



BLUERESILIENCE (MLIMI WANSOMBA) VALIDATION WORKSHOP REPORT



Workshop Report

Netsayi Noris Mudege, Keagan Kakwasha, Jonah Kondowe, Henry Kanyembo, Gayathri K, Praveen N.V. Kuruganti, November 2025

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Accelerating Impacts of CGIAR Climate Research for Africa (AICCRA) is a project that helps deliver a climate-smart African future driven by science and innovation in agriculture. It is led by the Alliance of Bioversity International and CIAT and supported by a grant from the International Development Association (IDA) of the World Bank. Explore our work at aicra.cgiar.org

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ABOUT AICCRA



AICCRA
Accelerating Impacts of CGIAR
Climate Research for Africa



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ABSTRACT

This is a workshop report from a workshop hosted by WorldFish in Kafue, Zambia, to validate the BlueResilience Platform, an aquaculture advisory tool that sends climate alerts and advisories to tilapia fish farmers. A total of 17 participants (6 women, 8 youth) participated in the training. At the end of the workshop, participants who included lead farmers, SMEs, and platform managers, had been trained on how the platform works, had validated and revised climate advisory messages in English and two local languages (Chichewa and iciBemba).

The Blue Resilience Platform which is currently hosted by WorldFish has reached 19,866 farmers (7,683 women) and of these, 8,813 farmers (2,884 women) are using generated climate advisories to respond to climate risk (see Table 1 on the details of the advisories). WorldFish has trained two Data Managers from the Ministry of Fisheries and Livestock Head Office to take over the administration of the Blue Resilience platform to ensure that more farmers can access the platform and enhance sustainability.

Keywords

Blue resilience, aquaculture, climate advisories, Zambia

ABOUT THE AUTHORS

Netsayi Noris Mudege is a Senior Scientist at WorldFish, based in Zambia. Her work focuses on inclusive business models, climate change, and scaling innovations to build resilient and equitable aquatic food systems in Africa and beyond. She led the AICCRA Zambia Aquaculture Bundle.

Keagan Kakwasha is the Monitoring, Evaluation & Learning Specialist at WorldFish Zambia, leading the MEL system for the aquatic food systems in Zambia & Southern Africa and supporting scaling of Inclusive Business Models. Keagan also leads MEL systems for the AICCRA Zambia project.

Jonah Kondowe is a Senior Research Analyst at WorldFish Zambia. He supports scaling of climate information services.



Henry Kanyembo is a Research Assistant at WorldFish Zambia, and supports scaling of climate information services, including GIS mapping.

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ACRONYMS

CSA	Climate-smart agriculture
CIS	Climate Information Services
DOF	Department of Fisheries
ZMD	Zambia Metrological Department



INTRODUCTION

Zambia's food system is threatened by climate change impacts. Characterised by weather extremes such as drought, floods, and excess heat, climate change has affected the livelihoods of many smallholder farmers. The climate crisis has made it urgent for farmers and other actors in the agricultural value chain to invest in tools that enable them to anticipate climate-related events and take appropriate mitigation measures.

To address challenges related to climate change impacts on agriculture and aquaculture, AICCRA Zambia is working with agribusiness-based private-sector players, especially Small to Medium-scale Enterprises (SMEs), to scale out climate-smart technical innovations and approaches. Under the AICCRA Bundle in integrated agriculture and aquaculture, WorldFish is scaling an aquaculture advisory tool aptly named BlueResilience/Ulimi waNsomba to provide climate advisories and alerts to smallholder tilapia farmers. This report focuses on a validation exercise and training on the BlueResilience/Ulimi waNsomba platform. The training targeted 17 participants (6 women, 8 youth), including government representatives from the Department of Fisheries, fish farmers, NGOs, fish farmers' associations, and WorldFish staff.

Workshop objectives and outcomes

The overall workshop objective was to validate, refine, and prepare climate advisory messages for the Blue Resilience Platform (Aquaculture Advisory Tool), ensuring their effectiveness, clarity, and readiness for dissemination to end-users. Specifically, day 1 focused on message validation and the refinement of advisories in English and in Bemba and Chichewa, two of the local languages spoken in Zambia. Day 2 focused on capacity building for platform managers, including data managers from the Ministry of Fisheries and Livestock (Department of Fisheries) and WorldFish technical staff. The platform managers were trained on how to operate and manage the platform to enhance its sustainability. The following were the expected workshop outcomes:

- A shared understanding of the BlueResilience/Ulimi waNsomba Platform, including its functions, data sources, and expected updates.



- Validated and refined climate advisory messages in English, iciBemba, and Chichewa that are accurate, clear, and accessible to target user groups.
- Enhanced capacity to use and manage the BlueResilience/Ulimi waNsomba Platform for message delivery and data management.
- Agreement on next steps on message dissemination to registered users, ensuring coordinated implementation among partners.
- Agreement on who will host the platform

OPENING REMARKS AND INTRODUCING THE AICCRA PROJECT

Dr Netsayi Mudege welcomed the workshop participants and summarized the workshop objectives. She presented the lessons learnt from implementing AICCRA Phase II. She explained that the aquaculture component was implemented in Northern and Luapula provinces, which host a significant proportion of smallholder fish farmers in Zambia. Smallholder farmers in these provinces face climate shocks, poverty, and limited access to climate information and quality seed and feed. Working with the private sector, particularly SMEs, the project provided training, extension support, market development, and climate services for smallholder farmers. The project strengthened the skills and knowledge of SMEs and extension officers in climate-smart aquaculture, the use of climate information systems for aquaculture, and gender equity, and improved their ability to train smallholders in climate-smart and improved aquaculture management practices.

The trained aquaculture-based SMEs played a critical role in scaling knowledge, extension services, and climate information systems. After they were trained, SMEs trained farmers, set up demonstration ponds, disseminated climate messages through field training, roadshows, radio programs, and dramas, SMEs showcased innovations at agricultural shows, and invested their own resources in developing learning sites. WorldFish provided technical support, including leading the co-development of climate-smart manuals in English and local languages for use by SMEs and local farmers.

She also presented on the financial literacy training and mentorship that WorldFish provided to SMEs, enabling them to use their newly acquired skills to



secure significant financing. She talked about the multi-stakeholder platform dialogues that the project hosted. These dialogues engaged farmers, financial institutions, feed companies, and government agencies to address climate-smart aquaculture, market systems, and financial inclusion.

Regarding climate information systems for aquaculture, she introduced the Blue Resilience tool, explaining that it provides essential climate advisories to tilapia farmers, enabling them to make climate-smart, informed decisions on their farms. She shared the project's key results, including increased resilient broodstock, expanded fingerling supply, market linkages of smallholder fish farmers to fish off-takers, the establishment of integrated farming models, the adoption of green technologies, and employment creation for women and youth. SMEs have created local demand for fish, supported producer groups, and helped stabilize supply chains.

Lastly, Dr. Mudege highlighted areas that need further development, such as strengthening partnerships with financial institutions and insurers to enhance access to credit and climate risk coverage, thereby further developing and stabilizing the aquaculture value chain. She concluded by outlining next steps, which include finalizing platform hosting arrangements, scaling dissemination of validated advisory messages, and deepening collaborations for resilient seed, feed, and financial services.

Plenary Discussions

This section presents the key questions asked and responses after the welcome address and presentation on the AICCRA project. Keagan Kakwasha facilitated this session.

Question 1. How has the market responded to aquaculture products?

WorldFish responded that the market has responded positively. The project successfully built strong, sustainable partnerships with SMEs in the two provinces where it was implemented. The SMES are producing and supplying quality fingerlings to farmers. They have also brought quality feeds closer to farmers and provided offtake and extension services to fish farmers. SMEs create a market for their products by providing extension services to farmers. Through the fish offtakers, farmers also have markets. For example, in Luwingu, an SME known



as Triple Blessings operates a supermarket, buys farmed fish from farmers, and provides farmers with fish feeds and extension services. Through technical and other support received from the project, Triple Blessings has established a cold room for fish storage and acquired a motorbike used to collect fish from farmers in surrounding communities. Triple Blessings also trains farmers he works with on market requirements, including preferred fish sizes and quality standards. Triple Blessings has become well recognised by fish farmers and consumers. Even the government, through the Citizens Economic Empowerment Commission (CEEC), recognizes him as a reliable local fish buyer. He has now expanded his business to offtake other products such as chickens, goats, and beef.

Question 2. We have seen several programs where, once the project ends, the results also end; there is nothing to see on the ground, only the ponds remain. What sustainability measures have you put in place to ensure that the Blue Resilience platform remains functional beyond the project's life?

WorldFish and the AICCRA project initiated collaboration with the Zambian Government during the development of the BlueResilience Platform to ensure long-term sustainability. Two data managers from the Department of Fisheries in the Ministry of Fisheries and Livestock have been trained to manage the platform, with the goal of eventually handing it over to the government to ensure farmers can continue accessing it beyond the project's life.

Question 3. What about the sustainability of the SMEs? What has been done about that?

The project has prioritized empowering local SMEs in the aquatic foods value chain as a key sustainability strategy. Local SMEs are based in their local communities, where they have been operating for years. In many instances, they are family-managed and therefore committed to improving their business models to continue operating. These SMEs provide aquaculture markets for smallholder farmers. For example, some sell aquaculture inputs, such as fingerlings and feed, while others buy fish from farmers for resale in their stores. SMES are motivated to continue providing these services beyond the project's lifespan as long as the business remains profitable. Evidence from previous pilots in Zambia and Malawi has shown that this is a sustainable model. Some of the supported SMEs have continued to expand their aquaculture businesses without project funding or



support. For example, one SME that started as a fish offtaker has now expanded his business to include integrated fish and livestock farming to meet the ever-expanding demand for fish and meat products in the district. Similarly, another SME, has invested in a climate-smart recirculating hatchery to meet the growing demand for quality fingerlings. These developments demonstrate that the project's sustainability mechanisms are yielding positive outcomes.

Question 4. Regarding the BlueResilience Climate Advisory, you have only implemented it in Northern and Luapula provinces of Zambia. Are there plans to roll it out to other provinces? Also, how were the two provinces selected?

The two provinces were selected because they are home to more than 50% of Zambia's smallholder fish farmers. So we felt that we would have the most impact there. We are interested in scaling up this work to other parts of Zambia; however, we need resources to do so. Where there are resources, we scale our technologies and innovations. Currently, we are collecting pond water temperature data from reference ponds in the Copperbelt and Central provinces to scale up the implementation of the Blue Resilience/Ulimi waNsomba AICCRA to these locations. The platform has also been scaled to Malawi by the PROFISHBLUE project implemented by WorldFish funded by SADC. WorldFish is working closely with partners, including governments and other regional bodies, to continue to raise funds to further improve the platform and scale it out to more users.

Additional comments

One of the farmers participating in the workshop praised the team's work, especially in developing BlueResilience, saying such verified platforms would help reduce misinformation.

"As farmers, we are usually vulnerable to wrong information. There are a lot of people who come online to offer various trainings on aquaculture management practices, and they provide wrong information; you will only learn later, after you have already stocked the fish and lost all of them. I have experienced this. Platforms like the BlueResilience, which are widely verified, could help us improve our farming practices. It needs to be accessible to all the farmers in the country", said Mr Sakuwaha, a smallholder fish farmer from Shimabala farming block.



Following this concern about misinformation, other participants advised that farmers should actively participate in farmer associations such as the Aquaculture Development Association (ADAZ), the Africa Women’s Fish Processors and Traders Network (AWFISHNET) - Zambia Chapter, and other associations to enhance knowledge and information sharing. When a farmer joins an association, it will be easy for them to be directed to authentic service providers and reduce misinformation. They need to join registered associations recognized by the government because they provide reliable information. A representative from the Department of Fisheries (DoF) added that the Department of Fisheries provides reliable and authentic information for free. However, she noted that farmers do not consult them until they are already facing a calamity, resulting in huge losses. The DOF representative called on the farmers to feel free to visit DOF for consultation at no cost:

"Please feel free to come to the Department of Fisheries. We have advisory units so that you also get a license, and it is very affordable, and we will attach you to a district fisheries officer, depending on where you are, and we can also advise whom to consult," said Ms Annie Mwiimbu.

The session ended with farmers encouraging the Department of Fisheries to market themselves and their services more broadly, including on radio and other channels where fish farmers get information.



INTRODUCTION TO THE BLUE RESILIENCE

Presentation Overview

Jonah Kondowe and Henry Kanyembo introduced the Blue Resilience Platform, a digital Climate Information System (CIS) developed to provide climate information to fish farmers to support adaptation and mitigation of climate change impacts within aquaculture systems. They gave a background to how the platform was developed and also explained that the platform is meant to help fish farmers and extension officers make more informed and climate-smart decisions to safeguard production especially with rising variability in temperature rainfall and other changing climate conditions that affect fish farming.

The Blue Resilience Platform which is currently hosted by WorldFish has reached 19,866 farmers (7,683 women) and of these, 8,813 farmers (2,884 women) are using generated climate advisories to respond to climate risks. WorldFish has trained two Data Managers from the Ministry of Fisheries and Livestock Head Office to take over the administration of the Blue Resilience platform to ensure that more farmers across the country can access the platform and enhance sustainability.

How the platform was developed

AICCRA hosted climate dialogues during which fish farmers expressed the need for climate information services that address the needs of farmers. The BlueResilience climate advisory tool was developed as a response to this expressed need.

Jonah Kondowe shared that to develop the BlueResilience Platform, WorldFish collected and analysed historical climate data and field data from reference ponds to design the decision frameworks for key fish species. Additionally, WorldFish hosted several consultative meetings with fish farmers, extension officers, researchers, and meteorological experts in Zambia and Malawi to ensure that the platform reflects local experiences and indigenous knowledge practices farmers already use to predict the weather.

Findings from climate analysis in Zambia shows gradual increase in minimum daily temperatures and more variation between highs and lows over time leading to higher evaporation rates and low oxygen levels in ponds. Rainfall is still concentrated between November and April with floods mostly in December and January, hence the need for timely advisories and stronger local early warning communication systems.

How the platform works

The presenters described the Blue Resilience Platform as modular and scalable digital system built in Python. While currently it is focusing on Tilapia fish species and using an air and water temperature algorithm, it can be expanded to new fish species and integrate additional parameters like rainfall dissolved oxygen and pH



levels. It has a deep learning model for hourly predictions, web-based interface for extension officers and an SMS function that deliver advisories directly to registered farmers through a USSD protocol. The architecture is flexible and allows regional customization, and real time monitoring of risks when weather conditions change suddenly

The Climate Information System use machine learning to forecast pond conditions and send out species specific advisories to farmers. On the two key pilot species, the Green Headed Bream perform best between 22°C to 29°C while the Three-Spotted Tilapia does well between 25°C and 30°C though in some areas the levels can fluctuate depending on weather and pond location. When thresholds are passed, the system triggers alerts recommending actions like feed adjustment, pond flushing, or even just closer monitoring of fish behaviour, depending on how serious the risk level is at that time. Some users have already tested the alerts and said the alerts help them to plan better, but still need to be validated with real pond data.

Kanyembo explained that the platform works as a digital climate risk management tool, providing actionable advisories and practical mitigation guidance. Registered farmers under designated camps and Extension Planning Areas receive SMS alerts on pond temperature risk levels and management actions to reduce losses from extreme conditions. Having this timely information, helps farmers to react faster to changes in water temperature and temperature extremes to protect fish before it's too late.

To wrap up, the presenters noted that the BlueResilience platform is a major step toward building climate-resilient aquaculture in Zambia and across the SADC region. They mentioned that WorldFish seeks to finalise hosting agreements for the platform with the Department of Fisheries and also seeks to strengthen collaboration with the meteorological department. They mentioned that WorldFish and its partners will keep improving the platform as it new data becomes available and also based on user feedback. Continued improvement based on user feedback will make the platform practical and relevant for farmers.

In summary, this presentation introduced participants to the Blue Resilience Platform. It highlighted what the platform is all about, including what it does and how it was developed. Blue Resilience platform generates and communicates climate information and advisory services to enable climate-informed decision-making at different scales from smallholder fish farmers to policy makers (<https://blueresilience.app/login>).

Plenary Discussions on the Technical Presentation

This section presents the key questions asked and responses after the presentation introducing the BlueResilience Platform. Keagan Kakwasha facilitated the plenary session

Question 1. Is this platform designed only for farmers producing Tilapia? What about those producing catfish

The Blue Resilience Platform was initially developed to provide advisories specifically for farmers culturing tilapia species, since the temperature tolerance ranges are almost similar, though with minor differences. However, WorldFish has plans to expand its use to other cultured species. However, we will need to collect additional data and develop a different air-water algorithm for catfish.



*Question 2. Why did you choose *O. macrochir* and *O. andersonii*? Why didn't you include *Oreochromis niloticus*?*

Since we were working in Northern Zambia, where culturing *Oreochromis niloticus* is prohibited, we focused on *O. macrochir* and *O. andersonii*. However, the advisories also apply to other tilapia species, as they tolerate similar temperature ranges.

Question 3. What space and time are needed to update the platform to ensure it provides reliable predictions, given that the weather keeps changing?

In the short term, the platform operates a machine learning model. Platform managers do not need to monitor the temperature daily. The platform will monitor it automatically and send messages as scheduled. However, in case of extreme emergency, the platform has been programmed to send alerts outside of scheduled times.

In the long-term operation of the platform and the model, we based the model on collected historical climate data collected over 30 30-year period. The Intergovernmental Panel on Climate Change (IPCC) report 2023 indicates that it takes 10 to 20 years for the climate to change. From this perspective, the BlueResilience platform's decision framework will remain valid for several years. In addition, temperature alerts use real-time data depending on the weather conditions in the specific community.

Question 4. I worry about the reliability of the Zambia Meteorological Data. Are there other possible alternatives to get this information?

R: The Zambia Meteorological Department has, over the years, improved its data collection methods, making the data more reliable. However, to improve the robustness of our model, we also integrate data from global meteorological and satellite-based service providers. This complements the national meteorological data from ZMD. Having these two data sources also enhances the reliability of weather and climate forecasts provided through the platform.

Question 5. How are farmers going to know about and access the BlueResilience Platform?

WorldFish has a database of 19,866 farmers (7,683 women) who have registered to start receiving climate information services for fish farming. These farmers are in Northern and Luapula provinces. WorldFish is also working with the Department of Fisheries at various levels, from district offices to the DoF headquarters in Chilanga, to disseminate information about the platform. Depending on availability, we also plan to disseminate information about the platform through local community radio stations and social media. We will also work with SMEs engaged in aquaculture businesses to spread the information. The platform will also allow farmers to self-register.

A representative from the DoF added that extension officers and radio sensitization campaigns will increase awareness and adoption of the platform. She added that the process could also be implemented through collaboration with the Department, allowing farmers to register through district offices if they are unable to do so on the platform due to technical challenges.

Question 6. How will the platform be maintained to ensure consistency over time?



The platform's architecture is cloud-based, which ensures reliable performance and continuity. Unlike systems hosted on physical servers that may be disrupted by equipment failure, damage, or theft, the cloud environment provides secure, scalable, and resilient infrastructure. This enables the platform to run smoothly and be maintained consistently over time, with reduced risk of service interruptions.

Question 7. In the event of flooding, does the platform provide guidance on how farmers should respond and where they can obtain the necessary equipment?

Currently, the platform is focusing on air and water temperature. There are plans, depending on funding availability, to include other climate risks such as flooding, but this is not the case at the moment. Additionally, the platform provides only advisory information, such as actions a farmer can take based on predicted pond water temperature, but it does not include details on where to access equipment. He added that farmers are encouraged to consult their extension officers for further guidance on obtaining the required tools and materials.

VALIDATION AND REFINEMENT OF CLIMATE ADVISORIES

The purpose of this session was to assess the clarity, accuracy, relevance, and accessibility of climate advisory messages sent via SMS, ensuring they are understandable, trusted, and useful for communities with varying literacy levels. Using guiding questions (see Appendix 3) workshop participants working in groups, reviewed and validated the climate advisories generated by the Blue Resilience platform.

Participants' Experiences in Accessing and Using Digital Climate

Advisories

During the discussion, participants were asked to share their experiences in accessing and using digital climate advisories. Almost all participants indicated that they had received digital climate advisories from the Zambia Meteorological Department (ZMD), which provided early warnings on various climate-related events such as droughts, cyclones, floods, expected rainfall, and appropriate planting time.

Do farmers trust climate advisories received on the phone?

Farmers stated that they trusted the messages since the messages are helpful in managing climate risks. However, some participants suggested that the poor reading culture in Zambia, may dilute the impact of these messages. A farmer explained that although she sometimes received messages she did not read them in full. In some instances, she said she only reads the first line, missing important details such as the recommended mitigation measures or the full context of the message.

The reading culture in this country is very bad. Even myself, sometimes I receive messages from ZMD but I only read the first line and stop there. I have noticed that messages from the Blue Resilience Platform also guide farmers on what actions to take depending on the temperature. If the farmer does not read the



entire message, it won't help them respond effectively to climate risks affecting their farm," Annie shared her experience with digital climate advisories.

Farmers further emphasized the importance of awareness campaigns to help them recognize and trust messages from verified sources. They explained that if farmers are unaware of the purpose or origin of the messages, they are less likely to trust or act on the information provided.

Mr. Sakuwaha added, *"There are a lot of scammers these days sending different messages. Although climate advisory messages are easier to trust since no payment is involved, it is still important to sensitize farmers so that they know the source of the message. It's easier to trust the content if you know who sent it."*

To be trusted, farmers noted that the early warning messages need to be accurate and reliable. Another farmer shared his experience with advisories that did not help him but instead caused him to lose her investment:

"Last year, I received an early warning message advising me to replant after a short drought during the farming season. I followed the instructions, but unfortunately, the maize I replanted still dried up because there was no more rain. So, in the end, the advisory did not help me." Said Esther, a fish farmer, sharing with the group about her experience with climate advisories.

Participants also highlighted the importance of connecting the messages to a trusted institutional source, such as the Department of Fisheries (DoF). While participants said they trust climate advisories, they suggested that, for BlueResilience, there was a need for prior sensitization meetings or community briefings to strengthen credibility and encourage the adoption of the suggested practices. They mentioned that because of many scams, if messages are delivered without prior sensitization farmers may fear acting on them since they will not understand the reasoning behind the instructions.

Validating and refining climate advisory messages

Participants were provided the climate advisories that will be disseminated by the BlueResilience platform so that they could review and validate them using the following criteria: 1) is the message clear, 2) is the message useful and relevant, 3) is the message culturally relevant, 4) is the message correct and, 5) is the message correctly translated in the local language.

Participants generally found the messages useful and relevant for their fish farming activities, especially during the colder season when fish behavior and feeding patterns change. However, they suggested that several messages needed to be revised using precise language and guidance, particularly regarding temperature thresholds and feeding quantities. Phrases such as "when the weather has warmed" or "reduce feeding drastically" were seen as too vague. Farmers expressed that understanding exactly what temperature level indicates "warm" or "cold," and how much feed to provide at those times, would enable more confident action. Clear numeric guidance (e.g., water warmed to 25°C, feed half of the usual amount) would therefore be more practical.

In messages 5 and 6, participants stated that the phrase 'beat the water' could cause confusion. Farmers could misinterpret the messages, resulting in disturbing already stressed fish. They recommended replacing this with a clearer



explanation, such as gently stir or move the water to increase oxygen. They also suggested that it is better to explain the purpose behind the action to prevent harmful practices because of misunderstanding the message.

The translated Bemba versions were appreciated. However, participants suggested that key terms must be used consistently. For example, they preferred using the words ***ukutalala*** to describe cold-water conditions and ***ukukaba*** to describe warm-water conditions. They also noted that the Bemba message should not contain phrases or instructions that do not appear in the English version, to avoid changing the meaning. They stated that ensuring that the English and Bemba texts match in both instruction and intent will support clearer understanding.



Table 1: Original and Revised validated climate advisories in English

Original Message ID	Validated Message (climate advisory)	Summary of Participant Understanding	Words/Phrases Not Understood	Suggestions for Simpler Wording
<p>message1: Emergency!!! The pond temperature is expected to be 15°C or below in the next 24 hours. Stop feeding immediately. Resume feeding when temperatures are stable at 18-20°C. Do not handle, net, or disturb fish until the weather has warmed. Watch for symptoms of parasites or disease. Contact your DoF if there are diseases or parasites.</p>	<p>message1: Emergency!!! Tilapia Farmers, the pond temperature is expected to drop to 15°C or below within the next 24 hours. Stop feeding the fish immediately. Do not handle or disturb the fish until the weather warms up and the water temperature is stable at 18-20°C. Only light handling for sampling is permitted if absolutely necessary. Resume feeding only when temperatures remain stable at 18-20°C. Monitor your fish closely for any signs of parasites or disease. Contact the Department of Fisheries in your area if you observe any signs of illness or parasites.</p>	<p>It is clear, it is an emergence action; it says the temperature is expected to decrease. It also explains not to disturb the fish and watch out for any diseases.</p>	<p>Do not net the fish: would you know if I say do not net the fish? I don't know about DOF if many people know DOF.</p>	<p>Contact the department of fisheries in your area Specify on the degrees required</p>
<p>message2 High Risk!!! The pond temperature is expected to be between 16 and 18°C over the next 24 hours. Drastically reduce feeding. Feed during the warmest time of the day. Stop feeding entirely if the fish show no interest. Monitor closely for diseases and parasites. Contact your DoF if there are diseases or</p>	<p>message2 High Risk!!! Tilapia Farmers, the pond temperature is expected to be between 16 and 18°C over the next 24 hours. Drastically reduce feeding. Stop feeding entirely if the fish show no interest. Monitor closely for diseases and parasites. Feed during the warmest time of the day. Contact the Department of Fisheries if there are signs of diseases or parasites. Do not handle, transport, or disturb fish</p>		<p>Warmest part of the day also needs to be specified Note clear what is meant by reduce feeding drastically</p>	<p>Specify on the degrees required Specify on the rations of feeding frequency as shown in msg 3</p>



parasites. Do not handle, net, transport, or disturb fish until the weather has warmed.	until the weather has warmed and the water temperature is stable at 18–20°C. Only light handling for sampling is permitted if absolutely necessary.			
message3 Intermediate Risk!!! The pond temperature is expected to be between 18 and 23°C over the next 24 hours. Reduce your feed and split the daily ration into 2 feedings. Continue close observation of fish behavior to guide feeding. Do not handle, net, transport, or disturb fish until the weather has warmed.	message3 Intermediate Risk!!! Tilapia farmers, the pond temperature is expected to be between 18 and 23°C over the next 24 hours. Reduce your feed and split the daily ration into 2 feedings. Continue close observation of fish behavior to guide feeding. Do not handle, transport, or disturb fish until the weather has warmed and water temperature is stable at 24°C and above. Only light handling for sampling is permitted within the 18–23°C range. Resume feeding when temperatures are stable at between 24°C and 32°C.	The same 18 degrees makes the messages unclear from the previous message. The message content generally clear.	Why not start at 19 How were you coming up with the levels of risk; 18 is appearing everywhere? Not clear what is meant by that (weather has warmed)	Specify on the degrees required
Message 4: Normal!!! The pond temperature is expected to be between 24°C and 32°C. No immediate action required. Continue with your best management practices.	Message 4: Normal!!! Tilapia farmers, the pond temperature is expected to be between 24°C and 32°C. No immediate action required. Continue with your best management practices.	Clear	Clear	Clear
Message 5 HIGH RISK!!!. Water temperature is reaching 33°C!!!	Message 5 HIGH RISK!!!. Tilapia farmers, water temperature is reaching 33°C!!! over the	Reduce the feeding rate until corrected; what is corrected?	Stop fertilizing, do you continue fertilizing the pond	Removing the word has certain actions might stress the fish further



<p>over the next 24 hours. Monitor water temperature and fish behavior every 4 hours during the day and once during the night. Add fresh water to the pond. Reduce feeding rate until corrected, and stop fertilizing your pond. If fish are gasping for air at the surface, use an aerator or beat or stir the water to increase oxygen levels and increase water exchange (more water going in and out of the pond). Watch for symptoms of parasites or disease and contact DoF if needed.</p>	<p>next 24 hours. Monitor water temperature and fish behavior every 4 hours during the day and once during the night. Add fresh water to the pond. Reduce feeding rate, and stop fertilizing your pond until the pond water temperature reduces and stabilizes between 24°C and 32°C. If fish are gasping for air at the surface, use an aerator or beat or stir the water to increase oxygen levels and increase water exchange (more water going in and out of the pond). Watch for signs of parasites or disease and contact Department of Fisheries in your area if needed.</p>	<p>Beating the water is subject to various interpretations</p>	<p>even when the fish has already grown? Fertilizing the pond applies to primary production where the farmer does not use commercial feed.</p>	<p>Reduce feeding until temperature normalizes [are we assuming the farmer knows normal temperature]</p> <p>The first message is more clearer because it gives temperature is risk and normal. Same to apply to other messages.</p>
<p>Message 6 Emergency!!! The pond water temperature is predicted to reach 35°C over the next 24 hours. Monitor water temperature and fish behavior every 4 hours during the day and once during the night. Add fresh water to the pond. Stop fertilizing your pond. Stop feeding and resume with small quantities when the temperature reaches 33 °C, and feed normally at 32°C. If fish are gasping for air at the surface, use an aerator or beat or stir the water and increase water exchange (more water going in</p>	<p>Message 6 Emergency!!! Tilapia farmers, the pond water temperature is predicted to rise to 35°C over the next 24 hours. Monitor water temperature and fish behavior every 4 hours during the day and once during the night. Add fresh water to the pond. Stop fertilizing your pond and stop feeding. Resume feeding with small quantities when the temperature goes down and stabilizes at 33 °C, and resume normal feeding at 32°C. If fish are gasping for air at the surface, use an aerator or beat or stir the water and increase water exchange to increase oxygen levels. Watch for signs of parasites or disease and contact the</p>	<p>It is clear; it has clarified on normal temperature.</p>	<p>Add fresh water to the pond This part is similar to and increase water exchange (more water going in and out of the pond)</p> <p>Clarify and state what that action is to achieve</p>	<p>Removing the word has certain actions might stress the fish further</p>



<p>and out of the pond) to increase oxygen levels. Watch for symptoms of parasites or disease and contact DoF if needed.</p>	<p>Department of Fisheries in your area if needed.</p>			
<p>Message 7 Emergency!!! The pond water temperature prediction is approaching 41°C over the next 24 hours. Immediate and aggressive interventions to lower the temperature and increase oxygen levels are needed. Monitor water temperature and fish behavior every 2 hours during the day and night. Increase water exchange (more water going in and out of the pond). Stop feeding. Resume feeding with small quantities when the temperature reaches 33 °C, and feed normally at 32°C. Prepare to harvest if the fish are gasping for air at the surface, swimming, lying on their side, or floating still on the surface but still moving regularly. Harvest them before they die.</p>	<p>Message 7 Emergency!!! Tilapia farmers, the pond water temperature prediction is approaching 41°C over the next 24 hours. Immediate and aggressive interventions to lower the temperature and increase oxygen levels are needed. Monitor water temperature and fish behavior every 2 hours during the day and night. Increase water exchange (more water going in and out of the pond). Stop feeding. Resume feeding with small quantities when the temperature reaches 33 °C, and feed normally at 32°C. Prepare to harvest if the fish are gasping for air at the surface, swimming, lying on their side, or floating still on the surface but still moving regularly. Harvest them before they die.</p>	<p>The message is clear. Reduce on the last message</p>	<p>Small rations is subject to various interpretations</p> <p>Harvest them before they die.</p> <p>Reduce volume of the text. (more water going in and out of the pond).</p>	<p>Specify on rations like msg 3</p>



Table 1: Translated and validated local language advisories in Chichewa and iciBemba.

Chichewa	Bemba
<p>UTHENGA 1: Cadzidzidzi!!! Alimi a nsomba za <i>tilapia</i>, tempuricha, kutentha kapena kuzizira kwa pondi kuyembekezedwa kutsikira pa 15 C kapena kuceperapo m’maola 24 akubwerawa. Lekani kupatsa cakudya kunsomba zanu pomwepo. Musacite ciliconse kapena kusokoneza nsomba kufikira pomwe nyengo yafunda ndipo tempuricha yakhala pabwino pakati pa 18 – 20C. Cofunika cabe ndi kugwira koyesa, kololedwa ndi kofunikira. Yambaninso kuzipatsa cakudya nsomba zanu pokhapo ngati tempuricha ili pabwino pakati pa18-20C. Yang’anirani nsomba zanu pa zizindikiro za tizilombo kapena matenda. Lumikizanani ndi anchito za Department ya Fisheries ngati kuli matenda kapena tizilombo.</p>	<p>message1: Emergency (ICINGALETA UBUSANSO)!!! Abalimi ba Tilapia! Ukutalala kwa menshi mu cishiba kwalaba pa cipendo ca 15°C nokwisa pashi pa insa 24. Lekeni ukulisha apopene. Tekwasha ukwikata isabi, ukupishamo isumbu, ukusesha isabi, nangu ukupumfyanya isabi mpaka umwela mumenshi wafika pa cipendo ca 18 ukufika ku 20°C. Kuti mwaikata isabi panono panono ukumonafye epolifikile pa cipendo ca 18 ukufika ku 20°C. Ambeni ukulisha nga ukukaba nokutalala kwaba bwino pa cipendo ca 18 ukufika ku 20°C. Lolekesheni ifilangililo fyamalwele notushishi utuleta amalwele kwi sabi. Ishibisheni aba kuciputulwa cilolekesha pesabi nga amalwele notushishi fyangwa</p>
<p>UTHENGA 2: Cowopsa Kwambiri!!! Alimi a nsomba za <i>tilapia</i>, tempuricha ya pondi yanu iyembekezedwa kukhala pakati pa 16 ndi 18C kuposa maola 24 akubwerawa. Cepetsani kwambiri cakudya cansomba. Lekani kuzipatsa cakudya ngati nsomba zanu zilibe cidwi cofuna kudya. Yang’anirani mosamala za matenda ndi tizilombo. Lumikizanani ndi achito za Department ya Fisheries ngati pali matenda kapena tizilombo. Zipatseni cakudya pa nthawi yofunda kwambiri patsiku Lumikizanani ndi anchito za Department ya Fisheries ngati pali zizindikiro za matenda ndi tizilombo. Musacite ciliconse, kuika neti, kuzipereka Kumalo ena, kapena kuzisokoneza kufikira pomwe nyengo yafunda ndipo tempuricha ili pabwino pakati pa</p>	<p>message2 High Risk (ICINGALETA UBUSANSO)!!! Abalimi ba Tilapia! Ukutalala kwa menshi mu cishiba kwalaba pakati ka 16°C na 18°C pa insa 24. Cefyeni ifyakulya saana. Lekeni ukulisha ngesabi talilelenga ukufwaya ukulya. Lolekesheni ifilangililo fyamalwele notushishi utwingaleta amalwele kwi sabi. Lisheni ilyo kukabile mushita yakasuba. Ishibisheni aba kuciputulwa ciloleksha pesabi nga amalwele notushishi fyangwa. Tekwasha ukwikata isabi, ukupishamo isumbu, ukusesha isabi, nangu ukupumfyanya isabi mpaka amenshi mucishiba yakaba ukufika ku cipendo ca 18 ukufika ku 20°C. Kuti mwaikata isabi panono panono ukumonafye epolifikile pa cipendo ca 18 ukufika ku 20°C.</p>



Chichewa	Bemba
18C-20C. Ndi kugwira koyesa cabe komwe ndi kololedwa ngati kungafunikire.	
<p>UTHENGA 3: Cowopsa Cadzidzidzi!!! Alimi a nsomba za <i>tilapia</i>, tempuricha ya pondi yanu iyembekezedwa kukhala pakati pa 18 ndi 23C m’maola 24 akubwerawa. Cepetsani cakudya cansomba ndipo gawani cakudya ca patsiku m’mbali ziwiri [2]. Pitirizani kuyang’anitsitsa pa khalidwe lansomba kuti zikulangizeni mmene zingadyere cakudya. Musacite ciliconse, kuika neti, kuzipereka kumalo ena, kapena kuzisokoneza kufikira pomwe nyengo yafunda ndipo tempuricha ya madzi ili pabwino pa 24C ndi kuposapo. Ndi kugwira koyesa cabe komwe ndi kololedwa ngati kungafunikire, komwe kuli pa mlingo wa pakati pa 18-23C. Yambaninso kuzipatsa cakudya pomwe tempuricha ili bwino pakati pa 24C ndi 32C.</p>	<p>message3 Intermediate Risk!!! Abalimi ba Tilapia! Ukutalala kwa menshi mu cishiba kwalaba pakati pa 18°C na 23°C pa insa 24. Cefyeni ifyakulya nokwakanyamo ifyakulya fyabushiku bumo pabili. Konkanyenipo ukulolekesha saana pamyangalile nemimonekele yesabi pakuti mwishibe ngakulisha nangula iyo. Tekwasha ukwikata isabi, ukupishamo isumbu, ukusesha isabi, nangu ukupumfyanya isabi mpaka umwela wakaba mumenshi ukufika ku cipendo ca 24oC nokuya pamulu. Kuti mwaikata isabi panono panono ukumonafye epolifikile pa cipendo ca 18 ukufika ku 20°C. Konkanyenipo ukulisha bwino bwino ukukaba ngakwafika pa cipendo ca 24oC.</p>
<p>UTHENGA 4: Zilibwino!!! Alimi a nsomba za <i>tilapia</i>, tempuricha ya pondi yanu iyembekezedwa kukhala pakati pa 24 ndi 32C. Palibe ciliconse cimene ciyenera kucitidwa. Pitirizani ndi kuyang’anira kwanu kwabwino.</p>	<p>Message 4: NORMAL (IFYO CIFWILE UKUBA)!!! Abalimi ba Tilapia! Ukukaba kwa menshi mu cishiba kwalaba pakati ka 24°C na 32°C. Twalilileni nemisungile yesabi iisuma</p>
<p>UTHENGA 5: COWOPSA KWAMBIRI!!! Alimi a nsomba <i>tilapia</i>, tempuricha idzafika 33C!!! m’kati mwa maola 24 akubwerawa. Yang’anirani kuti tempuricha ya madzi ndi nsomba zanu m’maola anai [4] m’kati mwa tsiku ndipo onani tempuricha kamodzi pa nthawi yausiku. Onjezani madzi atsopano mu pondi. Cepetsani kuzipatsa cakudya kufikira pomwe zinthu zakhala bwino, ndipo lekani kuika manyowa kapena fataleza mu pondi mwanukufikira pomwe pomwe tempuricha ya madzi</p>	<p>Message 5 HIGH RISK (ICINGALETA UBUSANSO)!!! Abalimi ba Tilapia! Ukukaba kwa menshi mucishiba ce sabi kulefika ku cipendo ca 33°C pa insa 24. Ceceteni ukukaba no kutalala kwa menshi elyo nemyangalile pamofye nemimonekele yesabi mucishiba ngapapita insa 4 mushita ya kasuba elyo nomuku umo mushita yabushiku. Lundenimo amenshi ayapya mucishiba. Cefyeni imiku yakulisha mpaka ukukaba kwa menshi mucishiba kwaba pa cipendo ca 24oC ukufika ku cipendo ca 32oC. Nga isabi lyatapa ukufwaya umwela uwakunse pamulu wa</p>



Chichewa	Bemba
<p>itabwerera ndi kukhala pakati pa 24C ni 32C. Ngati nsomba zikubvutika kupeza mpweya pamwamba, gwiritsani nchito makina a <i>eyareita</i> kapena gunduzani madzi amenewo kuti mpweya wa <i>okosijeni</i> uculuke ndi kuwonjeza kusintha kwa madzi [madzi ambiri olowa mu pondi]. Penyetsetsani pa zizindikiro za tizilombo ndi matenda ndi kulumikizana ndi anchito za Department ya Fisheries.</p>	<p>menshi ya mu cishiba, bomfyeni ama aerator (tumashini twakuputa umwela mumenshi), nangu ukuma pamulu wa chishiba nokukumbaula amenshi pakufushako umwela wa oxygen mumenshi elyo nokufusha amenshi ayaleingila no kufuma mucishiba. Lolekesheni ifilangililo fyamalwele notushishi utuleta amalwele kwi sabi. Ngacakuti fyasangwa, ishibisheni aba kuciputulwa icilolekesha pesabi.</p>
<p>UTHENGA 6: Cadzidzidzi!!! Alimi a nsomba za <i>tilapia</i>, kutentha kwa madzi mu pondi kwagandizidwa kufika pa 35C m’maola 24 akubwerawa. Yang’anirani kutentha kwa madzi ndi khalidwe lansomba m’maola anai [4] m’masana ndi kamodzi m’nthawi yausiku. Musaike manyowa kapena fataleza mu pondi mwanu. Lekezani kuzipatsa cakudya ndipo, yambaninso kuzipatsa cakudya pang’ono pang’ono pomwe tempuricha yafika 33C, pambuyo pake zipatseni cakudya moyenera pamene tempuricha ili pakati pa 33C kukafika 32C. Ngati nsomba zikubvutika kupuma ca pamwamba pa madzi, gwiritsani nchito makina a <i>eyareita</i> kapena gunduzani madz ndipo onjezerani kusintha kwa madzi [madzi oculuka othiridwa mu pondi] kuti awonjezere mpweya wa okosijeni. Penyetsetsani pa zizindikiro za tizilombo ndi matenda ndipo lumikizananani ndi anchito za Department ya Fisheries ngati kungafunike.</p>	<p>Message 6 EMERGENCY (CITENIPO CIMO MU KWANGUFYANYA)!!! Abalimi ba Tilapia! Ukukaba kwa menshi mucishiba ce sabi kwaelenganishiwa ukuba 35°C pa insa 24. Ceceteni ukukaba no kutalala kwa menshi elyo nemyangalile pamofye nemimonekele yesabi mucishiba ngapapita insa 4 mushita ya kasuba elyo nomuku umo mushita yabushiku. Lundenimo amenshi ayapya mucishiba. Leken i ukufundisha icishiba. Leken i ukulisha isabi. Ambeni ukulisha ifyakulya finono finono ngokutalala no kukaba kwamenshi kwafika pa cipendo ca 33°C elyo kabili ambeni ukulisha icipimo icilingile bwino bwino pa cipendo ca 32°C. Nga isabi lyatapa ukufwaya umwela uwakunse pamulu wa menshi ya mu cishiba, bofyeni ama aerator (tumashini twakuputa umwela mumenshi) nangu ukuma pamulu nokukumbaula amenshi elyo kabili nokufusha amenshi ayaleingila nokufuma mucishiba pakufushako umwela wa oxygen mu menshi. Lolekesheni ifilangililo fyamalwele notushishi utuleta amalwele kwi sabi. Ngacakuti fyasangwa, ishibisheni aba kuciputulwa icilolekesha pesabi.</p>
<p>UTHENGA 7: Cadzidzidzi!!! Alimi a nsomba za <i>tilapia</i>, tempuricha ya madzi inaganizidwa kukwera ndi kufika 41C m’maola 24 akubwerawa. Zinthu zamsanga ndi zofunikira ziyenera kucitika kuti zitsitse tempuricha ndi kuculukitrsa mpweya wofunikira wa</p>	<p>Message 7 EMERGENCY (CITENIPO CIMO MU KWANGUFYANYA)!!! Abalimi ba Tilapia! Ukukaba kwa menshi kwaelenganishiwa ukulafika kucipendo ca 41°C pa insa 24. Mukwangufyanya, lolekesheni panshila ishakupweshamo ukukaba kwa menshi mucishiba elyo nokufusha umwela wa</p>



Chichewa	Bemba
<p>okosijeni. Penyetsetsani pa tempuricha ya madzi ndi khalidwe lansomba m’maola awiri [2] m’masana ndi usiku. Onjezani kusintha kwa madzi [madzi ambiri olowa m’kati ndi kutuluka mu pondi]. Lekezani kuzipatsa cakudya. Yambiraninso kuzipatsa cakudya pang’ono pang’ono, pomwe tempuricha yafika 33C, ndipo zipatseni cakudya coculuka pomwe tempuricha ili pakati pa 33C ndipo kwenikweni pa 32C. Konzekerani kuti mukolole nsomba zomwe zikubvutika popuma pamwamba pamadzi, kuasamira, kugona ca m’mbali kapena kuyandama pamadzi, koma zikuyenda bwino. Zikololeni pomwe zisanafe.</p>	<p>oxygen (uupema isabi mumenshi). Ceceteni ukukaba no kutalala kwa menshi elyo nemyangalile pamofye nemimonekele yesabi mucishiba ngapapita insa shibili mushita ya kasuba elyo nomuku umo mushita yabushiku. Fusheni ukwingila nokufuma kwamenshi mucishiba. Lekeneni ukulisha isabi. Ambeni ukulisha ifyakulya finono finono ngokutalala no kukaba kwamenshi kwafika pa cipendo ca 33°C elyo kabili ambeni ukulisha icipimo icilingile bwino bwino pa cipendo ca 32°C. Pekanyeni ukusombola nga isabi lyatapa ukufwaya umwela uwakunse pamulu wa menshi ya mu cishiba, isabi ukusendamina mumbali ngalileowa, nangu ukwelela pamulu wa menshi mucishiba ukubikapo no kwendauka cila inshita. Moneni ukuti mwasombola isabi libe talilafwa.</p>



CAPACITY BUILDING FOR MANAGING THE BLUE RESILIENCE PLATFORM

Praveen Kuruganti and Gayathri K from Crea2Sol Private Limited joined the workshop virtually, to present the enhanced Blue Resilience platform, conduct training those managing the backend of the platform, and provide technical clarifications. This session showcased the finalized advisory system, reviewed enhancements, and worked with stakeholders to validate functionalities, and gather feedback for operational readiness. The training focused on user management, dashboard operations, AI advisory interactions, and SMS dissemination workflows.

Blue Resilience Platform Presentation

The training modules focused on the following:

1. System Navigation & User Roles
 - a. Overview of Super Admin, Country Admin, Province Admin, District Admin, Extension Officer, and Farmer access
 - b. Demonstration of role-based dashboards and features



2. Dashboard & Reporting



- a. Viewing risk summaries, advisories, farmer distribution, and species-based analytics
 - b. Downloading reports and graphs in PDF format
 - c. Interpreting 7-day emergency/high/normal risk trends
3. 3.3 Advisory Generation & AI Agent Usage
 - a. Using species/date selection to generate advisories
 - b. Demonstration of LLM-powered AI assistant for contextual querying
 - c. Chatbot interface for farmer and extension officer usage
 4. Threshold Configuration
 - a. Configuring species-specific risk thresholds
 - b. Adding/updating environmental parameters
 5. Messaging & Dissemination
 - a. Overview of bilingual SMS dissemination (English & Ibibemba)
 - b. Manual sending process (for November timeline)
 - c. Costing overview and required datasets
 6. Bulk Upload & Self-Registration
 - a. Uploading farmer/EO records via Excel template
 - b. Registration approval workflow for new users

The session achieved the following:

- Demonstrated the advisory and alert system (Blue Resilience V2.0)
- Trained WorldFish staff on dashboards, threshold management, and advisory workflows
- Reviewed user roles, access levels, and self-registration processes
- Validated enhancements and gather final feedback
- Discussed SMS dissemination strategy for 15,000 farmers

Plenary Discussions Following the Training

Question 1. Is it possible for a farmer to login and get advisories rather than waiting for the admin to register them and send advisories?

While Praveen and Gayathri said that it was technically possible to do so by creating a page at the front end of the platform, the Department of Fisheries Representative was concerned that farmers may not key in correct details especially on the species they farm, or their gps coordinates, risking generating incorrect advisories.

*Question 2. Who will manage the platform?*

It was agreed by workshop participants that, since the Department of Fisheries is responsible for fish farming, they should manage the platform. Extension officers at the district, provincial, and national levels could have different levels of access. The Data Analyst from the Ministry of Fisheries and Livestock advised that district-level extension officers could be tasked with registering farmers on the platform, since they know the farmers and are responsible for providing extension services. He noted that this would enhance quality and sustainability but also build a strong relationship between farmers and district-level extension officers, as the platform's digital climate advisories recommend that farmers consult the Department of Fisheries when they see signs of disease or anything they cannot manage. However, some farmers worried that if farmer registration is restricted to extension officers and self-registration is not an option, extension officers may clandestinely demand payment to register farmers, which would be detrimental to farmers.

Question 3. How are these advisories generated? Do you select the temperature, or the temperature generated when you select the camp?

The BlueResilience Platform uses real-time temperature data, so the administrator does not have to select the temperature. This helps to minimize human error. When registering, the farmer will provide their name, phone number, camp, district, and province. Depending on the person's location, the platform will automatically display the prevailing temperature for the selected camp and send advisories to registered farmers.

Question 4. Is farmer data secure if they register on the platform?

All data is encrypted end-to-end. Therefore, farmers' names and GPS locations are not exposed to the public.

During this session, WorldFish asked participants if there were other things that they wished to see on the BlueResilience dashboard. The following were the suggestions from workshop participants.

- The dashboard should display the number of farmers receiving climate advisories, by location at the camp or district level, together with the types of risks recorded per location. This would help extension officers see, at a glance, the spread of risks and the coverage of farmers receiving early warning climate advisories.
- Farmers should have a landing page to access advisories on demand rather than waiting for the climate advisory message.
- The initial message that is sent to farmers must include an option to select their preferred language and a link for those who want to unsubscribe from the service.
- Access to data on the platform should be restricted to the district or province levels for respective platform administrators.
- The dashboard must show graphs of fish farmers by gender and of fish cultivated by region, as it can also serve as a tool for managing fish farmer data.



- The developers need to create a template for extension officers to collect feedback from platform users or use USSD prompts to gather quick feedback.
- The platform must generate automated advisories because there are not enough staff in the DoF to monitor it daily.

Hosting

The workshop participants discussed cost-effective ways of hosting the platform. The most cost-effective way was for DoF to host the platform and use Smart Zambia as the gateway for bulk message distribution. Integrating the platform with DoF and Smart Zambia was a long-term and sustainable solution. However, in the short term, whilst hosting arrangements are being discussed and finalised, WorldFish will temporarily host the platform using a mobile network operator (such as Airtel) as the gateway to distribute messages. It was suggested that Airtel would be ideal in the short term, as Smart Zambia has significant bureaucracy and might take a long time to respond.

Naming the Platform

Participants engaged in a competition to give the platform a local name that would be easily identifiable to farmers. Several names were suggested, including Smart Nsomba, Smart Pond, Ulimi waNsomba. The final selected name is Ulimi waNsomba.

Way Forward with additional funding

In future, the team could:

Work with extension officers to verify actual fish farmers, and with additional funding, scale out to other provinces like Lusaka.

- Consider developing an app for Android or App Store.
- Consider WhatsApp-based advisory broadcasting.
- Work on advisory generation at the individual farmer's coordinates
- Allow automated advisory scheduling.
- Bulk upload for adding new locations
- Include farmer unsubscribe/re-subscribe capability.
- Collect farmer and EO feedback via in-app survey or WhatsApp.

Closing remarks

Dr Netsayi Noris Mudege gave the closing remarks. She thanks the workshop participants for attending the workshop and actively participating to share their ideas helping to shape the BlueResilience Platform. She assured the participants that their input would be considered, and the platform updated to ensure that it responded to local needs.



WORKSHOP REPORT

Accelerating Impacts of CGIAR Climate Research for Africa (AICCRA)



APPENDICES

Appendix 1. Workshop agenda

**Agenda: Blue Resilience (Ulimi Wansomba)
validation workshop
Venue: Tiffany’s Canyon, Kafue**

Arrival of participants: 4th November 2025

Day 1: 5 November 2025

Time	Activity	Facilitator
08:30-09:00	Registration	Taonga
09:00-09:10	Opening Prayer (Volunteer)	
09:10-09:15	Welcoming remarks	Netsayi
09:15-09:40	Introductions/Expectations	Henry
09:40-10:10	Meeting objectives & project overview for AICCRA phase two	Netsayi N Mudege
10:10-10:30	Introduction to the Blue Resilience Platform What it is What it does Updates we are expecting What data was collected and used in its development	Henry & Jonah
10:30-11:00	Health Break	Taonga & Hanzunga
11:00-11:20	Continued + Discussion Introduction to the Blue Resilience Platform What it is What it does Updates we are expecting What data was collected and used in its development	Henry and Jonah
11:20-11:40	Video viewing (Blue Resilience)	



11:40-12:40	Validating messages in English and correcting (Group work)	Group work
12:40-13:00	Plenary validated messages	Keagan
13:00-14:00	Lunch break	Taonga & Hanzunga
14:00:16:30	Validating messages in iciBemba and Nyanja	Group work
	End of Day 1	

Day 2: 6 November 2025

Time	Activity	Facilitator
08:30-09:00	Registration	Taonga
09:00-09:30	Recap of day one	Netsayi
09:30-10:30	Training on the Platform	Praveen and Team
10:30-11:00	Health Break	Taonga & Hanzunga
11:00-14:00	Training on the Platform	Praveen and Team
13:00-14:00	Lunch Break	Taonga & Hanzunga
14:00-15:00	Next Steps – Discussion and advice on the gateway	Netsayi, Keagan and Praveen
15:00-15:30	Health Break	
15:30-16:30	Prelaunch to 15,000 registered people and messages sent	Netsayi, Keagan and Praveen
	End of day 2	



Appendix 2. List of participants



**Insert event title: Blue Resilience (Ulimi Wansomba)
validation workshop
Insert venue: Tiffany’s Canyon
Attendance Sheet**

S/ no.	First Name	Last Name	Gender	Age Cat. 1=<25yr 2=25-29yr 3=30-35yr 4= 36 & above	Organization	Email
1	Annie	Mwiimbu	F	3	MFL- Department of Fisheries	Anniemwiimbu@gmail.com
2	Emmanuel	Lwambula	M	4	Lwanuel Enterprise	lwambulae@gmail.com
3	Tropher	Sakuwaha	M	3	EM Enterprise	trophersakuwaha@gmail.com
4	Lucy	Katuka	F	3	Lwanuel Enterprise	Katukalucy6@gmail.com
5	Shaka	Maila	M	3	MFL- Department of fisheries	MAILashaka@gmail.com
6	Mary	Tongo	F	4	Farmer	
7	Esther	Mumba	F	4	E,M Enterprise	Estamumba@yahoo.com
8	Vivian	Phiri	F	3	Malaza Farms	Viviannemalazaphiri@gmail.com
9	Lizzy	Muzungaire	F	4	Envirosaze consultancy	Lizzymuzungaire@gmail.com
10	Jonah	Kondowe	M	3	WorldFish	J.Kondowe@cgiar.org
11	Netsayi	Mudege	F	4	WorldFish	N.Mudege@cgiar.org
12	Hanzunga	Halumamba	M	4	WorldFish	H.Halumamba@cgiar.org
13	Taonga	Sinkala	M	3	WorldFish	T.Sinkala@cgiar.org
14	Chrispin	Chikani	M	4	WorldFish	C.Chikani@cgiar.org
15	Clarence	Phiri	M	4	Translator	ceekayphiri500@gmail.com
16	Henry	Kanyembo	M	3	WorldFish	H.Kanyembo@cgiar.org
17	Keagan	Kakwasha	M	4	WorldFish	K.Kakwasha@cgiar.org

**Appendix 3. Focus Group Discussion Guide****1. Purpose**

To assess the clarity, accuracy, relevance, and accessibility of climate advisory messages sent via SMS, ensuring they are understandable, trusted, and useful for communities with varying literacy levels.

2. Target Participants

- Small-scale farmers, fishers, or rural community members (as relevant)
- Mix of gender, age, and literacy levels
- 6–10 participants per group (preferably separated by gender or age where needed)

3. Facilitation Team

- 1 moderator/facilitator
- 1 note taker (and optional translator/interpreter)

4. Discussion Guide**A. Introduction and Warm-up**

1. Have you ever received SMS messages about weather, farming, or climate?
2. From which organisations or sources?
3. Do you usually read and trust such messages? Why or why not?

B. Review of Messages

(Moderator shares one SMS message at a time — printed or read aloud in the local language.)

For each message, ask:**1. Understanding and Clarity**

- What do you understand from this message?
- Can someone explain it in their own words?
- Are there any words or phrases that are hard to understand?



- How would you say this message in your local language or dialect?

2. Usefulness and Relevance

- Is this information useful for you?
- Would you take any action based on this message? Which one?
- Is there anything missing or confusing?
- Does it come at the right time (season, activity period, etc.)?

3. Trust and Validity

- Do you believe this information is correct? Why or why not?
- Who do you think sent this message?
- What would make you trust it more?

4. Language and Translation

- Is the message clear in this language?
- Are there words that could be said in a simpler way?
- How would you rewrite this message so that everyone in your community understands it?

5. Tone and Cultural Fit

- Does the message sound respectful and friendly?
- Are there words or phrases that could offend or confuse people?

C. Overall Feedback

1. Which messages were easiest to understand? Why?
2. Which ones were confusing or unclear?
3. What changes should we make to improve them?
4. How often would you like to receive such messages?
5. What's the best way to make sure everyone (especially women, youth, or those who can't read) gets the message?



6. Facilitator Notes

- Use **visual aids** (print the SMS in large font or draw symbols).
- Read each message **slowly, twice**, and allow participants to repeat or paraphrase.
- Encourage quieter members to speak by asking for their examples or local expressions.
- Note local synonyms or metaphors participants suggest (useful for translation refinement).
- Pay attention to **non-verbal signs** (confusion, laughter, hesitation).

7. When is the best time to send messages

Documentation Template for note-taker

Mes sag e ID	Summa ry of Particip ant Unders tanding	Words/ Phrases Not Underst ood	Sugge stions for Simpl er Wordi ng	Perce ived Usefu lness	Trust Level (High/Med ium/Low)	Notes on Trans lation
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 aiccra.cgiar.org

 info@cgiar.org

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