CGIAR SUSTAINABLE FARMING

National Stakeholder Engagement Workshop for Sustainable Agricultural Planning and Climate Adaptation in Malawi

Workshop Report

MALAWI, LILONGWE – December 2025

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Executive summary

The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) Malawi successfully convened a one-day stakeholder engagement workshop on 1st October 2025 at Lingadzi Inn in Lilongwe as part of its Sustainable Farming Program. The primary objective of the workshop was to bring together key actors and stakeholders across Malawi's agriculture sector to collaboratively develop a practical and actionable sustainable farming systems plan. This plan is intended to enhance climate adaptation and build resilience among vulnerable farming communities, promoting long-term sustainability in agricultural practices.

The workshop was attended by a total of 23 participants, comprising 19 males and 4 females, who represented a diverse range of institutional stakeholders actively involved in the program's implementation. Among the attendees were representatives from the Department of Agricultural Research Services (DARS), District-level Department of Agricultural Extension Services from Mzimba, Kasungu, Balaka, and Zomba, the Lilongwe University of Agriculture and Natural Resources (LUANAR), the Department of Land Resources and Conservation, the Department of Crop Development, ICRISAT as well as regional partners including the International Institute of Tropical Agriculture (IITA) Malawi and CIAT Malawi.

The technical sessions commenced with an introductory remark from the Country Representative of ICRISAT Malawi, setting the stage for the day's discussions. This was followed by a series of insightful presentations beginning with Dr. Martin Moyo, who provided a comprehensive overview and recap of the Sustainable Farming Science Program. Subsequent presentations were delivered by experts including Dr. Botoman from ICRISAT, Dr. Pungulani representing DARS, Dr. Phiri from LUANAR, and representatives from districts identified as key climate risk areas. The workshop concluded with plenary discussions, allowing participants to exchange ideas, raise concerns, and collectively contribute to refining the strategies for Sustainable Agricultural Planning and Climate Adaptation in Malawi.

> *"By bringing all stakeholders to the same table, Malawi can turn climate risks into opportunities, shaping agricultural systems that protect our soils, nourish our people, and safeguard the future for generations to come."*

1. Introduction

Malawi's agricultural sector is vital to the nation's economy, contributing over 30% of Gross Domestic Product (GDP) and nearly 90% of export earnings, while employing the majority of the population, mainly smallholder farmers. However, climate change poses significant risks to this sector through erratic rainfall, droughts, and more frequent extreme weather events, threatening food security, incomes, and productivity. Addressing these challenges requires sustainable agricultural planning and effective climate adaptation strategies.

In response, the Government of Malawi, alongside development partners, civil society, private sector, academia, research institutions, and local communities, has emphasized a multi-stakeholder approach to deal with the challenges. This approach ensures that diverse perspectives, local knowledge, and expertise inform planning and adaptation efforts, enhancing the effectiveness and sustainability of interventions to build climate resilience in agriculture.

To strengthen coordination and collective action, ICRISAT Malawi under the Sustainable Farming Science Program organized a Stakeholder Engagement Workshop on October 1, 2025, at Lingadzi Inn, Lilongwe. The workshop included representatives from four districts—Mzimba, Kasungu, Balaka, and Zomba with participation from Chief Agricultural Officers and Agricultural Extension Development Coordinators, as well as partners such as the Department of Agricultural Research Services (DARS), Lilongwe University of Agriculture and Natural Resources (LUANAR), Department of Land Resources and Conservation (DLRC), Department of Crop Development (DCD), International Institute of Tropical Agriculture (IITA), and CIAT Malawi.

The workshop provided a platform to share knowledge, discuss challenges, and identify opportunities for climate-smart agriculture and integrated landscape management. Key themes included promoting sustainable land use, soil health improvement, biodiversity conservation, and livelihood diversification as strategies to mitigate the impacts of climatic variability. The event fostered a shared vision and coordinated action plan to advance Malawi's climate adaptation and mitigation objectives, aligning with the broader sustainable development agenda of Malawi 2063.

This report summarizes the workshop's discussions, outcomes, and recommendations, emphasizing the importance of continued stakeholder engagement, capacity building, and resource mobilization. By promoting inclusive dialogue and collaboration, the workshop contributes to shaping a resilient and sustainable agricultural future for Malawi amid the growing challenges of climate change**.**

1.1 Overall objective of the Workshop

To bring together key stakeholders in Malawi's agricultural sector to collaboratively design an actionable, sustainable farming systems plan that strengthens climate adaptation and resilience.

1.2 Approach

The one-day stakeholder engagement and planning meeting was held in-person and brought together various partners to share their experiences, expertise and lessons on Sustainable Agricultural Planning and Climate Adaptation in Malawi. The event facilitated in-depth group discussions, enabling participants to collaboratively analyse challenges and opportunities. Through these interactive sessions, the stakeholders jointly developed comprehensive strategies aimed at enhancing climate adaptation and strengthening resilience in dryland areas. This collaborative approach ensured that the planned interventions are well-informed, practical, and tailored to address the specific needs and vulnerabilities of dryland communities.

Plate 1: *Cross section of participants following the presentation (left) and DARS scientist making a presentation (right)*

2. Opening ceremony session

Dr. Sam Njoroge, the ICRISAT Country Representative, warmly welcomed all the participants and expressed his sincere gratitude for their presence and willingness to engage in the event. He emphasized the critical role of strategic collaboration among all stakeholders as a cornerstone for achieving the project's objectives. Dr. Njoroge highlighted that such partnerships are essential to guarantee the efficient and successful implementation of the project, ensuring that the planned outputs are effectively delivered and contribute to the intended impact. He encouraged continued cooperation and collective commitment to drive the project and its impact forward.

Plate 2: *Group photos of the representative of the partner and the relevant stakeholders*

3. Workshop Framework

3.1 Background and Key issues about Stakeholder Engagement Workshop

Dr. Martin Moyo, the ICRISAT Country Representative for Zimbabwe and Climate Action Cluster Leader, commenced the workshop by providing a comprehensive overview of the Sustainable Farming Science Program. He began by revisiting the core mission of the program, which is

dedicated to enhancing agri-food systems through the efficient production of nutritious food, safeguarding the environment, and creating equitable employment opportunities. The program tackles numerous critical challenges faced by agriculture today, including the impacts of climate change, soil degradation, the prevalence of pests and diseases among others. Central to its approach is the active involvement of farmers and community members, achieved through co-creation principles that foster collaboration and empowerment.

Dr. Moyo emphasized that the program integrates a wide range of innovative solutions that span agronomy, plant health, farming systems, and socioeconomic innovations. These efforts receive strong support from CGIAR and various other partners, together aiming to catalyse a transformation within agricultural systems. He further highlighted the urgent challenges the program is designed to confront. These include the need to boost nutritious food production by 60% to adequately feed an expanding population, addressing the significant 20 to 40% decline in growth rates of agricultural productivity driven by climate change, and reducing agriculture's global contribution to greenhouse gas emissions by 15%. Beyond environmental and production challenges, Dr. Moyo also drew attention to social issues within the agricultural sector, such as persistent inequalities, an aging workforce, and the marginalization or exclusion of key groups including youth, women, and other disadvantaged populations.

Concluding his remarks, Dr. Moyo outlined the main objectives of the workshop. These goals were to bring together stakeholders from across Malawi's agricultural sector in a collaborative effort to design a practical and sustainable farming systems plan that enhances climate adaptation and resilience. The workshop also aimed at fostering a shared understanding of both the climate-related challenges and the promising opportunities specific to Malawi's dryland agricultural regions. Additionally, the meeting served as a platform to strengthen existing partnerships and improve communication networks among vital stakeholders in the districts of Balaka, Kasungu, Mzimba, and Zomba, thereby laying a foundation for sustained agricultural development in these areas.

3.2 Enhancing Resilience in Dryland Farming Systems: Addressing climate-related and soil health challenges in Malawi

Dr. Lester Botoman delivered an insightful presentation on enhancing resilience in Malawi's dryland farming systems, emphasizing their critical role in ensuring food security and supporting the livelihoods of many smallholder farmers who rely heavily on rainfed agriculture. He explained that dryland farming primarily depends on the natural variability of rainfall, with little to no supplementary irrigation, and involves cultivating drought-tolerant crop varieties while employing techniques to conserve soil moisture. Despite these adaptive strategies, dryland farming systems in Malawi face significant challenges such as soil erosion, depletion of essential nutrients, and heightened vulnerability to climate variability and recurrent drought events.

Dr. Botoman highlighted the severe climate-related challenges confronting these dryland areas. These include increasingly erratic rainfall patterns, frequent and prolonged droughts, extreme temperature fluctuations, and overall unpredictable weather conditions. Such climate stressors severely undermine crop productivity and destabilize farming communities. The resulting consequences are manifest in recurrent flooding episodes, widespread crop failures, food shortages, and escalating malnutrition rates among vulnerable populations. Additionally, he drew attention to persistent soil health issues common in Malawi's drylands, such as extensive erosion, nutrient losses, soil acidity, salinization, and deterioration of beneficial soil microbial life. Together, these factors significantly diminish the resilience and sustainability of agricultural systems.

Central to Dr. Botoman's message was the critical importance of maintaining and improving soil health as a foundation for building resilient farming systems. Healthy soils are essential because they underpin crop growth, regulate water availability, facilitate nutrient cycling, and ensure sustained productive capacity over time. To address these challenges, he presented a set of key soil health indicators tailored for Malawi's drylands and proposed a range of practical, sustainable strategies for improvement. These included conservation agriculture practices that minimize soil disturbance, integrated nutrient management that optimizes fertilizer and organic input use, the application of organic amendments such as compost and manure, mulching to

preserve soil moisture, constructing terraces to reduce erosion, and promoting beneficial soil microbes that enhance nutrient availability and plant health.

In conclusion, he acknowledged ongoing challenges, particularly barriers to widespread adoption of these sustainable practices, policy shortcomings, and institutional limitations. He emphasized the necessity of enhancing farmer knowledge-sharing platforms, fostering integrated multi-stakeholder approaches, and prioritizing continuous research and investment. Dr. Botoman called for concerted collaboration among government agencies, research institutions, development partners, and farmers themselves to effectively strengthen climate adaptation and resilience in Malawi's vulnerable dryland farming systems.

3.3 Collaborative Approach to Building Climate Resilience in Malawi's Agricultural Land Scape

Dr. Pungulani from the Department of Agricultural Research Services (DARS) delivered an insightful presentation focused on Collaborative Approaches to Building Climate Resilience within Malawi's Agricultural Landscape. He opened by detailing the profound impacts of climate change on agricultural development, emphasizing that many of the existing agricultural technologies are rapidly losing their effectiveness due to the emerging and complex challenges posed by changing climatic conditions. These challenges are both biotic, such as increasing pest and disease outbreaks exemplified by the persistent fall armyworm infestations, and abiotic, such as the ongoing degradation of land and soil quality. He noted that the scientific community faces mounting pressure as climate change challenges intensify at a pace that frequently outstrips current scientific capacity, compounded further by a substantial gap in knowledge among many researchers who are struggling to keep up with these evolving threats.

Dr. Pungulani stressed the indispensable role that agricultural research must play in this context, highlighting three key components: the development of new, appropriate, and context-relevant technologies; the promotion of widespread adoption of these innovations by farmers and stakeholders; and the urgent need to update or establish legal and institutional frameworks that reflect current realities instead of relying on outdated regulations. He argued that these efforts require a concerted and collective approach, with various actors working together to design and

implement frameworks that can effectively enhance resilience within Malawi's agricultural systems.

A significant portion of his presentation was dedicated to the value of collaborative research partnerships. He explained that collaboration not only helps to avoid unnecessary duplication of research activities but also saves critical time and resources. More importantly, working together allows for the pooling of expertise from diverse specialists, which enhances creativity, maximizes resource efficiency, and accelerates progress in solving complex problems. Collaborations foster greater scientific output through increased publications and facilitate knowledge sharing that can lead to innovative solutions and practical applications on the ground. To encourage reflection, he engaged participants in an exercise distinguishing between three different levels of collaboration often observed in research: zero collaboration, partial collaboration (often collaboration in name only or "on paper"), and full collaboration, which involves genuine, active, and synergistic partnerships. Feedback from the participants indicated strong agreement that advancing full collaboration should be a priority in all future research endeavours related to climate resilience.

In closing, Dr. Pungulani outlined several potential strategies to strengthen collaboration and improve climate resilience research outcomes. Chief among these was the proposal to establish a dedicated climate resilience platform that would serve as a nexus linking public institutions, academic researchers, CGIAR centres, and private sector actors. This platform would facilitate continuous dialogue, data-sharing, joint planning, and coordinated action. He also emphasized the importance of developing comprehensive strategic documents that clearly guide climate resilience research and development activities, ensuring alignment of goals and efficient allocation of resources. Finally, he underscored the need for clear, practical guidelines on how to disseminate climate change resilience technologies effectively, ensuring that innovations reach and are adopted by the farming communities most vulnerable to climate impacts.

3.4 Building Effective Partnership: Strengthening Communication among Agriculture Stakeholders on Climate Change

Dr. Dean Kampanje Phiri from LUANAR delivered an insightful presentation titled "Building Effective Partnerships: Strengthening Communication among Agriculture Stakeholders on Climate Change," where he outlined a forward-looking research agenda aimed at steering agricultural practices toward achieving net zero emissions. He emphasized that this ambitious goal can only be realized through strong, collaborative efforts involving a diverse range of key partners. These include public sector organizations, private businesses, academic institutions, and collaborations within and between institutions. Dr. Phiri highlighted LUANAR's flagship initiatives, such as the FOODMA and Transform programs, as exemplary models that demonstrate how partnership-driven approaches can successfully drive impactful agricultural research and climate action.

Focusing on the core theme of communication, Dr. Phiri stressed that the foundation of effective partnerships lies in establishing clear goals and mutual expectations from the very beginning. It is crucial that every partner involved understands their specific roles and responsibilities, which fosters accountability and mutual respect throughout the collaboration. He pointed out that open and transparent communication must be prioritized, while also recognizing the need to protect confidentiality, especially when handling sensitive data produced through research activities.

To maintain the energy and productivity of these partnerships, Dr. Phiri advocated for the importance of regular meetings, ongoing engagement, and timely provision of feedback. These elements are vital to building cohesion and sustaining momentum among diverse stakeholders. He recommended the use of multiple communication channels tailored to the needs and contexts of the partners, including demonstration plots, emails, workshops, and other platforms that facilitate efficient information sharing and collaboration. Additionally, Dr. Phiri underscored the importance of respecting cultural and social dynamics, particularly when engaging farmers and local communities, to build and preserve trust in the partnership.

4.0 Group Work and Plenary Sessions

4.1 Climate Risk Analysis in the 4 districts of Balaka, Kasungu, Mzimba and Zomba

The analysis was done through group work that concentrated on examining major climate-related risks affecting Malawi, with a particular focus on assessing the impacts, vulnerabilities, and risks at the local community level. Participants were divided into four groups based on specific districts: Mzimba, Kasungu, Balaka, and Zomba. Each district group was responsible for conducting a detailed analysis of climate risks by addressing three core guiding questions outlined in Annex 2. The discussions within each group emphasized:

- Identifying the primary climate hazards experienced in their respective districts, such as droughts, floods, or temperature extremes.
- Determining which segments of the population—whether specific individuals, vulnerable households, or broader community groups—were most severely affected by these hazards.
- Investigating the existing adaptive capacities within these communities, including the resources, knowledge, and practices that could help them cope with or mitigate the identified climate risks.

Following thorough deliberations, each district group presented a concise summary highlighting their key findings and insights, providing a comprehensive understanding of local climate challenges and resilience potential.

4.2 Group Presentations by District

4.2.1 Mzimba South Group Presentation

Mzimba district faces a range of climate-related hazards affecting various areas and sectors. Flooding frequently occurs in the Mbawa, Manyamula, Mjinge, Kazomba, and Khosolo areas, while moderate hailstorms are common in Mbawa, Manyamula, and Khosolo. Drought conditions severely impact all 13 Extension Planning Areas (EPAs), including Kazomba, Mbawa, Emfeni, Luwerezi, Khosolo, Champhira, Vibangalala, Mjinge, Manyamula, Bulala, Chikangawa, Eswazini, and Hora. In addition, wildfires are a regular challenge in the Champhira, Khosolo, and Chikangawa EPAs. Seasonal temperature fluctuations between September and December are

notably experienced in Mbawa, Bulala, Kazomba, Champhira, Mjinge, Eswazini, and Manyamula. Dry spells also affect all EPAs, placing further pressure on agricultural and natural systems.

4.2.1.1 Groups most vulnerable to hazards

Certain groups are particularly vulnerable to these hazards. Women in Mzimba face heightened risks as they frequently travel long distances to collect essential resources such as water and firewood. Farmers across the district encounter significant disruptions to crop production due to drought and fluctuating temperatures. Livestock farmers struggle with reduced availability of water and pasture, while bean growers suffer losses as dry spells increase the prevalence of bean beetles, which damage crops.

4.2.1.2 Critical infrastructure at risk and impact on ecosystems and natural resources

Critical infrastructure is also at risk. Floods and storms frequently wash away roads, bridges, and silt dams, disrupting transportation and access to vital services. In some cases, rivers have dried up, further limiting water resources for both communities and agriculture. The natural environment suffers extensively from these hazards. Flooding accelerates soil erosion, leading to a decline in soil fertility crucial for crop growth. Wildfires degrade the soil's ability to retain water and protect against erosion, while drought reduces the availability of pasture and water for livestock and human consumption, threatening food security and livelihoods.

4.2.1.3 Adaptive capacity and opportunities

Despite these challenges, the community has embraced several opportunities to enhance resilience. In Mzimba South, a variety of soil and water conservation techniques are in use, such as swales, marker ridges combined with hedgerows, box ridges, infiltration and soak pits, and the reclamation of degraded gullies. Livestock resources support manure production, bolstering soil fertility. Agricultural extension workers actively assist farmers with climate-smart practices, supported by well-functioning District Agricultural Extension Structures (DAES) such as the District Agricultural Stakeholder Platform (DASP), Area Agricultural Stakeholder Platforms (AASP), and Village Agricultural Stakeholder Platforms (VASP). Additionally, the availability of

improved crop varieties and initiatives promoting forest restoration contribute to the community's adaptive capacity.

4.2.1.4 Community coping mechanisms and available support and policy frameworks

Communities have developed various coping strategies to manage climate risks. They adopt early-maturing, disease-resistant hybrid crop varieties and cultivate traditional climate-resilient crops such as Bambara nuts. Irrigation techniques and improved livestock management practices also help mitigate the adverse effects of erratic weather patterns and resource scarcity. While there are relevant policies aimed at addressing these issues, such as the Agriculture Policy (2024) and the Climate Policy (2008), these frameworks currently lack sufficient incentives and comprehensive implementation measures to fully enhance climate resilience at the local level. Strengthening and better operationalizing these policies could provide a more robust foundation for sustainable adaptation efforts in the district

4.2.2 Kasungu District Group Presentation

Kasungu district faces a range of climate-related hazards, including droughts and dry spells, outbreaks of pests and diseases such as the fall armyworm, severe storms, soil erosion, heat waves, and flooding events. These hazards have varied impacts on different groups and sectors within the community.

4.2.2.1 Groups most vulnerable to hazards

The farming community is particularly vulnerable, as droughts, dry spells, and pest and disease outbreaks directly threaten their livelihoods. Severe storms affect a broader spectrum, impacting both individual residents and farmers. Environmental issues like deforestation and soil erosion predominantly harm farming activities by degrading land quality. Heat waves affect the entire population, presenting health and socio-economic challenges for all residents.

4.2.2.2 Critical infrastructure at risk and impact on ecosystems and natural resources

Numerous essential infrastructures in Kasungu are exposed and vulnerable to these hazards. Residential buildings, school blocks, hostels, health facilities, warehouses, and churches face risks from storms and other extreme events. Additionally, vital physical assets such as

fishponds, roads, bridges, electricity poles, and livestock enclosures (kraals) are susceptible to damage, which can disrupt livelihoods, service delivery, and community well-being.

The natural environment also suffers significant impacts. Forests and grasslands experience stress from drying conditions and the swelling of rivers, altering their ecological balance. Water scarcity and pasture shortages threaten livestock and wildlife, while crops frequently wilt under heat and water stress. Moreover, soil nutrients are depleted through processes like leaching, further reducing land productivity and exacerbating food security concerns.

4.2.2.3 Adaptive capacity and opportunities

Despite these challenges, Kasungu benefits from several adaptive capacities and opportunities. The use of drought-tolerant crop varieties helps to mitigate production losses during dry spells. Climate-smart agricultural practices—such as the construction of swales, marker ridges, and ridge realignment—are increasingly adopted to conserve soil and water resources. Research and extension services provide critical technical support, and local indigenous knowledge, particularly traditional pest control methods, enhances community resilience.

4.2.2.4 Community coping mechanisms

Local farmers utilize various traditional and proven coping mechanisms. These include applying ash to control pests affecting beans and using botanical pesticides derived from native plants like ndundu, tephrosia, and dema to combat fall armyworm infestations. Soil and water conservation measures, including marker ridges, vetiver grass planting, and check dams, are widely practiced to reduce erosion and retain moisture. Additionally, early maturing crop varieties such as Katumani are planted to avoid losses from climate unpredictability. Riverbanks are also protected through targeted tree planting to reduce erosion and maintain water quality.

4.2.2.5 Coping strategies and available support and policy frameworks

Planned interventions build on existing efforts by promoting the planting of drought-tolerant and early maturing crop varieties adapted to local conditions. Community members are encouraged to use area-specific seasonal weather forecasts to guide farming decisions better. Afforestation initiatives and the management of natural regenerants aim to restore degraded ecosystems,

while the introduction of agroforestry tree species offers multiple benefits, including soil improvement, shade, and diverse income sources.

Kasungu has access to extension services and research-tested technologies that support hazard management and climate adaptation. Several national and district-level policies provide a framework for managing these risks, including early warning systems, the Disaster Risk Management Policy, Agriculture Land Resources Management Policy, National Irrigation Policy, Crop Production Policy, National Extension Policy, National Environmental Policy, and National Water Resources Policy. While many of these policies are operational, their implementation varies in effectiveness.

4.2.3 Balaka District Group Presentation

Balaka district is confronted with a range of significant climate-related hazards, including extended dry spells, flooding, drought conditions, intense heat waves, elevated pest infestations, and strong wind events. Additionally, the area is experiencing gradual shifts in weather patterns characterized by rising average temperatures and a delayed onset of reliable planting rains, which complicate agricultural planning and productivity.

4.2.3.1 Groups most vulnerable to hazards

The groups most vulnerable to these climate challenges are predominantly smallholder farmers, whose livelihoods heavily depend on stable weather conditions for crop production. Their exposure to these hazards makes them especially susceptible to losses and food insecurity.

4.2.3.2 Critical infrastructure at risk and impact on ecosystems and natural resources

Several key infrastructures in Balaka are at risk of damage from these climate impacts. This includes residential houses, educational facilities such as school buildings, electrical power infrastructure, and telecommunications networks—all crucial for the functioning and well-being of the local population.

The natural environment and ecosystems in the district also suffer from adverse effects. Soils face degradation through loss of fertility and increased erosion, driven by flooding, strong winds, and surface runoff. Furthermore, water bodies deteriorate in quality as floodwaters introduce

sediments, excess nutrients, and various pollutants, which negatively affect aquatic ecosystems and water usability.

4.2.3.3 Adaptive capacity and opportunities

Despite these challenges, Balaka benefits from a reasonably strong adaptive capacity. The district receives weather forecasts and timely information disseminated through multiple channels, including radio broadcasts, government agencies, non-governmental organization extension workers, and well-coordinated anticipatory early warning systems. These resources facilitate community preparedness and improve their ability to respond effectively to impending climate hazards.

4.2.3.4 Coping strategies and available support and policy frameworks

Historically, communities in Balaka have employed several coping strategies to manage climate risks. These include reliance on aid and support from governmental bodies and external stakeholders, adoption of irrigation farming techniques to mitigate dry spells, implementation of integrated pest management practices to control infestations, and engagement in rearing small livestock as an alternative livelihood source. Furthermore, there are established policies and institutional frameworks addressing climate risks that operate at various administrative levels—from the district council to Traditional Authorities (T/As), Group Village Headmen, and village leadership. These layered governance structures promote coordinated and locally tailored adaptation and response strategies, enhancing the district's overall resilience to climate variability and change.

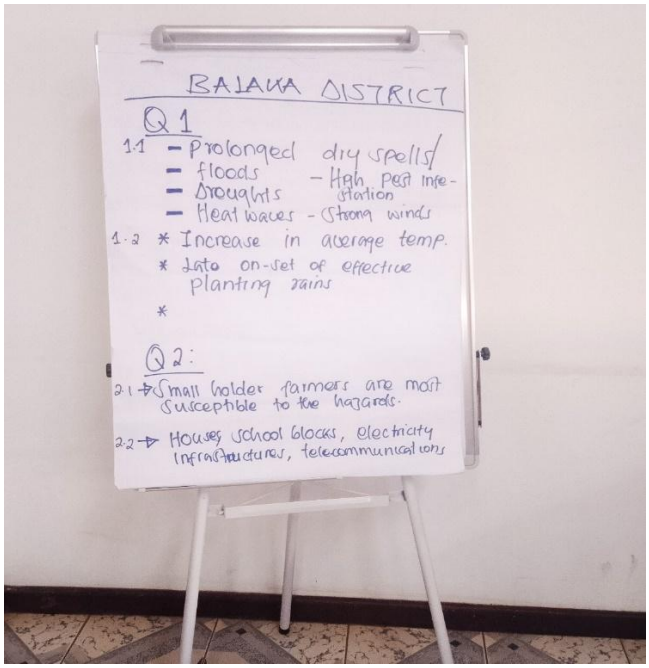

Figure 3: *Part of Balaka district's group work*

4.2.4 Zomba District Group Presentation

Zomba District faces multiple climate-related hazards, including floods, dry spells, severe storms, and fluctuations in temperature, with a noticeable trend toward overall warming over time. In addition to these, communities contend with droughts, heat waves, strong winds, and pest infestations, along with gradual changes such as rising temperatures and shifts in the timing of rainfall. These hazards significantly disrupt agricultural activities and daily life.

4.2.4.1 Groups most vulnerable to hazards

The groups most vulnerable to these hazards include women, children, the elderly, and people living with disabilities, alongside the wider community population. They often bear the brunt of the impacts due to their social, economic, and physical vulnerabilities.

4.2.4.2 Critical infrastructure at risk and impact on ecosystems and natural resources

Critical infrastructure in the district is also at risk. Floods and storms damage houses, churches, schools, and key facilities such as livestock shelters, roads, irrigation systems, and underground wells. The natural environment is severely affected as well: soil erosion and sedimentation degrade water bodies, while fisheries—such as those in Lake Chilwa—are threatened by drying

trends. Livestock suffer due to reduced access to drinking water and direct losses during flood events, further undermining agricultural livelihoods.

4.2.4.3 Adaptive capacity and opportunities

To adapt, communities have embraced several resilience-building approaches. Conservation agriculture practices, including minimum tillage and cover cropping, enhance soil health and water retention. Crop diversification and the use of drought-resistant, early-maturing, and disease-tolerant crop varieties help stabilize yields under variable conditions. Sustainable land management technologies, integrated household farming systems, early warning mechanisms, and access to localized weather forecasts strengthen community preparedness. Supplementary interventions like relief food distribution and food-for-work programs support immediate needs during crisis periods.

4.2.4.4 Coping strategies and available support and policy frameworks

In the past, residents have coped by engaging in irrigated farming where possible, participating in temporary jobs (piecework), relying on remittances, and drawing on indigenous knowledge such as recognizing the early fruiting of mango trees as a climatic indicator. Going forward, the community plans to further employ early warning systems, Participatory Integrated Climate Services for Agriculture (PICSA), broader integrated household farming approaches, and expanded sustainable land management activities to buffer against future shocks.

While highland areas of Zomba tend to be wetter, the lowland zones such as Chingale, Masaula, and Ngwere receive considerably less rain, which is why these areas are classified as dry land despite the district's overall substantial rainfall. Water conservation in Zomba relies on a comprehensive set of methods rather than a single approach. Key practices include contour ridging to slow runoff and reduce erosion, planting vetiver grass to stabilize soil, harvesting rainwater for supplemental use, and protecting riverbanks and wetlands to maintain natural water sources. These combined strategies help conserve moisture, reduce land degradation, and support sustainable farming under changing climatic conditions.

At the institutional level, various systems and policies support climate risk management in Zomba. The District Council Climate Management System (DCCMS) delivers timely weather forecasts to inform local decision-making. The Department of Disaster Management Affairs (DODMA) coordinates emergency responses and provides relief to affected populations. The Ministry of Agriculture offers extension services, assists with emergency crop recovery, and conducts damage assessments, while the Ministry of Local Government undertakes damage evaluations and identifies communities in need. Collectively, these efforts enhance the district's capacity to anticipate, respond to, and reduce the impacts of climate hazards.

4.3 Climate outlook for 2025/2026 season

Dr. Moyo began the discussion with a guiding question aimed at eliciting insights from the participants: What is the primary source of weather information in Malawi? The group unanimously identified the Department of Meteorology as the main provider of weather forecasts and related data. They then proceeded to examine and analyse the recently issued weather forecast for the 2025/2026 season, focusing on key aspects to better understand the expected climatic conditions.

Regarding rainfall, the forecast indicates that for the periods October to December 2025 and January to March 2026, most parts of Malawi are likely to experience rainfall amounts ranging from normal to above normal. However, certain areas in the northern and central region are expected to receive rainfall that is normal to below normal. There is also a notable risk of delayed onset of the rainy season, accompanied by so-called "false onsets," where initial rains occur but are not sustained, potentially impacting planting schedules.

In terms of temperature, the forecast predicts hotter-than-average conditions, particularly in December and February. Conversely, January may bring some relief with relatively cooler-than-normal temperatures, especially in central regions of the country. The forecast also highlights the expectation of dry spells, particularly in February 2026, which coincides with critical crop development stages. These drier intervals, combined with elevated temperatures, increase the risk of heat stress on crops, moisture deficits, heatwaves, and a higher likelihood of pest outbreaks affecting agricultural productivity.

The forecast further points to potential risks of soil erosion and localized flooding due to heavy downpours, despite overall sufficient rainfall totals in many areas. Such intense rainfall events could damage infrastructure and exacerbate environmental degradation. From a water resources perspective, the forecast suggests that cumulative rainfall should be adequate to support crop growth, maintain water levels in vital bodies such as Lake Malawi, and sustain essential sectors including hydropower generation, fisheries, and irrigation systems. Nevertheless, districts facing poorer rainfall coupled with dry spells could experience reduced yields of staple crops, especially given the heavy reliance on rain-fed agriculture by many smallholder farmers.

Drawing on these observations, the participants concluded that the forecasted weather conditions underscore the emerging challenges linked to climate change, which pose significant hazards for the farming community. There is a clear imperative to develop a well-targeted, context-specific action plan that enhances the resilience of agricultural practices against these climatic risks.

Following this, Dr. Moyo posed a second question to the group: How is an anticipatory early work plan formulated? In response, the Chief Agricultural Officer from Zomba shared a practical example, explaining that when early warning signals are received—for instance, about impending pests or disease outbreaks—they immediately begin mobilizing relevant experts and allocating necessary resources such as spraying equipment and appropriate chemicals. They also prioritize timely communication, ensuring that farmers are informed well in advance so they can take precautionary measures to protect their crops. This proactive approach enables preparedness and swift response, helping to mitigate potential damage and secure agricultural productivity.

5.0 Conclusion

The stakeholder engagement workshop brought together 23 participants from various institutions to discuss and address climate challenges in Malawi's dry agricultural regions of Mzimba, Kasungu, Balaka, and Zomba. Through presentations and group discussions, participants proposed a context-specific action plan focused on climate adaptation strategies

for 2026–2030. The workshop identified key barriers such as poor communication and coordination among farmers, policymakers, academia, researchers, and community groups, and established guidelines to improve partnerships and collaboration. The event strengthened stakeholder networks, laying a foundation for coordinated efforts to promote sustainable, climate-resilient agriculture and support the long-term resilience and productivity of Malawi's farming systems.

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This research was conducted as part of the CGIAR Sustainable Farming Science Program. This research is being implemented by CGIAR researchers from (insert names of CGIAR Centers involved) in close partnership with (list all partners involved). CGIAR is a global research partnership for a food-secure future. Its science is carried out by 15 Research Centers in close collaboration with hundreds of global partners. www.cgiar.org

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