

Strengthening Resilience through Knowledge Sharing and Co-designing Interventions in the Dolo Ado and Bokolmayo Districts, Somali Region, Ethiopia

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November 2025



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Acknowledgements

The authors sincerely thank the World Food Programme (WFP), United Nations High Commissioner for Refugees (UNHCR), Mercy Corps, and government offices for their essential role in co-developing our research activities, prioritizing key issues, and providing logistics support during project implementation. This work was carried out under the CGIAR Food Frontiers and Security Program. We would like to thank all funders who supported this research through their contributions to the CGIAR Trust Fund (www.cgiar.org/funders).

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Citation

Mekuria, W.; Haile, A. T.; Ebrahim, G. Y.; Dessalegn, M.; Taye, M. T.; Ruckstuhl, S. 2025. *Strengthening resilience through knowledge sharing and co-designing interventions in the Dolo Ado and Bokolmayo districts, Somali Region, Ethiopia*. Colombo, Sri Lanka: International Water Management Institute (IWMI). CGIAR Food Frontiers and Security Program. 28p.

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Front cover photo: A typical Ethiopian agricultural landscape (photo: Wolde Mekuria)

Back cover photo: Genal River passing through the refugee camps in the Somali region, Ethiopia (photo: Wolde Mekuria)

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Contents

Acronyms and Abbreviations3

Summary 4

1. Introduction6

2. Approaches used to co-design research for development interventions 6

3. Knowledge sharing and co-design of interventions 8

 3.1. Nature-based solutions for disaster risk reduction and enhancing land productivity 8

 3.2. Generating and archiving flood risk data to inform flood reduction and response ..10

 3.3. Access and availability of water for multiple uses13

 3.4. Livelihoods and socio-economic shifts in refugee and host communities15

4. Action plan and next steps18

5. Summary of Outcomes and Key Recommendations 22

References25



Acronyms and Abbreviations

DRMB	Disaster Risk Management Bureau
EMI	Ethiopian Meteorological Institute
FCM	Fragility, Conflict, and Migration
GCP	Ground Control Point
GIS	Geographic Information System
GESI	Gender Equality and Social Inclusion
IWMI	International Water Management Institute
IWUA	Irrigation Water User Association
LDN	Land Degradation Neutrality
M&E	Monitoring and Evaluation
MoWE	Ministry of Water and Energy
NbS	Nature-based Solutions
NGO	Non-Governmental Organization
O&M	Operation and Maintenance
PHM	Post-Harvest Management
PPP	Public-Private Partnership
PNRM	Participatory Natural Resource Management
RNID	Root of Normalized Image Difference
SORPARI	Somali Region Pastoral and Agro-Pastoral Research Institute
SWAT	Soil and Water Assessment Tool
SWC	Soil and Water Conservation
ToT	Training of Trainers
UNHCR	United Nations High Commissioner for Refugees
WFP	World Food Programme

Summary

Co-designing research-for-development interventions with humanitarian organizations, government agencies, communities, experts, and policymakers promotes a participatory approach that tailors disaster resilience solutions to local needs, builds trust and evidence, and empowers refugees and host communities. With this in mind, we co-developed research-for-development interventions in refugee host community settings in Ethiopia. The co-design exercise was conducted using a workshop that combined presentations, breakout sessions, and a panel discussion. It gathered 27 participants and focused on four themes: nature-based solutions for addressing natural disasters and land productivity, flood hazard mapping, water access and availability for multiple uses, and evolving livelihood shifts and governance to improve resilience. The participants included (i) policy and decision-makers, such as government representatives (local, regional, national); (ii) humanitarian organizations, such as WFP and UNHCR, along with collaborating NGOs; and (iii) researchers and academics.

The knowledge sharing component of the co-design workshop highlighted collaborative research approaches and results, while breakout sessions concentrated on co-developing future interventions. The panel discussion, involving WFP, UNHCR, NGOs, and government offices, examined steps and challenges in designing resilience programs in refugee-hosting settings, considerations for equitable and sustainable livelihoods, and the role of collaborative research in creating socially acceptable and sustainable solutions.

Recurring issues identified during the co-design workshop included environmental degradation, salinity, poor water infrastructure, weak extension services, and aid dependency. The findings indicated that the challenges in addressing these problems stem from limited technical capacity, fragmented governance, lack of reliable data, and insufficient funding. Social barriers such as gender inequality and low community engagement and weak institutional collaboration further complicate intervention efforts.

Participants collaboratively developed a suite of interventions and research priorities in various thematic areas to address the challenges and problems in the study areas. The key thematic areas included: (i) NbS for land restoration and flood mitigation, (ii) Tailored flood forecasting models integrating community data, (iii) Smart irrigation and salinity management technologies, (iv) Strengthening cooperatives and irrigation water user associations (IWUAs), and (v) Gender-sensitive livelihood programs and market access strategies. Furthermore, detailed action plans for interventions identified for each thematic area, outlining objectives, activities, timelines, resources, and expected outcomes were developed.

The key recommendations came out from the co-design workshop emphasized shifting from humanitarian aid to development-oriented assistance, promoting inclusive governance, expanding infrastructure, and enhancing stakeholder coordination. It was also suggested the importance of community participation in designing interventions, ensuring local authority support, and developing practical solutions tailored to environmental and socio-economic challenges.

1. Introduction

Co-designing research for development activities aimed at enhancing natural disaster resilience in refugee host communities involves collaboration among communities, experts, and policymakers to create tailored solutions that are effective, relevant, and sustainable (McKeon et al. 2024). Co-designing interventions requires key considerations, such as understanding community needs and ensuring community-led objectives, integrating local knowledge into planning and prevention, co-creating early warning systems, evacuation plans, and climate adaptation strategies, and building community capacity through education (Wang et al. 2024). The main drivers are recognizing co-design's potential for empowerment, generating locally relevant evidence, fostering trust, and supporting decolonized approaches by balancing power between researchers and communities (Robinson et al. 2022; Torkkeli 2024). This participatory approach ensures that interventions address specific vulnerabilities and risks within a community, fostering greater ownership and resilience (Micsinszki et al. 2022). Considering these points and building on the recommendations generated in 2024 through co-designed and implemented research for development activities supported by the Fragility, Conflict, and Migration (FCM) initiatives, we are co-developing practical research for development interventions for refugee host community settings in Ethiopia.

Specifically, this activity centers on co-developing resilience-building activities with WFP, partners, and communities in a changing environmental and sociocultural context. The co-designing of future research for development activities specifically aimed to support the planning and implementation of resilience programs in the Dolo Ado and Bokolmayo districts of the Somali region, Ethiopia. It covered four broad thematic areas relevant to refugee-host community settings. These were (i) nature-based solutions for addressing natural disasters and land productivity, (ii) flood hazard mapping, (iii) water access and availability for multiple uses, and (iv) shifts in livelihood, governance, and linked implications for livelihood resilience.

The co-designing of future research for the development activities brought together 27 participants from diverse organizations. These include (i) policy and decision-makers, such as government representatives (local, regional, national) (12); (ii) humanitarian organizations, such as WFP and UNHCR, and collaborating NGOs (14); and (iii) researchers and academicians (1). The co-designing exercises supported the development of a range of research for development ideas centered on the potential of using nature-based solutions to address natural disasters, such as drought and floods, enhancing flood resilience and informing effective interventions, improving water access and availability for multiple uses, and designing strategies for livelihood resilience. Overall, the focus was on collaborative learning and the development of evidence-based and practical responses for targeted regions.

2. Approaches used for the co-design of research for development interventions

We used a workshop that employed methods such as presentations, breakout sessions, and panel discussions. The presentations were primarily used to share research findings, whereas breakout sessions were used to co-design future research for development activities. The panel discussion aimed to (i) gain the experiences of WFP, UNHCR, WFP collaborating organizations, and government sector offices in designing resilience programs and (ii) gather the contributions of findings from the presented collaborative research

activities to designing resilience programs from their perspectives. The panel discussion was guided by three questions:

- (i) What are the key steps to be followed in designing a resilience program? What are the key gaps (challenges) in designing resilience programs in refugee-host community settings?
- (ii) What should development interventions or resilience programs consider in future equitable and sustainable livelihoods?
- (iii) How does collaborative research support addressing the challenges of designing sustainable and socially acceptable resilience programmes?

The co-design exercises were structured around two broad areas: setting the context and presenting research findings from the FCM initiative-supported activities, and co-designing future research areas for development. The first part of the co-design exercises was designed to communicate findings of research activities that were co-designed and implemented with WFP and WFP collaborating organizations, including NGOs, humanitarian organizations, and government offices. Knowledge sharing and communication covered four interrelated thematic areas: nature-based solutions (NbS) for addressing natural disasters and land productivity, flood hazard mapping, water access and availability for multiple uses, and shifts in livelihoods and governance contexts.

The second part was dedicated to co-designing future research for development activities. We used a breakout session to facilitate discussion among key stakeholders and co-design future research for development activities. The participants were divided into four small groups based on their expertise and interests. The formation of these groups was guided by pre-identified thematic areas: (i) Group 1: nature-based solutions for disaster risk reduction and enhancing land productivity; (ii) Group 2: Generating and archiving flood risk data to inform flood risk reduction and response; (iii) Group 3: access and availability of water for multiple uses; and (iv) Group 4: Livelihoods and socio-economic shifts in refugee host communities.

Following the formation of four small groups and the assignment of participants to each group, each group was asked to develop future research for development activities. The discussion in each of the breakout sessions was guided by questions, including:

- (i) Identifying key problem areas and challenges to address the problems.
- (ii) Suggesting research for development topics.
- (iii) Developing potential interventions or solutions.
- (iv) Identifying data gaps, data sources, and approaches for improved resilient programs.

In addition, the activities in the breakout sessions included the development of an action plan for the identified future research for development activities through:

- (i) Identifying potential research partners (e.g., universities, NGOs, local governments) and their roles.
- (ii) Developing detailed activities.

- (iii) Developing implementation guidelines for each activity.
- (iv) Setting timelines for follow-up activities.

3. Knowledge sharing and co-design of interventions

3.1. Nature-based solutions for disaster risk reduction and enhancing land productivity

- **Summary of research approach and findings**

This component of the research for development work (Mekuria et al. 2024) used both local and scientific knowledge gathered through multiple methods, such as inception workshops, reconnaissance surveys, field visits, focus group discussions, GIS, and remote sensing. The major collected data included (i) societal challenges and efforts to address them, (ii) biophysical and socio-economic profiles, (iii) potential nature-based solutions and available areas for implementation, (iv) environmental and economic viability of identified options, and (v) success and failure factors to implement potential options. GIS and remote sensing were mainly used to profile the biophysical characteristics of the study sites and generate flood hazard maps that were used as an input to identify NbS solutions.

The research informed that (i) there has been significant landscape alteration in the last 15 years due to an evolving agricultural environment that demands attention to sustainable practices; (ii) there is a need for targeted interventions, especially in grasslands and bare lands, to mitigate degradation risks and natural hazards, such as drought and floods; (iii) the availability of diverse context-specific potential NbS options and opportunities for wider implementation of interventions; and (iv) there is considerable potential to address the environmental, economic, and social challenges through better planning, design, and implementation of NbS. Table 1 summarizes the key recommendations tailored to various stakeholders.

Table 1. Key recommendations tailored to different stakeholders

Categories	Description	Recommendations
Project developers or designers	Professionals and organizations responsible for the planning, conceptualization, and design of NbS	<ul style="list-style-type: none"> - Consider context-specific biophysical and socio-economic conditions of refugees and host communities when designing interventions. - Evaluate differences in environmental, economic, and social benefits among NbS options, ensuring alignment with NbS planning and implementation objectives. - Develop a site-specific management plan, coordinate efforts, and engage stakeholders to implement NbS. - Enhance collaboration among stakeholders through local platforms that maximize NbS benefits while encouraging co-planning and knowledge creation.
Local-level practitioners	NGOs, community-based organizations, extension workers, and other field-level implementers.	<ul style="list-style-type: none"> - Implement identified NbS and provide training to refugees, IDPs, and host communities to strengthen climate change adaptation. - To mitigate overgrazing and degradation in grasslands, implement strategies like rotational grazing, exclosures, and direct seeding.

		<ul style="list-style-type: none"> - Empower local communities through PNRM. Promote community initiatives for SWC, water management, and sustainable land use to foster grassroots resilience. - Conduct regular monitoring with defined indicators of economic and ecological benefits to ensure sustainable interventions and advantages.
Policy and decision makers	Government bodies, donors, and high-level actors who shape enabling environments through policies, funding, and institutional frameworks.	<ul style="list-style-type: none"> - Examine financing mechanisms for NbS and ensure adequate funding to support these solutions. - Collaborate with knowledge institutes to assess the drivers and constraints affecting NbS adoption across contexts and develop evidence-based enabling environments, including policies and frameworks.

• Key insights from guided discussion

The stakeholders who participated in the co-design exercises raised important issues and suggestions aimed at strengthening the resilience program and improving the effectiveness of the interventions. Key concerns include increasing community participation and securing local authority support, particularly for the sustainable implementation of NbS. They sought practical recommendations for addressing challenges, such as salinity issues, land access for refugees, and the sustainability of household cooking energy after settlement. Participants also questioned the limited use of alternative technologies beyond motor pumps and emphasized the importance of assessing community interest in adopting NbS.

• Thematic discussions

During the thematic discussion in small groups, the stakeholders identified a wide range of interlinked problem areas and implementation challenges hindering effective natural resource management (NRM) and scaling of NbS. These issues span environmental, institutional, technical, and socioeconomic domains. The thematic discussion also produced a comprehensive set of development and research ideas to enhance NbS implementation and improve natural resource management in vulnerable landscapes or communities.

• Key problem areas or gaps

Stakeholders who participated during the co-design exercise emphasized the lack of biophysical and socioeconomic data and contextual understanding as key obstacles that hampered evidence-based project planning and decision-making. A major concern was the lack of site-specific NbS management plans and poor stakeholder coordination, which weakened the planning and execution of sustainability measures. The degradation of landscapes, including woodlands, rangelands, and riparian areas, along with increasing soil salinity due to poor irrigation water management, flash floods, and frequent droughts, indicates escalating environmental stress. These issues are exacerbated by extreme weather and the overall vulnerability of ecosystems.

There is also a lack of community experience in landscape restoration, which is constrained by limited technical skills, poor participatory approaches, and inadequate incentives shaped by cultural, economic, and labor-related dynamics. Institutional issues, such as unclear land tenure systems, especially communal ownership without formal certification, further complicate efforts. The absence of Monitoring & Evaluation (M&E) systems, scarcity of financial resources, and lack of documentation of up-to-date policy-relevant evidence for NbS

were additional barriers cited. These issues directly contribute to ongoing food and water insecurity in the affected areas.

• **Challenges to address the problems**

To overcome these problems, participants pointed to several systemic challenges: weak institutional capacities, recurring climatic shocks (drought and floods), shortages of skilled manpower, and poor infrastructure that limits access to and delivery of interventions. Moreover, the absence of supportive policies, insufficient funding, and failure to document and learn from best practices continue to hinder effective response.

• **Co-designed development and research ideas**

The co-design exercise produced a comprehensive set of development and research ideas (Table 2) to address key problems and systemic challenges discussed in the above sections.

Table 2. Co-developed development and research ideas

Development ideas	
Categories	Co-developed ideas
Coordination and collaboration	- Develop a multi-stakeholder guideline for better coordination and collaboration during the design and implementation of NbS, grounded in detailed stakeholder analysis, to foster inclusive planning and implementation.
Adaptive learning	- Document best practices, lessons learned, and failures to support adaptive learning.
Natural resource management	- Soil and water conservation (SWC) measures, both physical and biological measures. - Riverbank restoration through flood protection walls. - Integrated watershed management approaches, such as in situ water harvesting. - Capacity building and demonstration through model watersheds, coupled with broad community mobilization efforts. - Developing a buffer zone management plan for major rivers (Genale-Dawa River), which are intensively used for irrigated agriculture.
Research ideas	
Baseline	- Conduct a preliminary contextual assessment to use as a foundation for further research.
Framework	- Develop site-specific management frameworks for implementing NbS and ensuring technical and ecological suitability. - Develop a comprehensive Monitoring and Evaluation (M&E) indicator framework.
Land degradation assessment	- Assess land degradation neutrality (LDN) for target areas.
NbS design and implementation	- Identification of hotspot areas for NbS intervention. - Impact evaluations of NbS. - Analysis of drivers, barriers, and opportunities for community engagement, particularly to inform incentive design. - Strengthening of early warning systems for drought and floods. - Hydrological modeling of river overflows.

3.2. Generating and archiving flood risk data to inform flood reduction and response

• **Summary of research approach and findings**

In this study (Haile et al. 2024), a four-stage approach was applied to map floods using remote sensing data. The first stage involved field data collection, which included participatory mapping to delineate the maximum flood extent in 2023. Ground control points (GCPs) were collected, and the participatory-based flood extent was validated through a participatory transect walk. Multispectral images from Sentinel-2 and Landsat were acquired to detect floods. In addition, Sentinel-1 images were acquired to enable flood mapping during day and night times, including under cloud cover.

The second stage targeted the pre-processing of the remote sensing images. This was necessitated because of radiometric and geometric errors in the image data. For Sentinel-2 and Landsat images, cloud filtering and masking were applied. For Sentinel-1 images, the pre-processing included removing speckle noise, vegetation effect, and building effect. Further, the topographic shadow effect was corrected.

The third stage of our approach was calibration of the remote sensing method for flood detection. For flood detection, the Root of Normalized Image Difference (RNID) method was applied for Sentinel-1, and a combination of indices was applied for Sentinel-2 and Landsat. The maximum flood extent from the participatory mapping and GCPs served as a reference dataset for calibration of the flood detection methods.

During the fourth stage, flood maps were generated using the calibrated flood detection methods. These flood maps represented the 2023 extreme flood, showing the flood coverage at five refugee camps, including residential areas of the host community. The flood affected irrigated land and damaged standing crops. The refugee camps and host community are exposed to flood return periods of 1 in 10 to 1 in 100, depending on their location. A flood susceptibility map using multi-criteria analysis showed differences in flood susceptibility of the host community and refugees.

This study demonstrated the potential of remote sensing data for post-event flood hazard and impact assessment. It showed the strengths and weaknesses of the flood detection approaches. Some of the weaknesses can be addressed through the engagement of the community in data collection. IWMI's research in other flood-prone areas in Ethiopia showed the versatile applications of flood maps. These applications are calibration of flood inundation models, development of thresholds for flood early warning systems, and identification of flood hotspots. Future studies in a fragile environment can explore these uses of flood maps.

- **Key insights from guided discussions**

The stakeholders who participated in the co-design exercises indicated that the main rainy season of the study area is from April to June. However, the 2023 flood occurred during a period that the community did not expect (October and November). It was mainly caused by extreme rainfall over the upstream part of the basin and inflicted devastating damage because of the absence of an accurate and timely flood early warning system. The stakeholders emphasized that the lack of an appropriate channel for flood early warning dissemination exacerbated the flood impact. The main suggestions from the stakeholders to improve the flood preparedness and response in the study site included better validation of the participatory flood maps, detailed hot spot mapping covering the entire flood-affected areas and their surroundings, assessing localized flood mitigation and adaptation strategies, and linking the flood maps with return periods to inform infrastructure development.

- **Thematic discussion**

The co-design workshop highlighted several critical gaps and challenges in the existing flood early warning systems, particularly concerning institutional coordination, technical capacity, and data availability.

- **Key problem areas or gaps**

A key issue was the inadequate engagement of early warning committees, especially at the community level, in flood preparedness and response. Although information is exchanged

between zonal, woreda, and kebele levels, this communication is largely one-way and lacks the active participation and feedback of early warning committees, undermining the effectiveness of alerts and responses on the ground.

- **Challenges to address the problems**

The absence of a functional, localized flood forecasting model is considered a major barrier. The participants emphasized the lack of recent and reliable river discharge data, which hampers accurate forecasting and timely decision-making. Moreover, there are significant technical and practical challenges in implementing automated early warning systems, particularly when trying to balance natural flood behavior with human-controlled variables, such as reservoir operations.

A specific challenge was the difficulty in incorporating human decisions into predictive models, making it difficult to align forecasts with real-world flood dynamics. Overall, these issues highlight the urgent need to strengthen institutional coordination, invest in data infrastructure, and design early warning systems that integrate both natural and human-influenced hydrological processes.

- **Co-designed development and research ideas**

Thematic discussion in the small group identified a few key development interventions and ideas (Table 3). They also identified key research areas to support the identified development interventions for effective flood early warning.

Table 3. Development and research ideas identified with stakeholders of flood preparation and response

Development ideas	
Categories	Co-developed ideas
Coordination and collaboration	- Enhance collaboration between the Ethiopian Meteorological Institute, the Ministry of Water and Energy, humanitarian organizations, research institutes, early warning committees, and the community for enhanced flood preparation and response.
Adaptive learning	- Update flood forecast and flood mapping errors by engaging the community in data collection.
Priority interventions	- A tailored flood forecast model for the study site. - A two-way communication channel to disseminate forecasts to the community and receive flood data from them. - Strengthen the early warning committee through capacity development. - Translate seasonal forecasts from climate centres into flood forecasts, providing a basis for anticipatory actions to - Avail flood forecasts at 15-day, 7-day, and 3-day lead times for the community and humanitarian organizations.
Research ideas	
Baseline	- Evaluate the capacity of the early warning committee to support flood preparedness and response. - Evaluate the existing early warning systems, including gaps in implementing a multi-hazard early warning system. - Investigate potential contributions of the early warning committee to the various stages of a flood early warning system.
Framework	- Framework to support the establishment of a practical early warning system that integrates hydrology and hydrodynamic models, community data and remote sensing data. - Develop an approach to engage the community in data collection and the identification of thresholds to activate early warning within an acceptable error range.
Flood early warning system	- Assess effective approaches for a two-way communication channel for early warning dissemination. - Fill data gaps for hydrological modelling using remote sensing.

-
- Integrate community data to enhance the early flood warning system.
 - Evaluate the various components of the early warning system, including the effectiveness of the communication channel.
-

3.3. Access and availability of water for multiple uses

• **Summary of research approach and findings**

This research (Assefa et al. 2024) utilized the Soil and Water Assessment Tool (SWAT) to estimate surface water availability. The surface runoff component was the lowest water balance component in the districts, given that evapotranspiration and percolation accounted for approximately 96% of the annual rainfall. The total surface water availability for the districts was based on a simulated streamflow range of 26 – 843 Million Cubic Meter (MCM), with rivers being the primary water sources. Although residents near rivers have better access to water, they face high pumping costs for domestic and irrigation purposes.

The study also estimated potential irrigatable areas and highlighted that the estimates are approximately 5,900 ha and 5,300 ha for irrigation seasons one (August–December) and two (January–July), respectively.

Regarding water accessibility, this research identified the challenges of inadequate infrastructure, salinity, seasonal rainfall variability, and financial resource constraints. These challenges lead to impacts on agricultural productivity, such as the low resilience of local communities against droughts. During floods, there is a high risk of waterborne diseases in local communities.

The technological needs in these districts are high. For instance, owing to the high cost of fuel for diesel pumps, the adoption of solar pumps is an option. In the districts, there is already an awareness and use of solar pumps for accessing irrigation water, which needs to be expanded. Given the prominence of droughts and floods, access to impact-based weather forecasting tools and mobile applications is important to provide timely agricultural advisories and early warnings.

• **Key insights from guided discussions**

The participants iterated the research findings on critical water data gaps that constrained the design and planning of anticipatory actions. While there is a working approach to drought early warning (e.g., the WPF system), there is a need to set up a similar approach for the other side of hydrological extremes and floods. The participants were keen to find solutions to the salinity problem affecting the districts in both the catchment area and water sources. The discussion focused on approaches to reducing salinity, and they iterated that infrastructure solutions require support for salinity reduction to be successful in the area. Additionally, there is great interest in finding solutions that can tackle alternating droughts and floods simultaneously. Stakeholders who participated in the co-design exercise also discussed the challenge of the lack of participation of local people and the lack of political will to improve the livelihoods of the different communities in the districts. This is usually challenged by a lack of access to land, an unwillingness to adapt to irrigation methods, and a lack of capacity.

• **Thematic discussion**

Thematic discussion in small groups during the co-design workshop revealed critical insights into water access and management challenges in Dolo Ado and Bokolmayo, with profound implications for human well-being, livestock, and agricultural productivity.

The discussion in the small group first provided background information on water access and availability for multiple uses in target areas. Water access in the Somali region of Ethiopia has been severely constrained. Although the standard for human consumption is 40 liters per person per day, fewer than 40% of residents in Dolo Ado and Bokolmayo have consistent access to safe drinking water because of damaged infrastructure and inadequate supply systems. For livestock, a key livelihood source, watering points, such as birkads and ponds, are often non-functional or insufficient, creating competition with human and agricultural demands. In terms of irrigation, the region targets 20,000 ha, but the actual coverage is less than 1 ha per farmer owing to unreliable water sources, damaged canals, and the high cost of pump operation, especially during the dry season.

Discussions during the co-design exercise indicated that water availability was highly variable. The Genale–Dawa River system provides seasonal surface flows, which, while valuable, often result in flooding that damages infrastructure and displaces communities. Groundwater access is limited and inconsistent owing to fluctuating recharge rates, with shallow aquifers primarily used for domestic needs. Rainfall, averaging just 500 mm annually, is insufficient to meet the growing water demands and is highly erratic.

- **Key problem areas**

The main problems identified included: (i) seasonal variability, with alternating flooding and drought affecting water reliability; (ii) chronic water shortages, affecting people, livestock, and crops; (iii) poor infrastructure, including damaged or unmaintained systems for water delivery and irrigation; and (iv) potential for conflict between refugees and host communities over scarce water resources.

- **Challenges to address the problems**

The stakeholders outlined major barriers to addressing the identified problems. These included: (i) extreme seasonal fluctuation in surface and groundwater makes planning difficult, (ii) competing demands across sectors—human, livestock, and irrigation—create inefficiencies, and increase the risk of social conflict; (iii) operation and maintenance (O&M) is weak due to lack of spare parts, tools, and skilled labor; (iv) aging or broken systems, coupled with high fuel costs for generators, reduce system functionality and sustainability, (v) host communities, especially those located between the two rivers, face acute water shortages despite proximity to water sources, (vi) lack of coordination and integration among stakeholders further exacerbates these systemic issues; (vii) data gap relevant for decision makers and evidence generation, (viii) no workable flood prediction system, (ix) lack of capacity of locals, (x) lack of supportive conditions and policy framework for refugees – for example land, work permit, banking, and (xi) security challenges at border areas.

- **Co-designed development and research ideas**

The co-design exercise generated a comprehensive set of development interventions and research ideas aimed at improving water access, irrigation efficiency, and climate resilience in water-scarce areas, particularly in regions that are distant from rivers and prone to salinity and seasonal shocks (Table 4).

Table 4. Co-developed research ideas and implementation

Development ideas	
Categories	Co-developed ideas
Water resource management	<ul style="list-style-type: none"> - Deploy local water monitoring networks and integrate remote sensing and in-situ data to improve water resource management and planning. - Address the water needs of communities that are far from the rivers. - Livestock water monitoring and the introduction of community-based water-harvesting systems to ensure equitable access across users. - Introduce and scale smart irrigation technologies such as solar-powered drip systems to enhance irrigation efficiency. - Develop culturally appropriate approaches by improving traditional and indigenous water governance systems. - early warning systems and community-based waterpoint monitoring to improve preparedness.
Climate-resilient infrastructure,	<ul style="list-style-type: none"> - Conduct borehole drilling and flood protection works.
Salinity management	<ul style="list-style-type: none"> - Develop reliable technologies to delineate salinity issues for both surface and groundwater.
Research ideas	
Water availability	<ul style="list-style-type: none"> - Expand underground water exploration, especially in areas far from river systems, to diversify water sources.
Water demand data	<ul style="list-style-type: none"> - conduct disaggregated water demand surveys and strengthen infrastructure data systems.
Local engagement	<ul style="list-style-type: none"> - Enhance the engagement of local communities and ownership through participatory mapping and forecasting techniques.
Addressing salinity	<ul style="list-style-type: none"> - Research approaches for reducing salinity in groundwater, irrigation water, and soils, such as nature-based solutions and other technologies that are specific to the districts.

3.4. Livelihoods and socio-economic shifts in refugee and host communities

• Summary of research approach and findings

This component of the work investigated shifting livelihood systems, changing resource uses, and linked implications for resilient livelihood programs among people whose traditional livelihood system has been associated with pastoralism (Dessalegn et al., 2024). The study employed a qualitative research approach, based on which data were collected through semi-structured interviews, focus group discussions, and observations. The study highlighted changing pastoral livelihoods towards sedentary irrigation agriculture conducted through cooperative farming. The findings indicated that irrigated agriculture is expanding in hitherto pastoral communities as a form of adaptive livelihood strategy. While highlighting users' appreciation of irrigation farming for food and income security, the study pointed out several challenges related to production systems, productivity, input access, income generation, gender dynamics, and irrigation water user associations. The study highlighted contexts and practices that can enhance drought-resilient livelihoods. The study also conveyed important recommendations that should be considered for improved livelihood resilience and transitions. Some of these recommendations included the following:

- (i) Support in the form of input, knowledge, technology, and market channels is needed to make the ongoing livelihood transition (towards farming and crop production) sustainable.
- (ii) For sustained operations, existing cooperatives should pursue activities that contribute to their self-sufficiency and productivity.
- (iii) Collective action for irrigation water use should be guided by irrigation water users' associations.

- (iv) For enhancing gender inclusive benefits, livelihood interventions should consider activities that facilitate women's entrepreneurship and financial autonomy.
- (v) Livelihood interventions should consider functioning traditional resource-use and management practices.
- (vi) Local conflict resolution mechanisms should be empowered, as they facilitate inter- and intracommunity relations.

- **Key insights from guided discussions.**

During discussions, important issues were raised regarding livelihood shifts, particularly problems related to farming and cooperatives. For addressing problems related to farming, establishing agricultural extension systems that align with changing livelihood systems was an important issue pointed out during the discussion. Facilitating accessible input delivery systems was another important issue pointed out through discussion. Improving the sale of local farm products through appropriate market chains also helps to address challenges linked with the marketing of local products.

Regarding existing cooperatives running irrigation farming, discussions underlined that they have not been able to be self-sufficient. Furthermore, existing farm cooperatives are performing activities that should be carried out by irrigation water users' associations (IWUAs), which calls for the formation of independent IWUAs. However, humanitarian organizations consider that existing farm cooperatives are still important for them to work with and channel their support systems. So, what should be done? This was an important concern. Perhaps strengthening existing farm cooperatives while also establishing IWUAs can be a way forward.

Another discussion point was about the deterioration of pastoralism. While appreciating the value of pastoralism, the decline of the pastoral livelihood system was mentioned as a regrettable situation. "How can pastoralism be strengthened?" was a concern raised during the discussion.

- **Thematic discussions**

The thematic discussion during the co-design exercise revealed a range of systemic challenges to sustainable livelihoods, including agricultural development, economic resilience, and community empowerment in the region. These issues are deeply interconnected and span institutional, infrastructural, sociocultural, and economic dimensions.

- **Key problem areas or gaps**

Stakeholders identified several problems affecting their livelihood activities. These include problems related to extension services, market access, institutions, income generation, and access to land. Participants highlighted the weakness of agricultural extension services and limited agricultural mechanization, which hinders productivity, technology adoption, and effective post-harvest management (PHM). Insufficient government capacity at the local level contributed to the prevailing weak extension services. Constraints to market access also created challenges to people's livelihoods. Market access is constrained by poor infrastructure, including poor road infrastructure and a telecommunication network that discourages investment opportunities. A lack of timely market information and poor market

linkages, including weak linkages between producers and buyers, exacerbated the problem. At the human capital level, there is a shortage of skilled labor and misalignment between labor market needs and available skills.

A significant social barrier is the prevalence of a dependency mindset, often reinforced by humanitarian aid delivery models, which discourage income-generating activities (IGAs) and local initiatives. Available income-generating activities are characterized by gender inequality, in that there are very limited opportunities for women producers and entrepreneurs. Communities also face external shocks, such as climate variability, inflation, and currency devaluation, which further destabilize their livelihoods.

Institutionally, both cooperative farming and irrigation water use are characterized by weak institutional structures, and they are poorly governed, lacking active member participation and follow-up support from government bodies. Challenges related to land availability and land use planning, combined with limited opportunities for women, further marginalize key groups from contributing to and benefiting from development.

• **Challenges to address the problems**

Efforts to address these issues are hampered by insufficient government capacity, particularly for delivering consistent support and follow-up. Poor infrastructure, such as roads, air transport, and telecommunication, discourages private investment and market integration. There is also a lack of accessible skills training centers that limit local capacity-building.

Development initiatives often suffer from inconsistent targeting, which reduces their effectiveness. Additionally, humanitarian aid models have unintentionally fostered dependence, raising community expectations for continued external support, rather than self-reliance. Other social challenges include dwindling collective action, with low community commitment to shared interests and group-based development efforts.

• **Co-designed development and research ideas**

The co-design exercise generated a set of integrated development and research priorities aimed at enhancing resilience, promoting sustainable livelihoods, and reducing aid dependency in vulnerable communities, particularly among refugee and host populations. Table 5 indicates the development and research ideas co-designed with stakeholders.

Table 5. Development and research ideas co-designed with stakeholders

Development ideas	
Categories	Co-developed ideas
Coordination and collaboration	- Enhancing coordination and collaboration for improved early warning systems and climate information services to support timely decision-making and risk reduction in the face of climate variability.
Adaptive livelihood and enabling interventions for livelihood resilience	- Boosting agricultural productivity through improved crop and livestock systems. - Building economic resilience through livelihood diversification and income-generating activities, enabling communities to reduce vulnerability to shocks. - Facilitating access to finance to enable smallholders and entrepreneurs to invest in productive assets and grow local businesses.
Institutional capacity building	- Strengthening institutional capacity, including local-level institutional capacity for effective resource use and management, service delivery, and governance.
Research ideas	
Development interventions and self-reliance	- Assessing the impact of aid dependency on self-reliance and examining alternative options that can guide more empowering development approaches.

	- Comparing the impacts of cash-based versus in-kind support on local economies to inform more efficient and empowering aid strategies.
Institutional analysis	- Examining the role of rural institutions, such as cooperatives and irrigation water user associations (IWUAs), for sustainable livelihoods, and how to strengthen their effectiveness for facilitating livelihood resilience. - Evaluating the role and capacity of government institutions and extension services in supporting long-term sustainability.
GESI consideration	- Integrating the gender dimensions of livelihood interventions and economic participation in refugee and host community contexts.

4. Action plan and next steps

Following the identification of problems, challenges, and potential solutions to address the problems and challenges, the stakeholders who participated in the co-design exercise developed an action plan for one selected priority area of each thematic area (Tables 6 – 9). The thematic areas include (i) Nature-based solutions for disaster risk reduction and enhancing land productivity; (ii) Generating and archiving flood risk data to inform flood risk reduction and response; (iii) Access and availability of water for multiple uses; and (iv) Livelihoods and socio-economic shifts in refugee host communities.

Table 6. Summary of an action plan developed by the NbS group

Variables	Description
Activity	Design and implementation of physical and biological SWC measures
Objective	Increase land productivity by restoring agricultural and rangelands
Lead Partner	Regional Bureau of Agriculture
Supporting partners	Community, Research and University systems, NGOs, and UN Humanitarian organizations
Beneficiaries	Local community (Refugee, Host-community, and IDP)
Location	Somali Regional State, Fafan and Liban Zones
Start date	January 1, 2026
End date	December 30, 2030
Detailed activities	Planning and design of interventions through community engagement; developing community action plans; implementation; impact assessment; monitoring and evaluation
Timeline for each activity	Planning and design (first 6 months) Community action plan (up to 9 months) Implementation (4 years) Impact evaluation (every 2.5 years) Monitoring (continues in the middle of every activity)
Resource	Human: staffing (program and support) Financial: USD 5 million Material: Farm implements and other inputs
Implementation Guidelines	Preliminary assessment to understand the context and for technology–site matching; community and stakeholder engagement, technology selection should be gender sensitive
Monitoring and indicators	Runoff accumulation reduction, reduction of soil loss, community engagement (%), regeneration of vegetation, reduction of sedimentation in downstream areas
Risk factors	Conflict, ownership bias, labor, lack of short-term benefit
Follow-up timeline	Every six months after the inception phase
Expected outputs	3000 ha will be covered by diverse SWC interventions
Expected outcomes	Reduced flood incidents, enhanced agricultural and rangeland production, and increased local awareness of ecosystem-based nature solutions
Sustainability	Community stewardship agreements, capacity building of the local community, and institutionalization of the SWC model
Responsible contact	Wolde Mekuria, IWMI, w.bori@cgiar.org

Table 7. Summary of an action plan developed by the flood mapping group

Variables	Description
Activity	Workable/tailored flood forecast model with the capability to send automated messages, but also receive data/information from the committee to continuously update the model.
Objective	To detect floods with adequate lead time to support early action to protect life and livelihoods.
Lead partner	MoWE
Supporting partners	IWMI, WFP, local administration, DRMB
Beneficiaries	Local farmers, agro-pastoralists, refugees, and host communities.
Location	Genale-Dawa basin
Start date	January 2026
End date	June 2030
Detailed activities	(i) Stakeholder mapping and codesigning workshop; (ii) Identify data needs and data sources at the catchment and floodplain scale; (iii) Model selection; (iv) Basin characterization (biophysical and socio-economic); (v) Data pre-processing and preparation (proxy indicators to fill data gaps); (vi) Model set-up, calibration; (vii) User acceptance testing – followed by workshop; (viii) An iterative process so that the forecast and early warning meet user requirements (including capacity strengthening at the regional and national level and local level for the committee); (ix) Automation of the two-way communication (interface allowing early warning committees to receive forecasts and enter data into the system); (x) Piloting the early warning system – collect feedback; (xi) Full rollout – with workshop; (xii) Documenting for future scale, possible scale-up.
Timeline for each activity	(i) Stakeholder mapping and codesigning workshop (February 2026); (ii) Identify data needs and data sources at catchment and floodplain scale (March 2026 – May 2026); (iii) Model selection (June 2026 – Nov 2026); (iv) Basin characterization (biophysical and socio-economic) (June 2026 – September 2026); (v) Data pre-processing and preparation (proxy indicators to fill data gaps) (July 2026 – December 2026); (vi) Model set-up, calibration (January 2027 – June 2027); (vii) User acceptance testing – followed by workshop (July 2027); (viii) An iterative process so that the forecast and early warning meet user requirements (August 2027 -October 2027); (ix) Automation of the two-way communication (interface allowing early warning committees to receive forecasts and enter data to the system) – include local language options (November 2027 – February 2028); (x) Piloting the early warning system – collect feedback (MAM 2028); (xi) Full rollout – with workshop (OND 2028); (xii) Documenting for future scale, possible scale-up, including translation to local language (January 2026 – June 2030)
Resource needed	- Human – experts of MoWE (<i>discharge data</i>), IWMI (<i>Model, data, research</i>), WFP (<i>Early warning committee and remote sensing</i>), DRMB (<i>coordination and field presence</i>) - Monitoring equipment – MoWE and EMI - Financial – Donor-led project with partners' expertise contribution.
Implementation guidelines	Highly relies on the partner's expertise; Outsourcing the automation of early warning.
Monitoring indicators	Forecast skill matrix; Indicators to evaluate a workable early warning system
Risk factors	Unpredictable hydrological conditions due to climate change
Follow-up timeline	Post-implementation assessment: Project assessment every six months & Review for scale-up: June 2030
Expected outputs	Workable forecast model; Publications
Expected outcomes	Reduced impact of floods (Saving lives and livelihoods)
Sustainability	The system will be handed over to the government with full documentation
Responsible contact	Alemseged Tamiru Haile, (IWMI), a.t.haile@cgiar.org

Table 8. Summary of an action plan developed by the water access and availability group

Variables	Description
Activity	Reducing the impact of salinity
Objective	Increasing water availability for multiple uses in a required water quality standard
Lead Partner	Ministry of Water and Energy
Supporting partners	Ethiopian/Federal & Somali Regional Water Offices, UN Agencies, NGOs, Local Admins, Universities (AA and Jijiga)
Beneficiaries	Local farmers, agro-pastoralists, refugees, and host communities.
Location	Genale-Dawa basin
Start date	January 1, 2026
End date	December 31, 2030
Detailed activities	Water quality assessment; data sampling; water quality analysis; selection of treatment options, resource assessment and initiation; implementation of proposed treatment options; development of implementation report; project evaluation report
Timeline for each activity	<ul style="list-style-type: none"> - Water quality assessment-Inception phase (1 month) - Data sampling (2 months) - Laboratory and water quality analysis report (1 month) - Identifying treatment options –feasibility study (2 months) - Resource assessment & initiation (1month) - Implementation of proposed water treatment options (6 months) - Developing implementation report (1 month) - Project evaluation report (1 month)
Resource	Human-Material-Field/Lab assessment tools-Finance
Implementation Guidelines	<ul style="list-style-type: none"> - Ensure integrated, sustainable, and climate-resilient water management. - Comply with national and international water quality standards. - Promote equity, inclusivity, and community ownership. <p>Strengthen local capacity, monitoring, and accountability systems.</p>
Monitoring and indicators	Reduced salinity in water, soil,
Risk factors	Over-extraction and resource depletion; Water contamination risks; Weak governance and maintenance
Follow-up timeline	Every six months after the inception phase
Expected outputs	Identified salinity levels, hotspot maps
Expected outcomes	Enhanced and reliable access to safe, adequate water for domestic, agricultural, and livestock uses, improving health, livelihoods, and community resilience
Sustainability	Community-based water management institutions strengthened with clear roles, capacity, and accountability for operation and maintenance
Responsible contact	Meron Teferi and Girma Yimer, IWMI, meron.taye@cgiar.org , g.ebrahim@cgiar.org

Table 9. Summary of an action plan developed by the livelihood shift group

Variables	Description
Activity	Role of rural institutions (cooperatives and IWUAs) in driving sustainable livelihoods
Objective:	Enhanced Cooperative management & Irrigation water use for smallholders in Dollo Ado & Bokolmayo
Lead Partner (S)	Regional/Woreda Agriculture & Cooperative Promotion Bureaus
Supporting Partner (s)	Local Administration, SORPARI, Irrigation & Basin Development Bureau, IWMI, WFP, & Other partners
Beneficiaries	Local farmers, Producer cooperatives, unions (Host/Ref)
Location	Riverine kebeles of Dollo Ado & Bokolmayo Woredas
Start date	January 2026
End date:	Dec 2027
Detailed Activities	<ul style="list-style-type: none"> - Stakeholders & Community Engagement (target communities, line bureaus and relevant institutions) - Capacity Assessment of existing and potential cooperatives and farmers - Establish and Train cooperatives, farmers & IWUAs on cooperative Management, governance, resource management, Operation and Maintenance, Conflict resolution etc.
Timeline for each activity:	<ul style="list-style-type: none"> - Stakeholders & Community Engagement (target communities, line bureaus and relevant institutions)-first quarter - Capacity Assessment of existing and potential cooperatives and farmers-first quarter - Establish and Train cooperatives, farmers & IWUAs on cooperatives Management, governance, resource management, Operation and Maintenance, Conflict resolution etc. 2nd, 3rd, 4th Quarters of first year - Provide follow-up support and linkage with financial service providers-2nd year
Resources needed	<ul style="list-style-type: none"> - Financial resource, 1.5M \$ - Institutional experts, ToT trainers, Training materials, office suppliers, legalization and certification, implementation cost & financial start-up
Implementation guideline	<ul style="list-style-type: none"> - Adopt Community-based planning involves beginning to end - Build on existing systems
Monitoring Indicators	<ul style="list-style-type: none"> - # of Cooperatives established and/or strengthened - # of IWUAs trained - % of farmers adopting efficient irrigation management (irrigation schedules)
Risk factors	Conflict over resources (land, finance, etc.)
Follow-up timeline	Periodic (Weekly, monthly, and Quarterly)
Expected outputs:	<ul style="list-style-type: none"> - Established 5 producer cooperatives for 5 kebeles (Bokolmayo, Melkadida, Kobe, Helaweyn and Amino) - Established, trained, and supported 5 IWUAs
Expected outcomes	<ul style="list-style-type: none"> - Improved community-based structures (cooperative & IWUAs) - Improve Irrigation Water Use and Management - Improved operation & maintenance of irrigation facilities
Sustainability	Community government agreement; integration with local conflict resolution system; coordination with implementing partners, linkage with FSP
Responsible contact	Local government authorities, implementing partners, community leaders

As a critical next step following the co-design workshop exercise, the stakeholders emphasized the importance of systematically organizing the various research for development activities proposed during the discussions into clearly defined thematic areas. This would not only provide a strategic direction for future initiatives but also help align efforts across different sectors and disciplines. To translate these thematic priorities into actionable outcomes, participants recommended convening and coordinating key stakeholders, including government institutions, research organizations, development partners, and community representatives, to collaboratively develop robust project concepts and mobilize the necessary resources for implementation.

Strong emphasis was placed on maintaining and strengthening the collaborative spirit and partnerships initiated between IWMI and WFP. The participants viewed sustained

collaboration as essential for fostering resilient communities and ensuring long-term environmental sustainability. They stressed that collective efforts should go beyond isolated interventions and should instead be embedded within a broader framework of integrated and inclusive development.

Furthermore, the participants highlighted that the collaborative research agenda should not only address practical challenges on the ground, but should also be deliberately designed to inform and influence policy and strategic decision-making. This could be achieved by piloting innovative and context-specific best practices that generate evidence and demonstrate impact. They noted that such pilot initiatives should serve as learning platforms to bridge the gap between research, practice, and policy, ultimately contributing to systemic changes in resilience-building efforts.

5. Summary of Outcomes and Key Recommendations

The co-design exercise identified a range of interconnected problems and challenges along with a suite of development and research interventions, all pointing to the need for a holistic and integrated response to build resilient, self-reliant, and inclusive communities.

Communities face deep-rooted issues, including low agricultural productivity, market access constraints, and limited livelihood options, all of which are exacerbated by weak institutional structures, poor infrastructure, and limited access to finance and extension services. Social and governance-related challenges, such as aid dependency, low community participation, gender inequalities, and cultural individualism, further undermine sustainable development efforts. The situation is exacerbated by climate shocks, such as droughts and floods, and uncertainties in water availability and management, compounded by a lack of early warning systems, technical capacity, and up-to-date data.

In response, the stakeholders proposed a broad set of development interventions aimed at improving agricultural production, promoting livelihood diversification, expanding access to finance, and strengthening institutional and technical capacity. Emphasis was placed on building climate-resilient infrastructure, improving governance and coordination, and expanding community-based systems for land and water management, early warning systems, and market linkages.

The co-design exercise generated wide-ranging research for development activities aimed at informing context-specific, sustainable, and inclusive developments. The key research priorities include the following.

- (i) Contextual and technical assessments to guide Nature-based Solutions (NbS), including studies on land degradation neutrality, NbS impacts, and M&E frameworks.
- (ii) Improving early warning systems through evaluation of current gaps, remote sensing of water level data, integration of modeling and community input, and defining activation thresholds.
- (iii) Water resource management, focusing on local monitoring networks, disaggregated demand surveys, participatory forecasting, reducing salinity, and addressing water needs in remote areas.

- (iv) Governance and institutional research on the roles and effectiveness of cooperatives, IWUAs, and government institutions in supporting livelihoods and sustainability.
- (v) Socioeconomic and gender-focused studies, including analyses of aid dependency, economic participation of women in refugee/host settings, and the impacts of cash vs. in-kind aid.

The co-design exercise enabled us to obtain reflections from the panelists, comprising UN humanitarian organizations, collaborating NGOs, and government organizations. The panelists reflected on the key steps in designing resilience programs, challenges, considerations to ensure equitable and sustainable programs, and the contribution of collaborative research to the development of resilience programs.

The panelists outlined a comprehensive and logical process for designing effective resilience programs, emphasizing inclusive planning, evidence-based decision making, and long-term sustainability. The key steps forwarded during the co-design exercise were as follows:

Step 1: Contextual and participatory assessments: Begin with an in-depth situation analysis involving integrated context assessments, needs assessments, seasonal livelihood planning, focus group discussions, stakeholder mapping, and participatory planning to understand vulnerabilities, risks, and opportunities within communities.

Step 2: Identify priorities and areas of focus: Use the findings of the first step to identify vulnerable areas, align program goals with regional priorities, and assess the humanitarian-development-peace nexus, ensuring that programs address root causes and promote social cohesion.

Step 3: Program design and planning: Design context-specific and community-driven interventions based on an articulated Theory of Change. This includes developing area-based and integrated plans, multi-area compacts, and identifying the institutional support required for implementation.

Step 4: Capacity building and governance: Strengthen local governance, build institutional and community capacity, and ensure inclusive decision-making to support resilience and sustainability.

Step 5: Follow adaptive management: Implement the program while applying adaptive management principles, allowing for flexibility and adjustments in response to evolving needs and contexts.

Step 6: Monitoring, Evaluation, and Learning: Establish robust monitoring and evaluation (M&E) systems, ensuring the use of evidence to inform ongoing decision-making and continuous improvement.

Step 7: Sustainability and exit strategy: Ensure long-term impact by integrating a clear sustainability and exit strategy, focusing on community ownership, durable partnerships, and resilient systems that can function beyond the program's life.

Panelists identified key challenges to resilience-building, including conflict and competition over resources between refugees and host communities, insecurity, and climate-related shocks, such as drought and land degradation. Other major barriers include poor

infrastructure, limited market access, inadequate basic services, lack of coordination among actors, insufficient financing, data gaps, and overall fragmentation of planning and response efforts.

The panelists and participants of the co-design exercise indicated that collaborative research plays a vital role in resilience-building by generating context-specific evidence, guiding informed and inclusive decision-making, and influencing policy through evidence-based dialogue. It enhances accountability, supports learning, and fosters trust among the stakeholders. Identifying gaps and practical solutions helps to target interventions effectively, build local capacities, and scale best practices. Moreover, it promotes co-design, reduces duplication of efforts, and improves communication and the use of knowledge for sustained impact.

The participants of the co-design exercise outlined key recommendations for future resilience-building programs, emphasizing a shift from humanitarian aid to development-oriented assistance, particularly in light of the planned phase-out of aid in the Somali region by July 2026. These included:

- (i) Diversify livelihoods, improve community participation, and promote good governance.
- (ii) Context-specific and integrated solutions should be promoted, such as water harvesting, watershed restoration, and groundwater–subsurface integration, and institutional systems supported by strong research-for-development approaches.
- (iii) Enhancing stakeholder coordination, dialogue, and decentralized water governance.
- (iv) Expand irrigated agriculture and investment in infrastructure.
- (v) Promote inclusive education and skill development and strengthen local systems.
- (vi) Encourage public-private partnerships (PPP) and build on previous efforts.
- (vii) Influence of policies and strategies through evidence and inclusive processes.

The insights obtained during the co-design exercise underscore the urgent need for integrated and inclusive development strategies that not only address immediate needs but also tackle structural barriers to resilience. The goal of combining context-specific development interventions with targeted research is to foster self-sufficiency, climate resilience, and social inclusion, ultimately enabling communities to thrive in the face of complex and evolving challenges.

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