WEATHER CLIMATE WATER

WORLD METEOROLOGICAL ORGANIZATION

Stories of Success

IMPROVING THE ADAPTIVE CAPACITY AND RESILIENCE OF SMALLHOLDER FARMERS IN THE HORN OF AFRICA TO CLIMATE VARIABILITY AND CHANGE THROUGH ENHANCED CLIMATE SERVICES DELIVERY

Food and Agriculture Organization of the United Nations

ICPAC

ADAPTATION FUND

Agricultural Climate Resilience Enhancement Initiative (ACREI)

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Improving the adaptive capacity and resilience of farmers in the Horn of Africa to climate variability and change through enhanced climate services delivery

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FOREWORD

The Greater Horn of Africa is highly vulnerable to extreme weather and climate events, like drought and floods, that severely impact the region's mostly rain-fed agriculture. Persistent food and nutrition insecurity is of major concern, and this situation is compounded by the occurrence of increasingly frequent, back-to-back and more severe climate hazards, such as drought. While seasonal climate forecasting has become a mainstay of the region through forums like the Greater Horn of Africa Climate Outlook Forum (GHACOF), this information often does not reach smallholder farming communities on time, in an understandable format, or with locally relevant and actionable messages. Limited access to climate information and technical support aimed at enhancing agricultural productivity, as well as inadequate funding for response and adaptation options, exacerbate the situation.

While various programmes and projects have sought to address either resilience in agriculture through direct adaptation support, or to strengthen the delivery of national climate services as a key component of resilience, few have had a regional and national climate services delivery to local climate resilience approach, encompassing enhanced capacity of climate services providers (i.e. the National Meteorological and Hydrological Services (NMHSs)), improved capacity on climate adaptation and climate information of intermediaries for climate services in the agriculture sector, and direct adaptation and resilience support for smallholder farming communities. The Agricultural Climate Resilience Enhancement Initiative (ACREI) sought to do exactly this! The project brought together the World Meteorological Organization (WMO) as the United Nations agency mandated on matters of weather and climate services; the IGAD Climate Prediction and Applications Centre (ICPAC) as the WMO accredited Regional Climate Centre (RCC) for the Horn of Africa; and The Food and Agriculture Organization of the United Nations (FAO) as the United Nations agency leading the fight against hunger and food insecurity. Each of the organizations had a key role, with WMO ensuring coordinated action in line with principles enshrined in the Global Framework for Climate Services (GFCS); ICPAC leading capacity-building efforts of the NMHSs involved in the project to ensure localized and tailored climate services, and FAO ensuring that climate information and climate services could be effectively used to inform tangible adaptation and resilience actions in target communities.

This document highlights stories of success from the project that are both a testament to the impact of the ACREI project, as well as to the potential to replicate and enhance the model for broader impact across target countries and the Greater Horn of Africa as a whole. From enhanced communication of climate information to increased crop and livestock production, to enhanced climate resilient infrastructure, target communities are now better equipped to adapt to the adverse effects of climate variability and change. The journey of the farmers and other stakeholders involved in the project is a powerful reminder that with the right support and interventions, even the most vulnerable can overcome the challenges posed by climate variability and change and secure a better future for themselves and generations ahead.

ACKNOWLEDGMENTS

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INTRODUCTION

The Agricultural Climate Resilience Enhancement Initiative (ACREI)

The Agricultural Climate Resilience Enhancement Initiative (ACREI) is a partnership programme aimed at improving adaptive capacity and resilience to climate variability and change among targeted agropastoral communities in Ethiopia, Kenya and Uganda. Specifically, ACREI focused on strengthening climate services provided by National Meteorological and Hydrological Services (NMHSs) to smallholder agricultural communities in East and West Hararghe Zones in Ethiopia, Taita Taveta County in Kenya, and Isingiro and Sembabule Districts in Uganda, while supporting extension agents and farming communities to apply these services within a broader context of locally led adaptation planning and action for enhanced agricultural resilience to climate variability and change.

The project developed and implemented adaptation strategies and measures to strengthen the resilience of vulnerable smallholder farmers, agropastoralists and pastoralists in the Horn of Africa to climate variability and change. The first and second components, led by FAO, sought to enhance community adaptation practices through participatory extension services applying community adaptation planning in combination with the Farmer Field School (FFS) approach while climate-proofing extension services. The third component, led by ICPAC focused on the climate services capacity-building from regional to sub-national level, working closely with the NMHSs in the three target countries.

Partnering for climate resilience

The ACREI project was designed as an innovative partnership project to ensure that both the climate services aspects as well as the tangible adaptation aspects would be delivered through a chain of capacity-building and climate resilience actions from regional to community level. The project was led by the World Meteorological Organization (WMO) as a Multilateral Implementing Entity (MIE) accredited to the Adaptation Fund, while the Food and Agriculture Organization of the United Nations (FAO) and the Intergovernmental Authority on Development (IGAD) Climate Prediction and Applications Centre (ICPAC) were executing entities. Significantly, the ACREI project was the first regional project approved by the Adaptation Fund through its Pilot Programme for Regional Projects and led the way for multiple regional projects to be designed, funded and implemented as part of the Adaptation Funds portfolio of projects.

Measuring resilience in agricultural communities

While there are multiple definitions of resilience, these often converge in principle around the basic understanding that resilience is the capacity to respond to, withstand or recover from shocks and stressors in an adequate and timely manner. The different definitions also try to elaborate on resilience of what or whom (for example, an individual, household, community or ecosystem). However, in many cases the measurement of resilience itself (along with the drivers and trajectories of resilience) is often not clearly elaborated, if at all. In the ACREI project, a specific focus was placed on better understanding and measuring resilience in the targeted agricultural communities, using the Resilience Index Measurement and Analysis (RIMA) model. RIMA is a quantitative methodology for measuring resilience, that uses a Multiple Indicators Multiple Causes (MIMIC) model to estimate a household's Resilience Capacity Index (RCI) based on four pillars: Access to Basic Services (ABS), Assets (AST), Social Safety Nets (SSN) and Adaptive Capacity (AC), along with at least two food security outcomes[1].

RIMA was conducted in all counties at the start of the project as part of the project baseline assessment[2]. The findings showed that in Taita Taveta County, Kenya, asset ownership plays a crucial role in the resilience of households and that livestock adaptation would likely boost the resilience of households more than crop and off-farm adaptation practices. The resilience benefits of livestock-based adaptation options were further explored in poultry-focused FFS groups in the project, and reflected in community adaptation planning where resilient goat breeds were prioritized by some communities. In Sembabule and Isingiro, Uganda, a severe shortage of water was noted as one of the key shocks that undermine household resilience. This too was ultimately reflected in the communities' choices for adaptation support, with a majority of communities prioritizing water harvesting and small-scale irrigation support in their plans. Both project sites in Ethiopia, identified high food prices and a shortage of water as the main shocks that undermine the resilience of households. FFS therefore focused on climate-smart crop production practices for income and resilience. To respond to water shortages, communities were supported with water pond structures. Community adaptation planning also highlighted aspects of climate-smart agriculture and social safety nets echoing the RIMA baseline findings.

As of the end of the project, the RIMA endline survey demonstrated an increase in the Resilience Capacity Index (RCI) among project beneficiaries in all three countries. The improvement of social safety nets formed a key contribution of the project through participation in groups and associations, such as FFS and village savings and loan associations (VLSAs). Adoption of climate-smart practices, mostly for crops also contributed to enhanced resilience. The findings further showed that prolonged drought in the project locations impacted less on the livestock assets among beneficiary households as opposed to non-beneficiary households.

The RIMA methodology was hence successfully used in the project to:

(i) Understand the resilience profile of the targeted communities;

(ii) Establish baseline values from which to measure changes in resilience capacity as a result of the project interventions,

(iii) Identify the types of resilience interventions to focus on based on the household situation, including trade-offs and thresholds at which one intervention could become more or less effective than another; and

1 https://www.fao.org/policy-support/tools-and-publications/resources-details/en/c/1099197/

2 Ngesa, O., Grey, S., Duveskog, D., Atieno, I. (2021). Characteristics and Determinants of the Resilience of Smallholder Farmers: Lessons from Application of the RIMA II Methodology in Eastern Africa. In: Luetz, J.M., Ayal, D. (eds) Handbook of Climate Change Management. Springer, Cham. https://doi.org/10.1007/978-3-030-57281-5_67

(iv) Measure the resilience impact of the project. Other stories in this document provide more detail on the specific interventions and how they benefited the communities.

Summary of impact data from the end line survey

Ethiopia	Kenya	Uganda
Smallholder farmers accessing climate information increased by **75%**	Smallholder farmers accessing climate information increased by **7%**	Smallholder farmers accessing climate information increased by **42%**
Uptake of CSA practices • Quality seeds (27% to 51%) • Crop diversification (18% to 51%) • Organic farming (18% to 44%), intercropping (9% to 32%) • IPM (6% to 32%) • Mulching (11% to 24%) • Minimum tillage (7% to 21%) • Improved livestock breed (11% to 30%)	Uptake of CSA practices • Mulching (14% to 31%) • Cover cropping (6% to 28%) • Minimum tillage (13% to 37%) • IPM (7% to 12%) • Improved livestock breed (19% to 41%)	Uptake of CSA practices • Quality seeds (11% to 16%) • Crop diversification (36% to 47%) • Mulching (23% to 54%) • Minimum tillage (8% to 19%) • IPM (8% to 15%) • Improved livestock breed (3% to 8%)
Positive impact on resilience. RCI increased by **15%**	Positive impact on resilience. RCI increased by **7%**	Positive impact on resilience. RCI increased by **29%**

Climate-informed Farmer Field Schools (FFS)

The FFS approach brings farmers together in groups to carry out field-based experimentation and decision-making through discovery-based and experiential learning techniques[3]. Through weekly learning sessions facilitated by trained FFS facilitators, farmers gain an understanding of complex agroecosystem processes while testing and analysing crop, livestock or natural resource solutions to identified problems. Although FFS have been widely applied for over 30 years by FAO and other actors, climate change and variability have not featured frequently as key elements of the typical learning curriculum. ACREI along with some other similar interventions have recently contributed to more climate oriented FFS.

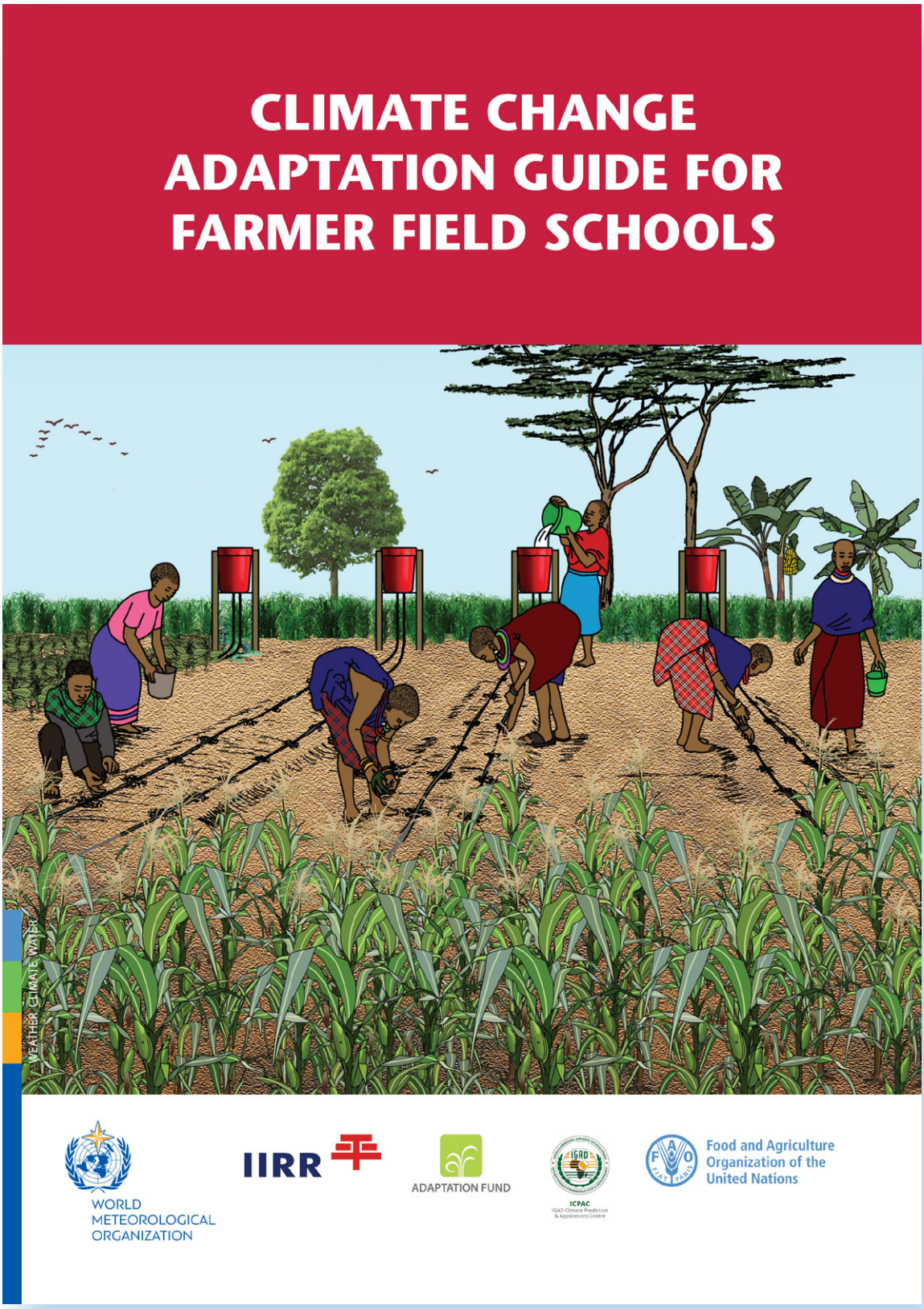
Under ACREI, 62 FFS groups were formed across the project target locations, 20 in Ethiopia, 22 in Kenya and 20 in Uganda. These groups averaged approximately 30 participants each reaching over 1 900 participants over the course of their operation. The learning in these groups was enabled by FAO trained facilitators, who, through farmer-led studies, observation and analysis have helped the groups to understand how agricultural production can be improved despite the erratic climate conditions. In the Gari Iffebas FFS group in Kersa Woreda of east Haraghe Zone, for example, members focused on critically observing and documenting different potato varieties at each stage of growth to understand their resilience to climate variability. A knock-on effect of this FFS learning was the establishment of potato seed multiplication for sale to other households in the community and with FAO support, the FFS group formally registered as a seed multiplication cooperative and opened a bank account. An agreement with a nearby research university made it possible to sustain access to potato seed planting materials. In the Mbulia FFS group in Voi sub-county of Taita Taveta, Kenya, the group focused on the performance of green gram under conservation agriculture practices to improve household production and income and develop strategies for resilience towards the adverse effects of climate variability and change. For sustainability, the FFS groups in the county were supported to form village savings and loan associations (VSLAs), with at one point over 2 000 000 Kenyan shillings (KES) (approximately USD 20 000 at the time) in circulation among eight groups in the Ngolia and Mbololo wards. In Isingiro and Sembabule Districts of Uganda, the FFS groups focused on trials related to intercropping and different fertilizer regimes, both important aspects for enhancing the productivity and resilience of agriculture. This learning is since being used by farmers in their own fields to improve their livelihoods and food security and has been complemented by other aspects of the project, particularly the community adaptation investment support. FFS groups were further supported with low-cost rain gauges to enhance their own knowledge of local rainfall patterns while also providing an opportunity for the NMHSs to gather microclimatological information for comparison with the readings from the official networks.

Learning and exchange among FFS groups both in-country and between countries was also programmed into the FFS learning under the ACREI project. In Kenya, joint FFS graduation events reached high attendance, resembling mini county agricultural fairs that demonstrated the agricultural produce and products of the various FFS groups in collaboration with stakeholders. In February 2024, farmers from FFS groups in Ethiopia, accompanied by agricultural extension and NMHS staff, held a learning visit to their counterparts in Taita Taveta County, Kenya, where they learned more about conducting trials on early maturing and drought tolerant crop varieties, visited water harvesting infrastructure sites developed under the project, and also engaged with radio journalists to understand more about their role in the communication of climate information. The FFS groups also provided the ideal opportunity for women's participation and empowerment. By Year 3 of the project, FFS groups in Isingiro District of Uganda were composed of approximately 75% women. In Kenya, women made up 60% of FFS membership and 50% of FFS leadership. FFS learning activities were always scheduled taking account of gender-based work outside the field to enable women's participation.

Two guidelines; a Climate Change Adaptation Guide for FFS and the Climate Information and

3 http://www.fao.org/farmer-field-schools/home/en/

Knowledge Guide for FFS have been developed through the project and have high potential for use across Eastern Africa as a whole. These guides were developed in partnership with the International Institute of Rural Reconstruction (IIRR) with input from FFS practitioners in the region. WMO is currently developing an online course on Communication of Agrometeorological Information, that is based on the various experiences and lessons under ACREI and other WMO projects, for use by NMHSs and intermediaries of agrometeorological services.



Leveraging local radio to communicate climate information

Surveys conducted by ICPAC at the beginning of the ACREI project (and indeed various similarly focused surveys conducted by other organizations elsewhere) indicated that radio was by far the preferred medium of farmers and field staff through which to obtain climate information[4]. Radio stations often include information and programmes about aspects such as the impending occurrence of agrometeorological hazards and related advisories on droughts, floods, prolonged dry spells, among others. Ensuring that this type of information is communicated in a timely, clear and understandable manner is crucial. Local radio stations often play a key role in communicating information in simplified formats and in local languages. For these reasons, the capacity-building and engagement of radio stations and media practitioners formed a key component of the ACREI project. A spiral approach was designed to incrementally develop the capacity of local media practitioners in agrometeorological reporting. This progressive approach ensured a solid foundation in basic concepts, followed by the introduction of more advanced techniques. To broaden the scope of their reporting and foster interdisciplinary collaboration, strategic partnerships were forged with relevant stakeholders, such as the FAO. Joint field missions to remote project areas provided valuable opportunities for journalists to gain firsthand experience and produce high-quality, evidence-based reports.

To help support the systematic communication of weather and climate information by radio stations and other media, ICPAC developed a methodology known as the Seasonal Media Action Plan (SMAP), which was first piloted under the ACREI project. The SMAP is a co-produced plan by the media and NMHSs in a location for the dissemination of weather and climate information in a given time period. It is normally developed jointly between the NMHS and local media partners at the start of a rainy season, identifying the types of weather and climate information to be shared, the associated timing and the specific responsibilities of different media partners, like local radio stations. At the end of the season or as part of the development of the next season's SMAP, the plan is reviewed to identify lessons and iteratively improve and evolve it. The SMAP fosters shared responsibility and accountability in the process of climate information communication. "At the end of the season, we will review the reporting levels and conduct a survey before the March–April–May season to gauge if end users have benefited from the increased media activity. Journalists who excel will be recognized and any identified weak links will be addressed in the new season" explained Collison Lore, the media engagement expert at ICPAC during an interview ahead of the October-November-December 2019 rainfall season in Kenya.

As part of a comprehensive strategy to improve media reporting on climate information, ICPAC also trained media practitioners on broader aspects of user engagement like conducting surveys, farmer vox pops (coming from the Latin term vox populi meaning "voice of the people"), broader climate information understanding, and climate information communication skills. Selected media practitioners who showed high promise and interest were supported with equipment like recorders to motivate them and enable them to implement what they had learned. Across the three project target countries, 12 radio stations were engaged under the project and sustainable partnership and capacity-building supported. Sifa FM, one of the radio stations engaged in Kenya, currently broadcasts weather and climate information to communities in Taita Taveta County through radio talk shows, news reporting, vox pops from field visits, feature stories and interactive sessions with staff from the Kenya Meteorological Department (KMD). An extremely positive outcome from this engagement and capacity-building is that several of the presenters who have been engaged and trained under the ACREI project have continued the climate and climate change reporting beyond the scope of just the

4 In Kenya, statistics indicate that 98% of the adult population has access to radio. Ethiopia's national radio station reaches nearly 45 million people across the country in widely spoken languages such as Amharic, Oromifa, Tigrinya, Somali Afar, and English. In Uganda, approximately 91% of the population has access to radio, with over 200 radio stations in operation across the country.

project and have been recognized at national and regional level for their efforts through various awards[5] (See Box 1).

Box 1. Women trailblazing in weather and climate reporting

Linda Akoth and Linah Mwamachi are award-winning journalists from Sifa FM in Voi who, since 2019, have worked extensively on weather and climate communication in Taita Taveta County, Kenya. After attending ACREI training courses for media practitioners in Taita Taveta, Linda and Linah committed to use their skills to disseminate weather and climate information to the women farmers in the County. They promoted user-friendly weather and climate information services to help communities cope with the changing climate and increasing risks of disasters, food insecurity and lack of water access.

Motivated by the potential of weather and climate information to address the challenges facing women, Linda focused on gender and climate reporting. She hoped to amplify women's voices and highlight women who had made progress in adapting to the impacts of climate change at the grassroots level through news articles and radio talk shows.

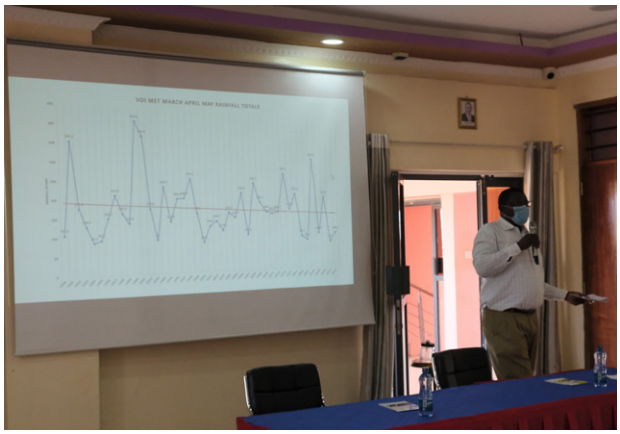
Linah championed the importance of co-production of weather and climate information. Her reporting highlighted how different stakeholders, like the media, civil society organizations, development partners and farmer representatives participate in the co-production of climate advisories. She argued that co-production leads to the co-development of solutions that are more appropriate and sustainable. Since women provide the bulk of the labour on farms, it was essential that their input and voices be included in the co-production process as key stakeholders.

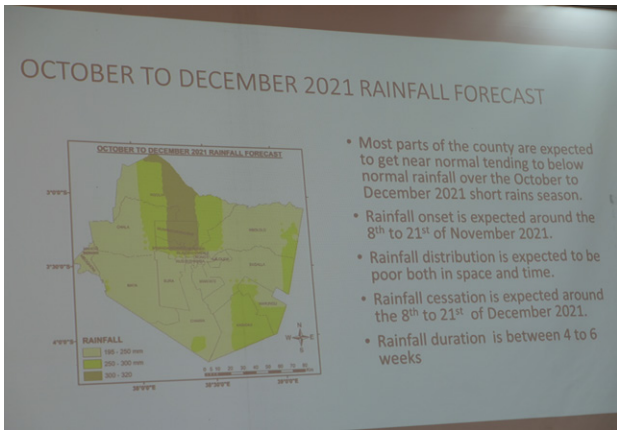
Their efforts paid off in a media competition organized under the ACREI project. Sifa FM was awarded Best Media House in the County for its dissemination of weather and climate information during the October–November-December 2019 rainfall season, while Linah and Linda received first and second position, respectively, as best individual journalists for climate and weather reporting. The awards ceremony was organized on the sidelines of continued training for the media on communicating climate information, therefore serving the dual purpose of raising their capacity and recognizing their efforts. In 2021, the two journalists participated in Climate Action Awards East Africa and Linda emerged as second runner-up under the category of Women for Results and Media for Climate (Radio). In 2022, Linda also attained an award for reporting in the Agriculture and Food Security Category of the first edition of the Association of Grassroots Journalists Kenya (AGJK).

The collaborative relationship between local media and meteorological agencies, established through the project, endures. National meteorological agencies maintain regular communication with the media via WhatsApp groups, disseminating timely weather and climate forecasts. This sustained engagement has resulted in consistent and high-quality reporting on these critical issues. The project's emphasis on peer-to-peer learning has created a supportive network of journalists, fostering knowledge sharing and professional development. Furthermore, local media have diversified their sources of information, now seeking input from a wide range of agrometeorological experts.

5 https://www.icpac.net/news/meet-the-winners-of-the-climate-action-awards-east-africa/

Co-producing seasonal climate advisories with farmers





The communication of climate information in the ACREI project followed a co-production approach. While data and tools to produce tailored climate information are no doubt crucial, a key aspect of the delivery of climate services for the agriculture sector in developing countries has been a shift to inclusive and participatory processes for their co-production. The ACREI project used two main methods of co-production with agricultural stakeholders. The first was Participatory Scenario Planning (PSP)[6], a methodology to collaboratively design and deliver seasonal user-centred climate information services in agricultural communities. It is a collaborative approach designed to integrate diverse knowledge systems to address the challenges faced by rural smallholder farmers in the context of climate change and variability. Recognizing the complex and dynamic nature of climate challenges, PSP emphasizes the importance of knowledge integration, iteration, and continuous adaptive learning and management. This process is reinforced at the sub-national level by involving a broad range of stakeholders, including national weather and climate information producers, intermediary institutions, local leaders, ITK experts, CBOs, the media and the local community.

With support from ICPAC, PSP workshops were conducted, consistently, in all project locations across all three countries for every important rainfall season, throughout the duration of the project. ICPAC staff initially facilitated the workshops, however, in subsequent workshops the NMHSs —Kenya Meteorological Department (KMD), Uganda National Meteorological Authority (UNMA) and the Ethiopian Meteorological Institute (EMI) — took the lead, ensuring that the capacity remained with them. Capacity-building for the NMHSs on the downscaling of the regional and national level forecast to the district or county level was also a key activity since the downscaled forecasts were crucial for understanding the local climate, without which a PSP workshop would not meet its goals. The PSP workshops enabled the co-production of agricultural advisories for the season among the respective NMHSs, local government departments, agricultural extension agents, disaster risk reduction agencies, non-governmental organizations (NGOs) and community-based organizations (CBOs), indigenous knowledge experts, and local farmers. As a result of the PSP workshops, collaborative agriculture sector advisories were developed for all locations for each important season. These advisories included aspects such as which varieties were best to plant, when to plant, and timing for undertaking other key agronomic practices. The advisories were translated into local languages such as Swahili for Kenya, Afaan Oromoo or Oromiffa for Ethiopia, and Runyankore and Runyarwanda in

6 https://careclimatechange.org/practical-guide-to-participatory-scenario-planning-seasonal-climate-information-for-resilient-decision-making/

Uganda. This process results in products that are scientifically sound, locally relevant, and useful for farmers. This co-production approach also strengthened the collective interpretation, ownership and practical application of seasonal advisories and climate forecasts.

Even during the COVID period, PSPs were still conducted consistently in the project locations, either in-person or virtually, ensuring that farmers and other agricultural stakeholders had the opportunity to jointly review the outcomes of the past season, discuss the upcoming forecast and identify the strategies to enhance agricultural resilience and risk management for the incoming season. In fact, the COVID period resulted in innovations in co-production that were used by journalists in the project locations. One such innovation used was the Zoom Mashinani[7] initiative (meaning Zoom at the Grassroots), which facilitated various engagements between farmers, NMHS staff and other stakeholders using video conference technology.

A second methodology, Participatory Integrated Climate Services for Agriculture (PICSA)[8] applied at household level, was used to help farmers primarily understand historical climate and the implications of seasonal forecasts in their decision-making. A regional PICSA training course was held in early 2023, late in the project because initial efforts to hold it were hampered by the COVID-19 pandemic. As such, a full PICSA rollout could not be achieved. However, in Ethiopia the trained NMHS and extension staff with support from FAO, were quick to build the capacity of local actors to roll out the approach in the project locations.

Results from the ACREI endline survey show that farmers involved in the co-production activities in the project demonstrated greater knowledge of climate adaptation and climate services, as well as having higher resilience capacity due to this knowledge.

7 https://www.icpac.net/news/zoom-mashinani/

8 https://centaur.reading.ac.uk/77187/1/PICSA%20Field%20guide%20-%2026-10-15%20final.pdf

Enhancing climate resilience in Njoro Ndogo Community, Taita Taveta County, Kenya

Mata ward of Taveta sub-county of Taita Taveta County, is located along Kenya's border with the United Republic of Tanzania. Many of the farming households there rely on some form of irrigated farming due to the dry nature of the area and highly unpredictable rains, that often lead to cyclical crop failure. Those undertaking irrigation use canals to guide water to their farms so they can grow maize, vegetables and fruit for household consumption and sales. These canals are often in a state of disrepair with water flow hampered by high levels of siltation.

The Njoro Ndogo Community in Mata ward was one of those identified for community adaptation investments under the ACREI project due to its vulnerability to climate variability and change. Through a series of community-based planning sessions, households came to the consensus on the need to either construct new, or rehabilitate existing irrigation canals. The intervention would benefit both crop and livestock farmers in the community. In 2023, following the endorsement of the community request by the County government and the project management team (PMT), the project supported the repair and upgrading of two kilometres of canals[9] in Njoro Ndogo, improving the delivery of water to the nearby farms. The reconstruction of the canal expanded the area under irrigation to 100 acres from the initial 12 acres. The canals now provide faster and more water, enabling the irrigation support to cover a greater area. To sustain the impact of this initiative, community members were grouped into clusters for collective action in production and marketing. This has not only inspired collective action and reduced conflict but has also enhanced household and collective resilience to the impacts of climate variability and climate change.

Other communities in Taita Taveta County were similarly supported, based on a high preference for water and irrigation related adaptation support that emerged during community adaptation planning sessions across the different communities. This support included the construction of check dams and retaining walls to raise water storage capacity along rivers used for irrigation and livestock watering, as well as distribution of over 1,800 water storage tanks to vulnerable households to enhance household vegetable production. Complimentary activities related to capacity-building on appropriate crop and livestock production practices and vegetable garden techniques were addressed through FFS activities, complemented by the seasonal participatory climate advisory processes conducted by the project. In total over 840 farmers benefited from climate-smart agriculture related support and more than 700 households established kitchen gardens as part of the project[10].

1,800

water storage tanks distributed to vulnerable households to enhance household vegetable production.

9 https://www.the-star.co.ke/counties/2024-07-31-fao-project-to-boost-food-production-in-taita-taveta

10 https://www.fao.org/kenya/news/detail-events/en/c/1677450/

Sustainable water availability for crop and livestock resilience in Uganda

In Uganda, the ACREI project targeted two districts in the south-west of the country, Isingiro and Sembabule. The two districts lie in the cattle corridor, which is highly water-stressed. Based on an identified climate challenge of water stress, community adaptation plans in both districts highlighted the need to support water harvesting. As a result, the project supported the construction of 109 rainwater harvesting tanks in the two districts. In Isingiro District, the Food and Agriculture Organization of the United Nations (FAO) supported the construction of 60 rainwater harvesting tanks of volumes ranging between 10,000 – 70,000 litres, reaching an estimated 900 households. In addition, community goat and poultry rearing support was provided. In Sembabule, 58 rainwater harvesting tanks were constructed, providing support to over 800 households.

As with other countries in the project, the FFS approach was used to enhance experiential learning on climate-smart practices, ensuring that concrete adaptation support was complemented by enhanced knowledge on climate resilient practices. Over 70% of the members of the FFS groups in Uganda were women, reflecting the major role that women play in agriculture in the communities, as well as reflecting the effectiveness of the FFS approach in attracting and working with women. The FFS groups learning ranged from vegetable production to crop production to small livestock rearing. All activities were conducted in collaboration with agricultural extension offices based in the target districts, ensuring that support for the farmers would be sustainable in the long run. Reports from the agricultural extension officers, integrated seasonal performance, comparing the forecast to what was actually observed, and linking this to adaptation actions taken by farmers. Exchange visits and field days were also conducted among the FFS groups, attracting attention from various stakeholders.

Climate-smart agriculture for climate resilience in Ethiopia

In Ethiopia, the ACREI project worked in ten villages, known as Kebeles, in the two target districts of the project, Kersa, East Hararghe Zone and Mieso, West Hararghe Zone of Oromia region. Here the project supported the introduction of climate-smart agricultural practices aimed at benefiting 8,412 households.

Firstly, using the FFS methodology, 20 FFS groups were formed, each with 32 members, totalling 640 participants. The group formation guidelines including gender sensitive programming, ensured that 50% of the members were women. These groups received extensive training in climate-smart agriculture, climate change and climate variability. Each group developed action plans and prioritized practices that would best address the challenges they faced. The FFS approach, first initiated in 2022, has since been widely appreciated for its ability to improve livelihoods and boosting incomes among the project beneficiaries.

Box 2: The Gari Iffebas Farmer Field School (FFS) Group

In the Gale-mirga Kebele of Kersa Woreda, Iffebas FFS group prioritized a better understanding of which of the available potato varieties (which include Tullema, Gudena and Chiro) would perform best under their agroecological and climatic conditions. An extension worker, with FAO support, guided them through the experiential learning process focusing on critically observing and documenting the different potato varieties at each stage of growth. The group applied the FFS tool Agroecosystem Analysis (AESA) to make observations on crop performance and the ecosystem, including observing weather parameters.

A knock-on effect of the FFS learning has been the establishment of potato seed multiplication for sale to other households in the community, with the group harvesting five tons of seed potato from their plot in 2019. With FAO support, the FFS group formally registered as a seed multiplication cooperative and opened a bank account, with the aim of making a sustainable income from seed potato production. An agreement with the nearby Haramaya University was also made to enable sustainable access to potato seed planting materials.

In a later phase, all ten Kebeles were supported to conduct community adaptation planning during which they identified, natural resources management, climate-smart agriculture (crop production) and livestock production as key components for agricultural resilience. FAO supported the community, through the adaptation grants component of the project, with the following activities.

1 Constructing 10 community ponds and implementing physical and biological soil and water conservation activities, like stone and soil bunding, trenching, tree planting and roof water harvesting – all aimed at conserving soil and water, enhancing water retention and rehabilitating degraded land.

2 Accessing locally available improved seeds of crops like sorghum, maize, wheat and beans. Additionally, the groups received grafted fruit seedlings and vegetable seeds to support sustainable agriculture. In total 11,409 kg crop seeds and 3,818 grafted fruit seedlings were distributed to project beneficiaries.

3 Accessing forage grass seedlings, locally adaptable small ruminants (such as goats) and locally adaptable poultry.

Farmers from the FFS group in Gale-Mirga Kebele identified and cultivated dry and wet season potato varieties (Gudane for the wet season and Tulama for the dry season), adapting to changing weather conditions. The FFS group producing these improved potato varieties has secured legal certification as a primary cooperative and joined the Afren-Kelo Cooperative Union (CU) – a well-known cooperative in the Oromia region - as shareholders. Another group in the Bululo Nega Kebele community were supported to form a savings group through poultry farming, selling eggs and establishing market linkages, particularly with better markets in Dire Dawa town.

Enhancing livestock assets for resilience

The ACREI baseline analysis identified livestock as a key component for resilience in the various communities of the project. During community adaptation planning, multiple communities requested support to increase their stock of resilient livestock breeds, such as Galla goats, a known resilient breed. Various FFS groups also include learning topics related to livestock, for example, experimenting with different feeding regimes for poultry, FFS groups even conducted a poultry auction during one of the field days, accruing significant income from the livestock sales. Livestock was consistently noted as an important component of food security and climate resilience that needed bolstering.

In Kenya, as part of the ACREI project, FAO distributed 2,750 Galla goats to seven wards in Taita Taveta County[1]. A total of 2000 farmers received the goats, which were organized into six clusters based on location. This clustering was designed to facilitate the use of available male goats for breeding, improving the hardiness of the stock of goats in the communities. The Galla goats, known for their suitability for Arid and Semi-Arid Lands (ASALs) and their ease of management, have already begun producing offspring and milk, significantly improving the nutrition of families, especially children. The offspring will be passed on to other farmers within the groups, further enhancing the resilience of the community. Galla goats, native to East Africa, are well-adapted to the harsh conditions of the ASALs and have a high twinning rate, contributing to food and nutrition security through milk production. In Ethiopia, goats were also a part of the adaptation and FFS learning support. In Uganda, while livestock distribution did not feature in the adaptation investments, livestock adaptation was a feature of the FFS group activities, while water investments in the communities were meant to serve a purpose of both crop and livestock resilience.

> As a county, we have a plan to ensure this county is food sufficient through improved agriculture production. We shall work with partners like FAO, who have been invaluable in ensuring that such resources entrusted to you, like these goats, are given good care to yield milk, meat, and money for you.
>
> Christine Kilalo, Taita Taveta Deputy Governor

1 https://kenya.un.org/en/218286-gift-resilience-2250-galla-goats-handed-taita-taveta-farmers

Agricultural value chain support in Taita Taveta County, Kenya

While much of the agricultural adaptation and resilience support under the ACREI project focused on enhancing the production aspects, one community prioritized the need to enhance agricultural marketing through increased value as a key means to enhance incomes and hence household resilience. The ACREI project equipped Mavuno Sana FFS with an oil press to enhance the sunflower value chain. Initially, members would travel to the neighbouring United Republic of Tanzania to press their sunflower seeds, which was costly, leaving the valuable by-product, sunflower cake in exchange. However, the procurement of a sunflower oil press under the project has made it more affordable to process the seeds, also allowing the farmers to retain the protein rich seed cake to use as livestock feed. The oil produced from the press has enabled the group members to minimize the cost of buying oil while extra oil is sold to generate income for the households.

Enhancing capacity of National Meteorological and Hydrological Services (NMHSs)

for agrometeorological observations and monitoring

As part of the ACREI project, a component was dedicated to enhancing observation networks and agrometeorological monitoring capabilities where gaps existed. While this was not a major focus of the project, it was noted to be something of importance for the NMHSs involved in the project. As part of ACREIs support, three automatic weather stations (AWS) were therefore procured for the project sites. These AWS also incorporated soil moisture sensors, this being an important parameter for agricultural drought monitoring and crop yield modelling.

Recognizing that ground observation gaps will persist for some time and that remote sensing and other data could also be useful in filling ground observation gaps, in 2019, with the support of the European Organization for the Exploitation

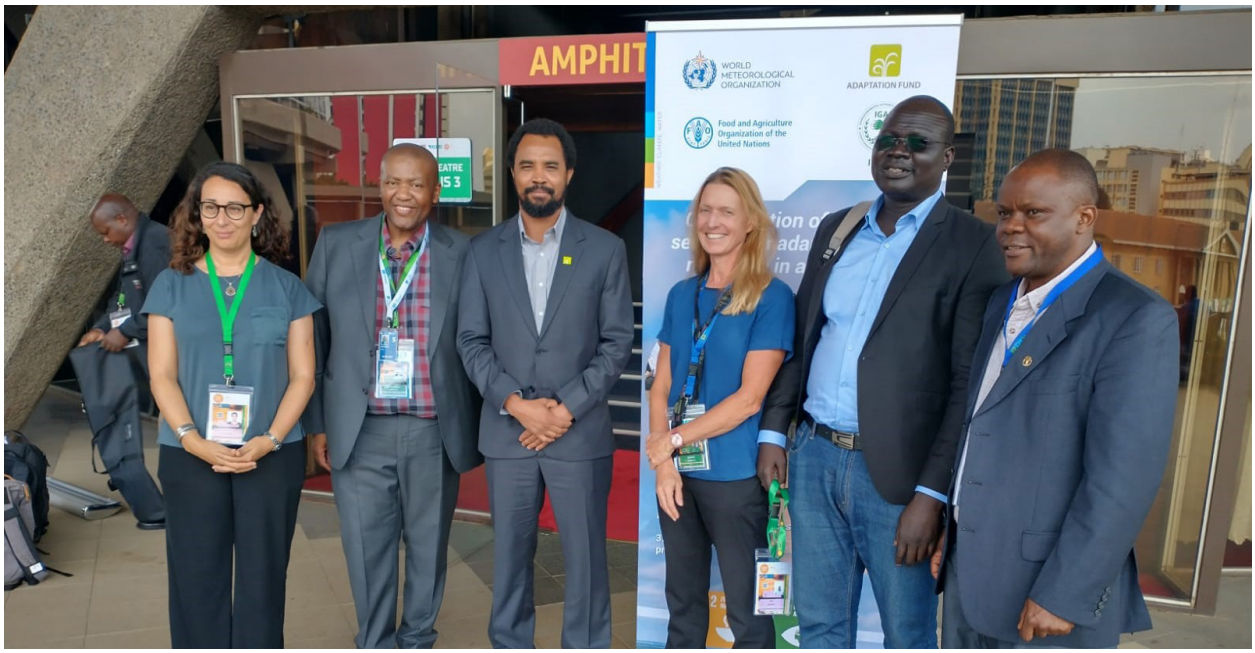
of Meteorological Satellites (EUMETSAT), a regional training was conducted on the use of satellite-based data and crop monitoring and forecasting tools for drought monitoring and agrometeorological applications. A total of 29 participants, from 13 countries participated in the workshop, that was hosted by the ACREI project and opened to participation of all ICPAC members with the support of other projects.

Historical climate analysis was also conducted for all the project locations, aiming to get a better understanding of the trends for aspects like seasonal rainfall totals, season length, occurrence of dry spells and ambient temperatures. This analysis was done using gridded datasets and the information provided a good analysis of the variations in trends across the project districts including places where no reliable ground observations were available.

Overall, there is still a need to enhance observation networks across the three target countries and support capacity-building on the use of agrometeorological data for aspects like operational drought monitoring and early warnings.

Advocacy for scaling up and out

The partners in the ACREI project took every opportunity to share experiences and lessons from the project on the global stage, participating in various international forums related to climate change adaptation in the agriculture sector. A standout event was at the Africa Climate Week in 2023, where the partners showcased good practices on participatory approaches that integrated local and indigenous voices, knowledge and experience into seasonal climate advisories, taking examples from the project, while also engaging other partners to share their experiences.



The final project advocacy event took place at a side event at the twenty-ninth Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC COP 29), where project partners held an event entitled "Insights and Impact of the Agricultural Climate Resilience Enhancement Initiative (ACREI)" in the Pavilion of the Intergovernmental Authority on Development (IGAD), ICPACs parent institution. Here the partners showcased the project as an ideal model for linking climate information to climate change adaptation. It is hoped that the ACREI model can be replicated and scaled up, building on the lessons learned and the documented good practices.

KEY LESSONS AND RECOMMENDATIONS

- To reach the last mile with climate services collaboration and multistakeholder partnership across the agricultural and meteorological spectrum proved critical, in this case between WMO, FAO and IGAD ICPAC, complemented by various stakeholders at local levels such as NMHSs, Ministries of Agriculture, Local Government Offices, Agricultural Research Institutes and more. This ensured a coordinated approach to climate services and support for climate change adaptation. Such multistakeholder partnerships, particularly in the co-production of climate services, must be enhanced.

- At the centre of the ACREI model was the careful and well-structured integration of multiple proven participatory and user-centred adaptation and climate services approaches applied in synergy, that jointly contributed to the impact observed, in a way that individual approaches applied alone would not. Community-based adaptation action planning was complemented with more in-depth participatory learning in FFS, informed by the set of climate context appropriate advisories.

- Sustaining support for extension delivery that reaches community levels is vital. Supporting and maintaining a pool of both public and private extension workers who are competent on climate services communication and have the necessary resources to undertake their work is important.

- Kenya having a decentralized NMHS structure (inadequate staffing not withstanding), demonstrated consistent and closer interactions between NMHS staff, intermediaries (like agricultural extension officers and the media) the media and the farming communities. Other countries could aspire to a similar decentralized NMHS system.

- Appropriate packaging and communication of agrometeorological information is crucial, with opportunities to engage local media, extension and other organizations to support this using local languages and understandable and actionable terminology.

- The co-production approach was a key pillar of the climate services component of ACREI and should continue, where possible creating permanent user-interface platforms that are not only reliant on project funding for their operations and sustainability.

- The project demonstrated the value of allowing a broad technical scope of interventions based on farmers preferences and informed decision-making and thus not prescribing the technical nature of project activities and indicators at project formulation or start but allow this to evolve during the project life. This is in sharp contrast to how most projects are set up.

- Social networks were found to contribute greatly to community resilience. The FFS along with registering of cooperatives and village savings and loan associations all contributed to this and will likely support resilience long after the project ends.

- The ACREI project overall achieved its intended aim for gender balance in project activities, however, with higher women engagement at community level than at more up-stream district/county forums platforms. It remains clear that a concerted effort on women's empowerment and involvement is needed, by approaching project design and implementation through a Gender, Equity and Social Inclusion (GESI) lens.

- Future opportunities exist for bundling climate services with other services, such as agricultural marketing information. These could be explored along with efforts to enhance digital agrometeorological advisories, noting still the preference for and ease of access to simple technology like local radio for rural farmers.

- Systematic monitoring of the socioeconomic benefits of climate services linked to its adaptation outcomes among farmers must be integrated into project design, as was done by using the RIMA methodology in the ACREI project.

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