AICCRA Kenya Briefing Pack

Climate change adaptation in Kenya's drylands

Strengthening institutional capacity for equitable action

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CGIAR

AICCRA
Accelerating the Impact of CGIAR Climate Research for Africa

The context

The urgency of climate change adaptation in the Kenyan arid and semi-arid lands (ASALs) has become increasingly evident.

The region suffered through a deep, five-season-long drought from 2021-2023, which severely affected productivity, livelihoods, and the environment. This resulted in extensive crop failures, a significant decline in household food security, and loss of income sources for hundreds of thousands of smallholder farmers, placing an estimated five million Kenyans in a state of acute food shortage and hunger.

In response to these challenges, the Kenyan government has launched several initiatives aimed at climate change adaptation in agriculture, including the Kenya Climate Smart Agriculture Project (KCSAP) and its subsequent phase, the Food Systems Resilience Project (FSRSP), as well as the Financing Locally-Led Climate Action (FLLoCA) Program.

Building on these efforts, the **Accelerating Impacts of CGIAR Climate Research for Africa** (AICCRA) project's Kenya team is actively engaging with multiple aspects of the climate-smart development ecosystem to promote sustainable and equitable change.

Now more than ever, farmers require accurate real-time climate information to help them plan their agricultural activities. As such, our key focus is improving the quality of climate information services and climate-smart agriculture, while increasing access to, and use of these resources by, women and youth.

Photo: ILRI/Kristen Tam

Photo: AICCRA researchers collaborate with the local community in Wajir to assess the dryland region, contributing to the development of a restoration plan through CGIAR's participatory rangeland management approach.

AICCRA in brief

CGIAR is the world's largest publicly funded global agricultural innovation network. For more than 50 years, it has provided evidence to policymakers and innovation partners along with the tools needed to harness agriculture's economic, environmental, and nutritional power.

AICCRA is a project that works with national and regional partners across Africa to provide access to—and enable the use of—enhanced climate information services and validated technologies and practices for climate-smart agriculture for millions of smallholder farmers across the continent. Through its innovative partnerships, CGIAR-led innovations are being delivered at a scale that meets the climate crisis.

Funded by the World Bank Group's International Development Association (IDA), AICCRA is designed to strengthen technical and institutional capacities that support climate change adaptation in six countries – Kenya, Ethiopia, Zambia, Mali, Ghana and Senegal – alongside support to Africa's regional organizations.

These groups collaborate across four thematic teams: (i) Priorities and Policies for climate-smart agriculture (CSA); (ii) Climate-Smart Technologies and Practices; (iii) Climate Services and Safety Nets; (iv) Gender and Social Inclusion. AICCRA is led by The Alliance of Bioversity International and CIAT and involves 11 CGIAR research centers and other official partners.

Photo: CCAFS/ S. Kilungu

AICCRA in Kenya

Photo: CCAFS/ O. Thiong'o

AICCRA is hosted in Kenya by the International Livestock Research Institute (ILRI), in collaboration with The Alliance of Bioversity International and CIAT, International Research Institute for Climate and Society (IRI), and International Crops Research Institute for the Semi-Arid Tropics (ICRISAT).

We're facilitating collaboration between Kenya's public and private sectors to develop tailored, gender- and socially-inclusive climate information services and digital agricultural advisory services.

Our researchers work with national public institutions to provide the foundation for promoting climate smart agriculture (CSA) and climate information services (CIS), and we also work with national civil society organizations investing in equitable rural development and climate change adaptation.

We work with county governments – including agricultural and meteorological extension services and county planning stakeholders – to bolster last-mile delivery of CSA and CIS technologies to farmers and herders, and embed climate-smart development into counties' spatial planning processes.

With our institutional partners, we employ a 'training-of-trainers' approach to embed knowledge and skills for supporting cutting-edge CSA and CIS into their practices and protocols. Alongside these partners, we work directly with farmers and herders to improve their access to CSA and CIS adaptation technologies and strengthen knowledge exchange networks, thus helping to weave resilience into their day-to-day practices.

To more effectively institutionalize capacity-strengthening efforts, we are also developing tailor-made curricula for universities and technical/vocational education training centres. These will ensure that the latest integrated CSA/CIS knowledge and training underpins the education of the next generation of administrators, researchers, extensionists, businesspeople and farmers.

By improving how markets function for farmers under climate change, and developing user-friendly crop forecasting systems (with a focus on loss and yield) with accessible digital tools and interfaces, AICCRA Kenya is ensuring that useable and actionable information is reaching farmers in an inclusive way.

For more information on AICCRA Kenya, visit: https://aiccra.cgiar.org/regions/kenya

Stories of impact

AICCRA Kenya's portfolio of CSA and CIS innovations is contributing to practical and sustainable change in the Kenyan climate change adaptation ecosystem across four key areas:

Integration of climate and agricultural data; work on drought-tolerant crops and climate-smart agronomy; interventions to support sustainable rangeland management and climate risk reduction; and the institutionalization of CSA and CIS knowledge.

Photo: CIAT/Neil Palmer

Integration of climate and agricultural data

AICCRA Kenya is integrating climate and agricultural data to provide targeted digital advisories that support climate risk reduction. A significant initiative is the creation of a national-scale AgDataHub, jointly owned by government meteorological and agricultural departments.

The hub amalgamates data from diverse sources at varying spatial and temporal resolutions, localizing this data and analytics to Kenyan administrative levels. Users can access this integrated data through web-based dashboards, which present crucial agro-meteorological information for crafting weather-informed agro-advisories, such as optimal planting times and suitable crop varieties based on historical rainfall patterns.

The hub also serves as a valuable resource for both public and private sector extension agents. They can interactively use maps or drop-down menus to drill down to specific wards, accessing information about past and current weather conditions, as well as future forecasts. This easy access and embedded analytics can significantly lower the costs and efforts required to provide precise, data-driven advisories for crops and livestock.

Additionally, the hub is being institutionalized and integrated with the existing Kenya Agricultural Observatory Platform (KAOP), established in 2017 under the World Bank-funded KCSAP project. Originally a collaborative effort of the Kenyan Agricultural and Livestock Research Organisation (KALRO) and the Kenya Meteorological Department (KMD), the integration with the

AgDataHub has significantly enhanced KAOP's capabilities and user experience by improving access to various types of weather forecasts and agricultural datasets, increasing the platform's value to farmers and other stakeholders.

Recent enhancements to KAOP by AICCRA have expanded the platform's reach.

> In 2023, AICCRA Kenya supported KALRO in delivering climate agro-advisories to 471,000 farmers, 60% of whom are women, primarily via SMS and radio.

The project has also increased awareness and adoption of climate-smart agricultural practices among 37,000 farming households in Kitui, Makueni, and Taita Taveta counties through targeted advisories and ongoing training. This initiative has markedly improved farmers' knowledge and implementation of climate-smart techniques, leading to higher crop yields and enhanced resilience to climate-related challenges.

Photo: ICRISAT

Taita Taveta County_Kasighau Ward Farmers Field Day.

Drought-tolerant crops and climate-smart agronomy

To help Kenyan farmers cope with reduced amounts of rainfall and changing weather patterns, the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) partnered with the Kenyan county governments of Kitui, Makueni, and Taita-Taveta to pilot demonstration farms in 2022 and 2023 for high-yielding, drought-tolerant, and early-maturing varieties of pearl millet, sorghum, green gram, and pigeon peas. And with AICCRA's help, these innovations are now being scaled in Kenya's drylands.

AICCRA has built community-level capacities by training 150 Trainer of Trainees and 30 county extension staff to disseminate knowledge.

Thirty demonstration plots, 10 in each targeted county, are showcasing the range of AICCRA's high-yielding, drought-tolerant crops. All demo host farmers in each of the plots are supported with farm inputs such as fertilizers and pesticides. These plots align with farmer preferences for improved crop varieties, and serve as platforms for demonstrating conservation agriculture and conventional tillage methods, focusing on good agronomic practices such as timely planting, soil ripping, weeding, and pest control.

To scale out adoption of the crops, demo host farmers extend invitations to 10 neighbouring farmers. They engage in shared activities such as constructing terraces, planting, weeding, and harvesting. The objective of this collaborative approach is to create opportunities for farmer-led exchanges of knowledge and collective learning.

So far, 243 lead farmers and extensionists have learned to cultivate drought-tolerant cereal and legume crops in the demonstration plots. An additional 12,500 farmers from 102 villages have received seed varieties of drought-tolerant sorghum, pearl millet, pigeonpea, and green gram. Insights gleaned from both the demonstration plots and participating farmers are disseminated to the wider community and reinforced through training materials distributed at harvest-season farmer field days.

> The farmer field days provide a platform for technology transfer among a broad network of agricultural stakeholders.

These events attract participants from neighbouring communities, including representatives from farmer producer organizations (FPOs), small-and-medium enterprises (SMEs), seed companies, and county government officials, facilitating a dynamic exchange of knowledge and practices.

Photo: ICRISAT

Livestock sector interventions to support sustainable rangeland management and climate risk reduction

Kenya's livestock sector makes up a critical component of its economy, with pastoralism providing much of the meat consumed within the country. Yet climate change is hitting pastoralists, and the rangelands in which they live and work, particularly hard. In this context, AICCRA Kenya is building capacities for participatory rangeland management (PRM), resulting in significant impacts for good governance, including women's participation and community commitment to restoring land.

Following a successful pilot in Baringo County with the support of the CGIAR Research Initiative on Livestock and Climate, AICCRA is now building capacities in several other counties and a variety of climatic contexts to scale PRM. The work so far has highlighted the importance of gender-inclusive approaches to PRM and recognising the crucial – yet often under-acknowledged – role that women play in rangeland management.

AICCRA is also supporting the scaling of KAZNET, a digital crowdsourcing platform designed by a team of ILRI scientists that leverages digital connectivity among pastoralist communities to collect data about specific indicators. The platform began in 2017 as a pilot programme for collecting livestock market information under the ILRI-led Index Based Livestock Insurance (IBLI) project. It works by 'micro-tasking' pastoralists to take pictures and enter specific information into an app on their smartphones, and feed this into the platform for use and analysis. It has also become a useful tool for verifying pasture conditions, which is the primary vegetation index used to trigger payouts for the livestock insurance.

KAZNET under AICCRA has expanded its operations in northern Kenya to collect and disseminate data on markets and the effects of drought on livelihoods and nutrition. These insights on climate trends are helping local pastoralist communities make more informed decisions about how to manage their livestock herds.

KAZNET is currently working with 24 contributors across three counties to collect data from 144 households, while 2,250 households are receiving timely information about markets and pasture conditions.

The reach of KAZNET is expected to expand to 6,000 households by December 2024.

The number of counties covered is also set to increase to five in the same year. To enhance engagement, the programme's researchers send SMS reminders to pastoralists, encouraging them to access KAZNET information. The team is also conducting studies to assess the platform's impact on decision-making and behavioral change among the users.

At the national level, the National Drought Management Authority has invited ILRI researchers to join a Technical Working Group, providing a platform to share KAZNET's results to inform programming and decision-making. The group includes representatives from the State Department for Livestock, the University of Nairobi, the Kenya Livestock Marketing Council (KLMC), county governments, and other stakeholders interested in gathering market data. Looking ahead, ILRI is exploring strategies to enhance local and national support capacities and aims to eventually transfer ownership of the project to Kenyan institutions, such as the KLMC.

Photo: ILRI/Kabir Dhanji

A Kenyan pastoralist inputs her children's consumption information into KAZNET's nutrition monitoring component.

Institutionalization of CSA and CIS knowledge

Curriculum development

AICCRA Kenya is committed to institutionalizing CSA and CIS knowledge, particularly through the development of university curricula and extension training programs, as well as through policy engagements.

In collaboration with four local universities—Murang'a University of Technology, Taita Taveta University, Chuka University, and Laikipia University—AICCRA has helped develop over eight university curricula in four counties. These include comprehensive Bachelor of Science and Master of Science programs, as well as professional short courses on specific CSA/CIS topics designed to enhance knowledge and skills.

Notably, three full-length curricula are already launched and open for enrolment: a Bachelor of Science and a Master of Science in Rangeland Ecosystem Management, and a Master of Science in CSA.

The curriculum development process has promoted collaboration among the four universities, facilitating knowledge sharing and identifying opportunities for scalable, sustainable growth and impact beyond AICCRA's initial contributions.

Furthermore, AICCRA Kenya is enhancing curricula for extension services. This includes the co-design of the pioneering short course curriculum, Climate Risk Management in Agricultural Extension (CRMAE), developed in conjunction with the Kenya Meteorological Department (KMD) and representatives from KALRO. This curriculum is specifically tailored to equip agricultural extension and advisory service (EAS) providers with the necessary tools and climate information to effectively manage and respond to the dynamic and varying climate conditions.

Photo: IRI

Farmer field day on a demo plot.

New tools for analysing, visualizing and disseminating climate information

AICCRA has also supported key developments by the Enhancing National Climate Services (ENACTS) initiative, including the Automatic Weather Station Data Tool (ADT) and Maprooms.

The ADT was developed in response to a very specific emerging CIS challenge. In recent years, a range of international initiatives, donors, and funders have invested in networks of automated weather stations (AWS) in an attempt to increase the availability and quality of climate data across Africa. However, a lack of coordination between the various groups funding these networks has meant that many countries have ended up with several types of networks, which often don't format and store their AWS data in the same way. This makes for major missed opportunities if national meteorological services cannot efficiently combine, synchronize, and analyse their datasets in the service of climate-smart decision-making. In response to this challenge, IRI scientists developed the Automatic Weather Station Data Tool (ADT), a free and easy-to-use web-based application that enables users from national meteorological services to access, process, perform quality control, and visualize data from different automated networks in one place. It also enables real-time monitoring of stations to help users understand where the data is coming from and address any interruptions in transmission. With AICCRA Kenya's support, KMD is now using the tool to great effect to simplify analyses and increase the use of data from the seven different AWS networks within its system.

AICCRA has also supported the development of '**Maprooms**', which are freely accessible, online analytical and visualization tools to make climate data more usable, and are designed to turn 'shapeless' climate data into actionable information for decision-making. The Maprooms are linked to rich sets of nationally-owned data at a very high spatial resolution of four kilometres, which is combined with satellite rainfall estimates and climate model reanalysis products to enable high-quality, spatially, and temporally complete datasets. They offer smallholder farmers, and

the network of actors that support them, critical information to facilitate agricultural planning, such as when the rainy season is likely to start, how much rainfall can be expected, and other key parameters that can make the difference between food security and insecurity for a family.

> Analyses from Maprooms are presented as maps and graphs, and are freely downloadable in a variety of common formats.

This automation allows for easy integration into reports, strategies, or other documents. Additionally, it enables even non-technical users to access robust information critical for agricultural planning and emergency response with just a click.

Photo: IRI

Installation of the automatic weather system

AICCRA-hosted workshops in Kenya have scaled the ENACTS approach to ensure that is exactly what happens on a consistent and sustained basis. This means bringing together all parties that play a role in promoting the use of climate information and services and broader resilience and building their capacity to extend these tools and knowledge to those in the agricultural sector who need it most. In an important milestone, in 2023, following installation and training of KMD on Maprooms, capacity development was cascaded to all county meteorological offices across Kenya.

Climate-smart investment planning

The agriculture sector in Kenya is particularly vulnerable to climate change due to outdated technologies and reliance on resources for production that are sensitive to a changing climate.

This has led the national government to prioritize investments in climate-smart and resilient agriculture, emphasizing the design of financially viable agricultural initiatives. The Kenyan Government is leveraging climate finance from sources like multilateral banks, the private sector, and international funds, particularly through the Financing Locally Led Climate Action (FLLoCA) program. However, there is a pressing need for frameworks to help public and private stakeholders set investment priorities that maximize financial resources.

In 2022, AICCRA, backed by the Ministry of Agriculture and Livestock Development's climate change unit (MOALD-CCU), developed the **Kenya Climate Smart Agriculture Investment Plan** (CSAIP). This plan provides strategic guidance and identifies CSA technologies with the highest potential to boost productivity and household incomes in a changing climate, proposing investment opportunities for investors.

AICCRA facilitated training workshops in Makueni, Siaya, and Taita Taveta counties to enhance technical and institutional capacities for climate change adaptation. Stakeholders improved in participatory investment planning, developed viable climate investment proposals, and aligned local strategies with broader climate policies.

AICCRA will collaborate with counties to design localized investment plans and packages that promote context-specific climate-smart agriculture within local communities.

In the spotlight:

AICCRA FARMER PHOEBE MWANGANGI

53-year-old Phoebe Mwangangi is an early adopter of climate-smart agriculture from Makueni County, a dryland region in Eastern Kenya.

She practices integrated subsistence farming on four acres of arable land, growing beans, pigeon peas, and maize, and grazes her sheep and dairy cow on six acres of shrubland for about a month each year.

Photo: ILRI/Mireille Ferrari

Phoebe Mwangangi (right) at the 2023 Africa Climate Summit in Nairobi, together with Halima Nenkari (left), Deputy Director of Livestock Production at Kenya's State Department for Livestock.

Phoebe has witnessed significant climatic changes over her 20 years of farming, experiencing longer and hotter dry seasons that have been devastating her crops. In late 2021, she and 24 other women in her area participated in a climate-smart agriculture (CSA) training led by AICCRA. The program covered rainwater harvesting, intercropping with legumes, crop diversification, and conservation tilling. It also introduced drought-tolerant and early maturing seed varieties for sorghum, pearl millet, pigeon peas, and beans.

One standout seed introduced by AICCRA is Nyota, a nutritious bean variety developed by the Kenya Agricultural and Livestock Research Organization (KALRO) with support from the Pan Africa Bean Research Alliance (PABRA). This early maturing, drought-tolerant bean has gained popularity among Phoebe and her peers. Phoebe considers it a lifeline for local farmers facing low yields.

'After maize failed us, it's not common for us to expect anything from the farm," she says, "but suddenly I can feed my family and have some crop left for sale.'

Phoebe attended the 2023 Africa Climate Summit (ACS) held in Nairobi, where she shared insights on farming, climate change and the impact of climate-smart practices for her community. She said, the information on CSA provided through the AICCRA project has the potential to "change the lives of farmers" for the better.

Photo:
ICRISAT

Training of Trainers (ToT) showcase the use of a handheld ripper for minimum tillage under Conservation Agriculture.

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

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