CHAPTER 6

THE CRITICAL ROLE OF LLA IN DROUGHT RESILIENCE

KEY MESSAGES

- Drought is among the world's costliest and most widespread climate threats. It causes damage exceeding US$ 300 billion every year and affects more than 1.8 billion people annually, impacting the poorest communities in particular.
- Local communities are already on the frontlines of drought resilience. In Nigeria's Doka community, farmers combine sandbagging, soil-rebuilding grasses, and scarecrows to protect crops, while similar practices across Africa demonstrate ingenuity and persistence.
- Social inequalities amplify vulnerability to drought. Women-headed households, pastoralists, and marginalized groups often face barriers to resources, decision-making, and recovery.
- Traditional knowledge is a critical resource, but climate change is testing its limits. While generational practices are vital, they increasingly need to be combined with scientific forecasts, climate data, and participatory research to remain effective in altered conditions.
- Anticipatory, adaptive, and absorptive capacities must all be strengthened. Drought resilience requires investments in early warning systems, flexible finance and insurance, community-based coping strategies, and sub-national, national, and regional policies and water management decisions that are led by the need of those affected.
- Scaling locally led drought resilience requires systemic support. For community innovations to endure, they must be backed by predictable funding, investment in local institutions, and accountability mechanisms that ensure national and global actors support local priorities.

Addressing Structural Inequalities

Investing in Local Capacities

Building Understanding

Collaborative Action and Investment

IN THIS CHAPTER

Communities working with PALM-TREEs researchers described psychological and social consequences as a result of drought.

DEALING WITH EXTREMES IN DOKA

In the farming community of Doka, Nigeria, smallholder farmers have long relied on tradition to navigate the challenges of each planting season. In recent years, however, their familiar coping strategies are being tested like never before.

At the start of each season, the farmers plant groundnuts and sorghum seedlings, and hope that the rain will arrive on time. Because if the rains are delayed, nature turns against them. Farmers must spring into action to save the precious seeds they have planted from swarms of hungry quelea birds. They set up *mutum-mutum*—handmade scarecrows—and must pay guards to scare off the birds.

Day and night, the guards kick up a cacophony with tin cans and plastic bottles filled with gravel to keep the birds at bay. They are powerless against the kadandoniya—millipedes in Hausa—that join the opportunistic quelea in devouring seeds, leaving the farmers with little to show for their hard work.

When the rains finally arrive, they bring another crisis. Sudden, heavy downpours trigger flooding, washing away topsoil and threatening fragile seedlings that have survived the drought. “The rain is supposed to bring us succor, but when it eventually does come, it only brings pain,” says Alhaji Abubakar, a farming group leader in Doka.

The farmers respond as best they can: they stack sandbags, dig run-off gutters, and plant soil-rebuilding grasses along the borders of their fields to prevent erosion. These strategies have served Doka for generations, but the changing climate is making it harder for smallholder farmers to protect their crops and livelihoods.

Increasingly erratic rainfall patterns are undermining food security in the savannah regions of Nigeria and Ghana. The impact of weather-related crop failure is particularly severe for households headed by widowed, divorced, separated, or single women, who often lack the resources to recover from repeated losses.[68]

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>
> Alhaji Abubakar, farming group leader in Doka, Nigeria

WHY DROUGHT RESILIENCE STRATEGIES MUST BE LOCALLY LED

A recent study estimates that droughts cost the world more than US$ 300 billion each year, making it one of the costliest and most pressing threats to societies and economies around the globe, particularly in the world's drylands. Over 1.8 billion people are affected annually, especially women and children, and the world's poorest and most vulnerable. The impact is long term and not limited to national economies—droughts also spur cross-border migration and heighten global security risks.[69]

Local Social Inequities as a Multiplier of Vulnerability

At the local level as well, the implications of droughts extend far beyond seasonal harvest shortages and immediate impacts on village economies. They affect local food security, gender equality, health, economic stability, education, and social and cultural practices.

The role of anthropogenic factors in worsening or improving the local impacts of drought are well documented. These include not only factors such as climate change, deforestation, agricultural practices and poor water management, but also social inequities, which determine whose water needs are prioritized.

Social inequities at the national and local level act as a multiplier of drought impacts by restricting access to increasingly scarce resources, reducing coping and adaptive capacities, and intensifying economic, health, and social hardships for marginalized populations. Poorer communities often face greater exposure to water scarcity due to limited access and infrastructure, and have more limited coping strategies. Poor farmers and pastoralists like Alhaji Abubakar, for instance, rely heavily on rain, and are more susceptible to drought-related crop failures, loss of pasture lands and livestock, and income disruptions.

Local knowledge combined with scientific seasonal forecasts is crucial to addresssing drought risks.

Drought also erodes social cohesion and support systems in vulnerable communities, reducing their ability to respond effectively. Health impacts worsen for disadvantaged groups, with gendered burdens especially affecting women who must travel farther for water and face higher risks during crises.

Race, ethnicity, gender, and other social factors can therefore intersect with economic status to amplify drought impacts, with historically marginalized communities experiencing compounded disadvantages during drought events. Additionally, political and historical inequalities force marginalized people to live in more drought-prone areas with fewer adaptive resources. These

marginalized groups may also lack political influence or social connections needed for accessing aid or information, compounding their vulnerability.

These social inequities are often very local, and demand focused equity-driven drought resilience solutions that are specifically tailored to local context.

Traditional Wisdom to Deal with Drought

Drought, however, is not a new phenomenon. While its frequency is on the rise due to climate change, communities in many parts of the world have dealt with it in the past and have developed multiple and complex local systems and coping mechanisms.

This traditional local knowledge, developed over generations, includes strategies to manage local water resources sustainably, predict drought conditions, and implement effective coping strategies. It encompasses understanding natural drought early warning signs, agricultural practices adapted to local ecosystems (such as mixed cropping and soil conservation), as well as community-based resource management techniques. These practices often rely on affordable, locally available materials and are culturally appropriate, enabling communities to reduce vulnerability and build resilience, even in resource-constrained settings.

However, climate change now impacts the reliability and applicability of traditional knowledge by altering weather patterns, disrupting natural drought signals, and challenging historical coping strategies, reducing their accuracy and effectiveness. This necessitates integration of modern scientific and local indigenous knowledge for adaptive drought management.

Climate Adaptation and Resilience (CLARE), a flagship research program on climate adaptation and resilience for Africa and Asia-Pacific, supports this integration of modern and traditional knowledge through needs-driven, action-focused research. CLARE is funded mostly (about 90%) by UK Aid through the Foreign Commonwealth and Development Office, and co-funded by the International Development Research Centre, Canada. The program bridges critical gaps between science and action by championing Southern leadership to enable socially inclusive and sustainable action to build resilience to climate change and natural hazards.

CLARE supports locally led approaches to strengthen drought resilience through early warning, insurance mechanisms, local co-creation, behavioral change strategies, and inclusive planning. The Program's work on drought resilience focuses on addressing social inequities and combining traditional knowledge with climate research through six projects:

- **Decision support for climate risk preparedness—towards gender-responsive crop insurance in West Africa**. Also known as GRIN, this project works with households in the savannah regions of Nigeria and Ghana to understand drought exposure, attitudes toward crop failure, and explore crop insurance solutions.
- **Strengthening Pastoralist Livelihoods in the African Greater Horn through Effective Anticipatory Action**. Also known as PASSAGE, this project aims to enhance early warning systems and encourage anticipatory action to protect pastoralist communities in the Greater Horn of Africa from worsening droughts.

While their effects and frequency are increasing due to climate change, communities in many regions of the world have long dealt with droughts and have developed a multitude of coping mechanisms.

- **Pan-African and Transdisciplinary Lens on the Margins: Tackling the Risks of Extreme Events**. Also known as PALM-TREEs, this project supports marginalized communities in Africa to respond to extreme events like droughts (as well as floods and heatwaves) and their socioeconomic impacts.
- **Behavioral Adaptation for Water Security and Inclusion**. Also called BASIN, this project promotes water security among vulnerable communities in Africa by studying and encouraging behavior change at multiple levels, from individuals to political institutions.
- **Building Insurance Mechanisms Adaptation**. Also called BIMA, this project builds gender-responsive livestock insurance mechanisms for agro-pastoral communities in Kenya, offering financial protection when drought strikes that is tailored to the needs of different groups, and different types of livestock, and that is effective for both users and insurance providers.
- **Climate Adaptation and Resilience in Tropical Drylands**. This project, also called CLARITY, operates in India, Niger, Nigeria, and Tanzania, using "transformational" labs', where communities co-develop equitable, sustainable plans for water and drought resilience.

Women and children are worst affected by the impacts of drought, floods, and extreme heat.

GRIN: CROP INSURANCE THAT PRIORITIZES WOMEN

The Decision Support for Climate Risk Preparedness Towards Gender-Responsive Crop Insurance in West Africa (GRIN) project was launched in March 2024, to design and implement gender-responsive drought index crop insurance informed by reliable weather forecasts and climate risk assessments. GRIN works directly with farmers and local leaders to understand context-specific risks—from droughts and floods to pest invasions—and supports better decision-making on crop insurance and payout options. Importantly, the project tackles structural inequalities faced by women, who carry the brunt of both domestic and small commercial farming activities, ensuring they have a voice in shaping solutions and accessing protection against climate-related losses.

GRIN works alongside existing insurance companies and meteorological agencies to pilot insurance products with incentives that acknowledge the limited financial resources of these communities. The incentives include elements such as flexible monthly or yearly subscriptions; a 10% rebate on premiums paid in advance; the option to pay premiums in the form of training; cash-back payments if there are no severe droughts; and best practices for storage post-harvest. Compensation for injuries sustained while farming is also included.

Meteorological agencies, for their part, provide reliable weather information to guide insurance decisions for women, offering content specific to different plant growth stages and harvest, as well as local climate trends.

PASSAGE: KNOWLEDGE LEARNING HUBS TO EMPOWER COMMUNITIES

In 2022, the Horn of Africa faced one of the most severe droughts in decades, leaving over 36.1 million people across the region struggling with water scarcity, food insecurity, and loss of livelihoods. The crisis hit hardest and affected the most people in Ethiopia (24.1 million

people), Somalia (7.8 million), and Kenya (4.2 million). For pastoralist families, the drought's impact was devastating, as more than 8.9 million livestock—their primary source of food, income, and cultural identity—perished.[70]

In a region where pastoral communities rely heavily on livestock mobility and healthy rangelands to access forage and water for survival, drought and extreme heat are the two most pressing climate change threats. To address these challenges, CLARE's PASSAGE project brings together academic institutions, practitioners, policymakers, and local communities to strengthen anticipatory action and early warning systems for cross-border areas in Kenya, Ethiopia, Somalia, and Uganda.

The project leverages predictive, multi-hazard, impact-based forecasts to help pastoral communities better prepare for climate-related shocks. Climate forecasts provided by national meteorological agencies are further enriched through research contributions on vegetation, temperature, and rainfall, such as the Vegetation Condition Index produced by the University of Sussex. They are then presented and discussed at regional forums such as the Greater Horn of Africa Climate Outlook Forums (GHACOF), and downscaled and tailored more locally through Sub Regional Climate Outlook Forums and at local Knowledge and Learning Hubs. At these forums, stakeholders discuss the potential impacts of forecasts for the upcoming season on various sectors.

PASSAGE works directly with pastoral communities through the local Knowledge and Learning Hubs using a novel framework called Forecast to Local Action (FOLA). FOLA brings together community members, local development organizations, and project teams to co-develop risk assessments based on local and scientific seasonal forecasts, community-developed vulnerability maps, and anticipatory action plans.

Collaboration with pastoral communities is key to PASSAGE's work in risk assessment.

This process of co-production allows for communities to be included and actively shape the early warning and preparedness processes, ensuring trust, relevance, and a direct link to protecting livelihoods.

For example, in Moyale, between Kenya and Ethiopia, communities combine forecasts from GHACOF with indigenous indicators like animal behavior, wind shifts, and star alignments to create a combined forecast. These are then linked to impact-based forecasts leveraged by PASSAGE, showing what a medium or strong drought would mean for different vulnerable groups like lactating mothers, children, or people with disabilities. Communities then agree on anticipatory actions such as pre-positioning nutrition support, organizing livestock destocking, and setting up cash or grain banks.

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>
> Halkano Roba, resident of Moyale, on the border between Kenya and Ethiopia

PASSAGE bridges the gap between scientific forecasts and community realities, enabling the development of locally led anticipatory action plans that are inclusive, context-specific, and equitable. "Before, when drought or floods were coming, we only knew after the damage started," says Halkano Roba, a resident of Moyale. "With the support of Knowledge and Learning Hubs, now we know we can receive early warnings and prepare our people."

The deliberately inclusive and participatory activities within the Knowledge and Learning Hubs have proven especially transformative for women in pastoralist communities, who are historically excluded from decision-making processes. "For women, the Learning Hub is a bridge to knowledge," says Buke Kalicha, a female farmer from Moyale. "We are now part of the discussions on how to act before disaster, and our voices are heard in the planning."

By fostering collaboration, inclusivity, and knowledge exchange, PASSAGE helps communities to move from reactive crisis response to proactive risk management. The project empowers pastoralists to anticipate hazards, play a role in protecting livelihoods, and build long-term resilience against a changing climate.

PALM-TREES: ADDRESSING THE MULTIFACETED IMPACTS OF DROUGHT

> **When drought and water scarcity strike, water for farming becomes secondary as we struggle to secure drinking and household supplies—and women and children are worst affected.**
>
> Salimat Musa, resident of Aladere-Ode village, Central Nigeria

In Aladere-Ode village, Central Nigeria, Salimat Musa has witnessed seasonal shifts before, but today climate extremes are harsher and increasingly unpredictable, stretching her community's resilience. "When drought and water scarcity strike, water for farming becomes secondary as we struggle to secure drinking and household supplies—and women and children are worst affected," she explains.

Her words reflect a wider truth: drought inflicts profound psychological and social pressures on rural communities. Beyond threatening livelihoods, it undermines mental health, wellbeing, cognitive ability, and social cohesion—deepening inequalities in places already underserved by essential services and aid. For many, resilience is pushed to its limits.

Women welcoming PALM-TREEs team members.

Launched in 2023, PALM-TREEs brings together physical and social sciences to confront climate extremes across six African countries—Nigeria, Ghana, Kenya, Cameroon, the Democratic Republic of Congo, and South Africa. The project not only measures the impacts of extreme events but also examines how and why communities interpret certain conditions as extreme, and how those perceptions amplify vulnerability.

To co-create adaptation strategies rooted in local realities, PALM-TREEs employs diverse methods, including interviews, vulnerability assessments, hazard metrics, climate modeling, and participatory workshops. Communities themselves decide which climate risks to prioritize and help design practical, transformative interventions that address both immediate needs and structural inequalities.

In Ghana, for example, research explores how droughts, floods, and water management affect vulnerable groups. Findings show women face higher sensitivity to heat due to their dual responsibilities in farming and caregiving. By combining these lived experiences with data, PALM-TREEs develops gender-sensitive adaptation strategies.

The project is anchored in African and international institutions, including the University of Cape Town, University of Lagos, and the University of Oxford. Its mixed-methods research feeds into Open Access Data Repositories and is disseminated through a cross-sectoral partner network to policymakers and stakeholders, strengthening inclusive planning, resilience, and equity.

PALM-TREEs also builds capacity at multiple levels. For researchers, particularly early-career scientists, it provides training and open data to deepen understanding of climate extremes and vulnerability. For stakeholders, including communities, practitioners, and policymakers, it fosters skills to integrate climate knowledge into policy and practice.

Participants of the BASIN National Stakeholders Workshop in Dowa, Malawi.

On the ground, the project strengthens local capacity in drought-resilient agriculture, climate information use, and cooperative market access through workshops, policy dialogs, and training events. In western Nigeria, for instance, PALM-TREEs raises awareness on using boreholes, tubewells, and pumps for dry-season vegetable farming.

It also promotes agroforestry as a sustainable drought-mitigation strategy. Marginalized men's groups receive seedlings of endemic tree species such as locust bean, shea butter, and cashew—the latter is now one of the region's most valuable agricultural commodities.[71]

BASIN: SYSTEMIC, STRUCTURAL, AND PSYCHOLOGICAL IMPACTS OF DROUGHT

The BASIN project applies concepts and methods from behavioral science and psychology to uncover the systemic, structural, and psychological factors shaping behaviors around water security in Malawi, Burkina Faso, and Tanzania. This includes exploring both individual behavioral determinants (such as perceptions of vulnerability and hazard awareness) and collective influences (such as social norms, community capacities, and intersectional identities).

Farmers are supported to conduct Climate Vulnerability and Capacity Assessments (CVCAs), using participatory tools like historical timelines, hazard mapping, and vulnerability matrices to analyze climate risks. Based on this process—and with guidance from BASIN researchers—they develop adaptation plans. These plans include drought-proofing measures such as building erosion-prevention channels, introducing environmental protection bylaws, strengthening village savings and loans groups, establishing tree nurseries, and installing new boreholes.

The CVCAs are facilitated by BASIN's NGO partners, including WaterAid, Shahidi wa Maji, and Water Witness International. They ensure adaptation strategies are rooted in community experience, fostering greater understanding, ownership, and trust. Each adaptation plan has clear timelines and designated leaders or committees responsible for implementation, reinforcing accountability and sustained engagement. The outputs also inform broader village action plans.

As one local leader in Malawi told Water Witness International, "This is the first time we have seen an organization return to us with results and ask for our input on what should be done next. For once, we feel included and are assured that our voice matters."

The Malawian community group of GVH Robeni works with BASIN to co-develop adaptation plans.

EQUITY, ACCESS, AND SUSTAINABILITY

CLARE's drought resilience projects demonstrate that equity, access, and sustainability cannot be realized without rooting adaptation in the lived experiences of those most affected. Research in fragile and climate-stressed contexts must contend with persistent barriers: limited and uneven access to reliable data, the exclusion of marginalized voices, and the challenge of translating scientific insights into policies and practices that are trusted and usable at the community level.

By applying the LLA Principles, CLARE ensures that communities are not passive recipients of external knowledge but active co-creators of solutions. Its drought-related initiatives bridge the gap between research and action by combining scientific tools—such as impact-based forecasts, vulnerability mapping, and innovative insurance mechanisms—with indigenous knowledge, lived experiences, and locally grounded governance systems. This co-production validates community expertise while strengthening the uptake, sustainability, and effectiveness of adaptation measures.

A defining strength of CLARE is its commitment to Southern leadership, long-term partnerships, and action-oriented research explicitly designed to foster equitable resilience. By convening diverse actors—including farmers, women's groups, local governments, insurance providers, and meteorological agencies—CLARE ensures that research outputs are accessible, relevant, and embedded

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> Local leader, Malawi

within local systems. Impact is measured not only through technical capacity and policy influence but also through community ownership, gender-responsive innovation, and strengthened trust between science and society.

Through these approaches, resilience strategies become more inclusive, more enduring beyond project cycles, and better equipped to anticipate and absorb the shocks of a changing climate. By championing and operationalizing locally led adaptation principles, CLARE is helping communities move from vulnerability to agency—reshaping how resilience to drought is built, measured, and sustained.