RESILIENT AGRICULTURE

Resilient Agriculture in East Africa, a pathway to survival and prosperity

In the sun-scorched fields of Machakos, Kenya, 46-year-old farmer Mary Muthembwa surveys her wilted maize crop. Once a dependable food and income source, the rains have become erratic, and her harvests have shrunk year after year.

Like millions of smallholder farmers across East Africa, Muthembwa faces a stark reality, climate change is pushing her family and community closer to poverty, with traditional farming methods no longer providing the security they once did across East Africa, from Ethiopia's highlands to Uganda's banana zones and Tanzania's rice paddies, farmers are grappling with longer droughts, unpredictable rain patterns, floods, soil degradation, and pest outbreaks like the devastating fall armyworm.

Over 70 percent of the region's population relies on agriculture, most of it rainfed, yet extreme weather threatens to undermine food security, incomes, and rural livelihoods.

But there is hope in resilient agriculture.

Resilient agriculture refers to the adoption of climate-smart farming practices and technologies that help farmers withstand shocks, adapt to changes, and sustainably boost productivity. Across East Africa, scattered success stories show how innovation can reshape agriculture and improve farmers' resilience if scaled up and supported effectively.

Stress-Tolerant Crops and Livestock

In Kenya's drylands, farmers have started switching to drought-tolerant maize varieties such as DroughtTEGO, developed by the African Agricultural Technology Foundation (AATF). These maize types yield up to 30 percent more under low rainfall compared to traditional varieties.

Similarly, in Tanzania, cassava farmers have adopted disease-resistant varieties that survive the ravages of cassava mosaic and brown streak diseases, safeguarding a critical food staple.

Livestock farmers are also tapping into hardier breeds. For example, Red Maasai sheep, native to Kenya and Tanzania, are more tolerant of parasites and dry conditions compared to imported breeds. Meanwhile, improved dairy goat breeds in Uganda are helping smallholders boost milk production even in tough environments.

These biological solutions are key to climate adaptation but they require investments in seed systems, breed dissemination, infrastructural development in modern irrigation and water management and farmer training to reach scale.

With unreliability in rainfall, irrigation offers a lifeline. In Ethiopia's Central Rift Valley, smallholder vegetable farmers have turned to drip irrigation systems that deliver water directly to plant roots, cutting waste and boosting yields. Supported by NGOs and microfinance, these low-cost systems have helped farmers double their harvests and incomes.

In Kenya, the National Irrigation Authority is expanding small-scale irrigation schemes, including sand dams, boreholes, and water pans, particularly in arid counties like Kitui and Baringo. These projects reduce farmers' dependence on rain and allow them to plant multiple cropping seasons.

But access to finance remains a major barrier. Many farmers cannot afford upfront irrigation costs without credit or subsidies. Expanding affordable finance mechanisms is essential to unlocking wider irrigation adoption.

Despite barriers, several innovative finance models are emerging across East Africa to support smallholder irrigation adoption. Pay-As-You-Go (PAYG) systems, used by companies like SunCulture and Futurepump, let farmers pay for solar irrigation in small, flexible installments via mobile payments, aligning costs with their seasonal cash flows. Blended finance approaches, such as those piloted by Africa Enterprise Challenge Fund (AECF) and AgriFi Kenya, combine donor or public funding with private capital to de-risk lending for banks and microfinance institutions. Farmer cooperatives and group lending schemes help smallholders pool resources and negotiate better credit terms for shared irrigation equipment, reducing individual risk. Leasing and equipment-as-a-service models shift large upfront purchases into affordable operational fees, while digital and mobile-enabled credit solutions, like those from Apollo Agriculture, leverage mobile data to provide small-ticket loans bundled with agronomic advice, helping farmers access the tools they need to increase productivity.

Livestock farmers across East Africa are increasingly vulnerable to feed shortages during dry seasons. To address this, projects like Kenya's Kenya Market-Led Dairy Programme have promoted the cultivation of improved fodder varieties, such as Brachiaria grass, alongside better fodder conservation techniques like hay and silage making.

In Uganda's Teso region, dairy cooperatives have introduced multi-nutrient feed blocks, providing a balanced supplement for cattle during drought. These feed systems help maintain livestock productivity and reduce grazing pressure on fragile rangelands.

Across East Africa, a diverse mix of players is driving fodder and feed innovations to boost livestock productivity and resilience. Research leaders like ILRI, KALRO, TALIRI, and NaLIRRI are developing improved fodder varieties, silage, and forage systems, while NGOs such as SNV and Heifer International work directly with farmers to scale up climate-smart fodder production and cooperative models. Financing bodies like the Africa Enterprise Challenge Fund (AECF) support agribusiness innovation, and networks like AgriProFocus help strengthen supply chains.

HIGHLIGHTS

- Over 70 percent of the region's population relies on agriculture, most of it rain-fed, yet extreme weather threatens to undermine food security, incomes, and rural livelihoods.
- Livestock farmers across East Africa are increasingly vulnerable to feed shortages during dry seasons. To address this, projects like Kenya's Kenya Market-Led Dairy Programme have promoted the cultivation of improved fodder varieties, such as Brachiaria grass, alongside better fodder conservation techniques like hay and silage making.

Mechanization is another game changer, especially in regions facing labor shortages. In Tanzania, smallholder rice farmers have benefited from two-wheel tractors and mechanized threshers, cutting labor costs and reducing post-harvest losses. Digital agriculture tools are also making waves. Kenya's iShamba platform provides SMS-based weather updates, agronomic advice, and market information to over 300,000 farmers. In Ethiopia, the Digital Green project uses video-based training to teach farmers new techniques in their local languages, improving knowledge uptake and practice adoption.

These innovations empower farmers with real-time information, helping them make smarter decisions under changing conditions.

Insurance as a Safety Net

Even the best-prepared farmers face risks they cannot control. Agricultural insurance is gaining traction as a resilience tool. Kenya's Index-Based Livestock Insurance (IBLI), pioneered by ILRI, compensates pastoralists for drought losses based on satellite-measured forage conditions, eliminating the need for costly field assessments.

Across the region agricultural insurance has seen notable success in recent years, helping smallholder farmers better manage climate risks like drought, floods, and pests.

Innovations such as index-based insurance where payouts are triggered by weather data or satellite readings rather than on-farm assessments have allowed products to scale affordably across Kenya, Tanzania, and Rwanda. Programs like Kenya's government-backed Kenya Livestock Insurance Program (KLIP) and partnerships led by companies like Pula Advisors have reached millions of farmers, bundling insurance with seeds, fertilizer, and credit to improve resilience.

In Ethiopia, weather-index insurance products protect teff, wheat, and maize farmers from extreme drought, with payouts triggered when rainfall falls below predefined thresholds. While uptake remains low due to cost and awareness barriers, pilot projects show that insurance can buffer farmers against devastating shocks, helping them bounce back faster.

The rapid spread of mobile technology has also played a key role, making it easier for farmers to enroll, pay premiums, and receive payouts quickly, turning agricultural insurance into a practical, growing safety net for East Africa's rural economies.

The success of resilient agriculture hinges not just on technology but on people. Persuading farmers to adopt new methods, convincing policymakers to support innovations, and informing consumers about the value of climate-smart agriculture.

Governments across East Africa are making moves. Ethiopia's Climate-Resilient Green Economy Strategy, Kenya's National Climate Change Action Plan, and Uganda's Agriculture Sector Climate Change Policy all prioritize climate-smart agriculture. But implementation on the ground often lags due to limited resources and institutional bottlenecks.

Nonprofits, media, and extension services have a key role to play. Sharing success stories, highlighting available technologies, resilient seeds, livestock breeds, and smart farming practices through media programs, community demos, and digital channels can help break through entrenched habits and skepticism.

With support from a local cooperative, Muthembwa recently planted drought-tolerant beans and installed a simple drip irrigation line on part of her farm. "I used to think farming was just about waiting for rain," she says. "Now I know it's about using every tool we can to survive."

If more farmers across the region can be reached with the right innovations, East Africa's agricultural future might yet bloom even under a changing climate. With the right support from governments, development partners, research institutions, and the private sector, resilient agriculture offers a pathway to adaptation, prosperity, and sustainability.

By Pauline Kairu

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RESILIENT AGRICULTURE

How the African Agricultural Transformation Initiative is building resilience across Sub-Saharan Africa

The launch of the Agricultural Transformation Office (ATO), backed by the African Agricultural Transformation Initiative (AATI), marks a turning point in how African governments are approaching agricultural reform.

For decades, Sub-Saharan Africa's agricultural plans have been ambitious on paper but stumbled in practice. Blueprints brimming with potential often faded under the weight of weak delivery systems, fragmented coordination, and minimal accountability. But a new approach is reshaping this narrative.

The Agricultural Transformation Initiative (AATI), established in 2021 through a partnership between the International Fund for Agricultural Development (IFAD), the Bill & Melinda Gates Foundation, AGRA, and McKinsey & Company, was created to bridge the gap between policy and practice across Sub-Saharan Africa. Its mission: to help governments not just draft agricultural strategies but deliver them effectively, ensuring national priorities translate into tangible outcomes for farmers and food systems.

In the African context, resilience is about more than just bouncing back from shocks. It's about building systems that anticipate, adapt, and transform amid climate change, economic disruptions, and shifting demographics. For smallholder farmers, resilience means access to climate-smart technologies, supportive institutions, and an enabling environment that allows them to thrive not just survive.

Lessons from Tanzania, Nigeria, and Sierra Leone

A crucial innovation was the launch of the Agricultural Transformation Office (ATO) during the Africa Green Revolution Forum (AGRF) in Dar es Salaam. This office now serves as the central coordinating body, overseeing the AMP's rollout, monitoring progress, ensuring policy coherence, and facilitating collaboration across stakeholders.

"Cementing the path towards this agricultural renaissance is the Agricultural Transformation Office (ATO), established last year in partnership with the African Agricultural Transformation Initiative. The ATO has designed an Agricultural Master Plan for Tanzania, a comprehensive masterplan identifying 15 flagships and 20 commodities critical to a food-secure Tanzania," noted Minister of Agriculture for Tanzania, Hussein Bashe.

Tanzania's Agricultural Masterplan (AMP), is now charting a bold new course for agricultural development. Co-designed with AATI following a formal request from the Ministry of Agriculture, the AMP is more than just a vision document it is a climate-smart, data-driven roadmap designed to quadruple agricultural GDP to $100 billion by 2050.

Safia Boly, Executive Director AATI

> **"Transforming African agriculture is not just about climate resilience or food security — it's about empowering women, youth, and smallholder farmers to become the backbone of Africa's economic future."**
> **— Safia Boly, Executive Director, AATI**

From the outset, the AMP has been anchored in a robust results framework, technical expertise, and mechanisms to track progress and adapt in real time. It was developed through extensive stakeholder consultations, involving government, private sector, development partners, and civil society, ensuring alignment with Tanzania's broader national goals.

Hon. Hussein Mohamed Bashe, Ministry of Agriculture, (Right), Hon. Abdallah Hamis Ulega, Former Minister of Livestock and Fisheries, (Left) during the launch of ATO Tanzania.

Chief Minister David Moinina Sengeh, and Dr Henry Musa Kpaka, Ministry of Agriculture, Sierra Leone, during the launch of the ATO Sierra Leone at the Africa Food Systems Forum 2024 (left to right).

Bashe highlighted the role of young and women farmers as driving transformation in Tanzania's agricultural sector not just as laborers, but as active agents of change, innovation, and economic growth. "We recognize and underscore the pivotal role of these farmers. They are not merely cultivators of the land; they are entrepreneurial stewards of our resources, business owners in their own right, operating at the front lines of a shifting agricultural landscape."

Early pilots tied to the AMP have already shown promising results, including improvements in yields, income diversification, and climate resilience, thanks to the smart integration of digital tools and performance-tracking systems.

In Nigeria, the Agricultural Transformation Initiative (AATI) worked closely with the government to tackle an urgent food crisis, following President Bola Tinubu's 2023 declaration of a state of emergency on food security. Responding to a request from the Vice President, AATI supported the establishment of the Food Security War Room (FSWR), a command center designed to coordinate rapid responses across ministries.

The initiative helped anchor the FSWR under the Federal Ministry of Agriculture and Food Security, develop a national food security dashboard, and launch a structured communications plan. These early wins not only improved Nigeria's crisis response but also laid the groundwork for future agricultural transformation efforts under AATI's guidance. In Sierra Leone, the recent launch of the Agricultural Transformation Office marks a critical milestone in the country's journey toward resilient food systems.

At the ATO Sierra Leone launch, Chief Minister David Moinina Sengeh emphasized, "Sierra Leone is demonstrating that with the right partnerships, political commitment, and focus on delivery, we can transform our agricultural sector to meet the needs of our people and our economy."

Minister of Agriculture Hon Musa Kpaka added, "Our focus on resilient food systems is not just about producing more; it's about producing smarter, in ways that sustain our environment and secure the livelihoods of farmers for generations to come."

Sierra Leone's approach highlights the importance of inclusive, climate-conscious planning, embedding the needs of women, youth, and marginalized communities into every stage of agricultural reform.

Safia Boly, Executive Director of AATI, reflects on the broader mission, "Across Africa, we have the tools and innovations to transform agriculture, but what has been missing is the delivery capacity. By empowering governments with the right systems, data, and coordination mechanisms, we are turning ambition into action."

"Transforming African agriculture is not just about climate resilience or food security; it's about empowering women, youth, and smallholder farmers to become the backbone of Africa's economic future," said Ms Boly.

The success of AATI's work relies on strong partnerships and committed leadership. National governments, development partners like AGRA and IFAD, research institutions, private sector players, and civil society actors all play critical roles in advancing agricultural resilience.

For example, the strengthened partnership between AGRA and Norway is helping accelerate climate-resilient agriculture across the region, bringing new funding, technical expertise, and innovation pipelines to national programs.

"African governments are leading the change and are demonstrating their political will for transformation; the collective effort of all partners will make durable progress possible," says Ms Boly. "We are here to support these efforts with technical expertise and financial support. It is clear that our collective success will be defined by national ownership and leadership."

The stakes could not be higher. Climate change is reshaping Africa's agricultural landscape, threatening the livelihoods of millions and the food security of entire nations. But through rigorous delivery systems, adaptive frameworks, and inclusive approaches, countries across Sub-Saharan Africa can build agricultural sectors that are not only more productive but also resilient, sustainable, and equitable.

The experiences emerging from Tanzania, Nigeria, and Sierra Leone offer a clear, replicable model, one where delivery is at the heart of resilience, and resilience is at the heart of transformation.

As Africa moves beyond plans on paper and into a future of sustained action, the Agricultural Transformation Initiative and its partners remain ready to help governments translate ambition into impact, ensuring that farmers across the continent have the tools, systems, and support they need to flourish.

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