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**BIG THING**

**Quarterly journal**

# **PROMOTING RESILIENT AGRICULTURE IN EAST AFRICA**



Due to erratic weather patterns and climate change, rain-fed agriculture can no longer be relied upon to realize a food secure Africa.

Resilient Agriculture has been identified as one the best solutions for agricultural sustainability, climate change adaptation, and farmers empowerment in Africa.

**How can we all be part of the solution?  
More details.... Page 2-10**

## RESILIENT AGRICULTURE IN EAST AFRICA

Conserving biodiversity and promoting environmental sustainability.

# East-African Countries Bet on home grown approaches to Improve Resilience

One powerful approach has been the use of early warning systems (EWS) in East Africa that predict weather patterns and warn pastoralist communities about potential droughts or floods.

**PAULINE KAIRU**  
SPECIAL CORRESPONDENT

**P**astoralism has long dominated East Africa landscapes, with livestock commonly moving between country borders.

The dryland of Djibouti, Ethiopia, Eritrea, Kenya, Somalia, South Sudan, Sudan and Uganda – countries in the Horn of Africa that make up the Intergovernmental Authority on Development (IGAD) region, have dominated the region's livestock production.

But growing impacts of climate change in the region are diminishing livestock productivity, also exacerbating food insecurity.

A multiplicity of strategies has been adopted across the region for countries in the Intergovernmental Authority on Development (IGAD) region to promote regional collaboration to increase resilience of pastoral livestock.

To build resilience against these challenges, several initiatives have been established with the aim of upholding sustainable pastoralism practices, both financial

and technical mechanisms to help prepare and respond to climate shocks.

These include the now popular livestock index-based insurance program which pays out benefits for losses related to weather and catastrophic events, the early warning systems on weather, harnessing traditional coping and adaptation mechanisms, among others.

One powerful approach has been the use of early warning systems (EWS) in East Africa that predict weather patterns and warn pastoralist communities about potential droughts or floods.

This year financing for a regional project to scale up hydro-meteorological and Early Warning Services in six countries in East Africa and around Lake Victoria has been approved by the Climate Risk and Early Warning Systems (CREWS) initiative.

The four-year, US\$ 7 million project will build on the achievements of the recently completed HIGHWAY project, financed by the UK Foreign Commonwealth and Development Office, supporting the East African Community (EAC) in achieving its Early Warning System Vision 2025.

The project is being implemented by the World Meteorological Organization (WMO), the UN Office for Disaster Risk Reduction (UNDRR), and the World Bank working closely together with several regional entities, and the National Meteorological and Hydrological Services (NMHSs) of Kenya, Tanzania, Uganda, Rwanda, Burundi and South Sudan.



Kenya Agricultural and Livestock Research Organization KALRO. Picture | File

## HIGHLIGHTS

Early warning systems allow pastoralists to take proactive measures such as destocking or moving their herds before conditions become too severe.

The four-year, US\$ 7 million project is made to support the East African Community (EAC) in achieving its Early Warning System Vision 2025.

The project will build capacity of the countries and regional institutions towards impact-based, people centered predictions and warnings, specific to national and local contexts.

Burundi and South Sudan, two countries in the region, not covered through the HIGHWAY project, will receive targeted support for institutional development through activities including the assessment of hydromet monitoring networks, early warning infrastructure and institutional capacities and the development of a roadmap for strengthening Early Warning Systems and hydromet services.

According to studies by the Food Agriculture Organization (FAO), early warning systems allow pastoralists to take proactive measures such as destocking or moving their herds before conditions become too severe hence ensuring households retain some value even amidst harsh climatic events experienced within semi-arid regions common across Eastern Af-

rican countries.

This is linked to yet another strategy initiated as a safety net scheme that can help pastoralists recover from any losses, namely the Livestock Insurance Program—a weather-based insurance. From the Karamoja sub-region in northeast Uganda, to Marsabit in Kenya and to Oromiya Region of Ethiopia, policy holding pastoralists now receive a payout if the index—the normalised difference vegetation index—passes a certain threshold.

“This growing emphasis on recognizing and managing the risk of drought, rather than waiting for it to affect vulnerable communities, implies substantive change across the system,” says the International Federation of Red Cross and Red Crescent Societies (IFRC).

According to World Bank Senior Agriculture Economist Pierre Gerber, “Acknowledging traditional coping and adaptation mechanisms, the strategy provides a framework to support their implementation that draws on latest technology and policy instruments, and also proposes novel forms of interventions and tools to build resilience.”

Rangeland restoration (essentially the process of regenerating the grassland cover and the organic matter in soils) is key in both climate change adaptation and mitigation. The strategy describes interventions to improve feed availability during the dry season and ensure adaptive levels of grazing pressure that

can reverse degradation trends and achieve restoration. Implementing such practices requires real-time agro-ecological data. Regional cooperation for data sharing, research and innovation can lower the costs and make such interventions viable in the shorter term.

“Transhumance [the practice of moving livestock from one grazing ground to another in a seasonal cycle – editor’s note] is an essential and time-tested adaptation by the pastoralists to dryland environment because availability of water and forage varies in space and time,” says ICPALD Director, Dereje Wakjira.

To address these challenges, IGAD’s Centre for Pastoral Areas and Livestock Development (ICPALD) and the World Bank Program for Climate Smart Livestock Systems in Africa supported IGAD member states to develop a “Strategy for Sustainable and Resilient Livestock Development in view of Climate Change 2022-2037.” Support for developing the Strategy was provided by Germany’s Federal Ministry of Economic Cooperation and Development (BMZ) through the German Agency for International Cooperation (GIZ).

The Strategy aims to increase the resilience and sustainability of the livestock sector to climate change impact in the region. It envisions a more resilient, productive, and sustainable livestock sector in the region for improved living standards and reduced vulnerability to climate change.



## RESILIENT AGRICULTURE IN EAST AFRICA

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# How Regenerative Agriculture Is Empowering Youths in Kisumu and Homa Bay Counties

The young agripreneurs are part of the 'Transforming Rural Economies and Youth Livelihoods (TREYL)' project (2019-2023) that is working to foster vibrant and inclusive rural economies. Implemented by Practical Action, the initiative is supporting 18–35-year-olds in key rural agricultural value chains.

## The Context

Rural, agriculture-based economies in the Lake Victoria Basin are failing to provide viable livelihood opportunities, especially for young people. The immense potential of the youth and agriculture sector in the region remains untapped.

The rural farming population in the region faces many challenges including declining farm productivity, degraded soil, unpredictable weather, limited knowledge about farming methods, inadequate market access, and poor post-harvest practices. Traditional industries such as fishing, sugar, cotton, and coffee have also declined. Consequently, the region is grappling with heightened levels of food insecurity, unemployment, underemployment, poverty, and rural-urban migration. The involvement of both men and women in rural agriculture has significantly diminished.

## Transforming Rural Economies and Youth Livelihoods

Various initiatives have attempted to unlock the potential of youth and the rural agriculture sector in the Lake Victoria Basin. One of them is the "Transforming Rural Economies and Youth Livelihoods" (TREYL) project, implemented by Practical Action in Kisumu and Homa Bay Counties.

The five-year initiative (2019-2023) is working to foster vibrant and inclusive rural economies by promoting



Everlyne Adhiambo, a regenerative farmer from Kisumu County's Nyakach area tending to her African Leafy vegetable garden.

agricultural livelihoods rooted in regenerative agriculture and participatory market systems development. The initiative targets 18–35-year-olds and focuses on chicken, peanut, and tomato value chains.

To date, TREYL has supported over 8000 young men and women to increase farm productivity and income through regenerative agriculture. By improving the viability of smallholder agriculture, the project is reducing rural youth unemployment, keeping families together, providing communities with more nutritious food, and boosting the local economy.

## Project Key Achievements

### 1. Increased adoption of regenerative agriculture by young small-holder farmers

The TREYL project has supported farmers in Kisumu and Homa Bay Counties to adopt regenerative agriculture. As a result, there has been a notable increase in farm productivity, farmer incomes and the soil's overall health and fertility. This has strengthened the business case for regenerative agriculture and motivated more youths to join agribusiness.

The project has promoted various regenerative agriculture methods, including rearing red Italian worms and black soldier flies to produce nutrient-rich and low-cost animal feeds and compost. Others include agroforestry, shed net technologies, minimum tillage, and the use of hydroponics as animal feeds. Some regenerative agriculture methods have witnessed greater adoption rates as they entail lower labour and

## HIGHLIGHT

- To date, TREYL has supported over 8000 young men and women
- Practical Action has also linked local youths to agro-dealers and manufacturers to serve as their last mile distributors.
- Currently about 720 Youth Saving and Loaning Associations [YSLA] groups are active with over 7000 members and a loan portfolio of Ksh30 million

financial demands to implement. The adoption of regenerative agriculture methods has reduced production costs through a circular farming system that minimizes reliance on external inputs. For instance, a poultry farmer keeping indigenous or improved kienyeji (indigenous) chicken is saving up to 60% on cost of feeds when supplementing with locally produced organic feeds. The transition to regenerative agriculture is also having a positive effect on women empowerment, including access to resources and power over their use. It is also providing diverse, gender-responsive opportunities. Gender empowerment messaging is being passed alongside knowledge on regenerative agriculture, and this explains the link.

### 2. Increased access to organic inputs

Partner farmers in Kisumu and Homa Bay Counties have exhibited an increase in awareness and utilization of commercially produced

organic fertilizers and pesticides. The inputs complement the use of locally-produced organic compost, further enhancing the sustainability and effectiveness of their agribusiness.

Practical Action has forged partnerships with organic input manufacturers and retailers to showcase the effectiveness of their products to farmers through field days and demonstration farms. This has led to a higher demand for organic inputs prompting local agro-dealers to expand their stocks accordingly. The organization has also linked local youths to agro-dealers and manufacturers to serve as their last mile distributors of organic inputs and to provide advisory services on regenerative agriculture for a fee. This has created additional income opportunities for local youths and is helping to reach more farmers.

### 3. Increased access to finance for farmers

To enhance access to finance for young farmers in regenerative agribusiness, TREYL has promoted the creation of Youth Saving and Loaning Associations (YSLAs) and linking them to formal financial institutions to access high-value credit. Currently, about 720 YSLA groups are active. They have over 7000 members and a loan portfolio of Ksh30 million. Eighty (80) YSLAs have successfully accessed loans from mainstream financial institutions, with an average loan amount of Ksh500,000 per YSLA group. The farmers have used these finances to expand their businesses. TREYL is now focusing on further strengthen-

ing the YSLAs and securing higher value credit with longer repayment periods.

### 4. Unlocking access to markets

Under TREYL, young entrepreneurs in Kisumu and Homa Bay Counties initiated cottage industries for value addition of agricultural products such as peanut butter and tomato paste. However, they faced challenges selling their products formally due to lack of necessary government quality assurance and licensing documentation.

To address the issue, the project sponsored hands-on business skills training, coaching, product development and certifications at the Kenya Institute of Research and Development (KIRDI). The youths acquired the Kenya Bureau of Standards (KEBS) quality certification for their products, allowing them to supply retail and wholesale shops. This has had a direct and positive effect on their business success.

In addition, the project convened market actors in the chicken, peanut, and tomato value chains to address market-related barriers to business. One of the issues that emerged was poor access to market information about products for sale and purchase. Through a participatory process, the actors resolved to establish a WhatsApp group where buyers and sellers of goods and services can meet. In 2022, a total of 2278 transactions worth Ksh 12 million were facilitated via the platform, demonstrating its usefulness.



Emmanuel Ragot, a chicken farmer, grows organic chicken feed

## RESILIENT AGRICULTURE IN EAST AFRICA

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# Drought-tolerant crops to the rescue in Africa

Despite having 65 percent of the world's uncultivated arable land, Africa still imports over 100 million tonnes of food annually.

**PAULINE KAIRU**  
SPECIAL CORRESPONDENT

Large areas of Ethiopia, Somalia, Djibouti and Kenya in Eastern Africa are currently facing severe drought, leaving an estimated 16.7 million people with acute food insecurity. Small-scale farmers and herders across the Horn have been particularly affected by this devastating drought, exacerbating their vulnerability to climate-related shocks.

Despite having 65 percent of the world's uncultivated arable land, Africa still imports over 100 million tonnes of food every year at a value of USD 75 billion. To address this issue and become a true global food powerhouse, the African Development Bank (AFDB) is calling for resilience beyond mere survival.

The United Nations Environment Programme (UNEP) is supporting 22 African countries to use Ecosystem-based Adaptation solutions that already exist in their environment to protect communities against the deadly effects of climate change.

Widespread crop failure caused by changing weather patterns has led to deterioration in household food security and loss of livelihood sources for hundreds of thousands of smallholder farmers.

Climate change effects like drought, a lack of access to resources like fertilizer and other stresses



Florence Njomo, a crop officer at Wambugu farm in Nyeri explains to farmers the importance of planting Gaddam variety of sorghum which is drought resistant. Picture | File

increase the risk of crop failure that negatively affects income, food security and nutrition of millions of smallholder farmers and their families. Malnutrition also remains a significant public health issue in Africa as over 30 percent of children under five years old suffer from stunted growth due to poor nutrition.

Many African countries have implemented agricultural programs focused on increasing food production while promoting balanced diets across communities.

Maize production being a key venture across sub-Saharan Africa, there

has been two most visible projects in the region focusing on maize production namely the Drought Tolerant Maize for Africa (DTMA) and Stress Tolerant Maize for Africa (STMA)— whose aim has been to diminish devastating constraints in maize production across the region by developing improved maize varieties with resistance and tolerance to drought, low soil fertility, heat, diseases such as Maize Lethal Necrosis and pests affecting maize production areas in the region.

The two projects have sought to increase maize yields by at least one

ton per hectare under moderate drought and with a 20 to 30 percent increase over farmers' yields.

Its target is to benefit up to 40 million people in 13 African countries, increasing maize yields by at least one ton per hectare under moderate drought and with a 20 to 30 percent increase over farmers' current yields, benefiting up to 40 million people in.

With activities in Kenya, Tanzania, Uganda, Ethiopia, Malawi, South Africa, Zambia, Zimbabwe Benin, Ghana, Mali, Nigeria and Mozambique, where nearly 72 percent of all maize area in sub-Saharan Africa is grown, and where more than 176 million people depend on maize-based agriculture for their food security and economic well-being, the project aims to develop and promote more than 70 new stress-tolerant varieties using innovative modern breeding technologies, expected to increase maize productivity by up to 50 percent.

To achieve their outcomes, these projects bring together farmers, research institutions, extension specialists, seed producers, farmer community organizations and non-governmental organizations.

Jointly implemented by International Maize and Wheat Improvement Center (CIMMYT) and the International Institute for Tropical Agriculture, in close collaboration with national agricultural research systems in participating nations. Millions of farmers in the region are already benefiting from the outputs of this partnership, which includes support and training for African seed producers and promoting vibrant, competitive seed markets.

Other drought-resistant varieties of wheat, rice and sugar cane are being used in field trials across the continent.

But beyond the advanced technologies, is the move towards the cultivation of traditionally drought-tolerant and resilient crops such as cassava, sorghum, millets, pigeon-pea, cowpea and green gram which are helping farmers overcome the failure of rains.

Promoting such drought-tolerant crop varieties and crops that can withstand harsh conditions could provide farmers a means of securing food production during prolonged periods of drought.

Drought-tolerant crops require less water to grow and produce a yield even under dry conditions which is critical for vulnerable populations living throughout the region affected by such weather changes due to climate change events according to research conducted by International Food Policy Research Institute (IFPRI).

The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), has been collaborating with stakeholders to out-scale the technologies for native regional drought-tolerant crops to ease the over-reliance on maize complicated food security, more so in years when rains failed.

Community based organizations and NGOs are working with other stakeholders to promote community-level seed production, establishment of seed banks to ensure sustainable access to affordable seeds by farmers.

To achieve food security and reduce malnutrition in Africa, diverse approaches that prioritize crop diversification that integrate cultivation of diverse crops such as fruits, vegetables, and legumes that are rich in essential nutrients including vitamins, minerals alongside protein among others.

## Drought tolerant crops and animals: A lesson from Kenya

**PAULINE KAIRU**  
SPECIAL CORRESPONDENT

Kenya has been rolling out on-farm solutions to counter climate change effects that have continually seen a reduction in crop, the nutritional quality of major cereals, and lowering livestock productivity.

Among the solutions that the country has adopted are stress-tolerant varieties of several crops of beans, pigeon pea, cowpea, maize, sorghum, cassava and millet in Kenya, to improve household dietary diversity score by 40 percent and reduced food insufficiency by 75 percent.

Cassava in particular can survive extended periods of drought and poor soil conditions while being a staple food across many African regions used for creating various dishes like cassava bread, chips, and cake providing car-

bohydrates along with high vitamin and mineral content. Millet is another crop well-adapted to dry conditions prevalent in East Africa with fiber, protein, iron magnesium alongside other essential nutrients while being gluten-free which makes it ideal for individuals with celiac disease or gluten intolerance.

The adoption of improved and resilient livestock breeds including Red Maasai sheep and Galla goats, improved household dietary diversity by 38 percent while reducing household food insufficiency by 90 percent in Kenya, according to a study done by the Consortium of International Agricultural Research Centres (CGIAR).

Initiatives exist promoting the use of drought-resistant crops across East Africa such as the African Agricultural Technology Foundation (AATF) developing new pest and disease resistant varieties of cassava while exploring innovative techniques processing cas-

savas that increase nutritional value, the Millet Network of India (MINI) promotes cultivating specific types worldwide while continually researching and developing newer adaptable varieties for growth under varying environmental circumstances.

The success of using drought-resistant crops hinges on farmer participation through selecting crop varieties demonstrating best agronomic practices crucial for promoting adoption according to the International Crops Research Institute for Semi-Arid Tropics (ICRISAT).

The Consultative Group for International Agricultural Research started a Climate Change, Agriculture and Food Security (CCAFS) programme around the country that has ensured the distribution of the hardy Red Maasai Sheep that are now being used to inseminate local breeds to make them hardy and climate resilient.

Galla goats also referred to as the Bo-

ran or Somali goats are originally from the Arid Northern Kenya, and are known as the milk queens of the Kenyan arid and semi-arid areas. The Galla are also known to be heavy and fast growing, with great disease resistance compared to local goat breeds.

CCAFS' East Africa Regional Programme Leader, Dr James Kinyangi noted that increasingly arid-area-projects are being rolled out in other regions of the country as climate change impacts take hold.

The programme has been assisting farmers in Siaya, Homa Bay, and Migori, whose agro-ecological conditions are similar to those in areas like Narok and North Eastern Kenya where Maasai sheep and the Galla goats thrive. CCAFS introduced the two animals in the area because the local breeds were found to have high disease burden and slow growth, which results in low weight even in adulthood.

"Galla goat tolerates hardy conditions,

survives for long and uses less water. We introduced 80 breeding units in seven test villages in Nyakach and Nyando areas, a programme that has turned out to be a success," said Dr Kinyangi. The programme has also introduced the Dorper Red Maasai sheep and the Red Maasai sheep, which tolerate certain types of worms—Flukes—that suck the blood of sheep and lead to stunted growth. Locals are cross-breeding the foreign breeds with their local breeds. Promoting the use of drought-resistant crops and improved livestock breeds alongside investing in research and development efforts tailored specifically towards local conditions, ensuring appropriate seed systems coupled with extension services, implementing irrigation infrastructure plus water management techniques can significantly improve food security while building resilience against climate change impacts.

## RESILIENT AGRICULTURE IN EAST AFRICA

## No Small Potatoes: CRAFT and Private Sector Partnerships Mitigate Climate Change Risks

*“Agribusinesses play a significant role in scaling up of climate adaptation measures in value chains. By leveraging the expertise and resources of Agri-SMEs, CRAFT seeks to implement comprehensive strategies that address the specific vulnerabilities posed by climate change.”* Menno Keizer, the Climate Resilient Agribusiness for Tomorrow (CRAFT) Project’s multi-country manager.

Potatoes are central to the life, health, and wellbeing of people and farmers in East Africa. They are also an important food and cash crop in the region.

The Kenyan potato industry is valued at \$500 million; Tanzania is the sixth largest potato producer in Africa, involving over half a million farmers, and in Uganda, potato production continues to increase with production growing by 172,000 Metric Tonnes from 2006 to 2018. However, because of climate change, the value chain is at risk.

The CRAFT climate change risk assessments in Kenya, Tanzania, and Uganda reveal significant climate risks for potato production. Projections indicate temperature increases of 2.5°C and 2.6°C in Tanzania and 2.8°C and 2.5°C Kenya for the March-April-May and October-November-December seasons respectively, by 2050. During the same period, Uganda faces a potential decrease of over 90% in potato yield during the March-April-May season. With a growing population and greater uncertainty about the impact of climate change for farmers and their crops, action is needed now.



**Representative from Starlight Cooperative and a farmer harvesting high-quality potatoes cultivated from certified seeds**

The private sector has a vital and unique role to play in addressing these challenges.

The CRAFT project, which is implemented by an international consortium led by SNV, is collaborating with 56 agribusinesses across seven value chains, including potato, to enhance resilience for farmers and businesses. To achieve this objective, CRAFT has successfully trained over 260,000 farmers through 3,926 farmer field schools. Additionally, 4,544 extension workers and lead farmers have received specialized training to enhance their knowledge and skills. As a result, more than 131,000 smallholder farmers have adopted two or more climate-smart agricultural practices and realised an increase in incomes. Through the Climate

Innovation and Investment Facility (CIIF), CRAFT has addressed low funding levels, improved the bankability of agribusinesses and de-risked investment in climate smart agriculture. The project has provided matching grants to 10 agribusinesses in the potato value chain, attracting private sector investment of over three million euros.

East Africa Fruits (EAF) a CRAFT Tanzania partner, sought to assist farmers to realise production abundance, enhancing the capacity of 3,500 smallholder farmers to improve potato output by 15% by 2022. The matching grant has allowed the company to grow toward its goal of becoming Africa’s largest food distributor.

*“In the last few years, our business has grown, and we have been able to double our revenue,”* said Elia Timotheo, EAF CEO. By de-risking private sector investment, agribusinesses can attract more financial resources, lead to sustainable agribusinesses and contribute to food security.

CRAFT also facilitated the adoption of climate-smart agriculture technologies and practices among agribusinesses SMEs, farmer cooperatives, and smallholder farmers. This included promoting drought-tolerant varieties. CRAFT connected Starlight, a Kenyan female-led cooperative with Fresh Crop, a potato seed company, and CRAFT partner.

*“Farmers struggled to access certified seed and relied on seeds bought in the open markets which were often*

*affected by pests and diseases, resulting in a negative impact on the quality and quantity of their harvest,”* said Kamiti, a farmer and cooperative member. The collaboration between the two agribusinesses created subsidised and readily available certified seeds, with 70% of the cooperative’s 2,500 farmers accessing the seeds. This partnership has led to increased production, reduced pests, and disease incidences (hence less use of agrochemicals), and joint marketing efforts.

CRAFT has built agribusiness capacity to support farmers adopting climate smart agriculture technologies and practices which ensure the production of quality potatoes. Kisoro Potato Growers’ Cooperative Union in Uganda constructed a diffuse light store, with support from CRAFT, to maintain the quality of seeds multiplied by farmers. The partnership between Kachwekano Zonal Agriculture Research and Development Institute (KaZARDI) and the cooperative enhanced access to foundation seed potato. Seed potato varieties such as Rwangume and Taurus are distributed to trained seed potato multipliers within the community. The cooperative aggregates the seed at the centrally located diffuse light store for easy access to the farmers. *“We trained our seed producers, but we continued to have poor seeds due to uncondusive storage,”* Fidel Kamari, the chairperson of the cooperative notes. *“The diffuse store helps us maintain the quality of seeds produced by farmers,”* Fidel

adds. The cooperative is also finalising an Ambient store - a facility for storing ware potatoes which will ease the challenges involved in post-harvest handling of potatoes during marketing. *“It will be a one-stop centre for potato buyers, increasing the cooperative and farmers’ bargaining power,”* said Kamari.

The above are some of examples of the interventions the CRAFT project has implemented across East Africa. Through a private sector-led approach, agribusinesses SMEs and cooperatives are contributing to the resilience of smallholder farmers, the sustainability of agribusinesses, and ensuring a more secure future for potato production – good for people, good for the planet.

#### About CRAFT

The Climate Resilient Agribusiness for Tomorrow (CRAFT) is a five-year Project being implemented in Kenya, Tanzania, and Uganda. The project is implemented by a consortium consisting of SNV (lead partner), Wageningen University & Environmental Research (WUR & WEnR), Accelerating Impacts of CGIAR Climate Research for Africa, Agriterra and Rabo Partnerships, and is financed by the Dutch Ministry of Foreign Affairs (MoFA). Visit the CRAFT website at <https://www.crafteastafrica.org/>. Contact us at [info.snvcraftproject@gmail.com](mailto:info.snvcraftproject@gmail.com)



## Building resilience with locally-bred high yielding Bubayi seeds

MILLICENT MWOLOLO  
SPECIAL CORRESPONDENT

In the face of diminishing farmlands, population growth, urbanisation and climate change, planting the right seeds combined with good agronomical practices can make the difference for small-holder farmers in Kenya. This is the gap that Bubayi Products Ltd, a certified seeds company which sources and produces some of the highly-resilient and high-yielding seed varieties for beans and other legumes in Kenya, seeks to fill.

Located in Kiminini, Western Kenya region, Bubayi started in 1995 and transited into a seed business in 2013. Ever since, the firm has been working with small-holder farmers to ensure that they produce more food and can withstand climate change, says Lucy Mayer, the founder and managing director at Bubayi Products Ltd.

Bubayi produces high yielding and highly resilient Kenya Agricultural and Livestock Research Organisation (KALRO) Rosecoco bean varieties that include KK8 Rosecoco, KAL 194 Rosecoco, KK Red 16 and Nyota High Iron Bean. With the bean seeds, which take

between 60 to 90 days to mature, Bubayi provides the farmers with an ideal rotational crop with maize.

Each season, farmers are contracted to grow a seed crop, giving them a guaranteed market for their bean production. In this way, Bubayi helps grow livelihoods, promotes gender inclusion and food security, and strengthens sustainable agriculture in Kenya.

Through the Mbegu Plus Project, which is supported by the European Union, Slovak Aid and Self Help Africa via the AgriFI Kenya Challenge Fund, Bubayi has been training small-holder farmers on the entire process from land preparation to harvest, soil health, water catchment in the soil, and how to put the residue back to the land. This improves the quality of soil, building resilience for higher yields.

The project has registered numerous successes in its two years. In a baseline survey conducted by Bubayi, the farmers have shared that the yields have been increasing progressively.

For 72-year-old Walter Kemboi, a small-holder farmer in Trans Nzoia County, the Mbegu Plus Project was the booster shot that he just needed. Before joining the project, Mr Kemboi was producing between 180 and 240 kilogrammes of beans per acre. When



#### MBEGU PLUS PROJECT

- **Over 550** – The total number of smallholder farmers that Bubayi has, with the assistance of the AgriFI Kenya Challenge Fund (co-funded by the European Union and SlovakAid and managed by Self Help Africa), contracted in Transnzoia, West Pokot, Elgeyo Marakwet, Bungoma, Bomet, Siaya, and Narok counties to multiply improved Rosecoco bean seed varieties.

he was just about to give up, he was introduced to Bubayi Products Ltd, by a neighbouring farmer and joined Bubayi local seed out growers.

*“I am producing up to 840 kilogrammes of clean quality beans per acre. My income has greatly increased. I was able to clear university tuition arrears for my daughter, construct a semi-permanent kitchen and buy fertiliser in preparation for the next season. I used the bean husks as feeds for my livestock...”*

Mr Kemboi has become a better farmer. *“Before any stage of crop production, we’re taken through soil protection, crop protection and how to minimise post-harvest losses. I can now intensively grow beans considering climate change mitigation, minimising inputs and maximising the yields. We were also provided with knapsacks and drying structures which greatly promoted my yield increase,”* expresses Mr Kemboi.

Ms Mayer has lived in rural Kenya for over 30 years with her husband and co-director who is also a regenerative farmer. *“We have first-hand experience of the challenges of farming, especially now with the changes in environment, nature and climate. Our aim is to provide the best start that we can to bean growing farmers by making available excellent and resilient seed, suited to specific agroecological zones, and advice on how to mitigate against the challenges associated with climate change.”*

Bubayi, a seed company, works with agro-dealers and complies with the Kenya Plant Health Inspectorate Service (KEPHIS) regulations. The firm uses brown paper-bags rather than nylon for their seeds. They are passionate about the environment and soil

This project is funded by the European Union



## RESILIENT AGRICULTURE IN EAST AFRICA

Conserving biodiversity and promoting environmental sustainability.

# The Rainforest Alliance—Meeting the demand for agric commodities while conserving biodiversity

Building on our many years of experience in tropical agriculture, we are now supporting farms and companies that are ready to transition to a regenerative model

**PAULINE KAIRU**  
SPECIAL CORRESPONDENT

**A**griculture is a major part of the climate problem, currently generating 19–29 percent of total greenhouse gas (GHG) emissions, and threatens more than 80 percent of species already at risk of extinction.

Yet, a growing global population and changing diets are driving up the demand for food, in a sector struggling to keep up as crop yields level off in many parts of the world, ocean health declines, and natural resources—including soils, water, and biodiversity—get stretched dangerously thin.

A 2020 report found that nearly 690 million people—or 8.9 percent of the global population—are hungry, up by nearly 60 million in five years. The food security challenge will only become more difficult, as the world will need to produce about 70 percent more food by 2050 to feed an estimated 9 billion people.

The Rainforest Alliance envisions that sustainable farming methods, integrating approaches to managing landscapes—cropland, livestock, forests, water and fisheries, that address the interlinked challenges of food security and climate change—could come to the rescue of a sector at a crossroads.

As a remedy, the Rainforest Alliance, has been championing regenerative agriculture which comprises a broad set of principles and practices under the umbrella of climate-smart agriculture.

The Rainforest Alliance is an international non-profit organization working at the intersection of business, agriculture, and forests to make responsible business the new normal, by building an alliance to protect forests, improve the livelihoods of farmers and forest communities, promote their human rights, and help them mitigate and adapt to the climate crisis.

In what the organization calls the “harm-reduction approach” the concept seeks to reduce the harm that conventional practices such as the application of harsh pesticides do to land, whereas regenerative agriculture goes beyond a harm-reduction approach to restore ecosystems and



A MSuLLi program regenerative agriculture model farm in Kirinyaga county Kenya.

add to nature’s richness.

For more than 30 years, the organization has worked to make agriculture more sustainable by partnering with farms and companies all over the world, to help them along a sustainability journey.

Besides regenerative and climate-smart agriculture, the NGO is using integrated landscape management, private and public sector engagement, livelihoods diversification, connecting landscape and finance by engaging financial players interested in contributing to and benefiting from landscape governance, climate-positive management, and conservation.

The Rainforest Alliance develops and implements long-term conservation and community development programs in several critically important tropical landscapes where commodity production threatens ecosystem health and the well-being of rural communities.

Its integrated landscape management approach expands our focus beyond a single farm or forest to cover a far wider geographical area that encompasses producers, companies, communities, local governments, and non-governmental organizations. By involving a diverse range of stakeholders in our landscape management programs, we bring all land users together to discuss common interests and determine collective actions. In Kenya, the NGO is working in the Mt. Kenya Landscape, a biodiversity reservoir



Rainforest Alliance (MSuLLi program) team and county government of Embu during the signing of an MoU towards working together in Mount Kenya Landscape Restoration

## HIGHLIGHTS

The world will need to produce about 70 percent more food by 2050 to feed an estimated 9 billion people.

Dedicated to conserving biodiversity for more than 30 years reaching in 60 countries.

that is an important agricultural area, and a national water tower.

“Building on our many years of experience in tropical agriculture, we are now supporting farms and companies that are ready to transition to a regenerative model—a crucial first step on the path toward creating an overall system that actually adds to nature’s richness,” says Rainforest Alliance’s Senior Director for East and Southern Africa, Julius Ng’ang’a.

He explains that farmers can begin by reducing external inputs like pesticides, for example, and eventually enhance the health of their land.

“When measures to enrich land—such as planting shade trees to protect and nourish soils—are applied on all fronts, you have yourself a regenerative farm,” says Mr Ng’ang’a.

The Alliance whose core mission started out being to save rainforest ecosystems, has evolved over time from raising awareness about rainforest destruction to a more integrated landscape management approach that involves various stakeholders, including producers, companies, communities, local governments, and non-governmental organizations, and has directed its efforts at ensuring ecosystem health across several critically important tropical landscapes where commodity production threatens the survival of rural communities and the environment.

Rainforest Alliance, international organization dedicated to conserving biodiversity and promoting environmentally sustainable and socially just practices in the farming and forestry industries, primarily in rainforests, in over 60 countries.

The organization’s regenerative practice involves using climate risk mapping, training, and digital technology tailored to the project landscape to help farmers reduce their use of synthetic fertilizers and pesticides towards more resilient ecosystems.

It is doing this in the tea, coffee, avocado, flower, cocoa, herbs and spices sectors.

“Local farmers receive training and support to manage farms as a business while utilizing innovative technology in crop production and marketing decisions. The organization also engages with public entities at different levels while diversifying private sector engagement from financiers to certification bodies and buyers who can service various on- and off-farm activities,” said Mr Ng’ang’a.

Using the Rainforest Alliance Certification Program, the organization works with companies towards responsible business practices.

“The seal means that the certified product or ingredient was produced using methods that support the three pillars of sustainability: social, economic, and environmental,” added Ng’ang’a.

To meet the rainforests’ conservation goal, the Alliance employs a comprehensive monitoring and evaluation approach to assess the impact of its interventions on livelihoods, human rights, biodiversity, and climate.

To achieve its mandate, it works with governments, companies, and local and international civil society organizations to advance policies that support rural producers.

## USE OF TECHNOLOGY

Through the strategic use of digital solutions, the Rainforest Alliance aims to increase public awareness and engagement, make data-driven decisions, and promote sustainable practices throughout supply chains. Some of the digital solutions we leverage on to make informed decisions and plan effective forest protection efforts include:-

- Remote sensing and satellite imagery technologies to enable us to closely monitor deforestation activities by providing real-time data on forest cover and changes.
- Geographic Information Systems (GIS) for analyzing and visualizing spatial data related to rainforest ecosystems.
- Mobile applications build networks with local communities and stakeholders.
- Social media and online campaigns to help raise awareness about our work, share educational content, success stories, updates on our initiatives and engage a broader audience
- Blockchain technology to promote transparency in supply chains, trace the origin and movement of certain commodities, such as coffee.

To join the alliance and be part of the conservation efforts please visit, [www.rainforest-alliance.org](http://www.rainforest-alliance.org)

## RESILIENT AGRICULTURE IN EAST AFRICA

Conserving biodiversity and promoting environmental sustainability.



The NCPB Silos in Nairobi. Picture | File

# Scaling post-harvest technologies in Africa

PAULINE KAIRU  
SPECIAL CORRESPONDENT

**D**espite the numerous efforts to enhance food security in Africa, hunger and malnutrition have remained an enormous barrier to Africa's socio-economic development.

And although Africa's food insecurity is attributable to persistent droughts and natural disasters such as floods caused by climate change and global warming, it is also in a large part caused by food wastages and food post-harvest losses.

It has been estimated that approximately 1.3 billion metric tonnes of food in Africa are lost immediately after harvesting and do not reach consumers.

This food is estimated to range between 30% and 40% of the food African farmers produce. If the appropriate measures and mechanisms were established to curb the post-harvest food losses, such saved food can adequately feed approximately 1.6 billion African people across the continent.

The drivers of post-harvest losses in Africa include poor handling mechanisms of farm

produce between harvesting, storage, and distribution.

Furthermore, post-harvest losses are caused by the decomposition of the food due to high temperatures and humidity. Some of the fields are inadequately harvested with limited drying methods before threshing. In addition, most African farmers have limited storage facilities. Storage challenges, due to poor infrastructure, makes it difficult to transport crops and produce to market.

Off-grid cold storage technology solutions still remain nascent with business models and technologies largely untested in rural areas in SSA.

However, innovative off-grid solutions are stepping in to save the dire situation.

FreshBox, an off-grid cold storage solutions provider based in Kenya leveraged the challenge to pilot and improve its cold room technology. FreshBox, which forms partnerships with farming cooperatives, recently won a tender to install solar-powered cold rooms in Somalia.

In Kenya Sokofresh which offers solar-powered cold storage and market linkage for small holder farmers in Kenya in the process reduc-

■ CONTINUED ON PAGE 9

## Strengthening smallholder farming by accelerating market development and innovation delivery

### MESSAGE FROM THE REGIONAL DIRECTOR

Syngenta Foundation for Sustainable Agriculture (SFSA) is an independent Swiss non-profit organization that collaborates with smallholder farmers in developing countries (Asia and Africa).

#### Our Vision

Our Vision is a bright future for smallholder farming.

#### Our Mission

To strengthen smallholder farming and food systems, we catalyze market development and delivery of innovations, while building capacity across the public and private sectors.

SFSA operates in East Africa as Syngenta Foundation East Africa (SFEA) across nine countries (directly and through partners).

SFEA delivers programs in the following areas: -

1. Agriservices  
Developing sustainable business models to link smallholders to markets, for example through rural entrepreneurship and innovative digital tools.
2. Agricultural Insurance Solutions  
Developing, implementing, and scaling up affordable agriculture insurance products, protecting

smallholders against weather risks, and helping them to access credit and inputs.

3. Seed Systems for better crop varieties
4. Research and Development  
All our programs are designed to build the resilience of smallholder production systems through innovations, making the link to urban markets, and last-mile delivery.

SFEA is privileged and proud to be one of the implementing partners of the Nutrition in City Ecosystems (NICE) project which is being featured today. The NICE project works at the nexus of policy, agriculture, environmental management, soil health, food safety, nutrition, and wellbeing.

Lucy Kioko, Regional Director SFEA.

### Agriculture Resilience and Nutrition: Advancing Sustainable Food Systems for Healthier Lives through the NICE Project

Agriculture resilience refers to a set of measures aimed at increasing the capacity of farming systems to withstand the effects of climate change while ensuring sustainable food production. Farmers, including those in city foodsheds, can improve their ability to adapt to changing climatic circumstances by diversifying crops, enhancing soil health, conserving wa-



A female farmer in Busia attending to her farm.

ter resources, and using agroecological practices. Importantly, these practices can help improve nutrition outcomes.

Nutrition In City Ecosystems (NICE) project connects the demand and supply side of food systems, engages women and youth - including through social business models - and builds local governance capacity initially in two secondary cities each in Bangladesh, Kenya and Rwanda.

Emphasis is placed on increasing the production and demand for nutritious

and agroecologically produced foods, and targeting food value chains that allow for income generation, thus reducing poverty and contributing to better health. This is possible thanks to multi-stakeholder and multisectoral collaboration bringing together city authorities, local businesses and civil society and creating a dynamic network of city learning hubs for dissemination and scale-up.

In Kenya, the NICE project is led by Busia and Bungoma counties where

the project promotes optimal practices based on the most recent data in nutrition, social and behavioral change communication, as well as resilient agriculture. NICE promotes local and national ownership of food system transformation. The goal is for participating communities to incorporate their lessons learned into national policies and communicate them across the country and abroad.

We can improve food systems, reduce hunger, and develop a healthier society by linking agriculture resilience and nutrition. This comprehensive strategy not only tackles the urgent issues of climate change and malnutrition but also helps to long-term sustainability and the well-being of current and future generations. We can work together to create a future where agriculture flourishes, communities are fed, and everyone can live a healthy life.

The Nutrition in City Ecosystems (NICE) project is supported by the Swiss Agency for Development and Cooperation (SDC). It is implemented and co-financed by a public-private Swiss consortium comprising the Swiss Tropical and Public Health Institute (Swiss TPH), ETH Zürich (Sustainable Agroecosystems Group and World Food Systems Centre), Sight and Life, and the Syngenta Foundation for Sustainable Agriculture.

## RESILIENT AGRICULTURE IN EAST AFRICA

Conserving biodiversity and promoting environmental sustainability.



# Enhancing Agricultural Productivity and Resilience through Climate-Smart Approaches in East Africa

Agriculture remains the backbone of the economy among East African countries. It accounts for approximately 27% of the gross domestic product and is the main economic activity for over 70% of the total population in the region

**H**owever, the sector is facing persistent low productivity, increased vulnerability, and an inability to support the growing food demands, driven by rising incomes, population growth, and increasing urbanization. Poor performance of the agriculture sector is attributed to the fact that it is largely rain-fed and dominated by smallholder farmers who lack adaptive capacities and are disproportionately affected by recurrent and increasingly devastating climate shocks such as droughts, floods, pests, and diseases.

The Agricultural sector is also a major source of Greenhouse Gas Emissions (GHG). While, globally, the main source of emissions is energy; in Africa, most emissions are from the Agriculture, Forestry, and Other Land Use (AFOLU) sector. The GHG emissions from this sector account for 14.8 per cent, whereas in Sub-Saharan Africa, AFOLU sector accounts for 61 per cent of GHG emissions. Livestock emissions per capita are higher globally. Therefore, achieving food security for a growing population in a sustainable manner in line with the Paris Agreement, while securing the livelihoods of people who work in the sector, represents a major challenge for Africa.

The concept of Climate Smart Agriculture (CSA) addresses three challenges which are increasing resilience in the agricultural sector, guaranteeing more productivity, and reducing the proportion of GHG created in the AFOLU sector. CSA has several methods and approaches catering to the entire production cycle. These include climate-resilient seeds, agroforestry, improved pasture management, hydroponics, solar water pumps for irrigation, so-

lar cold chain transfer, sustainable agriculture certificates, and index-based insurance against crop failure, among others. CSA methods should be context-based and specific. For example, the cost of buying and maintaining solar-powered water pumps is too high for many smallholder farmers in East Africa. Other methods are only profitable if they are scaled up in larger agricultural production facilities. These methods also have limited application to smallholder farmers in East and West Africa. If various feasibility aspects such as scalability, economic viability, acquisition costs, and GHG emission reductions are taken into account, the following methods would prove efficient:

**Smallholder agroforestry:** This method allows farmers to increase their income by planting trees on unused land. After a few years, this generates additional income from the timber. Planting trees absorbs GHG emissions and improves soil fertility. The potential of agroforestry to mitigate climate change is significant which is why countries like Kenya have made agroforestry part of the national strategy for achieving its targets under the Paris Agreement. Climate-resilient seeds are more resistant to disease and pests and increase yields in the value chains of corn, legumes, rice, and vegetables by 20 to 30%. They have the potential to transform the food supply of entire regions. Many new types of seed are currently being researched and marketed in East Africa, accompanied by strong knowledge transfer to smallholders, supported by both public- and private-sector initiatives. Supply and distribution chains are also expanding, which underlines the sustainability of this method, along with the afford-



Pastoralist in search for grazing resources for his cattle in West Pokot County, Kenya



Aerial view of commercial wheat farms in Narok, Kenya

able purchasing costs. About 20 to 60% of food in East Africa is wasted due to poor storage facilities, transport problems, and lack of infrastructure. This particularly affects smallholders who are unable to store and conserve their farm produce appropriately.

The introduction of Solar Cold Chain Solutions in East Africa is still in its infancy and is mainly driven by export-oriented sectors such as fruit and flowers. Conventional cold chain systems have limited reach because of the low rates of electrification in rural areas of Tanzania and Uganda, for example. This is part of the reason why solar-powered cold chain solutions are gaining ground. These systems are attracting broad support from development partners due to their potential in food preservation.

Within the process of promoting

CSA, it is equally important to identify, nurture and support scalable innovative Agripreneurship. This can also create new perspectives for enabling and facilitating sustainable growth,

**The concept of Climate Smart Agriculture (CSA) addresses three challenges which are increasing resilience in the agricultural sector, guaranteeing more productivity, and reducing the proportion of GHG created in the AFOLU sector**

creating jobs, and building wealth for the dominantly unemployed youth

population in the region. Increasing youth engagement in agriculture should involve making agriculture more appealing to the youth.

Considering the multifaceted challenges and potential of the agriculture sector, not only in East Africa but on the entire continent, the Konrad-Adenauer-Stiftung through the Regional Programme Energy Security and Climate Change in Sub-Saharan Africa strategically works to support transformational interventions in the sector. This includes studies and research on the economic viability of CSAs, the support of youth-led Agripreneurship, building networks and platforms that enable knowledge and experience sharing in the region as well as research on the critical role of the public sector in creating an enabling policy and institutional environment for developing and scaling up best CSA applications and practices in the region. This fits into the overall objective of the Regional Programme to support the creation of an enabling political and social framework for climate-friendly sustainable development as well as fostering regional and international cooperation on energy security and climate adaptation and mitigation plans in the region.

For more information about Konrad-Adenauer-Stiftung, Regional Programme Energy Security and Climate Change in Sub-Saharan Africa-reach us on:- [info.climate-nairobi@kas.de](mailto:info.climate-nairobi@kas.de)



## RESILIENT AGRICULTURE IN EAST AFRICA

Conserving biodiversity and promoting environmental sustainability.

# Decreasing post harvest losses for small scale farmers

■ CONTINUED FROM PAGE 7

ing food waste, currently works with over 7000 small scale farmers with cold storage hubs across the country.

In Uganda, a country whose economy depends so heavily on agriculture, and where 875,000 metric tonnes of mangoes are produced, EcoLife is using its cold room to improve the mangoes' shelf life, which allows them to negotiate higher prices with market traders.

The African Union High Level Panel on Innovation and Emerging Technologies (APET) encourages African farmers to utilise smart technologies and techniques to curb food losses to empower the continent's food self-sufficiency.

To encourage reduction of post-harvest losses, APET encourages the utilisation of post-harvest technologies and techniques to stabilise food supply and reduce seasonal fluctuation of food availability and resultant food prices.

For instance, the "Yield Wise Programme" in Kenya, Tanzania, and Nigeria has applied modern technologies towards decreasing post-harvest food losses for smallholder farmers.

In these three countries where smallholder farmers lose approxi-



The AtoZ grain storage bag that was launched in 2015. Picture: File

mately half of their annual harvest, adopting modern cooling chambers has enabled smallholder farmers in these African countries to preserve fresh tomatoes through home processes such as making tomato pastes and dried tomatoes. In this way, the smallholder farmers are able to extend the shelf-life of the tomatoes and enhance market value addition.

Consequently, the smallholder farmers' profits increased by an estimated additional US\$ 1.4 million through the utilisation of these Yield Wise Programme's preservation technologies.

The adoption of digital technologies such as mobile phone applications, television, and radio communication

technologies can also be used to inform farmers on available markets, and that can reduce post-harvest losses.

In Zimbabwe, smallholder farmers use digital technologies to meet timeous market demands and avoid market congestions. Such timeous market information enables smallholder farmers to avoid post-harvest losses due to evidence-based decision-making capacities on their farming activities.

Furthermore, through smartphone applications such as WhatsApp and Facebook, African farmers can access market information on inputs and produce advisory services and weather data. In addition, mobile phone money transfers and crop insurance have enabled African smallholder farmers' decision-making processes when selling their crops and produce, even during the COVID-19 pandemic lockdown regulations.

Grain losses significantly contribute to the region's food insecurity. To address this challenge, farmers utilise "Purdue Improved Crop Storage" (PICS) bags to protect their grain.

Essentially, the PICS bags are airtight storage bags that prevent the penetration of pests into the stored grains without using chemical preservation. As such, this enables the grains to

have a longer shelf-life during storage.

The adoption of technologies to preserve food can enhance Africa's food security.

According to the New Partnership for Africa's Development is an economic development program of the African Union-NEPAD, to enable such actions, African governments should collaboratively formulate the essential policy frameworks, measurable implementation efforts and mechanisms, and adequate capacity strengthening measures at all developmental levels.

NEPAD posits that this would attract Africa's development partners to support ongoing efforts spearheaded by African governments and regional economic communities through well-organised and monitored progress towards achieving this goal.

But NEPAD also notes that these food security ecosystems should incorporate Africa's indigenous best practices and expertise related to post-harvest losses management and agriculture, so as to adapt food preservation technologies and practices to local contexts and realities in a cost-effective manner.

"Most importantly, African governments should urgently invest in public awareness campaigns on post-harvest losses, food wastages, and food waste management. This can enable coun-

tries to improve income, nutrition, and food production and processing ecosystems.

"Mobilisation of the necessary human, technical, and financial resources to enhance sustainable post-harvest losses management frameworks and cost-effective post-harvest technologies and techniques in Africa, can enable Africa's smallholder farmers, traders, and agro-processors to benefit from such technologies and management systems," says NEPAD.

"Fundamentally, simple and accessible technical solutions should be identified and promoted to capitalise on African community practices that can best facilitate access to knowledge at the local level."

"Ultimately, African countries should expand their countries' post-harvest policies and strategies by adopting market-based approaches and indigenous preservation technologies and techniques. These market-based methods should explore value addition measures to smallholder farmers and agro-processors through inclusive food and agricultural industrialisation."

Similarly, the necessary private sector investments should be executed to enable sustainable and effective post-harvest solutions in Africa.

## Beating papaya mealybug menace in East Africa: A collaborative research approach

The papaya mealybug is a scourge for smallholder farmers across East Africa, and threatens both livelihoods and food security.

Originating from Mexico and Central America, before spreading to the Caribbean and South America in the 1990s, the pest was first detected in Kenya in 2016.

The papaya mealybug, a polyphagous insect pest, affects not just papaya but more than 200 crops of economic importance, including cassava and avocado.

### Devastating impact

Its impacts are significant. It is estimated to have caused, for example, 57% yield losses worth GBP £2,224(\$2,762)/ha each year between 2016 to 2020 in East Africa. In some cases, it can cause the complete loss of the crop.

In Kenya alone, more than half of the country's crop has been affected by the papaya mealybug, making some farmers abandon the fruit altogether.

And it is feared that the pest could soon spread to areas south of the Democratic Republic of Congo, northern Cameroon, Zambia, Madagascar and western Ethiopia, which are environmentally suitable and have suitable crop hosts.

### Fighting back

Despite the horror stories, science is fighting back against the papaya mealybug, with collaborative strength in research and application of safer-to-use and more environmentally friendly biological controls where possible.



Teacher and pawpaw farmer Wilfred Mutondi shows his infested pawpaw fruit. Picture: CABI

ence International (CABI) is working with partners in East Africa to combat the menace. The initiative involves the use of the encyrtid wasp (*Acerophagus papayae*) towards the sustainable control of the papaya mealybug as part of an integrated pest management plan.

The partners include Kenya Plant Health Inspectorate Service (KEPHIS), National Museums of Kenya (NMK), the Kenya Agricultural and Livestock Research Organisation (KALRO); Uganda's National Agricultural Research Organisation (NARO) and Ministry of Agriculture Animal Industry and Fisheries (MAAIF); and South Sudan's University of Juba.

Before the release, with funding from the CABI-led PlantwisePlus programme, which aims to help farmers to be prepared for crop pests and take a more sustainable approach to manage them, our scientists estab-

lished the performance of the parasitoid under laboratory conditions for its efficiency as a potential agent for use in the classical biological control programme of papaya mealybug. Nearly 75 percent of adult females were killed during this study, ensuring that fewer numbers of the pest will progress to the next generation.

A study on knowledge, attitudes and perceptions of farmers from three coastal counties in Kenya about classical biological control of papaya mealybug revealed that 85 percent of farmers viewed the release positively, and most (94 percent) would support the biological control programme in their community.

Following the promising results both from the biological and socio-economics teams, Kephis issued a release permit for this biocontrol agent in the country. Mass releases have been done in the coastal counties of Mombasa, Kwale and Kilifi.

The parasitoid became established with parasitism rates of up to 53 percent after one release and up to 72 percent after the second release. The release sites showed very minimal incidence of papaya mealybug infestations, suggesting that the biological control project is a success. CABI is now in advanced plans to extend the parasitoid releases to Uganda and South Sudan, as part of a Darwin Initiative funded project.

### Strength in partnership

This involved the top leadership of the county agricultural departments of Kilifi, Kwale and Mombasa, local authority, farmers, KEPHIS, KALRO and CABI.

Fernadis Makale, Research Officer, Invasive Species Management at CABI's regional centre for Africa, said, "Bio-control for most pests has been shown to succeed at the community level and



Papaya plant affected by papaya mealybug. Picture: Fernadis Makale

*A. papayae* is not an exception. But for any such programme to succeed, collaboration with farmers and their various communities – along with regional authorities and national government agencies – is vital not least in the dissemination of knowledge but also in the practical application of mitigation methods on the ground."

### FACTBOX

CABI has worked in Africa for many years, but in 1995 it formally established a regional centre in Nairobi and is in discussion with the Uganda government to establish an office in Uganda, within the East Africa region. In Africa over 80% of people living in rural areas rely on the crops they grow for food and for income. They face many challenges in growing sufficient good quality produce, such as changing climatic conditions, threats from pests and diseases, lack of access to markets, and limited access to current agricultural information. Agriculture is essential for sub-Saharan Africa's economic growth and yet average crop yields in Africa are among the lowest in the world. CABI's Africa Centre strives to improve livelihoods, working with the communities that it serves to address the problems they face using sustainable approaches. Find out more at [www.CABI.org](http://www.CABI.org)

## RESILIENT AGRICULTURE IN EAST AFRICA

Conserving biodiversity and promoting environmental sustainability.

# Nutritious Sweetpotato Helping Farmers Recover from Climate Stresses and Drought in Africa

**S**weetpotato production and consumption is impacting millions of lives in Eastern and Southern Africa (ESA) and contributing to the recovery and resilience of local food systems to climate shocks and droughts. African countries, particularly in the ESA region (Ethiopia, Kenya, Uganda, Mozambique, Madagascar, Malawi) have faced drought, flood challenges and conflicts, especially in the last two years. These experiences have forced farmers to transition into more climate-resilient farming systems to adapt to their environment. Sweetpotato has become an increasingly important climate-resilient food and nutrition security crop because it's a nutritious staple crop accessible to rural communities, early maturing, drought tolerant and high-yielding.

*"The Sweetpotato program at the International Potato Center has worked with partners in Africa to enable over six million households to access nutritious sweetpotato varieties. Over the years, we have fine-tuned our agriculture-nutrition marketing approaches and strengthened supply chains, and with the help of our partners we have made a demonstrable difference in the lives of households in over twelve countries in Africa including Eastern Africa countries Ethiopia, Kenya, Uganda, Rwanda and Tanzania;" ~ Paul Demo, Director for Africa, International Potato Center (CIP).*

## Impacting where it counts most Humanitarian and Fragile Context

The International Potato Center (CIP) has been working with partners at national and sub-national levels to reach farmers and consumers from fragile environments through humanitarian programs including women of reproductive age, adolescent girls and children under five years. Strategic partnerships with World Food Program (WFP) and other humanitarian agencies have helped increase sustainable production and supplies of orange-fleshed sweetpotato as a nutritious staple food for displaced and refugee populations and their neighbouring communities. This includes drought-prone Arid and Semi-Arid (ASAL) counties of Northern and Eastern Kenya, regions affected by ongoing conflicts such as Karamoja, Acholi and West Nile, communities in Uganda, as well as Tigray and NSSPR regions of Ethiopia. This innovative delivery model of sweetpotato delivery in fragile and humanitarian context has so far reached more than two million people through household production and humanitarian markets especially during crisis. CIP's contribution include strengthening seed systems, technical capacity sharing and



CIP-WFP training of local sweetpotato multipliers farm of Simon Mwendwa, Tana North, Tana River County, Northern Kenya.

knowledge transfer as well as promoting utilization of OFSP including through homegrown school feeding programs. Dissemination through institutions (schools and health systems), promotion of OFSP using complementary infant feeding technologies, such as the Healthy Baby Toolkit (HBT), and value chain development through processing and commercialization has helped to scale up in reaching the many households producing and consuming the OFSP.

Sweetpotato provides farmers with options for diversification of the dominant cereal-based cropping systems that are currently experiencing challenges from the prolonged droughts. Farmers can now access sweetpotato varieties that are well adapted to the regional climate stresses including drought, floods and heat. These varieties have been developed through collaborative research and innovation and scaled-up throughout Africa and globally. They are released and/or registered for release with national partners through regional varietal exchange mechanisms and protocols.

*"The program's resounding success can be attributed to robust dissemination models and partnerships with public and humanitarian agencies, such as WFP, which allowed for rapid and efficient outreach to vulnerable population. What's most remarkable from a development standpoint is the program's focus on strengthening seed systems at both the national and local levels to ensure a continuous supply of quality*

*seed."* ~ Joyce Maru, Global Director (a.i) Sweetpotato Program, International Potato Center (CIP)

CIP and partners have helped millions to access the nutrition, health and economic benefits of sweetpotato, this way helping to address the issues of food and nutrition security that have been exacerbated by climate change, Covid-19 pandemic and ongoing conflicts. Today, orange-fleshed sweetpotato (OFSP) varieties are well-rooted in the local farming systems and diets in many parts African countries. The benefits of the nutritious orange-fleshed sweetpotato, which is rich in vitamin A and other micronutrients, have reached vulnerable households and communities through smallholder production, nutrition education and awareness creation,

local markets and supply chains for fresh roots and products, commercial partnerships with private sector and linkages with humanitarian agencies that reach millions of vulnerable families. Capacity sharing and knowledge transfer in priority areas of the value chain has also been critical in ensuring farmers can access quality planning materials to boost production and productivity.

Policy influences and advocacy at regional, national and sub-national levels have helped ensure governments prioritize and promote OFSP production to contribute to food and nutrition security outcomes in the countries. There is increased interest and demand from humanitarian agencies and governments to understand the role of OFSP in improving diets and

contributing to recovery programs. CIP and partners achievements in expanding humanitarian partnerships and transforming lives through the orange-fleshed sweetpotato program demonstrate unwavering commitment to addressing nutritional challenges and fostering sustainable agriculture. With continued support and collaboration, the program's positive impact can be extended to reach even more communities in need, ensuring a healthier and more prosperous future for smallholder farmers and their communities.

The International Potato Center (CIP) is a CGIAR research center, a global research partnership for a food-secure future. CGIAR science is dedicated to reducing poverty, enhancing food and nutrition security, and improving natural resources and ecosystem services. CIP's research program in Africa focuses on potatoes and sweetpotatoes to ensure that these root and tuber crops contribute to food security, nutrition, income and climate resilience and adaptation for farming households. CIP operates a Regional Office for Africa based in Nairobi Kenya and has representation and offices in 11 African countries.

Article by Joyce Maru and Martha Awino (CIP)



From screenhouse to plate during Covid 19 Isiolo Kenya.

For more information contact  
Martha Awino – CIP, Senior  
Communication Specialist  
martha.otieno@cgiar.org

## RESILIENT AGRICULTURE IN EAST AFRICA

Conserving biodiversity and promoting environmental sustainability.

# Feeding Africa: Untapped potential in small-scale irrigation can help farmers to change the game

PAULINE KAIRU  
SPECIAL CORRESPONDENT

In Africa, where rainfall is often erratic and insufficient to support crop growth, agricultural irrigation has become a vital component of food production.

But although many farmers in the regions rely on irrigation systems to supplement the water supply for their crops artificially, there is still a huge deficit in terms of irrigated agriculture in the region.

According to the International Food Policy Research Institute (IFPRI), only 6 percent of the land area under cultivation in sub-Saharan Africa, is currently under irrigation on the continent which stands at slightly more than 13 million hectares.

East Africa boasts a variety of irrigation methods ranging from traditional furrow-based systems to modern drip-irrigation techniques based on factors like soil type, water availability, and crop types that determine which method works best for each region or country, but low and ineffective irrigation contributes to Sub-Saharan Africa's low agricultural productivity.

According to the United Nations, rain-

water harvesting could end much of Africa's water shortage.

"African countries suffering or facing water shortages as a result of climate change have a massive potential in rainwater harvesting, with nations like Kenya and Ethiopia capable of meeting the needs of six to seven times their current populations," according to a United Nations, urging governments and donors to invest more widely in technologies that are low cost, simple to deploy and maintain.

But in recent years solar technologies have become a viable option for small-scale farmers.

"Solar powered irrigation systems (SPIS) provide reliable and affordable energy, potentially reducing energy costs for irrigation. Particularly in rural areas, where cost of diesel fuel is high or where reliable access to the electricity grid is lacking, they can provide a relatively flexible and climate-friendly alternative energy source."

Governments too have been keen to promote strategies to stimulate renewable energy solutions, including solar energy – yet uptake remains low.

In the agricultural sector, solar-powered irrigation have particularly been valuable for far-flung areas not connected to the national grid electricity distribution system.

"Sustainably managed solar-powered irrigation, ultimately, represents a reliable, cost-effective and environmentally sustainable solution to reduce farmers' vulnerability to energy shortages that hampers production capacity," says the Food and Agriculture Organization of the United Nations-FAO.

"The reliance on rainfed agriculture prevents farmers from cultivating high-value nutritious crops that often need large amounts of water that are applied more frequently.

Unlike large-acreage government irrigation schemes, small-scale irrigation is typically farmer led.

Solar powered irrigation systems are now an affordable and climate-friendly technology for both large and small-scale farmers in developing countries. But they need to be adequately managed and regulated to avoid the risk of unsustainable water use, FAO stresses.

But although solar irrigation has been touted as a key climate smart strategy for Africa, and research confirms a large expansion potential, actual sales of solar irrigation pumps have remained extremely low, with capital to invest in the system being a major barrier for small-scale farmers.

FAO calls for considerations in the overall market and finance ecosystem,



Farms with installed drip irrigation system. Picture|POOL

to strengthen multiple building blocks for solar irrigation development over the long term. "There's need to address both supply side and demand side problems with finance, as well as public regulatory institutions."

Overall, it is estimated the total irrigated area expansion potential for Africa over the next 50 years of 24 million hectares, a 177 percent increase over existing equipped irrigated areas of 13 million hectares. Northern Africa has almost exhausted its irrigation potential and has limited potential for new irrigation area development, merely 1.8 million hectares over the existing 6.3 million hectares. Whereas only 4 percent of the area cultivated in Sub-Saharan Africa is equipped for

irrigation.

Thus, whereas agricultural withdrawals as a share of total renewable water resources reach a high of 219 percent in northern Africa, that share is only 1 percent in Sub-Saharan Africa. Among the regions in Sub-Saharan Africa, only southern Africa, led by South Africa, withdraws 6 percent of total renewable water resources for agriculture.

Thus, the potential of irrigation development for Africa, and in particular for Sub-Saharan Africa, is large, given existing water resources, the high value of irrigated agriculture on the continent, and the large number of rural poor that could benefit from productivity enhancement as a result of irrigation investment.

## Private Sector: A Crucial Partner in Strengthening Climate Resilience and Incomes in East Africa's Food Value Chains



Menno Keizer, CRAFT Regional Project Manager/Agribusiness Expert

As a native of the Netherlands, a country whose economy, much like that of East Africa, heavily relies on agriculture, I have witnessed firsthand the transformative power of intentional government policies and private sector involvement in the agri-food sector. Over the past five decades, the Netherlands has emerged as the world's second-largest agricultural producer by employing this recipe

for success and I believe that East Africa has the potential to follow suit and soar as a leading agricultural producer, even in the face of climate risks.

Agriculture plays a vital role in the livelihoods of approximately 80% of the East African population, and as evidenced by the recent budgets of Kenya, Tanzania, and Uganda, the sector has been rightfully recognized as a key pillar in the development of these nations. However, in the face of numerous challenges primarily stemming from climate change and its associated impacts, it is crucial to recognize the significant role the private sector can play in enhancing climate resilience and increasing incomes in the food value chain.

The Climate-Resilient Agribusiness for Tomorrow (CRAFT) project is an example of how the private sector can play a role in supporting climate change adaptation strategies. With funding from the Dutch Ministry of Foreign Affairs and implemented by SNV, Wageningen University and Research, Agriterra, AICCRA, and Rabo partnerships, this five-year project partners with agribusinesses and farmer cooperatives in Kenya, Tanzania, and Uganda to strengthen their business performance and facilitate the resil-

ience of smallholder farmers. By de-risking investments in specific agricultural value chains, CRAFT has attracted private sector investment exceeding 10 million euros from 56 agribusinesses and cooperatives. The project itself invested seven million euros in the supported agribusinesses and companies to climate proof their supply chain by having 260,000 smallholder farmers trained in various climate smart technologies and practices.

Through this partnership, we have identified areas in which private sector involvement has increased climate resilience and incomes in the food value chain. First, the private sector is crucial in ensuring that climate action is inclusive and reaches marginalised groups, particularly women and youth. They also enable smallholder farmers to gain access to vital climate smart information, technologies, and practices like certified seeds, fertilizers, and weather information, which in turn has empowered farmers to enhance their productivity and adapt to changing climatic conditions. They have also played a vital role in creating sustainable market opportunities, especially for low-margin crops. In these ways, the private sector can contribute to the creation of resilient food systems.

However, several barriers impede the private sector's engagement in climate action. Access to information on climate risks and opportunities, as well as finance for adaptation, remains a challenge. Additionally, a suitable legal and regulatory framework is needed to foster private sector investment in climate change adaptation. Furthermore, it is imperative to prioritize the development of capacity within agri-enterprises and among farmers to effectively respond to the challenges posed by climate change. The CRAFT project has developed climate risk assessments and crop suitability maps to provide information to agribusinesses and cooperatives to make sound decisions. To improve the resilience of smallholder farmers climate smart technical training manuals were developed and over 4,300 extension workers and lead farmers were trained in its use, which was then cascaded down to the 260,000 farmers trained.

Governments play a key role in addressing these barriers. In addition to their efforts, governments in Kenya, Tanzania and Uganda should continue creating enabling legal, institutional, and regulatory frameworks and incentives that attract private sector engagement in climate change adaptation. In addition, they should increase do-

mestic financing to attract private actors' investment in food value chains through public finance instruments such as tax benefits, credit enhancement, and risk-sharing mechanisms. They should also strengthen the engagement and involvement of the private sector in climate change adaptation planning and implementation and development of mitigation pathways. Additionally, building the capacity of agri-enterprises and farmers on CSA practices will enhance their ability to respond effectively to climate change. CRAFT in the three countries supports stakeholder platforms to bring various actors and stakeholders together to discuss the above points.

The private sector holds immense potential in increasing climate resilience and incomes in East Africa's food value chain. By leveraging their resources, expertise, and market-oriented approach, private sector entities can drive climate action, enhance climate resilience, and improve the livelihoods of smallholder farmers. It is imperative to actively engage the private sector in the development of climate-resilient food value chains, fostering a sustainable and prosperous future for East Africa.

By Menno Keizer  
CRAFT Regional Project Manager/  
Agribusiness Expert  
mkeizer@snv.org

## RESILIENT AGRICULTURE IN EAST AFRICA

Conserving biodiversity and promoting environment sustainability



Nyando climate-smart villages are home to a mix of technologies tailored to boost farmers' ability to adapt to climate change, manage risks and build resilience. These technologies will in turn improve livelihoods and incomes. Picture: S.Kilungu (CCAFS)

### Promoting Climate Resilience in Eastern Africa Through Agribusiness Small and Medium Enterprises

A private sector-driven model project, called Climate Resilient Agribusiness for Tomorrow (<https://crafeastafrica.org/>), is co-developing and co-funding climate-smart business concepts and cases with lead agribusiness small and medium enterprises (Agri-SMEs) and cooperatives has empowered farmers to deal with climate-related risks. Successful business case leads – 'Business Champions' (BCs) - implement the business cases which involves training and other extension services on climate-smart agriculture practices, technologies, and services, which are provided by the Business Champion to targeted smallholder farmers. Each business case focuses on one of seven entry value chains that include common bean, green grams, potatoes, sesame, sorghum, sunflower, and soybean. The value chains were selected based on their importance to the food system and climate risks.

Interventions are designed to improve the climate resilience of the focus crops by supporting Agri-SMEs, cooperatives, and farmers to build resilient farming systems that increase productivity and reduce losses throughout the supply chain. The business cases serve various functions; aggregators, processors, or service providers (SPs) and enter into contract farming with SHFs to facilitate access to climate-smart inputs, services and technologies. The BCs' services are designed to advise, support and guide farmers from pre-planting to post-harvest handling. In the past four years, the project has supported 56 business cases of which 15 are cooperatives and 41 are SMEs. Of these, 56 business cases, 20 are either women or youth-led SMEs. The project has triggered private sector financing of CSA technologies and practices amounting to €10,680,106.

At business level, the project works with trainers of trainers (ToTs) and agribusiness management to cascade CSA practices and technologies to smallholder farmers in their supply chain. To continuously improve the skills of extension workers and lead farmers, 1,586 ToTs and extension workers were trained. Climate change adaptation practices and technologies are promoted through 1,785

farmer field schools. To improve access to good quality seed, selected business champions supported the development of quality declared seed (QDS) plots to boost availability of the right varieties in their localities.

#### Results and lessons at the farm level:

- A total of 116,555 farmers trained, out of that,

53% (62,317) farmers increased their income and 91,800 farmers applied two or more climate resilient farming practices in the past 12 months.

- The project reached a total of 81,210 ha of farmland under production, of which 44,835 have become more resilient to climate shocks.
- The increased use of weather information is helping farmers make more informed decisions, with 25% of farmers reporting that they utilize weather information now.
- Improved climate-resilient crop varieties are becoming more popular among farmers, with 26% reporting their use according to a recent farmer survey.
- Responses from farmers during focus group discussions conducted showed CSA practices and technologies spillover to other crops that are grown by smallholder farmers.
- Farmers reported improved capacity to deal with changing climatic and weather patterns through the adoption of CSA technologies and practices. This is evidenced by the 70,049 farmers whose crop enterprises have become more resilient to possible shocks. Additionally, 44,835 hectares of farmland have become more resilient to possible stresses and/or shocks, indicating the effectiveness of CSA practices in enhancing resilience.

#### Results and Lessons for SME and Cooperatives

- Input credit arrangements have expanded business revenue streams and built trust with farmers.
- The contract farming arrangement has guaranteed farmers' access to markets.
- Cooperatives' service provision model strengthens the connection with farmers and is more inclusive.
- Working with and through agri-businesses is key to sustaining CSA interventions, especially seed companies respond well to increased demand for their products.
- Agribusinesses play a vital role in increasing the availability of CSA technologies to smallholder farmers in the areas where they operate. In recognition of this, 480 SME representatives have been trained on CSA practices and technologies relevant to their company and/or value chain. This training helps to better equip the agribusinesses, support the adoption of CSA practices and technologies by smallholders in their area of operation.

Article contributed by John Recha, Teferi Demissie, Joab Osumba, Maren Radeny and Dawit Solomon

## Early Warning Systems and Climate Information Services to Manage Climate Risk in eastern Africa

The most damaging impact of climate change globally is weather becoming erratic, affecting the intensity and frequency of heat waves as well as rainfall. When it comes to the severity of impacts made by such extreme weather conditions, namely droughts and floods, the eastern Africa is one of the most vulnerable regions on the planet.

The region has been grappling with extreme drought conditions between 2020 up to date. For decades, the region has been experiencing extremely high temperatures with 2023 being the third worst dry spell compared to the 2010-2011 and 2015-2016 seasons. This has seen pastoralists travel several kilometres in search of food, feed and water. This led to more than 13 million livestock succumbing to the harsh weather conditions in the region. Accordingly, 22 million people in the region were at risk of starving and hundreds of thousands were displaced. The onset of rains in March 2023, on the other hand, displaced hundreds of thousands in Ethiopia and Somalia and a few dozen people were killed due to the flash floods.

This comes after the Intergovernmental Authority on Development (<https://igad.int/>) predicted in 2022 that over 50 million people in the Greater Horn of Africa (GHOA) would suffer from acute food insecurity. The 2022 October to December season was the 5th consecutive failed rainy season. This shows that as the droughts continue, each year the number of impacted people will continue to rise as more and more farmers fail to recuperate from poor yields. According to the 64th Greater Horn of Africa Climate Outlook Forum (GHACOF 64) for the June to September (JJAS) 2023 season, it is anticipated that later this year, Eritrea, Djibouti, central and northern parts of Ethiopia, western Kenya, Sudan, and pretty much of South Sudan will receive less rainfall.

One factor that makes these impacts so great is that many of the smallholder farmers have very little capital and have limited access to climate information services (CIS) as well as early warning systems (EWS). This results in farmers having little to no warning time for the short rainy seasons meaning they are unable to prepare; unfortunately,

this often results in total crop failures for many farmers. According to the United Nations Secretary-General (UNSG), "Countries with limited early warning coverage have disaster mortality eight times higher than countries with high coverage." The same UNSG also announced the United Nations' mission to ensure that everyone on the planet is protected by an EWS by the year 2027, in an initiative called "Early Warning for All".

For transformation to take place and shift from drought management to climate risk management, there is a need for public-private partnerships. Governments need to invest in physical and technical infrastructures that will enhance weather and climate prediction as well as expand knowledge.

**"Countries with limited early warning coverage have disaster mortality eight times higher than countries with high coverage."**

In light of this information, IGAD's Climate Prediction and Applications Centre (<https://www.icpac.net/>) as well as Accelerating Impacts of CGIAR Climate Research in Africa (<https://aicra.cgiar.org/>) have laid out plans for increasing the number of people with access to multi-hazard EWS in the GHOA. Since natural disasters have no regard for national borders, these organizations are pressuring the cooperation of all national and regional governments in the GHOA in creating and implementing such systems. In order to help these countries, accelerate implementation, AICRRA and its regional partners offer technical and financial assistance in the creation of the National Framework for Weather, Water and Climate Services (NFWWCS). The creation of this system will enable the region to create well-coordinated efforts for improving their CIS and EWS to make it possible for the "Early Warning for All" plan to be successful.

Article contributed by Yosef Amha, Teferi Demissie, Ahmed Amdihun, Viola Otieno, Ernest Afiesimama, James Murombedzi, Maren Radeny, and Dawit Solomon



Deaths of livestock due to severe drought. Picture: ILRI/George Wamwere-Njoroge

## RESILIENT AGRICULTURE IN EAST AFRICA

A Key solution lies in investing in a robust feed and fodder sub-sector



AFRICAN UNION  
INTERAFRICAN BUREAU  
FOR ANIMAL RESOURCES

# Private sector-led solutions to prevent livestock losses in the face of droughts in the Horn of Africa

## More than 8.9 Million Livestock Lost: What is the Investment Gap?

The Greater Horn of Africa is emerging from the most severe drought in living memory precipitated by five consecutive seasons of failed rains, an occurrence unprecedented over the last 40 years. With the onset of rains, the region breathed a collective sigh of relief, but the millions of livestock skeletons scattered across the landscapes in the arid and semi-arid areas evidence the massive losses in what used to be a vibrant livestock enterprise. With an estimated loss of 8.9 million livestock in the Horn of Africa, the drought obliterated a financial equivalent of over half a billion dollars (USD. 0.5B).

This figure captures only the livestock fatalities: it doesn't factor in the massive erosion of animal genetic resources, livelihoods built over decades, and gainful employment lost in one drought. Neither does it reflect the production losses, including milk, meat, hides and skins, manure, and other products that are critical to food and nutrition security, incomes, environmental health, and the economies of the region. The loss of over 120 million liters of milk has left over 1.6 million underage children and about one million pregnant and breastfeeding mothers acutely malnourished. This massive loss of 8.9 million livestock is equivalent to about half of the total food import budget for Kenya (which according to KNBS stood at 1.2 billion USD in 2022) or two-thirds of the export value of coffee from Uganda, Africa's largest coffee exporter, which earned 876 million USD in 2022 (Food Business Africa). If this magnitude of loss on core production assets of a country were to happen to any other economic sectors it would wipe out most of them, and yet livestock economies in the region have repeatedly suffered similar losses in the last three decades.

The livestock sector has shown a unique and remarkable capacity to rebound, being domiciled around pastoral and smallholder livelihoods, which produce 80 to 90% of meat and milk in the region. However, the cost of these losses has been enormous and has taken a significant toll on resilience capacities and business continuity, especially on producers who bear the brunt of such risks in the livestock sector.

Pastoral systems, where livestock keeping is the predominant economic activity, are the most vulnerable to the effects of drought, and various studies show that it takes at least five years to rebuild a herd. This means that unless coping mechanisms are enhanced, many pastoral households and communities will move from vulnerable to destitute or migrate out of pastoral livestock systems

### A Disaster that Recurs

Rain-fed agriculture is the mainstay of most African countries, which



will continue to face drought with increasing severity, duration, and frequency making it increasingly hard and near impossible to recover and rebound before the next incident. Evidence shows that there is a substantial shift in seasonality and decline in the March to May long rains, with droughts tripling relative to 1970-79, and flooding increased by tenfold (UN OCHA 2011/ Checchi and Robinson 2013). The last three droughts have each in turn, as they occurred, been declared the worst in living memory

The latest drought from late 2020 to 2022 and early 2023 had the unprecedented feature of being the first with five consecutive rainy season failures, a climatic event not seen in the last 40 years, with massive loss of livestock and wildlife. This outlook augers that future droughts might be worse.

The obliteration of half a billion dollars from the livestock sector underscores huge market failures and raises critical glaring questions:

### What policies and investments are missing to protect and promote livestock livelihoods and businesses?

The Livestock Sector Advocacy Report: Increased Investment in the Livestock Sector Critical for Attainment of the Malabo Declaration Goals (AU-IBAR, ILRI, Akademiya 2063 and LPN 2021) whose recommendations were endorsed by the African Union Summit 2022, highlighted that only 2% of Official Development Assistance in the agricultural sector is directed to livestock, and a significant portion of that is ad hoc support for emergency response.

How robust and equitable are business models, for the livestock sector, which generates products that are in high demand, but are unable to protect producers? The dairy subsector, dominated by smallholders and pastoralists, contributes on average 3.3 of the National GDPs of EAC countries, 10% of their AGDP, and 10% of agricultural employment.

### Untapped Business Opportunity?

Drought is an inevitable phenomenon of African environments particularly in arid and semi-arid areas and should no longer present a shock to the livestock systems. Research by USAID agencies has projected that one dollar (USD 1) invested in building people's resilience will result in up to three dollars (USD. 3) in reduced humanitarian aid and averted losses.

This means that resilience-building strategies are by far more economically preferable and suitable for most of Africa's emerging economies that are strained by external debt, food imports, rising inflation, wage bill, health care, and an unemployment crisis.

While this is a high-magnitude crisis, it presents a huge opportunity where the solution lies in building business models as more sustainable solutions to the crisis, without excluding other efforts applied to mitigate the effect it has on livelihoods. From a business and investment perspective, what would it take to save 10 million cattle facing a similar drought that has recently been experienced in the Horn of Africa? To keep 10 million cattle alive would require an investment of 10 million hectares of high dry matter cultivated or rangeland pastures, calculated at a daily intake of 10kgs in dry matter equivalence, with a production of 7.2 tons of grass per hectare annually. Such an investment would earn a cumulative return of USD. 8.4 billion in net profit, annually. The foregone return on this investment is sixteen times more than the total value of the livestock lost in the drought, and additional value contributed to gross domestic product (GDP).

The business opportunity goes beyond primary production of feed

and fodder; to developing functional feed reserves in proximity with livestock-dominated regions, efficient distribution of feeds to boost access, and contracting services ranging, from land preparation, fertilization, and harvesting and many a range of other off-shoot business opportunities in the supply of agro-inputs, sales fodder cultivation, and processing equipment. This has a direct effect on the growth of the financing sector which is part of the key drivers of such investments, and the overall quality of livestock products to humans at the impact level.

### Market Led Solutions

Agri-SMEs in East Africa face an acute need for finance tailored to their specific requirements. For example, while agriculture contributes to 25-30% of the GDP on average in the countries covered in this report Kenya, Rwanda, Tanzania, and Uganda, it received only 2-7% of total bank credit in 2018 (Dalberg, 2018). This situation is evident in many other African countries. The report observed that lenders found financing agricultural enterprises especially difficult due to external risks (such as price volatility, climate change, and government regulations) among other business risks such as management capacity and inadequate financial records.

Some of the ways being practiced in Kenya, and which could be tested in other countries, is to aggregate the product consumer (off-taker) and use the agreement between the off-taker and the producer as part of the support documents for the loan request.

To further secure the financing from additional risks, the bank channels the funding through the input suppliers for example the seed suppliers, fertilizer manufacturers, and contractors of mechanized services like land preparation, seeding, and baling among others.

Some banks have been able to attract guarantee funds that are designated for climate-smart agri-enterprises which include feed and fodder production.

The objective of such strategies is first to boost the volumes of feed and fodder available and to make it easily accessible in the event of feed and fodder scarcity.

### Policy Beyond Rainfall

While it's a huge tragedy to lose livestock, livelihoods and businesses to the effects of drought, there needs to be a more structured approach to creating a robust feed and fodder sub-sector. These may include;

- Defining where commercial cultivation can be promoted and supported. In specific terms, such policies should facilitate the release of any underutilized lands that can be used for feed and fodder production.
- Fiscal policies, where the government provides tax incentives for feed and fodder inputs, by either zero rating inputs, imports of mechanization equipment, as well as reducing rates on lands under feed and fodder production
- In terms of resource allocation, governments can designate funds toward irrigation, so that the land leased out for feed and fodder production has the requisite capacity to produce across seasons.
- Formation of multi-stakeholder platforms that evaluate the status of feed and fodder reserves annually, providing the relevant data on production deficiencies, and working closely with weather experts on forecasts and creating an accountability mechanism on feed and fodder availability.

Article by Sarah Ashanut Ossiya, PhD Project Coordinator; David Maina, Feed and Fodder Business Development Expert, and Fiona Imbali, Program Assistant, Communication and Visibility, Resilient African Feeds and Fodder Systems Project, African Union – Interafrican Bureau for Animal Resources. Graphic Design by Fahim Kremer.

## EFFECTS OF SOME DROUGHTS IN THE HORN OF AFRICA ON HUMANS AND LIVESTOCK

