



PanAfrican Agriculture

BALANCED AND AUTHORITATIVE

ISSUE 13 | JULY-SEPTEMBER 2023

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The fertiliser headache

Farm input shortages and high prices threaten Africa's food security.

Cultivating peace and profit

Meet Cameroon's women farmers growing pepper and promoting refugee integration.

Q&A

With IFPRI Director of Communications and Public Affairs Charlotte Hebebrand.

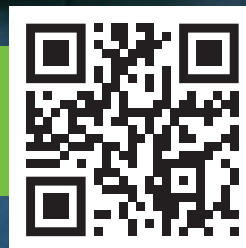
Dr **Wilson Songa** MBS, OGW

42 years of an illustrious career in agriculture.

ISSN 2958-826X



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Editor's Note

Build stable markets to achieve fertiliser security in Africa nations

AFRICAN governments, concerned about low food production on the continent, committed to increase fertiliser use from an average of 8.0kg of nutrients per hectare to 50kg of nutrients per hectare by 2015 under the Abuja Declaration.

Eight years down the line, that target is far from being met, with fertiliser use in most countries in sub-Saharan Africa still standing at below 25kg per hectare.

Concerns about fertiliser security have further grown in the past three years on the back of acute shortages and high prices related to the global supply chain disruptions caused by the Covid-19 pandemic and the Russia-Ukraine war.

Many African countries depend on fertiliser imports from Russia and Ukraine.

According to the International Fertilizer Development Center (IFDC), which has been tracking data related to the price and availability of the key farm input across 20 African countries, fertiliser prices rose almost 30 percent starting early 2022 due to the Russian invasion of Ukraine.

In this issue of the *PanAfrican Agriculture*, we run a scan on the fertiliser headache on the continent in our special report section.

Besides highlighting the struggles of farmers in different countries accessing or buying fertilisers, we bring you some interesting stories of how governments, development-focused

non-governmental organisations, researchers, and private businesses are trying to solve the problems.

If you are looking for a deeper understanding of the fertiliser security issue in Africa, we highly recommend you spare a few minutes to read our Q&A with Charlotte Hebebrand, the Director of Communications and Public Affairs, International Food Policy Research Institute (IFPRI).

Behind every story of a successful public policy, programme or institution there is always an outstanding individual or team of individuals who made it happen.

For our personality profile and cover story, we feature Dr Wilson Songa, the Kenyan agriculture consultant and former government technocrat credited with helping to develop and implement the country's robust phytosanitary measures, among other key agricultural policies, during his more than 30 years in public service.

As usual, our writers were on the lookout for stories of innovations making a difference in farming communities across Africa and they filed quite some interesting ones like that of a women farmers' cooperative growing and processing pepper, and promoting refugee integration while at it.

Read these plus stories on other agricultural issues on the continent.

Cianki



16. 42 years of illustrious career in agriculture

Dr Wilson Songa, a scientist with a deep knowledge of agricultural research, policy and management, speaks about his professional career, which includes more than 30 years in Kenya's public service – 14 of that in senior management and administration roles. He is currently a senior adviser on strategy and partnership at Syngenta Foundation, and sits on multiple boards in the agricultural sector.



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Published by:

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The Manager of Knowledge Management and Communication Dr. Richard Kasuga accompanied with other Managers and Directors from TARI HQ, Center Directors and some staff from TRI Tumbi and TARI Kihinga visiting various seedling nurseries at TARI Tumbi after the opening of Agricultural Technology Transfer hub. Photo Credit: TARI

Tanzania grapples with counterfeit seeds menace

By Zuwena Shame

MAIZE is the most important crop in Tanzania, grown by more than 50 percent of the country's farmers and accounting for 31 percent of total food production.

The crop covers 45 percent of total arable land and generates close to 50 percent of rural cash income.

Small-scale farmers account for 85 percent of the total maize production, with medium and large-scale farmers contributing 10 percent and 50 percent respectively.

Betwelo Mpangala is one of the maize farmers in Songea Rural District, Ruvuma Region, more than 900km from Tanzania's commercial capital Dar es Salaam.

He has been growing the crop for years and the harvest was good since he started using improved seeds.

But this year, he says, he harvested less than expected after planting fake maize seeds.

"I used to harvest 25 100kg bags per acre, but this year I harvested less than seven bags per acre on a farm where I thought I followed all good agronomic practices," says Mpangala who owns a 42-acre farm in the area.

There are more than 50 maize seed varieties officially approved for commercialisation in the country — the most of any crop.

But there are several challenges that limit certified seed use, including high retail price, inadequate and proliferation of cheaper counterfeits.

The Tanzanian government established Agriculture Seed Agency (ASA) to expand seed production and distribution, facilitate seed accessibility by farmers, promote private sector participation in the seed industry development, and strengthen the capacity for research and development of improved varieties.

However, farmers and local seed producers still complain about fake seeds and restrictive policies such as those that don't allow them to produce their own seeds.

Oziniel Benego, a maize and sunflower farmer in Kongwa District, in Dodoma region, a committee member of Mtandao

wa Vikundi vya Wakulima Tanzania (MVIWATA), a national network of farmer groups in Tanzania.

Benego said that sometimes they receive hybrid seeds from the government agents which are labelled with all the good qualities but which don't yield good results when planted.

"Being small-scale farmers, our incomes are low. Therefore, we go for seeds from government agents because they are affordable but when we plant them the results are very disappointing," said Benego. Benego and other farmers have resorted to producing seeds locally, which they deem reliable and sustainable.

However, they face challenges getting licensed by the authorities to enable them sell and distribute seeds to other districts.

The local seed producers are pushing for official recognition and friendly policies.

"I would like to call on the government through its agents to educate us (small-scale seed producers) on how to add value to our local seeds we produce, because this will enable us get certification and licence to sell and distribute our seeds within our districts and the rest of the country," said Benego.

ASA chief executive officer, Dr Sophia Kashenge, said that fake seeds challenge can be attributed to a number of factors, including limited knowledge among farmers on where they should buy certified seeds.

The official policy, she said, is very clear that access to high-quality seeds is essential to raising productivity and improving the competitiveness of the agricultural sector.

"We have been encouraging farmers to use improved seed varieties to increase their production and overcome the effects of climatic change. It has been revealed that there is a poor pace over the adoption of improved seeds by many farmers, especially those in rural

areas, a situation which weakens the performance of the key sector in which the national economy hinges," Dr. Kashenge said.

Paulo Msemwa, an agronomist in Ruvuma region, blamed the proliferation of fake seeds on "deceitful people who move around villages pretending to sell certified seeds, while they are not".

"That's why we are directing farmers to stop from buying seeds from unknown people who move in villages and weekly or monthly open markets," he said.

Dr. Richard Kasuga, the communication and knowledge management specialist at the Tanzania Agriculture Research Institute (TARI), said that Tanzania Official Seed Multiplication Institute (TOSCI) has the sole mandate to certify seeds and provide awareness to farmers on how to identify fake seeds.

TOSCI established a special input verification service known as 'T-HAKIKI', which uses technology to help farmers identify fake inputs.

The programme was financed by Alliance of Green Revolution in Africa (AGRA) and Mastercard Foundation.

"The technology will help the farmers to understand the proper use of these inputs at their convenience just via their mobile phones," said the Director-General of TOSCI, Patrick Ngwediagi.

"This will also help the government in dealing with unscrupulous traders. T-Hakiki will revolutionise the agriculture sector and improve food security hence increasing the income of smallholder farmers and reduce the prevalence of counterfeit or adulterated agricultural inputs in Tanzania."

When presenting the agriculture budget 2022/2023 early May this year, the Tanzanian Minister for agriculture in Tanzania, Hussein Mohammed Bashe, pointed out that the government had made various efforts in curbing seed challenges farmers face in the country.

He cited, among others, the renovation of TARI research centres such as Tengeru in Arusha, which is complete.

The renovation of Mlingano in Dodoma and Mikocheni in Dar es Salaam is in progress.

He also said that the government, through TARI, has a plan to step up seed research on strategic crops.



The Tanzanian government established Agriculture Seed Agency (ASA) to expand seed production and distribution, facilitate seed accessibility by farmers, promote private sector participation in the seed industry development.
Photo Credit: Zuwena Shame

Sofia Tesfazion, Director, Resource Mobilization, AATF speaks in panel discussion during the 2023 Feed the Future Innovation Labs Regional Partners' Meeting held in Nairobi in May 2023. Photo Credit: Feed the Future Innovation Lab for Horticulture, University of California, Davis

Bundling climate-smart solutions for Africa's agriculture

By Verenardo Meeme

AFRICA should adopt climate-smart solutions that address multiple challenges smallholder farmers face across the agricultural value chain, an official of the African Agricultural Technology Foundation (AATF) has said.

Sofia Tesfazion, the Director, Resource Mobilization at AATF, said bundling or aggregating solutions, as opposed to isolated interventions, would ensure projects achieve sustainable outcomes and greater impact with less financing.

"Given the limited climate finance coming to Africa, Africa requires projects that address multiple facets," Tesfazion said during a panel discussion on climate mitigation

systems at the 2023 Feed the Future Innovation Labs Regional Partners' Meeting held in Nairobi in May.

"This strategic shift is a significant step forward in the battle against impacts of climate change, promising a brighter future for Africa's vulnerable farming communities."

Africa faces a disproportionate burden of the adverse effects of climate change despite being responsible for only 3.0 percent of global emissions.

But the continent only receives 10 percent of what it requires for climate action.

Tesfazion also called for the strengthening of the circular economy programming capacity, noting that the current investments are focused on either adaptation or mitigation, thereby losing the co-benefits.

AATF, a non-profit organisation, promotes the development and transfer of agricultural technologies to smallholder African farmers.

For instance, AATF is participating in a consortium of partners that are implementing the Bio4Africa project that is funded by the European Commission's European Research Executive Agency and led by CIRAD that develops bio-based solutions and circular value chains.

The project that is being piloted in four African countries - Ghana, Uganda, Ivory Coast and Senegal – aims to transfer simple, small-scale and robust bio-based technologies adapted to local biomass, needs and contexts to smallholder farmers and contribute to sustained food security.

Technologies being piloted under the project include green bio refining, pyrolysis, hydrothermal carbonisation, briquetting, pelletising, bio-composites and bioplastic production.

“The Bio4Africa project also drives the cascading use of local resources, diversifies farmer incomes and contributes to the development of a bioeconomy in Africa,” Tesfazion said. The panelists included Evan Girvetz, Thematic Lead for Climate Smart Technologies and Practices at the Alliance of Biodiversity International and Edward Amoah Idun from the Current and Emerging Threats to Crops Innovation Lab.

The discussion was moderated by Jerry Glover, Deputy Director of the Center for Agriculture Led Growth and Lead for Research Budget and Strategy at the Bureau for Resilience and Food Security, USAID.

While highlighting Africa's climate change investment, Tesfazion noted that the continent primarily focuses on adaptation measures rather than mitigation efforts. A staggering 90% of African countries' Nationally Determined Contributions (NDCs) revolve around adaptation, particularly in the agricultural sector.

Girvetz of Alliance of Biodiversity International and CIAT, also argued for organisations to consider local suitability, priorities and conditions in their project strategies to sustainably increase agricultural productivity and incomes, build resilience to climate change from the farm to national levels and reduce greenhouse gas emissions from agriculture.

“There is no such thing as an agricultural practice that is climate-smart per se. Whether or not a particular practice or production system is climate-smart depends upon the particular local climatic, biophysical, socio-economic and development context, which determines how far a particular practice or system can deliver on productivity increase, resilience and mitigation benefits,” she said.

Financing for climate-smart agriculture needs to be scaled up considerably to attain adaptation and mitigation benefits while enhancing food security, Girvetz said.



Technologies being piloted under the project include green bio refining, pyrolysis, hydrothermal carbonisation, briquetting, pelletising, bio-composites and bioplastic production.



Former Kenyan Agriculture Principal Secretary Harry Kimtai at the 2023 Feed the Future Innovation Labs Regional Partners' Meeting held in Nairobi. . Photo Credit: Feed the Future Innovation Lab for Horticulture, University of California, Davis



A young farmer holds cassava harvested from her farm in the southern region of Cameroon. Photo Credit: Elias Ntungwe.

Cassava processing grows Cameroon's food basket

By Elias Ngalame

SANGMELEMA basin in the Southern region of Cameroon remains a food basket, accounting for a significant share of the country's maize, coco yam and cassava production.

In 2021, the government invested in a CFA1.2 billion cassava processing facility Sotramas, aiming produce 120 tons of starch and flour per day and create an income generation opportunity for cassava farmers in the region.

But a shortage of raw materials initially hindered the facility from meeting the production target.

To solve the problem, the promoters of Sotramas, the Ministry of Agriculture, municipality of Sangmelima and the Chamber of Commerce, Industry, Mines, and Handicrafts (Ccima) of Cameroon, established multiple cassava clusters around the city of Sangmelima, getting empowering over 1,000 youth to join in cassava farming.

"These clusters were established on fields of 150 hectares per five farmers. The government offered the farmers quality seeds and trained over 1,000 youth to take up cassava farming.

"We are glad the scheme has been successful," says the regional delegate for agriculture in Sangmelema, Andreas Ébène.

According to estimates by the Ministry of Agriculture, over 4,000 hectares of cassava were being cultivated in the area in 2022, thanks to the project.

"It will take over five years for Sotramas to reach full capacity, a goal that is being gradually achieved," Ebah Sone of the Chamber said.

Cassava processing has been a blessing to the famers in the area since the project started.

"We can now transform our cassava into flour and sell in big markets in the city of Yaounde and Douala, thanks to the processing plant," says Regina Assam, a cassava famer.

With more hands on the plough, production has tripled, attracting more costumers from big cities and improving the income of the farmers.

"Though a student, I am also into cassava farming. The income I earn enables me buy some books and pay my school fees. This is a relief to my parents," says Anthony Doh, a young cassava farmer who benefited from the training project.

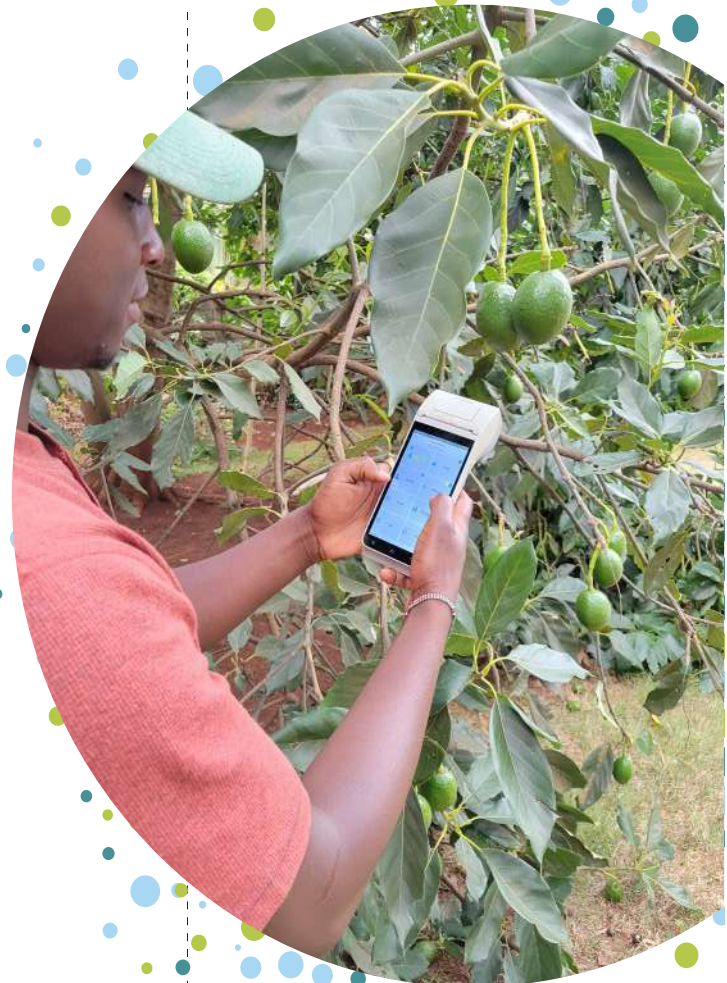
Cassava is a staple food in Cameroon and most parts of west and Central Africa.

However, its production like most food crops experts say, is hampered by lack quality seeds, attack by pests, and a lack of farm inputs such as fertilisers.

"When farmers are given the support they need it's possible for Africa to fight hunger," says Agustin Njamnshi of the Pan African Climate Justice Alliance (PACJA).

Farmers also worry about the poor condition of roads, which make it difficult to transport their produce to markets.

"We need good roads. Our products go bad because of delays in reaching distant markets. The roads in Sangmelema are a nightmare," Doh says.



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Edward Mukiibi, president of Slow Food. Photo Credit: Slow Food

Chemical-free ecological gardens hand bees a lifeline

By Busani Bafana

BY 2050, the world population would balloon to around 9.7 billion people with Africa accounting for more than half of that growth, highlighting the need to increase agriculture productivity to meet food and nutritional security.

As climate change impacts make it hard to grow more and healthy food sustainably, agroecology is dangling a solution.

Agroecology discourages use of chemical fertilisers and advocates a shift from exploiting resources to regenerating them.

Promoters of agroecology say it offers an inclusive and complete path towards agriculture transformation because it links the

social and environmental aspects of sustainability, addressing the food system.

Slow Food, a global organisation promoting local food and traditional cooking and a proponent of agroecology, is promoting the protection of bees and highlighting the danger of their continued loss through the Gardens in Africa project. The project educates communities and school populations on the importance of bees in our agriculture as well as how the bees are a big pillar in building Africa's food sovereignty.

Edward Mukiibi, president of Slow Food, says communities and schools are supported in establishing ecological gardens that produce vegetables and incorporate a rich diversity of African flowering plants

from where bees can collect nectar. These gardens do not use synthetic chemical products to control pests but rather ecological means of protecting plants like intercropping, crop rotation and timely planting.

Insect pollinators -- wasps, birds, butterflies, moths, flies and bees -- are important in boosting crop yields.

They help about 80 percent of the world's flowering plants to reproduce by transporting pollen grains as they move from spot to spot. Bees are important pollinators without them agriculture productivity would be reduced and our food diversity even narrowed.

Slow Food is also piloting the Slow Food Coffee Coalition project in Uganda and Malawi to rebuild and fostering

agroecological and agroforestry coffee production systems. This project supports coffee producing communities to integrate agroforestry trees in coffee fields. Due to the absence of dangerous bee-killing chemicals in the agroforestry systems, many coffee farms now use the flowering agroforestry trees to keep bees for improved yields and livelihoods.

“The loss of bees in Africa has greatly contributed to fall in crop yields in many farming communities,” says Mukiibi.

“Less bees during the bean growing season directly means less yields at the end of the season. This has also forced researchers to develop the so-called high yielding varieties to address the declining yields of local varieties without considering the fact that this decline in yields on many crops is connected to the loss of bees.”

This is also true for the loss of biodiversity. Many important crops whose reproduction greatly depend on pollination work of bees, especially vegetables like African Spider weed are steadily becoming scarce in our local food systems and diets due to the loss of bees. Slow Food works with communities to develop production systems that do not use harmful chemical products and to implement practices that restore nature.

Slow Food Chapters in Africa are also involved in advocacy campaigns against the use of harmful agrochemicals, including in Kenya, Uganda, Tanzania and Nigeria.

Pollinators contribute directly to food security. According to bee experts at the Food and Agriculture Organization (FAO), a third of the world's food production depends on bees.

The FAO notes that bees and other pollinators are increasingly under threat from human activities. Bee populations have been declining globally over recent decades due to habitat loss, intensive farming practices, changes in weather patterns and the excessive use of agrochemicals such as pesticides.



Pollinators such as bees are important in boosting crop productivity.
Photo credi: Busani Bafana

FAO says agriculture in the 21st century faces multiple challenges: it has to produce more food and fibre to feed a growing population with a smaller rural labour force, more feedstocks for a potentially huge bioenergy market. At the same time the sector has to contribute to overall development in the many agriculture-dependent developing countries, adopt more efficient and sustainable production methods and adapt to climate change.

Food sovereignty is at the heart of agroecology principles enabling communities to produce their own healthy food. Despite Africa having vast uncultivated arable land and secure water resources is a major importer of food and civil society organisations are pushing for food sovereignty in Africa. Africa imports more than 100 million tonnes of food annually spending more than \$75 billion, according to the African Development Bank.

African civil society organisations and people's movements concerned about food and agriculture in Africa have highlighted historical imbalance in relations between Europe and Africa, citing that Africa's food systems are increasingly under corporate control.

About 120 African civil society organisations are calling for a redesign of EU investment policies and public development finance to shift funding towards the agroecological transition, reducing Africa's dependency on food and chemical imports.

Noting that smallholder farmers provide up to 80 percent of the food consumed in sub-Saharan Africa, they receive minimal support to better their production, the civil society organisations argue that almost 90 percent of the billions in global subsidies distributed to farmers each year contribute to harming people's health, exacerbating the climate crisis, destroying nature, and driving gender inequality.

“African peoples' movement and civil society organisations believe that by addressing the real needs and concerns of the African people, Africa can lead the transition to sustainable food systems through agroecology,” the civil society leaders said in a statement to the 5th AU-EU Agriculture Ministerial Conference in Rome in June 2023 Rome.



Sifting priorities: Cooperative members process black-eyed beans. Mayramou manages the cooperative's produce until members are ready to sell so they can maximize profits. Photo Credit: WFP/Glory-Ndaka

Women's cooperative adds spice to livelihoods, refugee integration

By Elias Ngalame

MARIE Hamidou, a pepper farmer in Mayo-Moskota in Cameroon's troubled Far North region, wears a smile on her face because of the regular rich harvests from their group farm.

Though the mother of four doesn't own land, she is part of Klakil Farmers' Cooperative, a 47-member group, that feeds the town of Mayo-Moskota.

In 2021, cooperative received support from the government and the World Food Programme (WFP) in the form of fertilisers, financial aid and machines to transform pepper production.

Thanks to the support they now harvest over 100 kg of pepper from their seven-hectare farm.

Its members include longtime Mayo-Moskota residents but also displaced people like Marie, who fled the Boko Haram insurgency that has gripped the northern region of Cameroon.

"The financial and equipment support has really helped us not only produce better but also processing and transforming our harvest into liquid form and bottling," says Marie.

The programme supports cooperatives in 10 Far North communities, helping members to manage their finances, increase their harvests, get through the lean seasons, and earn a profit in the markets.

In partnership with the Korean International Cooperation Agency (KOICA), the programme also offers logistical support to the cooperatives, and funding to develop village savings and loans associations.

The refugee women, who had their food aid cut in 2020, say that without the support they would be unable to feed themselves, educate their children or take care of their health.

Marieclaire Nkwenti, WFP Cameroon's programme assistant for livelihoods and resilience, says the women are also trained on marketing strategy.

"Thanks to the training they can now sell produce at fair, bargain prices to large retailers, schools, supermarkets — and even to WFP. Such investments enable members to finance further agriculture resilience-building projects," she says

Members of the cooperatives say they have gained market access and sell produce at fair, bargain prices.

The project has proved valuable in many other ways, including integrating newcomers into the communities and empowering the women.



Each cooperative has a mix of participants that include internally displaced people, refugees and members of the host communities. Together, the members decide which development projects to implement, providing much sought-after work opportunities. Photo Credit: WFP/Glory-Ndaka

“The training has been a lesson of life, a skill that I will always have forever. This pepper farming has been an income provider for my family,” says Joan Awung, another member of the cooperative.

Although the farmers said they have more output this year compared to previous years, they also had to grapple with some challenges.

“Our crop came out well this year compared to previous years. But we faced challenges of pests and diseases, which we used pesticides to tackle,” says Salisu Yabou, one of the pepper farmers.

Haruna Adella Idris, the president of the pepper farmers’ cooperative, cite lingering challenges with harvesting, bagging and logistics.

“Transporting our products to the market is still a perilous task because of the poor state of the farm-to-market roads. The situation is worse during the rainy season,” she says, adding that they need support in from the government and other relevant development organisations to address the logistics problem.

But despite the short comings, the farmers say working together as a team makes the pepper production much easier.

“We work as a family though coming from different backgrounds,” Haruna says.

In Mayo-Moskota and other participating communities, cooperative members say they have forged some of their most enduring friendships.

Among them are people who have fled the devastating effects of recurrent droughts and floods on crops and livelihoods, in search of better growing conditions.

“We have made new friends and easily relate with one another. This project has really reinforced our cooperation and shown us that, together, we can build buoyant communities,” says Joan.

As they work together harvesting produce with the local farmers, stories are shared of experiences that help to build stronger bonds. They have all become friends and family to each other.

“Our cultivation land is limited. We are hoping the government can give us more land so we can increase production and extend our markets,” says Joan.



Dr Wilson Songa at work. Photo Credit: Murimi Gitari

42 years of illustrious career in agriculture

By Murimi Gitari

SITTING down with and listening to Dr Wilson Songa speak about his professional career, you will be left awestruck by his deep knowledge of agricultural research, policy and management.

After more than 30 years in Kenya's public service – 14 of that in senior management and administration roles – he is currently a senior adviser on strategy and partnership at Syngenta Foundation, and sits on multiple boards in the agricultural sector.

He has represented Kenya in various capacities on regional, African and international agriculture sector committees and fora, and contributed 36 publications in refereed journals, technical reports and refereed conference proceedings.

Dr. Songa holds a PhD in Plant Pathology from the University of Reading, UK, a Master of Science in Crop Science from Wageningen Agricultural University in the Netherlands, and a Bachelor of Science degree in Agriculture from the University of Nairobi, and has attended various professional development programmes.

His illustrious career started off in 1981 as a research scientist at the Kenya Agricultural Research Institute (KARI), now Kenya Agricultural and Livestock Research Organisation (KALRO)

He thereafter joined Kenya Plant Health Inspectorate (KEPHIS) where he rose through the ranks to General Manager, Phytosanitary Services between 1998 and 2003.

"I was transferred from KALRO to KEPHIS-Muguga and at this time, KEPHIS was just starting as a new institution.

This was some kind of a different space for me as I was used to research. By the time I was leaving KALRO-Katumani I was a consultant in soil-borne pathogens in East and Central Africa. Now I was being taken to offer different kind of services that I was not quite familiar with," Dr Songa says.

In 1999, he was selected for the Cochran Fellowship programme, which supported scientists from middle-income countries, emerging markets and emerging democracies for short-term training programmes on phytosanitary services in the US.

"Kenya had just embarked on a journey to enhance phytosanitary measures through the formation of the Kenya Plant Health Inspectorate Services (KEPHIS) where I was the officer in charge of the plant quarantine station," Dr Songa says.

"The Cochran Fellowship took place between the last week of April and second week of May in the year 1999 where every logistic was planned by the sponsors, making it easier for us. This was inclusive of a special visa to ensure that the team had the ability to visit all the areas planned for within the programme. A key highlight was the warm luxurious reception in Florida unlocking a very exciting experience."

The training opportunities for the Cochran Fellowship are for senior and mid-level specialists and administrators working in agricultural trade and policy; agribusiness development; management; animal, plant, and food sciences; extension services; agricultural marketing; and many other areas.

The training programmes are designed and organised in conjunction with US universities, USDA, and other government agencies, agribusinesses, and consultants.

Key activities on the fellowship involve visiting areas related to enhancement of phytosanitary measures and plant health inspection.

Dr Songa recalls visiting ports, border points and customs during his time in the US, which provided him with a better insight of plant health inspection, certification and the impact on trade. It also enabled him to appreciate the importance of a common framework to

facilitate trade especially in East Africa. The fellowship set

him on the path to senior administration roles in the public service, starting with being appointed the Chief Executive of the Pest Control Products Board (PCPB) in 2003.

He served as the Managing Director, Horticultural Crops Development Authority (HCDA) between 2004 and 2005 before his elevation to the Agriculture Secretary, Ministry of Agriculture.

His crowning moment in the public service came in June 2013 when he was appointed as the Principal Secretary in the Ministry of Industrialization and Enterprise Development.

But it is in agriculture where he left an indelible mark on public policy.

While serving as the Agriculture Secretary at the Ministry of Agriculture, he was the official advisor to the Minister of Agriculture and the Kenyan government on all agriculture-related matters, with a staff of 6,500 and a financial oversight of KShs40 billion'.

He was involved in the development and execution of several policies including: Kenya Industrialization Transformation Program (2015); Agricultural Sector Revitalization Strategy (2005-2009), Agricultural Sector Development Strategy (2010-2013) and the National Biotechnology Strategy (2008-2013).

He also oversaw Kenya's compliance with the EU's Good Agricultural Practice (EUREP GAP) Standards. He was recognised for exemplary work and received Moran of the Burning Spear (MBS) in 2008 and Order of the Grand Warrior (OGW) in 2004 by then Kenyan president Mwai Kibaki.





**Dr Wilson Songa is currently a consultant with Syngenta Foundation.
Photo Credit: Murimi Gitari**

“It was really an honour working in these ministries and one thing I am proud of is that regardless of the various departments we had, we managed to work as a team. Due to the fact that one cannot be able to bet there all the time supervising, I really emphasised on working as a team. We had put in place the mechanisms of how to work things out and had a proper channel of implementation. This is something I had learnt while at KEPHIS having been in charge of phytosanitary measures and also the administration acting director,” he said.

Being one of the pioneers and implementers of the biotechnology policy, Dr Songa describes biotech as a technology whose time has come and cannot be stopped.

“We are scientists and we cannot recommend to people what would harm them knowing very well that we will also consume the same products. But the (GMO) products have been tested in the laboratories with results showing no harm to humans and that they are fit for consumption,” he says.

“I remember we sat down with the current president [William Ruto] who was then the Minister for Agriculture and told him all about biotechnology, and it became so easy for us. He ran with it. He was in Parliament. So, as we were sitting behind, he was listening but we had to go through the stage of making him understand. So, there is really absolutely nothing wrong with that

technology, only that it should be by choice. The way you go to a supermarket, and you want to take a crate of eggs that you can afford. It should be the same for GMOs. What is the need of education our kids in the best schools in the world to become scientists and when they come back home and tell you this is fit for consumption, they are faced with protests?”

While serving as the Agriculture Secretary he once took a team of his staff to see BT cotton in South Africa and the wide adoption of farm machines such as combine harvesters in the country.

“What those combine harvesters leave on the field after harvesting is what a farmer in Kitui is harvesting. This shows that the farmers from these two countries cannot compete. One has already embraced the technology and the other is still relying on the traditional methods of growing food,” he says.

On the fertiliser shortage, he says one of the solutions is for the government to determine which fertilisers are needed for various crops and starting import them in bulk for distribution to farmers.

“There are few people in the industry who have personal interests in fertiliser business and this is one of the contributors to the high cost of fertilisers,” Dr Songa says. During his free time, he likes listening to music of any kind.

“I remember going to this place in Eastern Europe and there was a local band they had invited to perform. I found that music very good. So, if you love music, it should be all round. It should hit. You should not say you only like this particular genre of music if you are a lover of music,” he says.

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AGM fertiliser warehouse in Ghana. Photo Credit: Justice Lee Adoboe

Covid, war, subsidy cuts: Triple fertiliser trouble for farmers

By Justice Lee Adoboe

AS food prices soar across the globe amid supply chain disruptions, the situation in Ghana could become dire due to difficulties farmers face accessing or buying fertilisers.

It is estimated that smallholder farmers produce more than 90 percent of the food consumed in Ghana. Including

Local staples include cassava, maize, millet, rice, millet, yams, and rice.

The country imports almost all of the fertilisers needed to boost the yields of these crops and enhance food security.

Charles Nyaaba, the executive director of the Peasant Farmers Association of Ghana (PFA), described the fertiliser situation in the country as unstable since 2020, attributing the problem to the global supply chain disruptions due to Covid-19, the Russia-Ukraine crisis, and the shrinking government subsidies.

“Fertiliser prices have increased more than 100 percent since 2020, and that has made it difficult for most peasant farmers buy,” Nyaaba said.

“The government has also reduced the subsidy component in the price of fertilisers. The decline started from 2019. The subsidy reduced from 50 percent in 2017 to 36 percent in 2020 and decreased further to 15 percent in 2022. For us in PFA, we expected that since governments around the globe were supporting their farmers, making it possible for them to get flexible credit, and also increasing farm input subsidy, ours would also take the cue. Unfortunately, it is the reverse.”

Nyaaba said some fertilizer blending companies also took advantage of the supply chain bottlenecks to produce poor quality fertilisers.

“Many farmers who bought such fertilisers do not get the desired results in crop yields,” he said.

The difficulty accessing fertilisers has compelled some farmers to grow their crops without using the farm input, while others have reduced their farm sizes.

Still others Nyaaba said stopped farming altogether or switched from

cultivating crops that require so much fertiliser to those that do not.

“These developments reflected on food supply for 2021 and 2022. In 2022, for instance, the supply reduced drastically for maize and rice, causing most poultry businesses who depend on local cereal farmers to shut down or scaled down. That is the extent to which the fertilizer price hikes has impacted on peasant farmers and the general Ghanaian agriculture economy,” he added.

Ghana introduced the fertiliser subsidies in 2008 in response to the global finance, food, and fuel crisis. The implementation has however been fraught with challenges, including hoarding and smuggling.

In recent years the government’s flagship Planting for Food and Jobs (PFJ) agriculture programme became the main avenue for farmers to access subsidised fertilisers.

The programme which commenced in 2017 with a seed grant of USD120 million from the Canadian government operated on five pillars: Fertilizer, Seed, Extension, E-agriculture, and Marketing.

At least 600,000 metric tons of fertilizer was provided for farmers annually under the programme.

Many Ghanaians have, however, not been impressed by the outcomes of the programme as the country experienced consistent food shortage and food price hikes over the same period.

Food inflation averaged 48.7 percent year on year in April 2023 from 26.6 percent during the same month in the previous year and has been a major contributor to ballooning inflation which hit a record 54.1 percent in December 2022.

Farmers complained the quality was low and the price almost at par with the price on the open market. In most cases, the subsidies were delivered late, when the time for application had long passed.

Ghana's agriculture sector has the potential to consume between 1.2 million and 1.5 million metric tons of fertiliser annually.

But the core market is around 600,000 and 800,000 metric tons per year, said Prince Akoto-Adipah, Chief Executive Officer (CEO) of the Ghana Chamber of Fertiliser.

Until the establishment of the Dangote fertiliser plant in Nigeria, most landlocked neighbouring countries depended on fertilizer exports from Ghana with more than 200 local blending companies.

Though companies like Yara and EMG export legally to these neighbouring countries, the smuggled component is far higher.

Akoto-Adipah said one of the major challenges Ghana faces with access to fertiliser is the fact that there is no company doing primary production in the country.



Prince Akoto-Adipah, the CEO of Ghana Chamber of Fertilizer. Photo Credit: Justice Lee Adoboe

All of them blend their products, with a few parent companies doing primary production and supplying to their Ghanaian subsidiaries such as Yara and OCP.

Ghana has toyed with the idea of establishing a fertiliser plant to utilise its offshore gas resources for fertiliser manufacturing.

With Covid-19, and closure of factories and borders, Ghana, like other countries in Africa, has felt the impact of a fertiliser shortage.

“With the [Russia-Ukraine] war, market closures, and sanctions on Russia, it means no imports can come from the two countries -- they cannot export. So the market had to adjust and those with excess capacity have to bridge the gap. So the impact has been bad,” said Akoto-Adipah.

Russia and Ukraine control more than 50 percent of the phosphorous market, for instance.

The drop in supply over the period of Covid-19 and the Russia-Ukraine crisis is confirmed

by market data by the American International Trade Administration, which put the value of Ghana's fertiliser imports at USD173 million in 2019, USD109 million in 2020, and USD79 million in 2021.

“Coupled with that is our inability to pay during the Covid-19 era. Due to the shortage, those who had a little to export, were taking payment upfront for their supplies, something most of the companies here could not do because government payments for their supplies had been in arrears from 2020,” Akoto-Adipah said.

He said that development contributed greatly to fertilizer shortages and rising fertiliser prices on the market since suppliers also wanted to get assurances

from the government before delivery to farmers.

“An already precarious situation was exacerbated by the foreign exchange volatility, with a weak local currency (Ghana Cedi) constantly plunging against all major traded international currencies in a generally challenging macroeconomic environment,” he said.

The local currency depreciated cumulatively by 30.0 percent against the US dollar, in 2022, compared with 4.1 percent depreciation in 2021, according to Bank of Ghana.

Moreover, the increase in import tariffs and general charges at the port contributed to accelerating fertiliser import price hikes.

“If you were able to import at a particular price, you needed to ensure that you would be able to recoup the total cost, and make some margins such that you could buy again when you return to the market in the next two or three months. This also compelled suppliers to constantly increase prices, making the situation unbearable for farmers,” Akoto-Adipah said.



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*Kenya's Deputy President Rigathi Gachagua distributing the subsidised fertilizer to farmers at a past event.
Photo Credit: Henry Owino*

Kenya adopts mobile payments, e-vouchers to cut off fertiliser cartels

By Henry Owino

KENYA has allocated KShs15 billion to the fertiliser subsidy programme meant to cushion farmers against high cost of the input and improve food production in the country.

Distribution of 50kg bags of the subsidised fertiliser began just before the planting season in March, with a bag selling at KShs3,500, down from KShs6,000 previously.

“The government has determined that greater production and availability to subsidised fertiliser are the

most workable and long-lasting ways to reduce the cost of food,” said President William Ruto’s Spokesperson, Hussein Mohamed.

To cut off cartels or brokers that been blamed for undermining past subsidy programmes and ensure the fertiliser reaches farmers, the government initiated a nationwide campaign to register farmers.

Farmers were required to register with their local administrators – chiefs and assistant chiefs – and at any National Cereals and Produce Board (NCPB) store.

NCPB is the State strategic food reservoir.

Purchases of the fertiliser were made through a short code, *707#, upon which farmers were identified together with the size of their land as captured during registration. They were prompted to select the type of commodity they need, for instance planting fertiliser. They paid via a mobile phone and received an e-voucher in form of an SMS for presentation to the officers in charge of distribution.

Farmers could only get fertiliser depending on their acreage. For instance, a farmer with one acre could only buy two bags.

“The government has in the last six months managed to register five million farmers and the distribution is now being managed digitally. The government is committed to supplying more than 300,000 metric tons of various types of fertilizers during this rainy season,” Mohamed said.

The programme was rolled out in March 20 in Nyamira and Kisii counties in western Kenya where according to Mohamed, over 134,000 farmers had registered.

Programme implementers

Deputy President Rigathi Gachagua told senior officials attending a recent workshop in Nairobi that the fertiliser subsidy programme was central to achieving the government’s food security agenda.

He said government was going to ensure farmers get the fertilizers directly without going through cartels.

The officials who are involved in the distribution of the farm inputs include deputy county commissioners, cooperative officers, chief officers and county agriculture officers from the 12 pilot devolved units.

“The Kenya Kwanza Administration has prioritised subsidising agricultural production as one of the ways of increasing productivity and bringing down the cost of living while making our nation food Secure. We have to make sure the fertiliser does not go to cartels. It must reach the farmers ahead of the rains and the planting season,” the Deputy President said.

The programme is being jointly implemented under a multisectoral framework bringing together

ministries of Interior and National Administration; Agriculture and Livestock Development; The National Treasury and Economic Planning; Co-operatives, Micro, Small and Medium Enterprises Development and Investments, Trade and Industry.

“Please, work with everyone in the rolling out of this subsidised fertiliser programme without any form of discrimination. We expect at least 2,149,760 farmers to benefit from this programme in the first phase of implementation going forward,” Gachagua said.

The programme has also received the backing of the county governors.

“We will encourage decentralization of the collection units to ensure the fertilizers reach the farmers who deserve it most,” said Kenneth Lusaka, the chairman of the Council of Governors, Agriculture Committee.



A bag of fertilizer used on an onions farm. Photo Credit: Henry Owino



Smallholder farmers in Uganda have been urged to maximise fertiliser use alongside organic manure to improve soil nutrients. Photo Credit: Istock

Fertiliser optimisation tool gives farmers more for less

Lominda Afedraru

REPORTS of Uganda's surplus production of crops like sugar cane and its being endowed with natural resources often give the impression that the country is blessed with fertile soils. Yet this is contrary to what soil scientists have found.

A study conducted by National Agricultural Research Laboratories (NARL) Kawanda shows that Uganda faces severe soil nutrient depletion.

This is because many farmers keep tilling the land over and over again without applying practices that maintain soil fertility.

Calculate the amount

Therefore, it is recommended that small holder farmers should maximise

fertiliser use alongside organic manure to improve soil nutrients.

The most important ingredients required to increase soil fertility are nitrogen, potassium and phosphorous (NPK). Secondary components include calcium, magnesium, sulphur, copper, iron, manganese and zinc.

The scientists have come up with Uganda Fertiliser Optimisation Tool (FOT). It is computer-based tool used to calculate the required amount of fertiliser for a specific agricultural activity per unit hectare. It also indicates what a farmer will earn from the output invested.

The software is loaded on mobile phones.

NARL is working on this project with University of Nebraska. In US, the FOT has been applied by farmers and has worked well.

The profit

Dr Cranmer Kayuki Kaizi of NARL says that FOT considers the land area the farmer wishes to plant for a particular crop and expected commodity value at harvest, the cost of fertiliser and the finance available to the farmer for purchase of fertiliser.

The profitability varies greatly depending on which nutrient is applied to which crop and at what rate.

FOT was developed for crops such as sorghum, beans, rice, groundnuts and maize. Currently, the team is in the process of developing this tool to cover other crops.

It is made available to extension workers who show farmers how to calculate the fertiliser rate for a particular crop and estimate average yield and net returns.

The target is extension workers in various African countries: namely, there are Uganda, Kenya, Tanzania, Rwanda, Mozambique, Zambia, Malawi, Ethiopia, Ghana, Burkina Faso, Nigeria and Niger.

Guide farmers

Calculations are made with MS Excel, and a farmer will be able to know that if he or she applies 50kg of urea on one hectare, the yield will amount to 44kg of maize grain per hectare.

For the case of rice, if the fertiliser purchased amounts to \$60 (Shs204,900) to the hectare, the farmer will be in position to reap \$700 (Shs2,390,500) per hectare. Therefore, the tool enables farmers to apply fertiliser depending on the economic return.

The tool also helps guide the farmers on which crops to invest in and the fertiliser usage. In Uganda, it has been tried in Kapchorwa, Aleptong, Arua, Tororo, Sironko, and Apac districts and it is to be introduced in Kisoro, Kabale and Ntungamo districts.

The implementing partners, CABI and NARL have trained community knowledge-based (CKB) trainers in Kapchorwa and Mbale.

Increased yields

Sam Satya, the coordinator, says that using FOT has advantages such as putting farmers with little cash at hand in a position to buy fertiliser at whatever quantity in a bid to get good yields.

Farmers growing other crops not covered by FOT are at a disadvantage because they are not able to make use of it.

So far, about 300 farmers in Mbale and Kapchorwa have adapted the FOT technology and they have realised increased yields.

The farmers have learnt to determine which quantity of fertiliser to purchase for an acre of land. Previously they would apply 50 kg of either urea or diammonium phosphate (DAP) on one acre. Yet, by applying FOT, a farmer can use 30 kg of urea and 12 kg of DAP for one acre and still reap better yields.

A farmer who used 50kg of urea would harvest eight bags of maize but now by using less quantity of urea, he or she can harvest 20 bags of maize.

Farmers are advised to measure the fertiliser and mix it with soil per hole, and by the time it spreads across the field and it rains, the fertiliser would have been absorbed.

Managing soil fertility

In case of farmers lack money to purchase fertiliser mainly urea and diammonium phosphate (DAP), they may grow legume crops, which fix nitrogen in the soil.

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The tool also helps guide the farmers on which crops to invest in and the fertiliser usage. In Uganda, it has been tried in Kapchorwa, Aleptong, Arua, Tororo, Sironko, and Apac districts and it is to be introduced in Kisoro, Kabale and Ntungamo districts

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Cover crops such as Macuna, Chlotolaria and soya bean are key nitrogen-fixing crops that farmers are encouraged to grow during fallowing of their fields.

It is also advisable for farmers to embrace use of inorganic fertiliser like urea because 100kg of urea contains 46 percent nitrogen compared to 100kg

of organic manure, which contains 1.0 percent nitrogen.

Therefore, it is recommended that smallholder farmers should maximise fertiliser use alongside organic manure to improve soil nutrients.

Fertilising pastures

The experts contend lawn fertilisers should be spread evenly and applied according to manufacturer's instructions. Water is required if the weather is dry.

To help the nutrients penetrate the soil, aerate the lawn before applying fertiliser. This also helps improve surface drainage and prevents compaction.

Apply more fertiliser for light soils

Light and free-draining soils, usually sandy in composition, lose nutrients more quickly than other types, especially in rainy spells. Apply fertiliser more frequently on these soils, especially nitrogen fertilisers to maintain levels.

Apply less fertiliser for clay soils

Heavy clay soils and soils containing a lot of organic matter require less frequent application. This is because both substances act as reservoirs holding the nutrients and releasing them slowly over time to the plants.

Acidic or chalky soils

Phosphates and potash become more soluble in an acid soil, making them easier for rain to wash away. In chalky (alkaline) soils, phosphate becomes insoluble when mixed with the calcium present in chalky soils. In both cases, divide the application into two or three and apply over the growing season.

Trees

To feed a tree, apply fertiliser evenly in the area under the canopy. The tree's feeding roots tend to be near the surface in that area. A gentle shallow aeration will improve penetration of the nutrients as well as improve surface drainage and reducing compaction. Avoid damage to the roots by keeping shallow.

To qualify as a TFRA-authorized dealer under the fertiliser subsidy programme, one must, among others, be registered and have enough space for storing the stock so as to make fertiliser distribution efficient.

Photo Credit: Zuwena Shame

Delays mar Tanzania fertiliser subsidy

By Zuwena Shame

THE Tanzanian government through its regulatory authority Tanzania Fertilizer Regulatory Authority (TFRA) has provided fertiliser subsidies to farmers to reduce the cost of the farm input and increase food production in the country.

The usage of fertilisers in Tanzania is extremely low and remains below recommended rates, and low-input and rain-fed subsistence farming dominates Tanzania's agriculture, contributing to poor crop yields, according to a 2016 AGRA report.

The Russia-Ukraine war, now in its second year, has further disrupted fertiliser supply to Tanzania, which imports over 70 percent of its fertiliser.

TFRA has introduced digital platform for providing fertilisers to farmers in Tanzania, including Urea and DAP that account for almost of 50 percent of total fertiliser usage in Tanzania.

Under the fertiliser subsidy programme, there was to be an increase usage of fertiliser in the 2022/23 agricultural season to 500,000 tonnes, from 475,000 tonnes used by farmers in the 2020/21 farming season. The usage is expected to increase to 800,000 tonnes by 2025.

By using digital platform, TFRA aims to increase the efficiency of delivery of subsidies, seal fraud loopholes and reduce administrative costs. The digital platform is also being used to register farmers, suppliers, producers, and agents and also coordinate distribution of fertilisers and payment for subsidised fertilisers.

Despite the government efforts to increase the usage of fertilisers, there are challenges regarding the availability of certain fertilisers.

Doroth Nengai, a farmer in Meru district in Arusha Region, says she has experienced difficulties getting Urea fsince February this year. When she didn't find the fertiliser at her local Kikatiti outlets, she extended her search to Arusha City but still failed.

Doroth, who grows vegetables such as green peppers, zucchini , cauliflower , broccoli and sweet lemon, attributes the problem to bureaucratic distribution channels.

When launching TFRA board , the Minister of Agriculture, Hussein Mohammed Bashe, urged those appointed to the board to make sure that usage of fertilisers in Tanzania increase from 19kg to 50kg per acre.

He also advised the board to improve supervision and registration of farmers to enable them to get the right data for decision making.

Nuru Gulila, a maize and sunflower farmer, in Ruvuma Songea Rural complains that the subsidised fertiliser from TFRA takes to long to reach farmers in his area because of its long process which one is required go through before he

or she can buy the commodity.

To purchase the fertiliser, TFRA guidelines requires one to fill a form and get registered by extension officer from his or her area. Thereafter, a farmer shall be provided with a special number which will be used when buying fertiliser from an authorised dealer within his or her area.

Gulila says after going through the long process for 3-4 days, he still got only three bags of the subsidised fertiliser from an authorised dealer.

Gulila cites DAP as an example of the fertilisers from TFRA that are hard to get.

He decided to plant crops while waiting for DAP to reach his authorised dealer but when it did, he faced another challenge of waiting for it for three days due to backlog of orders amid the high demand.

“Farmers are many in Songea region but fertiliser suppliers are few. Due to this we don't get fertilisers on time and sometimes we are restricted on how many bags we can get from dealers. For example, I wanted to buy 50 bags but due to scarcity of fertilisers, I got only 10 and was told to come again for the others. This is not right because we are spending a lot of time and energy. The government should increase the number of suppliers for this region,” said Gulila.

Gulila said that he had also struggled to get CAN under the fertiliser subsidy the previous season from the local dealers and had to buy it somewhere else.

According to the TFRA guidelines, distribution of the subsidised fertiliser to farmers for 2022/2023 season was to end on June 30 this year.

Complaints from farmers about the current season suggest that the government should review and improve processes for providing fertiliser subsidies especially to rural areas where a majority of farmers are.

Mponda Sabinus, another farmer based in Ruvuma, says that the government through TFRA should increase the number of authorised dealers especially in rural areas.

Sabinus grows maize and beans. He says that in some cases it takes a farmer to travel over 300-400 km to find a dealer, something which forces them spend more to pay for accommodation and food in guest houses.

Widening the dealers' network to remote areas, he says, will see farmers avoid spending more money and resources trying to find the subsidised fertiliser.

Rashid Msita, who owns three rice farms in Mbeya region, says he lost 45 percent of his projected harvest for the previous season due to delays getting fertilisers.

By the time he managed to get fertiliser in February the time, it was too late as rice crop was already maturing.

“I applied the fertiliser at that stage but the results were not good because it was past the right stage,” says Msita.

He recalls that when there was a shortage of fertilisers, some TFRA-authorised dealers brought

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To qualify as a TFRA-authorised dealer under the fertiliser subsidy programme, one must, among others, be registered and have enough space for storing the stock so as to make fertiliser distribution efficient

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three different fertilisers from other companies with low quality, strange names and no ingredients published in the bag.

He chose not to buy them and waited for the familiar one.

To qualify as a TFRA-authorised dealer under the fertiliser subsidy programme, one must, among others, be registered and have enough space for storing the stock so as to make fertiliser distribution efficient.

“The main challenge here is some of the authorised dealers don't have enough warehouses to keep stock. There is a huge demand of fertilisers in rural areas and dealers do appear in TFRA system that they have enough stock when they don't, something which makes them provide less fertilisers to farmers. They keep a stock of 50 bags and finish, then the next day run to urban dealers and collect more stock,” says Msita.

He gives the example of villages in Mbarali District in Mbeya region such as Madundasi, Utengule, Ijumbi Ruiwa, Igulusi, Mlamba, Inyala, Itewe, Ilongo and Uturo.

The Minister of Agriculture, when presenting the sector budget for 2023/2024, recently said that the government through TFRA would continue providing fertilisers subsidies until 2023/2026 so as to increase fertilisers usage from 19 kg per acre up to latest 50kg per acre, reduce production expenses and increase availability of fertilisers.

He said that 3,050,621 farmers had registered for the fertiliser subsidy programme by April this year, with 801,776 of them from 26 regions having benefited.

Bashe said the available fertiliser stock included 75,399 tons produced in the country, 617,079 imported and 126,964 remaining from 2021/2022.

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*Dr Dennis Beesigamukama, a Postdoctoral Fellow in Insect Frass Fertilisers and Soil Health and the lead research scientist on the project at Icipe shows maize grown using BSF-composted organic fertilizer.
Photo Credit: icipe*

Icipe scientists seek super organic fertiliser from insects

By Murimi Gitari

ABOUT a third of arable land is severely degraded, according to the Food and Agriculture Authority (FAO), costing the world US\$400 billion in agricultural production each year.

Soil degradation reduces the quality and quantity of crops produced as the capacity to support animals and plants by the same soil is diminished.

This causes the soil to lose the chemical and biological qualities that sustain the millions of organisms living within it.

Over the past few years, fertiliser prices have skyrocketed due to

the Russia-Ukraine war, adding the burden on farmers already struggling with the effects of drought and other challenges associated with food production

At the Nairobi-based International Center of Insect Physiology and Ecology (Icipe) scientists have been burning the midnight oil trying to develop alternatives to taming this pandemic of the soil through the use of insect composted organic fertilisers.

The research focuses on refining and diversifying frass fertiliser production technologies and understanding the impacts of insect-composted organic fertilisers

on soil health and crop productivity in different agroecological zones.

Dr Dennis Beesigamukama, a Postdoctoral Fellow in Insect Frass Fertilisers and Soil Health and the lead research scientist on the project at Icipe, says use of organic fertilisers have the potential to transform food systems in Africa.

“Organic fertiliser is the one of the solutions of addressing fertiliser crisis and soil degradation. In Africa, about 65 percent of the soil are highly degraded and can no longer support crop production with 25 percent of the soils having the challenges of soil acidity caused by aluminium toxicity and nine percent lack phosphorous,” says Dr Beesigamukama.

“Here at the centre, we use saprophytic insects which feed on decomposing matter as bio converters of organic waste into high quality and cost-effective fertilisers.”

All insects that feed on organic matter can be used for production of organic fertiliser.

But the centre is currently focusing on more than 10 insect species, including the Black Soldier Fly (BSF), mealworms, crickets, beetles, desert locusts, silkworms and grasshoppers, for the production of organic fertiliser, animal feed and food.

The BSF is preferred by the researchers because of its efficiency in biodegradation.

Its voracious appetite offers the opportunity to recycle bio-waste into organic, high-quality fertiliser, while also contributing to waste management and animal feed.

The BSF has the ability to convert one ton of food waste into 250 kg of fresh larvae within 12 days. This process can potentially be two to 10 times faster than composting, depending on factors such as temperature, aeration method, and moisture content.

With BSF, one needs a maximum of five weeks to get a mature and stable organic fertiliser compared to a period of between two to six months for the ordinary composting methods.

“A plant requires between 18 and 21 nutrients to grow and produce enough yields but the synthetic fertilisers like NPK can only supply three with other supplying four. Organic fertilisers can supply all these nutrients and this is why we look at them to rebuild the soil, reduce the acidity in soils and rejuvenate organic matter and beneficial microbes which are key in improving soil fertility. They have additional benefits like improving soil moisture storage that is key in adapting cropping systems to the shocks of climate change, which synthetics may not do. So that's why we are looking at organic fertilisers as inputs that could play a critical role in enhancing the productivity of the food systems, especially for smallerholder farmers,” says Dr Beesigamukama.

“In conversion of organic waste into organic fertiliser, we have the insects who act as ‘main factories’ as they break down the waste during their

growth age as they feed. As they pass the waste through their digestive system the waste they release is now what becomes as organic fertiliser. This process takes place in the wild and what Icipe has done is to make it captive or domesticate it by establishing insect rearing systems.”

The insects reared in these systems lay eggs in the any kind of waste, including animal manure, waste from the markets, food waste, and industrial waste that is decomposable.

The larvae hatch after four days and then starts feeding for a period of between nine and 16 days depending on the conditions.

As they feed, they break down the waste.

After the 16 days, the scientists then harvest the insects through sieving to separate the larvae from the waste to get what is known as frass or residue. The frass is then taken through a post-treatment process to convert it into a mature and stable fertiliser. This process of treatment takes only four weeks from the

period of larvae harvesting, giving a period of only five weeks to get the mature fertiliser.

After separation the frass is taken through a composting process. Beneficial microbes in the waste and digestive enzymes help to speed up the waste degradation.

The frass or organic fertiliser can be used in the production of any crop.

Dr Beesigamukama their research findings show excellent performance of the frass fertiliser in boosting crop yields. For example, in maize they found that the frass fertiliser could increase grain yield by between 6.0-27 percent compared to 7.0 percent for the conventional organic fertilizer and NPK. For beans it was up to 12 percent higher yield compared to synthetic fertilizer and 58 percent yield higher compared to unfertilised soil.

“Another benefit of the frass fertiliser is the profitability of crop production. We have found that this fertiliser can increase the profits from crop production by between 10-154 percent. It can also increase the gross margins of farmers by 35 percent and the return on investment can increase by between 5.0 percent and 156 percent. From what we found, if farmers can produce this fertiliser and use it on their own farms, they would make profits that are way higher than if they bought it.”

Frass fertiliser is also less expensive than synthetic fertilisers. It costs US\$854 per hectare every season to fertilise with synthetics, but only US\$390 per season using frass fertiliser over the same area. Furthermore, frass fertiliser has been found to be effective in suppressing devastating crop pests such as potato cyst nematodes, root knot nematode, and cabbage and onion root maggots, as well as the tomato bacterial wilt disease.

“We do provide free hands-on training here at Icipe to anyone interested in learning about the production of organic fertilizers or anything to do with insects,” Dr Beesigamukama says.



Bumper maize harvest obtained using black soldier fly (BSF)-composted organic fertilizer. Photo Credit: icipe



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A farmer applying fertiliser on plants. Photo Credit: IFDC

Filling the fertiliser data gap

By Murimi Gitari

TIMELY fertiliser data plays a major role in increasing agricultural productivity for farmers. Unfortunately, access to quality fertiliser data has been a major challenge for many industry actors, including regional economic communities, national governments, public and private sector actors, and farmers across sub-Saharan Africa.

Thus, diverse efforts are being made to increase access to and use of quality fertiliser data to drive policy and business decisions to increase agricultural productivity and improve the livelihoods of millions of vulnerable people across the region.

Following the Africa Fertilizer Summit held in Abuja, Nigeria, in 2006, partners of the International Fertilizer Development Center (IFDC), including the International Fertilizer Association (IFA), came together to support the AfricaFertilizer initiative (formerly AfricaFertilizer.org). The main mandate of AfricaFertilizer is to provide timely and accurate information on fertiliser trade, policies, prices, etc., all in an effort to stimulate growth in the markets.

Since its inception, AfricaFertilizer has led the effort to collect, process, validate, and widely disseminate the much-needed fertiliser data to facilitate well-calibrated decisions

by policymakers and businesses, which ultimately leads to better access to fertiliser for agricultural productivity.

AfricaFertilizer's Fertilizer Technical Working Group (FTWG) sessions serve as a strategic platform to accomplish the initiative's core mandate. Currently, these workshops allow experts to gather information on 18 selected African countries -- Benin, Burkina Faso, Côte d'Ivoire, Ghana, Mali, Niger, Nigeria, Senegal, and Togo in West Africa and Burundi, Ethiopia, Kenya, Malawi, Mozambique, Rwanda, Tanzania, Uganda, and Zambia in East and Southern Africa.



Data validation exercise by key fertiliser stakeholders. Photo Credit: IFDC

In these workshops, key fertiliser stakeholders from the public sector (ministries of agriculture, customs, research institutions, CountrySTAT), the private sector (fertiliser blenders, producers, suppliers, importers, and exporters), technical partners, donors, and civil society organisations actively participate in reviewing and validating the country's fertiliser data.

"At these workshops, we take the data validation exercise very seriously, and any data that is not agreed upon by the stakeholders, we go a step further and work with them on a one-on-one basis to make sure that whatever is put out there is accurate," says Sebastian Nduva, AfricaFertilizer Programme Lead.

Many industry actors find value in AfricaFertilizer's data validation work, as the output calibrates their respective private sector activities.

"WAFA works with IFDC and other partners across each of the countries in West Africa to look at the data on production, export, consumption, and other things related to fertilizer to assess the progress we are making to get greater output for agriculture," said Dr Innocent Okuku, Executive Secretary of the West African Fertilizer Association (WAFA).

According to Moses Negedu, Data Analyst for FEPSAN, the workshop has had a positive impact. "Now we know our apparent consumption of fertilizer locally, and we see all the gaps in the sector, and we now know how to tackle them," he said.

AfricaFertilizer's mandate goes beyond providing quality fertiliser data to include incentivising the fertiliser industry to make quality investments in strengthening and expanding the industry to increase agricultural productivity.

At this time of fertiliser crisis, AfricaFertilizer's data fills in the information gap to help a range of stakeholders make informed decisions, including investing in profitable areas to positively impact agricultural productivity.

The 2023 Nigeria FTWG Meeting, for example, featured some interesting highlights.

The volume of fertilizer raw materials imported in 2022 included 187,297 metric tons (mt) of granular ammonium sulfate, 177,776 mt of diammonium phosphate (DAP), and 111,313 mt of muriate of potash (MOP). These are the major raw materials used in blending NPK.

The total quantity of NPK fertilizer blended in 2022, as tracked by FEPSAN, was 553,639.16 mt.

Urea production rose from 2,701,279 mt in 2021 to 3,458,740 mt in 2022, a 28% increase.

Importation of fertilizers decreased due to the Russian-Ukrainian crisis. Nigeria could not import the large quantities of MOP required from Russia and only brought in 35,400.65 mt. It later sourced the balance of 75,075.55 mt from Canada.

About 301,353 mt of stock was carried over into 2023. It was not utilized in 2022 due to late importation of raw materials used for blending by NSIA.

Fertilizer exports rose significantly due to an increase in international fertilizer prices in 2022, making the higher net margins attractive for manufacturers. Exports climbed from 1,348,924 mt in 2021 to 2,540,523 mt in 2022, an 88% increase.

Customs data showed about 18,400 mt of land exports of urea, NPK, and MOP to neighboring countries.

The legal framework should allow the free distribution and movement of fertilizer to neighboring countries through land borders.

Figures on limestone (filler) need to be included in the validation process going forward, as limestone companies are growing in number. It is an important part of NPK blends and accounts for 26% of the production. FEPSAN has the capacity to track filler usage among blenders.

HortiNigeria creates market potential for the fertilizer industry in the horticulture sector through investment in crop-specific fertilizers, establishment of soil analytical services, establishment of capacity building services for potential fertilizer experts within both public and private sectors, an increase in financing in the supply chain, and more investment in organic fertilizer.

Following the fertilizer law in Nigeria, the Federal Ministry of Agriculture and Rural Development (FMARD) has started

registering blenders and has trained over 100 state officials/inspectors, three from each state. An amendment of this law will also include agrochemicals.

More fertilizers need to be imported into the country to correct the high in-country prices currently experienced at retail points to enable farmers to purchase these products at affordable prices.

With the vital role played by these national-level FTWG sessions, securing additional resources will help expand data collection, validation, and dissemination to enable data-driven decisions for African food systems.

This article was originally published on the International Fertilizer Development Center (IFDC) website.



Stakeholders from the public sector, the private sector, technical partners, donors, and civil society organisations who participated in a fertiliser data validation workshop. Photo Credit: IFDC



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*Brian Mogeni (in a white coat) takes the lead in the preparation of compost manure.
Photo Credit: Brian Mogeni*

Preparing compost manure: the do's and don'ts

By Brian Mogeni

COMPOST manure is a natural or an organic material added to crops to boost nutrient supply, improve soil quality, retain moisture, and boost plant growth. Compost manure is environment-friendly, making it key to climate-smart agriculture, organic agriculture, and regenerative agriculture. Steps in preparation

1. **Collection of materials:**

To prepare compost manure, you need a mix of organic materials such as crop residues, animal manure, and kitchen waste. These materials should be fresh and free from chemicals such as pesticides or herbicides. Composting requires organic materials that are rich in nitrogen and carbon. Nitrogen-rich materials include kitchen

scraps, manure, grass clippings, and green leaves. Carbon-rich materials include dry leaves, straw, sawdust, and newspaper. You can also add some soil to provide microorganisms that will break down the organic materials. Use topsoil because it's the one that contains the microorganisms.

2. **Building the compost pile:**

Choose a location with good drainage and enough space to build a compost pile. Begin by creating a layer of about 3 feet of organic materials on the ground. The first layer should be carbon-rich materials like twigs, dry leaves or straws. You can alternate between dry and moist materials to ensure good aeration. It's important to keep every layer moist and not too

wet. So sprinkle water after every layer. Too much water will make the layers too wet and this will cause the materials to rot instead of composting. Add a thin layer of soil on top of each organic layer to introduce microorganisms that will break down the materials. Incorporate manure like cow dung to add nitrogen and speed up your compost heap. If you are using a bin, make sure it has ventilation holes to allow air to circulate.

3. **Cover your compost pile:**

cover using a polythene bag. Covering will help retain the moisture and heat important for your compost. Covering will also protect your compost from getting soaked by rainwater.



Compost manure preparation. Photo Credit: Brian Mogeni

4. **Turn the compost pile:**

After a few days, the compost pile will heat up as the organic materials break down. This is a good sign that composting is taking place. You need to turn the pile to ensure that all the materials are evenly exposed to air (oxygen) and moisture. You can use a pitchfork or a shovel to turn the pile. Ensure that you turn the pile every 3 to 4 days for the first few weeks.

5. **Monitor the compost pile:**

As the composting process continues, you must monitor the pile regularly to ensure it remains moist and aerated. If the pile becomes too dry, you can add some water. If it becomes too wet, you can add some dry materials such as straw or leaves. You can also add some organic matter such as grass clippings or coffee grounds to boost the composting process. The compost should start to smell earthy and crumbly. If the compost smells bad, it may be too wet or too dry, or it may not have enough oxygen.

6. **Harvest the compost:**

After about 2 to 3 months, the compost should be ready for use. It will have a dark brown colour and a pleasant earthy smell. You can harvest the compost by sifting it through a mesh or sieve screen to remove any large materials that have not broken down. Or simply remove the top unfinished compost using a shovel or hands. The compost can then be applied to your garden or farm as a natural fertiliser.

For hastened decomposition E.M (Effective Microorganism) or B.M (Bio-Mate) is used. In this case, water that is sprinkled in every layer is mixed with E.M or B.M at recommended ratio. Where E.M. or B.M. is used, turning materials is not necessary.

You need to identify materials that will compost like sawdust, grass and shrubs, young weeds, vegetable wastes, straws, and eggshells. Materials like bones and dairy products, and diseased plants should be avoided.

Always opt for a method or size of compost that will help you the only time you need it. Making excess or extra will lead to waste.

Benefits of composting

- Utilises or reduces wastes: through composting you will get to utilise wastes like kitchen refuse instead of throwing them away
- Improves soil condition and soil health: compost manure will help to replenish soil fertility instead of using inorganic fertilisers that are not safe for the environment.
- Compost is also convenient to any farmer or gardener as he or she need not get expensive resources to prepare compost.

In conclusion, preparing compost manure is a simple process that can help farmers improve soil quality, retain moisture, and boost plant growth. By following the above guide, farmers can produce their own compost manure and reduce their reliance on chemical fertilisers, which can be costly and harmful to the environment.

Brian Mogeni is an Agricultural Extension, Communication and Administration Officer at SOCAA.

Charlotte Hebebrand, the Director of Communications and Public Affairs, International Food Policy Research Institute (IFPRI). Photo Credit: Busani Bafana

How Africa can achieve fertiliser security

Charlotte Hebebrand, Director of Communications and Public Affairs, International Food Policy Research Institute (IFPRI), discusses the state of the fertiliser industry in Africa, how adoption of innovations can make the commodity affordable and the need to build viable fertiliser markets

By Busani Bafana

What is the state of fertiliser security in Africa currently on the back of the Ukraine-Russia conflict?

Charlotte Hebebrand: The conflict initially led to an actual scarcity of fertilisers globally and especially in sub-Saharan Africa, as exporters and traders catered more to larger markets. This has now eased, as have the international prices of fertilisers, which have come off their 2022 peaks. But there is still a problem of affordability since domestic prices remain high in many African countries due to depreciating currencies or other factors.

What is the annual demand and use of fertilisers in Africa?

Estimated annual consumption in Africa is 15 million tons. Consumption is estimated to have declined between 5.0 percent (by the International Fertilizer Association) and 25 percent (by the International Fertilizer Development Center).

How much fertiliser is Africa currently producing and are we able to meet continental demand?

Africa produces double of what it consumes – circa 30m tons, but a significant portion of that is exported.

A case in point is Nigeria where there is now substantial production of nitrogenous fertilisers. The three major producers are Indormana, Notore and since last year also Dangote. The product is there for the Nigerian market and efforts are made to export to other West African countries. But a large share of the total Nigerian production is being exported outside the continent.

These are the realities of the market: a new plant like Dangote likely needed to show strong offtake agreements in order to attract the financing necessary for building a large facility, and export markets such as Brazil and India are much larger and more attractive than the African market where fertiliser consumption is still relatively low and the markets are not as developed.

How are fertiliser companies coping with global supply chain disruptions?

The reverberations of the Russia-Ukraine conflict were widespread, compounded by some fertiliser export restrictions imposed by countries like China keen to ensure sufficient supply for domestic use. Over time trade flows have been altered.

What can be done to wean Africa of fertiliser imports?

Considering that today, Africa imports of circa 90 percent of its fertiliser use (and would require more if farmers would increase their use), it would not be possible to wean Africa completely of fertiliser imports in the foreseeable future.

However, keeping more of the fertilisers already produced in Africa or increasing that production

and marketing it only in African markets (rather than larger, more lucrative markets) would help ease the reliance on imports. But it takes several years and it is very costly to build new fertiliser mines and plants. And non-African markets remain more attractive than African markets given transportation infrastructure, trade and regulatory bottlenecks, inadequate access to finance for farmers, agro input dealers, etc.

It is important to remember that even with increased production on the continent, countries would have to import from other African countries since it is neither realistic nor a good idea to build up a fertiliser industry in all 54 countries!

The end game – whether fertilizers are sourced from imports and/or production in the continent – is to have a viable fertiliser market facilitated by increased yield responses to fertilisers and better

offtake prices in order to increase the fertiliser crop price ratio so as to incentivise the use of fertilisers. Improved infrastructure, improved intra-African trade and aligned regulatory regimes are also crucial to make fertiliser markets work more efficiently.

Extension services can support farmers to apply fertilisers more efficiently and provide advice on integrating organic fertilisers, or support farmers switch to less fertiliser-intensive crops.

Smallholder farmers struggle with high fertiliser prices annually. What actions can be taken to ease the pain of high prices?

Many governments have fertiliser subsidy schemes to make fertilisers more affordable. Fertiliser subsidies can take up a significant portion of government expenditures, especially



Bush beans grown using black soldier fly-composted organic fertilizer. Photo Credit: icipe



A farm worker applies fertilizer in a field of Staha maize for seed production at Suba Agro's Mbezi farm in Tanzania. (Photo: Peter Lowe/CIMMYT)

in a high price environment, and cannot always be maintained. Subsidy schemes can be improved through better targeting and ensuring that they do not distort markets.

Providing cash transfers to smallholders who may not see much return on their fertiliser use (due to poor rainfall or other less than ideal growing conditions, suboptimal practices and information) may be a good alternative to fertiliser subsidies which might be of more benefit to struggling farming households and possibly decrease the budgetary pressure on government.

What are the latest innovations or business solutions to make fertilisers affordable?

With regard to Africa, there are some long-standing issues that if solved, would help to make fertilisers more affordable.

It's important to provide farmers, especially women farmers, greater access to finance, and to ensure good linkages to both input and

output markets. Financing is also required for the fertiliser supply chain.

Even prior to the Ukraine crisis, fertiliser prices in Africa were higher than elsewhere due to hurdles in moving fertilisers to the final consumer and trade and regulatory bottlenecks. On the industrial side, "green ammonia" produced from electrolysis powered by renewable energy is being explored as a much climate friendlier alternative to ammonia produced from traditional ammonia production which is heavily reliant on the use of fossil fuels. The technology could – if it becomes economically viable – also potentially make nitrogenous fertiliser more affordable or if taken up in a way that leads to more plants (some start-ups are even looking at mini green ammonia production sites at the farm level) reduce transportation costs.

Do you see the rise of agroecological/sustainable farming practices such as conservation farming, minimum tillage, and

regenerative agriculture having an impact in Africa at all?

These practices are important for two reasons – they can provide more organic plant nutrients, but they also improve soil health (many African soils are depleted) which, in turn, is important for improving fertiliser response. Organic and inorganic fertilisers both play an important role in integrated nutrient management, something being looked at in the CGIAR initiative on Excellence in Agronomy.

According to the First Resolution of the Abuja Declaration on fertilisers, African governments agreed to increase fertiliser use from an average of 8.0kg of nutrients per hectare to 50kg of nutrients per hectare by 2015. Have any African countries met this target?

Yes. But most countries in sub-Saharan Africa still use below 25 kg per hectare.



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*Kenyan food vendors at an open-air market on the outskirts of Nairobi.
Photo Credit: Simon Maina. Photo Credit: KNA*

How realistic are the promises of low food prices in Kenya?

By Dr Timothy Njagi

GOVERNMENTS have a dual responsibility of ensuring that consumers, especially, those in urban centres can access food at affordable prices, while producers maintain reasonable margins. These two objectives work at cross purposes, in that when food prices are high, producers are expected to be happy, while, when food prices are low, consumers are happy. To maintain a balance, governments intervene using a set of policy choices. Input subsidies, producer price support, import tariffs, and supply of public goods such as research and extension are policy choices to support producers. On the other hand, food subsidies and household transfers are some of the options to support consumers.

In Kenya, the Kenya Kwanza has prioritised the agriculture sector, alongside SMEs, housing, health and digital and creative

economy as the key pillars to drive economic growth. The government has set a number of targets in the agricultural sector. First, it aims to raise agricultural productivity for key commodities. For example, maize productivity is expected to increase from eight to 15 90kg bags an acre, milk production from 2.5kg to 7.5kg a cow a day, and beef carcass weight from 110kg to 150kg. Second, the government seeks to address the cost and access to agricultural inputs. Third, the government hopes to reduce import reliance to attain food security. Reducing imports will also improve the foreign exchange position while maintaining economic growth locally. Fourthly, the government will enhance public investments in the sector, committing to spend KShs250 billion during the current term. The public expenditure target is, however, lower than the commitment under the Malabo commitment.

The rationale behind the commitments is very realistic regarding the economic growth targets. The agriculture sector already contributes 21 percent to the economy directly. Another 4.0 percent is contributed through agro-processing under the manufacturing sector, with sufficient contributions also coming through the wholesale and retail, services and household transfers. The agrifood system is estimated to contribute about 45 percent to GDP.

Food inflation remains a key driver of overall inflation in the country, with the other key contributions coming from energy (cost of electricity) and transport (fuel prices). Food inflation rose from the pandemic in 2020 before declining towards 2021. It started growing in the second half of 2021 due to logistics challenges arising from the pandemic before climbing in 2022 following the Russia-Ukraine war. Although food prices are starting to decline, they are still high compared to the pre-pandemic period.

Food prices are determined by the cost of production or the import prices and tariffs imposed in the importing country. The cost of fertiliser has been rising since the second half of 2021, and the cost of fuel has also been rising with significant increases since the Russia-Ukraine war. These two shocks signal that the production costs will be high. For imported food, the exchange rate as well as the logistics involved in importation influence the price at which consumers can access food. As such, we expect any government intervention to be around these variables.

Food prices dominated the political debate during and after the elections in 2022. Before the election, the government had introduced a food subsidy for maize, which is the essential staple, to maintain the price of maize flour at KShs100 per 2-kg packet. This policy was interpreted as a political intervention to woo voters to the government's side. However, access to cheap flour was limited as stocks disappeared from shelves immediately; they were made available due to panic purchases and low supply by millers. Before this policy, the government had also intervened in providing a fertiliser subsidy for targeted value chains and import duty waivers for essential food imports such as maize, wheat, rice, and raw materials for animal feeds intending to slow down the rising food prices. However, these policies did not realise the objective because the prices continued to rise in the global markets.

The Kenya Kwanza government reintroduced the fertiliser subsidy as a measure to lower the cost of production. In addition, the government extended the import duty waivers for the key cereals and raw materials for animal feeds and changed a key provision for the imports. The government now allowed trace genetically modified material (less than 1.0 percent) as opposed to 0 percent under the previous administration. Other options under deliberations are growing maize in countries where the costs are low such as Zambia and the revival of the large-scale Galana-Kulalu food security project. However, the debate became very political, with the government and main opposition coalition indicating



Global economists see Kenya's average cost of living breaching government target for two consecutive years. Photo Credit: | BD-POOL

prices they felt consumers should be purchasing food at. These prices were way below the prevailing market prices. At the end, the debate on food prices has become extremely political, devoid of facts and evidence and has led to unrealistic expectations by consumers on what the fair market prices for food should be.

The move to expand fertiliser subsidies to lower production costs was justified. However, the model used to provide the subsidy has been shown to be inefficient and ineffective. The subsidy, which is expected to cover about 30 percent of the market, arrived late, and the uptake has been suboptimal due to logistical challenges. Also, farmers have to use the fertiliser with improved seed varieties to maximise gains. The duty waivers have not led to cheaper food as the exchange rate has deteriorated significantly over the past year, falling from KShs98/USD in January 2020 to KShs138/USD in May 2023 (a 40 percent increase in about two years). Still, political leaders continue to create expectations that prices should be lower. The proposal to cultivate maize in Zambia may realise a lower cost of production, but the logistic to get the maize to the Kenyan consumers will reduce this benefit.

The fact remains that the business environment reflects rising costs of production. For farmers this is

reflected in the costs of inputs (seeds, agrochemicals, transport, labour) which are not covered by the subsidy. Also, the global markets indicate that prices are still higher than the pre-pandemic levels. If the country was to achieve the promised lower prices, consumers at the global markets would rush to buy the local maize, which would still push the price higher. Even if the government were to impose an export ban, it would still generate a political debate about why the government would deny its producers higher incomes, and more likely create a very lucrative black market for the banned commodity.

The country requires an objective debate on what constitutes fair prices, driven by data and evidence and devoid of political manoeuvring. In a year such as this, we should objectively debate what we can learn from past shocks (2008, 2017) and the responses implemented during such periods, and see how best to ensure the current interventions are geared toward the objectives. Low food prices are not an event, but a realistic objective that can be attained in the medium to long term. Short fixes are likely to be very expensive and unsustainable.

Dr Timothy Njagi is a Research Fellow, Tegemeo Institute of Agricultural Policy and Development.



Scientists devise new ways to breed trees with multiple benefits for climate and biodiversity. Photo Credit: World Agroforestry

Figure 1. A simple non-mist polythene propagator being used to root single-node, leafy, stem cuttings of a selected tree for its mass propagation, domestication and subsequent cultivation as individual plants. Photo Credit: Prof Roger RB Leakey

Africa leads the way in breeding super tree crops

By Roger RB Leakey

AROUND the world, especially in the tropics and sub-tropics, there are tens of thousands of plant species which produce edible fruits, nuts and leaves. There are even more which produce medicinal products. In traditional culture, many, if not most, of these have been important locally in everyday life. Today, as a result of deforestation, the availability of these products has declined.

In addition, the demand has declined as lifestyles have changed with increased urbanisation. Nevertheless, a transformation is underway. Rural households struggling to survive on small and typically unproductive farms producing a very limited range of food crops now seek to bring these traditionally important species back into their lives.

As highlighted in an article in the Pan African Agriculture issue of January-March 2023, over the last 30 years an indigenous food revolution has begun and scientists in 532 research teams in 310 organisations of 34 African countries have been working to domesticate some 60 of these indigenous species as new crops to diversify farming systems and local economies. These initiatives span all the agroecological regions of Africa, with some species being important in more than one region.

Notable among the nutritious and marketable products of these new crops are: the leaves and fruits of Baobab (*A. digitata*), fruits and oil-rich kernels of Marula (*S. birrea*), oily fruits of Safou (*D. edulis*), the food thickening kernels of Bush mango (*I. gabonensis* / *I. wombolu*), the nuts of Cola, Kola, Shea (*C. spp.*, *G. kola*, *V. paradoxa*) and the leaves of Eru (*G. africana*).

This initiative to develop new tree crops started in 1992 with an international conference in Edinburgh, "The Rebuilding of Tropical Forest Resources". It was then taken up in 1993 by the World Agroforestry Centre and has become a global programme, in which Africa has led the way with about 60 tree species.

The focus is on identifying and selecting elite individual trees producing fruits, nuts or leaves with useful physical or biochemical traits within wild populations. Typically, regardless of the trait being selected, the best two or three trees in a population of 100 are 50-100 percent better than the average for the site. This means that their products are substantially more useful and more marketable than those of the wild population.

To capture this superior quality and develop a new crop, these elite trees must be propagated vegetatively. This is most easily and cheaply done by the application of very simple horticultural techniques, such as the rooting of leafy softwood stem cuttings. These techniques have been developed over the last 50 years using home-made propagators that do not require running water or electricity (see training videos: <https://www.youtube.com/watch?v=KS97PSwbQ5E>).

Thus, these techniques are appropriate for use in remote communities with minimal training. This, therefore, opens up the possibility that any rural community can engage in the activity and become the beneficiary of the outcomes. It becomes a livelihood enhancing activity driven by self-help incentives. The programme started in Cameroon, where thousands of farmers from hundreds of villages adopted the concept and benefited both domestically and commercially from producing superior products. They were also able to sell plants to their neighbours.

One of the unique features of this initiative is that it is voluntary and self-supporting. The cost to the participants is virtually zero, apart from the commitment of time and some effort. Unlike typical development projects, this award-winning programme was developed from scratch with a participatory, grassroots, approach. This has been a key driver of its success as once the participant has learnt the basic skills, he or she can select, propagate and then cultivate whatever species suits them, in whatever way and on whatever scale they wish. They manage the activity, and they are the beneficiary of their own efforts.

As mentioned earlier, now after 30 years of research done in parallel with the above participatory community initiatives, the domestication of indigenous trees producing food and medicinal products has become a major

| Humid Lowlands of West and Central Africa | Sahelian Drylands of West and North Africa | Highlands and Dryland of East Africa | Savannah and Miombo Woodlands of Southern Africa |
|---|---|--|--|
| <i>Allanblackia</i> spp. <i>Prunus africana</i> <i>Irvingia</i> spp. <i>Dacryodes edulis</i> <i>Garcinia kola</i> <i>Cola</i> spp. <i>Gnetum</i> spp. <i>Ricinodendron heudelotii</i> <i>Chrysophyllum albidum</i> <i>Tetrapleura tetraptera</i> <i>Canarium schweinfurthii</i> <i>Pentaclethera macrophylla</i> <i>Baillonella toxisperma</i> <i>Trichoscypha aciminata</i> <i>Afrostryrax lepidophyllus</i> <i>Gnidia glauca</i> <i>Pausinystalia johimbe</i> <i>Tetracarpidium conophorum</i> <i>Garcinia lucida</i> <i>Gambeya africanum</i> | <i>Vitellaria paradoxa</i> <i>Adansonia digitata</i> <i>Sclerocarya birrea</i> <i>Tamarindus indica</i> <i>Zizyphus mauritiana</i> <i>Azanza garckeana</i> <i>Moringa oleifera</i> <i>Borassus aethiopum</i> <i>Carapa procera</i> <i>Parkia biglobosa</i> <i>Vitex doniana</i> <i>Dalium guineense</i> <i>Garcinia kola</i> <i>Xylopia aethiopica</i> <i>Detarium microcarpum</i> <i>Balanites aegyptiaca</i> <i>Prosopis africana</i> <i>Argania spinosa</i> <i>Irvingia gabonensis</i> | <i>Adansonia digitata</i> <i>Allanblackia stuhlmannii</i> <i>Zizyphus mauritiana</i> <i>Vitellaria paradoxa</i> <i>Ficus natalensis</i> <i>Balanites aegyptiaca</i> <i>Albizia coriaria</i> <i>Markhamia lutea</i> <i>Tamarindus indica</i> <i>Vitex doniana</i> <i>Vitex mombassae</i> <i>Sclerocarya birrea</i> | <i>Sclerocarya birrea</i> <i>Adansonia digitata</i> <i>Azanza garckeana</i> <i>Uapaca kirkiana</i> <i>Strychnos spinosa</i> <i>Strychnos cocculoides</i> <i>Dovyalis caffra</i> <i>Vangueria infausta</i> <i>Parinaria curatellifolia</i> <i>Sizygium cordatum</i> <i>Vitex</i> spp. <i>Flacourtia indica</i> <i>Zizyphus mauritiana</i> |

Table 1. African tree and other woody species producing edible products that have been identified as prime candidates for domestication in the literature over the third decade (species in bold have pan-African priority in the region) After: Leakey et al., 2022.

research theme in African research institutes and universities. This research is filling a void in the scientific literature and providing important knowledge about the many species overlooked by science and specifically by agriculture. Embedded within this new knowledge is a growing recognition that these indigenous tree species have a wide range of biochemical properties. When harnessed by domestication, these properties could create highly nutritious and commercially important functional foods to meet the complex needs of malnourished and sick people. These products then have important implications for the development of local businesses in trade, product processing and the development of new industries. Ideally, these opportunities can be realised in-country, so enriching the national economy and providing employment for local urban populations. These more technically complex commercial activities can be linked to the domestication programmes through selection criteria supported by the 'Ideotype Concept'. This is a means by which the tree selection process in the field can be married-

up with the laboratory characterised biochemical traits needed for industrial development. This allows the identification and selection of the 'Ideal Tree' in wild populations for subsequent propagation.

As described in a previous article in the Pan African Agriculture issue of January-March 2023 these developments have important international policy and business implications. Potentially, adding these new crops to tropical agriculture can help to achieve the UN sustainable development goals by restoring and recapturing natural, social and human capital within African agriculture and new related food industries.

Roger RB Leakey is Vice President, International Tree Foundation, Oxford, UK.

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The crop protection industry in Kenya follows strict regulations and invests heavily in developing safe, innovative products to protect crops. Photo Credit: aakGROW/CropLife

Championing sustainable pest control in Africa

By Eric Kimunguyi

PESTICIDES, better known as pest control products (PCPs), play a crucial role in agriculture by protecting crops from pests and diseases. The use of pesticides has progressively increased in Africa because agriculture contributes significantly to economic growth and food security. PCPs have not only enhanced food security but also improved farmers' incomes through increased crop productivity and protected yields.

In Kenya, the agricultural industry is the backbone of the economy, contributing approximately 33 percent of the country's gross domestic product.

The agriculture sector is a source of employment for more than 40 percent of the total population and 70 percent of the rural population. Pest control products have a significant impact on this economic sector, ensuring higher yields, reduced post-harvest losses, increased quality of crop production thus improving market competitiveness and supporting export opportunities.

The use of PCPs in all contexts is highly regulated. The regulatory framework for pesticides encompasses national, regional, and international legislation and conventions that help assure safety for users, consumers and the environment. In Kenya, the Pest Control Products Board (PCPB) is the statutory organisation that regulates the importation and

exportation, manufacture, distribution and use of pest control products.

The crop protection industry in Kenya, represented by aakGROW/CropLife Kenya, is committed to ensuring the health and safety of individuals and communities and has been at the forefront championing stewardship and regulatory frameworks that support the use of PCPs. As a result, the industry follows strict regulations and invests heavily in developing safe, innovative products to protect crops.

To further strengthen the industry efforts, aakGROW/CropLife Kenya in conjunction with CropLife Africa Middle East and CropLife International have launched the Sustainable Pesticide

Management Framework (SPMF) initiative. This programme aims at achieving a step-change in responsible pesticide management.

The SPMF combines best practices in regulatory and stewardship to create an enabling environment for innovation and an infrastructure that supports responsible use of pesticides. This includes collaboration with governments on regulatory risk-based frameworks, improvement of poison information reporting centres, container management programmes, and anti-counterfeit activities.

This forward-looking, systematic approach will provide farmers information and training on responsible crop protection practices and access to innovative technologies that protect human health and the environment and optimise crop production.

SPMF activities are focused on three key pillars to achieve sustainable pesticide management:

- The SPMF aims to reduce the reliance on highly hazardous pesticides (HHPs) and demonstrate change through accelerated access to innovation and by building an enabling environment that ensures, where HHPs cannot be replaced or more time is required for a

sustainable transition, products are used safely through certified retailers, spray service providers or other risk mitigation measures. Monitoring the effectiveness of applied risk management measures is a critical part of these activities.

- To ensure innovation is available to farmers, the SPMF will extend access to new and existing solutions, including biologicals, through an enhanced regulatory framework that facilitates strategic decisions and by building the capacity of local regulators in science-based risk assessment. The project also champions adoption of the integrated pesticide management (IPM) such as crop rotation to minimise the impacts of pests while at the same time reducing chemical use.
- The programme will equip farmers with information and best practices that ensure responsible and effective use of pesticides, while also taking measures for responsible distribution. In addition, the SPMF will focus on incident reporting, including supporting more and better poison centres across target regions.
- The SPMF initiative, funded by CropLife International, is a proactive, long-term engagement that supports

low- and middle-income countries to develop and advance local capacity in line with the FAO-WHO Code of Conduct on Pesticide Management. In Africa, it has been rolled out in Kenya and Morocco and will soon be launched in a third country in the region.

By striking a balance between the benefits of pesticide usage and the need for environmental and human health protection, Africa can achieve sustainable agriculture that ensures food security, protects ecosystems, and improves the well-being of its people. To address these challenges, African countries must prioritise the enforcement of existing regulations, enhance monitoring systems, and invest in education and training programmes for farmers. Governments, NGOs, research institutions and other stakeholders in the industry should collaborate to support farmers in adopting these practices, develop locally adapted solutions, and create platforms for knowledge exchange.

aakGROW is the umbrella body in Kenya for manufacturers, formulators, re-packers, importers, consultants, distributors, farmers, and users of pest control products.

Eric Kimunguyi is the CEO of AAK/ CropLife Kenya



aakGROW/CropLife staff takes a group of farmers through the best practices in the usage of pest control products.

Photo Credit: aakGROW/CropLife



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*A Janst Healthcare International worker demonstrates how to apply agricultural disinfectant.
Photo Credit: Janst Healthcare International*

Agricultural disinfectants: How to choose the right one for your farm operations

By Sam Kariuki

M AINTAINING good hygiene practices is essential for the health and safety of plants, animals and the workers. It is also important for the safety of the food produced and the protection of the environment. Hygiene practices reduce the need to use harmful pesticides and antibiotics, which leads to antibiotic resistance in people and animals.

An important aspect of good hygiene practices in farming is disinfection to eliminate harmful pathogens. There are several types of agricultural disinfectants in the market today. Traditional agricultural disinfectants include quaternary ammonium

compounds, hydrogen peroxide, chlorine-based disinfectants, and peroxyacetic acid.

New, safer, and sustainable solutions such as Hydroliq Agricultural Disinfectants exist. Hydroliq is a revolutionary technology that turns normal water into a highly potent but safe disinfectant. Given the wide variety of disinfectants available one can easily end up making the wrong choice. If you choose the wrong one you may end up suffering unnecessary losses. You could lose productivity as well as continue to suffer from the pathogens.

In this article, we look at the considerations you need to bear in mind when choosing the right disinfectant.

1. Why do you disinfect?

It is important to choose the right disinfectant for the right type of farming. Even where an active ingredient in a disinfectant is broad-based and used in various farming environments it is important to get the concentration right for the right impact. For example, the disinfection of the greenhouse before a new crop is introduced will need a higher concentration than for continuous disinfection when there is no visible sign of infection. The concentration required when actual contamination has been identified may also be different.

2. What pathogen do you want to eliminate?

You have to be clear about which pathogens you want to disinfect against because some disinfectants can be effective against one pathogen but ineffective against another. While most marketers indicate their disinfectants as highly effective you may need to check independent reviews on how effective the active ingredients are on various pathogens. You could also choose to test the disinfectant on a sample animal or crop before going full swing to be sure you are going to get the results you need.

3. Where do you need to disinfect?

Also, it is key to use the right disinfectant and disinfection method in the right place. If you use disinfectants for surfaces on plants or animals you may fail to get the hygiene levels you require. For example, the best disinfectant for work surfaces applied by wiping may be ineffective when it comes to disinfecting walls and high places, which may require a disinfectant dispersed through fogging.

4. Environmental factors

Environmental factors affect the effectiveness of some disinfectants. For example, some disinfectants' effectiveness is affected by temperature and the PH conditions of the places being disinfected. As such you need to be sure that the disinfectant you choose is right for the environmental conditions you have.

5. Effect on the environment

What is the impact of the disinfectant on the soil, pollinators, water, and air? The disinfectant may be highly safe when used in its unbroken molecule but it breaks down into molecules or elements that are harmful to the environment. The same might happen when the disinfectant breaks down to safe residues but before it breaks down it is harmful to the environment. You, therefore, need to be clear on the choice and method of application of the disinfectant that is safe for the environment.

It is also important to note that even when a disinfectant can break down to safe residues this can take too long hence it harms the environment before it breaks down.

Some residues are safe only in small quantities. Be sure the disinfectant you use has the lowest residues that are safe. Also, ensure the active ingredient is in the smallest possible quantities in comparison to the safe materials in the disinfectant.

When choosing a disinfectant always go for one that is both safe in its totality and when it breaks down.

6. Corrosion of materials

The biggest disadvantage of most disinfectants, even the so-called non-toxic ones, is their corrosiveness. They will attack materials such as steel, aluminum, plastic, and rubber. Corrosiveness leads to major costs of repairs and replacements of agricultural structures, tools, and equipment.

Corrosiveness shortens the life of structures, leading to hefty capital investments which could be utilised in the expansion of your farm or improvement of productivity.

7. Pathogen resistance

Over time pathogens can develop resistance to certain disinfectants. As such you need to consider this possibility when choosing a disinfectant. The pathogens will most likely become resistant to the most commonly used disinfectant in an area or one that you have been using for a long time. As such it is important to be sure that there is minimal risk of resistance in the disinfectant you are using or frequently change the disinfectants based on their active ingredients.

8. Toxicity to humans

Many disinfectants attack human skin and mucous membranes, leading to respiratory problems and asthma. They could also affect the eyes, causing itchiness and making them watery.

Choose a disinfectant that is safe for the workers even if the disinfectant is used in the presence of people or have prolonged exposure to it.

9. Effect on plants and animals

If the disinfectant is going to be used on the plant be sure it has minimal phytotoxicity on the plant even when used in large quantities.

For animals make sure that the disinfectant you use does not cause pain to them, especially if they have lesions, wounds, or cracks on the skin or hooves. This is important not only for the animal's well-being but also for the productivity of the animal. For example, a dairy cow can have its milk productivity reduced greatly if it experiences pain caused by a disinfectant.

10. Regulations and standards

Always be sure the disinfectant you use meets various farming best practices and standards that apply to you. It will be a major loss to use a disinfectant that ends up costing you an export market because of the residues it left or because it was ineffective in controlling a pathogen that makes your product ineligible for that market.

Conclusion

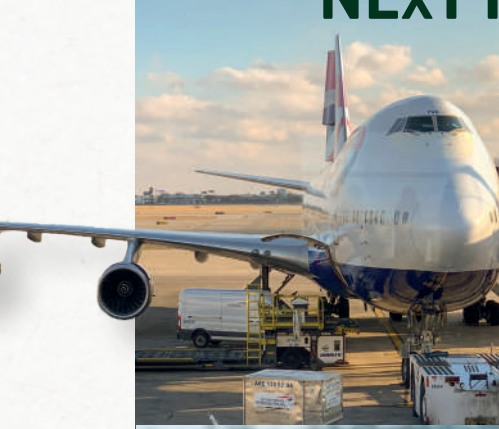
Given all the above considerations you need to go for a disinfectant that requires minimal expertise in use and handling. Some disinfectants can have catastrophic impacts if mishandled due to their impact on people, crops, animals, and the environment. Others can be highly ineffective if you miss a small detail in mixing. As much as possible go for one that requires basic skills to handle while remaining effective against the pathogens.

Hydroliq Agricultural Disinfectants are safe, sustainable, and highly potent against 99.99% of disease-causing pathogens in horticulture, dairy, poultry, food handling and, food processing sectors. Hydroliq has a fast contact time and does not have a pungent smell. It does not irritate the skin and also does not corrode your structure, tools and equipment. It does not harm plants, animals, pollinators, soil and water.

Sam Kariuki of Growth Partners leads the team that is distributing Hydroliq Agricultural Disinfection Solutions in the East African Region with Janst Healthcare International.

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The New Export Trade Kenya programme is implemented by COLEAD, funded by the European Union and established in collaboration with the EU Delegation in Nairobi and Kenyan stakeholders.

The programme's main objective is to secure improvements in the capacity of all stakeholders in the Kenyan horticultural sector to enable adaptation to evolving SPS, commercial, social and environmental requirements on local, regional and international markets



Small-scale farmers on a rice plantation. Photo Credit: AfDB

AfDB approves \$11.7 million to boost fertiliser access by African farmers

By Murimi Gitari

THE African Development Bank (AfDB) has approved USD11.7 million for 2023 projects under the African Fertilizer Financing Mechanism (AFFM), which seeks to boost fertilizer access, use and trade on the continent.

AFFM, a special fund established by the African Union in Abuja in 2006, aims to improve agricultural productivity by providing the necessary financing to boost fertilizer use in Africa and achieve the 50kg of nutrients per hectare target.

It is hosted and managed by the AfDB.

AFFM's work is crucial in addressing food crises and various threats to food security caused by Russia's war in Ukraine, climate change, conflict, locust infestation and disease.

"The 2023 projects will be implemented to support the second pillar of the Bank's African Emergency Food Production Facility, which was launched to avert a looming food crisis in Africa following Russia's invasion

of Ukraine. In addition, AFFM will actively work with African countries and other key stakeholders to develop the national food and agriculture pacts that the continent's leaders presented at the Feed Africa Summit in Dakar in January 2023," said AfDB in a statement.

AFFM also facilitates smallholder farmers' access to inputs and extension services through credit guarantee projects and capacity building for farmers and input distributors.

The objective of the credit guarantee projects is to ensure proper use of fertilizers, increase agricultural productivity and improve soil conditions.

The fund has been implementing three commercial credit guarantee projects amounting to USD8.3 million, with the recipient countries being Zimbabwe (USD4.3 million), Côte d'Ivoire (USD2 million), and Ghana (USD2 million).

For 2023, it plans to implement trade credit guarantee schemes totalling USD9.7 million in Tanzania, Uganda, Mozambique and Kenya.

Three more new projects could be launched in Senegal, Zambia and Ghana if the United States Agency for International Development (USAID) follows through on its USD15 million commitment to the AFFM.

AFFM's 2023 programme of activities include strengthening the fertilizer sector through access to finance, supporting the development of sustainable policy reforms to improve fertilizer production, trade and use, and facilitating access to inputs and technical assistance for smallholder farmers.

It will continue to work with the International Fertiliser Development Centre (IFDC) and the Alliance for a Green Revolution in Africa (AGRA) on initiatives to improve fertilizer production, trade and use launched in 2021.

It will also conduct an in-depth analysis of fertilizer policy in at least 10 African countries, which will map the current situation, identify gaps and prepare an action plan.



Amuru fish pond in Uganda. Photo Credit: Lominda Afedraru

Uganda scientists breathe new life into fish farming

By Lominda Afedraru

AWELO Fish Farm Ltd in Northern Uganda's Oyam district is a model agricultural enterprise.

Set on a former rural homestead, the company runs a fairly complex operation that includes a fish hatchery, fish ponds, and milling machines for maize, sunflower and rice.

Incubator rooms are designed to mimic a natural stream environment, with constant upwelling flow of fresh water to supply oxygen and wash away waste.

Incubator trays are filled with small, plastic, saddle-shaped pieces that act as artificial gravel. The substrate also provides hiding spaces where

hatched young fingerlings can remain undisturbed until they have absorbed their yolk material for body development.

The company is building a fish feed mill, the only facility of its kind in the region, to enable it produce and supply fish pellets to farmers in Oyam and neighbouring districts in addition to fingerlings of the African catfish.

James Ebuku, the 33-year-old founder of Awelo Fish Farm, puts the entire investment in the enterprise at between UGShs600-700 million.

But its origin couldn't have been humbler, with Ebuku starting off with little more than passion for fish rearing and personal ingenuity.

It all started in 2013 when he completed an IT course at Makerere University in Uganda's capital city, Kampala.

Instead of continuously searching for jobs and failing, he decided to undertake a one-year training in fish breeding at the Aquaculture Research and Development Centre in Kajansi.

In 2015, he left the city and moved to the village to start his fish farm.

"I saw my father's house in the village empty and decided to put it to good use, with every room turned into a fish pond. Most famers in the region concentrate on using wetlands where they dig ponds but mine is unique," he says.

Ebuku hatches and sells fingerlings to fellow farmers at between Shs400-Shs500 each depending on the size.

The facility at the moment has a capacity to hatch and breed 20,000 fingerlings at ago but his target is to produce 100,000 fingerlings at the end of this year

Mature fish, at six weeks if well fed, is sold at a farm gate price of UGShs8,000 andUG Shs10,000 in the open market.

Ebuku hopes involvement in a programme implemented by scientists from the National Agricultural Research Organisation (Naro) will improve his farm's capacity to breed fingerlings and meet the growing demand.

The Naro scientists under the Development Initiative for Northern Uganda (Dinu) are promoting adoption of better farming technologies.

The DINU Northern Uganda coordinator, Dr Alfred Komakech, said they were taking stock of active fish farmers in the district and identifying the challenges they are faced with in a bid to give assistance in terms of technical advice and inputs.

According to recent Food and Agriculture Organisation (FAO) data Uganda produces up to 15,000 tonnes of fish from aquaculture.

There are an estimated 20,000 ponds throughout the country with an average surface area of 500 metre square per pond.

Production ranges between 1,500 kg per hectare per year for subsistence farmers to 15,000 kg per hectare per year for emerging commercial fish farmers.

But aquaculture faces several challenges, mainly disease outbreaks, poor quality brood stock of fingerlings, poor quality feeds and water quality management which needs to be addressed.

Merecelino Onencan started his farm in early 1970s but was forced to halt operations due to the insurgency in Northern Uganda.

He revived it in 2004 as Kukure Integrated Fish farm.

But the Naro scientists say the few catfish and tilapia fingerlings in his four ponds are too old to yield much, being from a brood stock of 2014.

They intend to help Onencan revamp the business by providing new brood stock, a good water pumping system to enable enough oxygen for the fish as well as quality feed. His hatchery will also be refurbished.

Howard Kasigwa, a fish breeder, notes that the Naro intervention comes in handy because fish farmers like Onencan lack knowledge of good pond management and access to quality fingerlings.



James Ebuku at his fish farm in Northern Uganda where he hatches catfish species. Photo Credit: Lominda Afedraru

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Local fishermen in South Sudan using upgraded canoes on the Nile. Photo Credit: Richard Sultan

Upgraded canoes bring home big catch for South Sudan fishing communities

By Richard Sultan

EVERY morning, they arrive on motorcycles in groups of five, six and sometimes eight at Gudele market in South Sudan's capital Juba, quickly make their way past the entrance to the stalls and hand wooden boxes full of fish to waiting fish mongers.

After unpacking the boxes, the fish mongers take note of the count, confirm with the riders and hand them the money for the previous day's sales.

As soon the riders verify it is the right amount, they jump onto their bikes, heading back to Terekeka, a fishing town on the western bank of the Nile.

Gudele is one of several markets in Juba that is nowadays flooded with fresh fish from Terekeka, unlike the years before 2022 when much of the commodity was imported from neighbouring Uganda.

The increased fish supply is thanks to a community resilience project implemented by UN Food and Agriculture Organisation (FAO) in Bor and Terkeka areas following the devastating effect of Covid-19 and floods on local livelihoods.

Josephine Napwon, South Sudan's minister of Environment and Forestry,

said floods and drought caused by climate change have displaced more than two million people in the country since 2019.

"The climate crisis is worsening in our country, and over two million people are internally displaced due to flooding and drought, and failure in rain patterns have resulted in crop failure," Napwon said during a climate change validation workshop held in Juba.

Demissie Redeat, FAO South Sudan fishing project manager, said idea behind the project was to help people in the communities to improve the quality and volume of fish traded so that they can be resilient to the shocks of flooding.

The project involves provision of fishing nets and training of the local fishermen on appropriate boat building technology and fishing best practices.

"The core of the project is where we provided training to the traditional boat builders. It's a hands-on practical training on the epoxy lamination process. The process involves making the hulls and surfaces of the traditional canoes smooth through sanding and clogging any gaps and cracks; mixing the required chemicals (resin and epoxy) with appropriate proportion, and finally, painting or laminating the canoe surface with the mixture of epoxy and raisin.

The whole idea is to make the surfaces of the canoe water proof and sunlight resistant," said Redeat.

Traditional canoes absorb a lot of water and they dry out when exposed to sunlight- this process overtime causes cracks reducing their durability.

Redeat said epoxy-laminated canoes are water-proof and sunlight resistant hence they have much longer durability -- up to 10 years compared to 3-5 years of useful life for traditional canoes.

"These enhanced canoes are easy to manoeuvre. The fishermen can access more productive fishing grounds which is a higher source of income for them when they sell their catch. Secondly it reduces on the cutting down of trees which means it saves the environment and lastly productivity in other aspects of life as they will no longer have to worry about their livelihood," Redeat said.

"It is one step ahead. Now that we have given them the introductory part, yeah, next time they will be able to produce fibre glass canoes. So, they will not be completely using timber. The fibre glass canoe is very light, weighing only 40kgs, and can last for more than 20 years. It has a different design but we are determined to achieve it," he said.

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*A Kenyan miraa trader displays the produce at a market in Laale in Igembe North.
Photo Credit: Merudaily.*

Juba's open-air miraa pubs defy ban

By Richard Sultan

FEW crops divide cross-border opinion like khat, the leafy shrub known for its stimulant effect. Going by different local names -- miraa, Mugoka or Marungi -- it is considered an illegal stimulant substance in South Sudan, is legal in Uganda and a cash crop in Kenya.

Despite its blacklisting in South Sudan, you will find it being sold in an open-air market in Kakuma, a suburb of the capital next to United Nation Mission in South Sudan (UNMISS) headquarters.

We bump onto Akec Wol, a 16-year-old boy, wearing a black pair of oversized jeans with big pockets, running up and down trying to sweet-talk prospective clients about the quality and quantity of the bundles of khat twigs in his hands. He says that Kakuma is just one of the several open-air markets for the stimulant in Juba.

"We have selling spots in Nyakuron, Atla

Bara and almost all suburbs of Juba," Akec says as he keeps his gaze from side to side in search of more clients.

The open-air market is thronged by foreigners and South Sudanese alike who enjoy khat.

According to scientists, its leaves or twigs have a stimulant effect when chewed.

Elizabeth Hartney, a psychologist and Director of the Centre for Health Leadership and Research at Royal Roads University, Canada, says people who use khat typically chew fresh leaves because the active components of the plant break down quickly as they dry out. Dried leaves are sometimes used as a tea, although the effects are less potent.

"Khat leaves are usually green or green-brown. When fresh, the leaves have a glossy appearance. As they dry, they turn leathery yellow-brown. Given its appearance, it can easily be mistaken for Marijuana. The leaves of the khat plant are often packed together in a bundle

and wrapped in banana leaves," says Hartney.

According to the World Health Organization (WHO), the effects of khat consumption are similar to those of strong coffee.

In South Sudan, it is a source of livelihood for many people, including single mothers, as well.

A few kilometres to the east of the Kakuma lies the Juba suburb of Atla-Bara A where another open-air market is in the middle of the neighbourhood. A young well-dressed lady in her early 30s is seated on two plastic chairs stacked together to support her weight.

Like you would find at a tea selling joint in Juba, plastic chairs and small plastic tables are neatly arranged behind her. Some of the seats are already occupied by customers chewing away in groups of two or three.

When we ask the lady for five minutes



Khat is smuggled from Uganda on a daily basis and occasionally from Kenya. Photo Credit: Murimi Gitari

of her time, she readily obliges perhaps thinking we are new clients. She introduces herself in fluent classical Arabic as Beatrice Osa, the owner of this particular khat selling outlet

“I am a mother of two, my husband abandoned me and my kids three years ago. I tried doing a lot of jobs to fend for my children until I got introduced to this khat business by my friend seven months ago,” she says while pointing to a woman selling her khat 15 metres away.

Khat is smuggled from Uganda on a daily basis and occasionally from Kenya,

About 700 metres to the west of Nimule’s Customs Office, police officers stand on guard to prevent people illegally crossing the border. But we learn that it’s from here that khat destined for sale within Nimule, Magwi, Torit and finally Juba is smuggled, packed and distributed using vans that bear temporary plate numbers and motorcycles at dawn before daybreak from Elegu in Uganda where the trade in khat is legal.

The transporters of khat, according to residents of Nimule, are mysterious – they are only referred to as Team No Sleep (TNS).

One of the local dealers who prefers to remain anonymous for fear of reprisal says that in Nimule, the getting khat is as easy as walking into a restaurant for a meal.

“In the past, security organs have tried to stop them but they always find themselves either outsmarted by the smugglers or swallowed in by the huge chunks of the smuggling pounds,” he says.

Another dealer says all you need to join the khat business is to be introduced by someone who is already in the TNS system. He refers to TNS as a company which offers to them protection from external threat at the crossing point, distribute the goods to Juba and other towns for a fee.

“Our duty is to cross the crocodile-infested river to Uganda, buy the products and cross back to Nimule. We then count the number of rolls to the company that will now handle the later processes,” says the dealer.

At another open-air market in Juba’s Gudele suburb, Ashraf Andama, a local dealer from Uganda’s West Nile region, is busy haggling over the price with a seemingly stubborn client.

Andama tries to explain that a police raid at one of the distribution points necessitated the hike in price, but the client would hear none of it.

The client, fondly referred to as Yaba which literally means an elderly man, loudly questions the wisdom of the police raiding the distribution point.

“How do you stop the sale and consumption of a product whose selling points are equaling the number of pubs in Juba?” Yaba poses.

He further accuses those against Khat of double standards because Khat is never grown in Juba. “Let them go and stop it from entering it into the country but not us the consumers,” he says.

Many people in Juba, including parents and teachers tend to agree with Yaba, putting the security operatives on the spot.

“This is a fight that we have lost years ago, we should just legalise it like alcohol and focus on treating its health and social impact to our society,” says Andrew Sebit, a resident of Atla Bara.

However, with the continued silence and lack of strong pronouncements from the authorities, the community is not sure of what role to take.

For TNS and the likes of Akec and Osa, it is business as usual.



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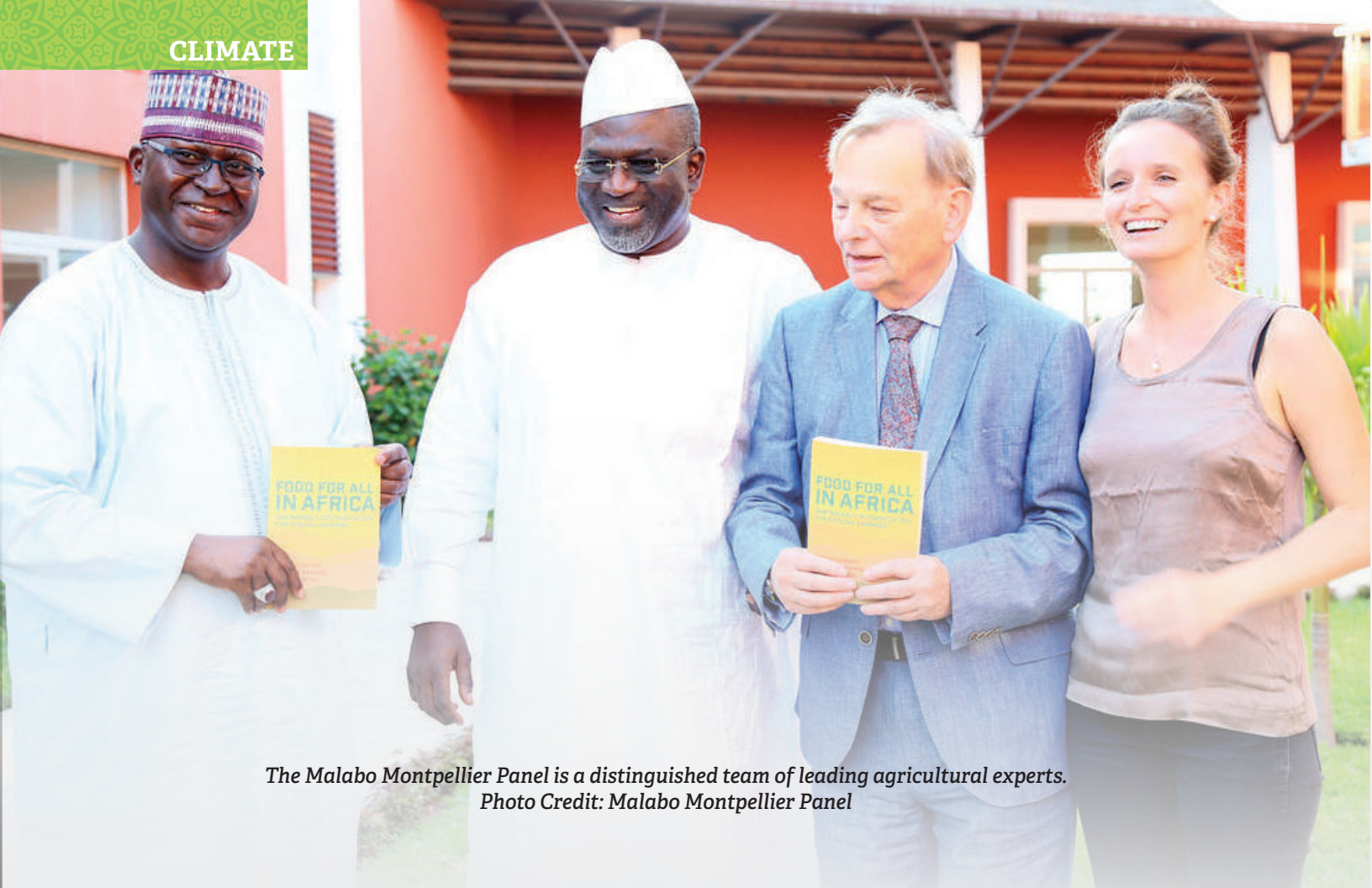


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*The Malabo Montpellier Panel is a distinguished team of leading agricultural experts.
Photo Credit: Malabo Montpellier Panel*

How Africa can unlock innovative climate finance for its food systems

Busani Bafana

AFRICA has a shortfall of more than \$40 billion for adaptation, making it imperative to tap domestic and global finance to enable the continent climate-proof its agriculture and food systems, agriculture experts say.

Current levels of adaptation financing needs for agriculture, forestry, and land use (AFOLU) and water sectors in Africa amount to an estimated \$41.3 billion, according to a report launched by the Panel of experts at the Malabo Montpellier Forum in Dakar, Senegal.

However, research indicates that small-scale farmers, agri-entrepreneurs, and those in related industries received just \$3.6 billion in adaptation finance in 2017/18.

The report, ADAPT: Policy innovations to unlock climate finance for resilient food systems in Africa, highlights opportunities for African countries to stimulate more public and private sector financing while also calling for greater access to global funding.

The report notes that Africa's access to international climate finance remains low and insufficient, with total estimated access at only 5.0

percent of the available global finance. The majority of African farmers are smallholders with few sources of finance and limited access to infrastructure and information.

Dr Katrin Glatzel, Director of Policy Innovation at AKADEMIYA2063 and also a Director of the Malabo Montpellier Panel, says that financing for climate adaptation across food systems faces the same technical and structural challenges as agricultural financing in Africa. Perceived high risks, low liquidity, long timeframes, lack of large investment-grade projects, and high upfront capital and transaction costs militate against adaptation financing.

in closing the gap for adaptation funding in food systems, agricultural experts recommend developing a pipeline of bankable projects focused on food systems and related infrastructure supported by investable adaptation plans. In addition, they recommend supporting locally led adaptation efforts to ensure that resilience-building interventions meet the needs of the most vulnerable and have a sustainable impact.

Dr Glatzel says that drawing on local communities' knowledge, experience, and needs, bottom-up and devolved decision-making approaches can help governments and funders pinpoint the most impactful and urgently needed adaptation interventions.

The Malabo Montpellier Panel is a distinguished panel of leading agricultural experts.

The report analyses four systematically selected African countries – Benin, Mali, Rwanda, and Zimbabwe – to review how governments could optimise investments in climate-resilient food systems through innovations such as national climate funds, blended public-private finance, and participatory funding structures coupled with innovative policy-design and institutional structures.

For example, Benin has created several institutions to support adaptation, including the National Fund for Environment and Climate Change (FNEC) and the Community Development Support Fund (FaDEC).

Mali, for its part, has established the centralised Mali Climate Fund. The country was also among the top seven recipients of climate adaptation finance between 2011 and 2020 thanks to its close partnerships with international development partners.

Rwanda has invested heavily in establishing new, innovative, and world-class institutions such as the National Fund for Environment (FONERWA), which supports a demand-led approach for bridging funding gaps.

In Zimbabwe the government has collaborated with the Green Climate Fund (GCF) to design the Zimbabwe GCF Country Programme, a four-year plan to ensure the country's readiness to mobilise climate finance from the GCF.

The report follows the recent UN COP27 climate talks, where negotiators agreed to establish a fund to compensate developing countries for the loss and damage already caused by climate change, such as the four consecutive failed rainy seasons in East Africa.

In addition to a loss and damage fund, high-income countries previously committed to providing \$100 billion a year to support adaptation in low-income countries, which has yet to be met.

The report authors find that Africa accessed just five per cent of the global finance available, while less than 20 percent of private sector climate finance went toward adaptation.

According to the Malabo Montpellier Panel's report, climate change will lead to an equivalent annual GDP loss of 10 to 20 percent in Africa by 2100 with low or non-existent and inappropriate adaptation measures.

"The poor quality and quantity of data on climate finance flows is a global concern," Dr Glatzel says, emphasising the importance of designing reliable tracking mechanisms and simple digital tools to record climate finance flows at the national level.

"African governments can play a leading role in resolving this issue."

Recording and reporting on climate finance received can be a powerful tool to hold developed countries accountable, she adds.

Zimbabwe, for example, has invested in a Development Projects Management Information System (DEVPRMIS) to improve transparency and accountability through data capturing and information sharing among government agencies, development partners, and civil society organisations.

The system will track public sector investments, development assistance, as well as private sector projects being implemented in Zimbabwe.



Agricultural experts on the Malabo Montpellier Panel. Photo Credit:MMP



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Maurice Odera on his vegetable farm in Kenya's Migori County. Photo Credit: Henry Owino

Building the fruits, vegetables value chains on post-Covid demand surge

By Henry Owino

IN the wake of the outbreak of Covid-19 in Kenya in mid March 2020, health personnel encouraged citizens to eat plenty of fruits and vegetables.

Urban dwellers even began growing their own foods in balconies, and open spaces available in their rental compounds.

Among the results of that public health campaign was a spike in demand for the horticultural produce, creating more opportunities for local farmers in the key economic sector.

Horticulture is the third largest foreign exchange earner for the country, generating around Sh150 billion annually and supports millions of livelihoods.

However, the sector continues to grapple with constraints along the value chain compounded by uncoordinated markets and limited know-how by many small-scale farmers to produce high-quality crops.

The authorities believe that most of these challenges can be solved by implementing a 10-year strategic plan for the agricultural sector.

The Kenya's Agriculture Sector Transformation and Growth Strategy (ASTGS), 2019-2029, highlights the Government's initiatives to build households' food resilience by increasing smallholder farmers' incomes through supporting high agricultural productivity and value addition.

"The 10-year strategy recognizes that Kenya's vibrant agribusiness sector has tremendous potential to be a powerful engine of transformation. The implementation as much as possible is to be done through the private sector," said Josephine Simiyu, the head of regulations and compliance at the Horticulture Crops Directorate, at a recent stakeholder conference in Nairobi.

Simiyu represented the Principal Secretary for the State Department for Crop Development, Phillip Harsama, at the conference held to discuss resilience in the sub-Saharan African fruit and vegetable value chains.

Agriculture is the mainstay of Kenya's economy, contributing over 33 percent of the gross domestic product (GDP)

directly and an additional 27 percent through linkages with manufacturing and service-related sectors.

It employs 40 percent of the total population and about 70 percent of the rural population while it accounts for 65 percent of the country's export earnings.

In his keynote delivered on his behalf by Simiyu, Harsama noted that horticultural exports have undergone tremendous growth in the last 10 years, from KES 80 billion earnings in 2013 to about KES 160 billion in 2022. The development trend has been very encouraging and the country has been able to earn the much-needed foreign exchange, besides providing food for the population, employment, and providing raw materials for the processing industry.

"I am delighted to note that in this conference, key stakeholders and experts from academic, government, non-profit and private sectors of horticulture, nutrition, gender equity, youth engagement, and agri-entrepreneurship, have gathered to speak, discuss and share their experiences from within the region and beyond," he said.

"There is need to enhance linkages with researchers, academia, extension providers and regulators to meet the ever-growing demand for market volumes and quality of our fruits."

Fruits and vegetables have a critical role in healthy populations and economic empowerment of smallholder farmers.

Harsama called for partnerships in the horticulture sector and bridging gaps among sector actors to nurture resilient horticultural value chains, and overcome climate change and other food system shocks.

Government policies

The Principal Secretary said the Kenyan government has put in place policies that have facilitated

investments in the horticulture sector and deliberately improved rural infrastructure that has enabled the movement of produce across the country and establishment of private cooling chain facilities to support post-harvest handling of the fruits and vegetables.

Further, the government has facilitated horticulture development through tax-free imports of some farm inputs and the development of export logistic handling facilities at the port of exit.

The government has actively tried to mitigate Kenya's reliance on European markets by opening new trade and flight routes to other countries, particularly the US, China and Russia, and the Middle East as, well as promoting Kenya's entry into regional value-chains, particularly for small- and medium-sized players

The promotion of exports goes hand in hand with the promotion of production for the markets and processing, as well as local consumption. "

"In Kenya we have champions of value addition including exporters and processors who produce mango pulp (puree), juices, jam, jellies, crisps, cosmetics among other products for domestic and export markets," PS Harsama pointed out.

The world is now going green using renewable energy for environmental conservation. The Kenya government has put measures to encourage climate smart and sustainable production practices through resilient value chains that can withstand climate shocks and sustain livelihoods.

As countries around the world race to fight the effects of climate change, carbon trading continues to gain popularity.

Challenges of horticulture

The lucrative horticultural industry has faced several constraints namely; low incentives in terms of local market prices, high costs of inputs (seeds, fertilisers, pesticides), Stringent international standards and market requirements, which are a barrier to accessing the export market, post-harvest losses and lack of quality to improve consumer acceptance.

The national government, in collaboration with other stakeholders, is addressing these challenges, through improved market linkages and access, empowerment of farmers and strengthening of support institutions under the Ministry of agriculture, including Agriculture and Food Authority (AFA).

To this end, all stakeholders are encouraged to work very closely with AFA with the objective of accessing these services.

Harsama encouraged horticulture participants in different players along the fruit and vegetables value chain to bring out challenges within the value chain and come up with interventions and chart a workable way forward. This is because horticulture has the potential to inspire change in communities and country at large.

Erin McGuire, Associate Director, Feed the Future Innovative Lab for Horticulture (ILH), said fruits and vegetables play a crucial role in nourishing communities. She said she was excited to collaborate with International Centre for Evaluation and Development (ICED) and the global partners in addressing challenges and seizing opportunities in horticulture.

"Together, we strive to ensure that East African families have access to essential nutrients while ensuring farmers can generate successful livelihoods within horticultural production and marketing," McGuire said.

A photograph of two women standing in a field of tall green plants. The woman on the left is wearing a teal jacket with a crest on the chest and is pointing at a tablet held by the woman on the right. The woman on the right is wearing a purple patterned top and a red patterned skirt. The background is a bright, sunny outdoor setting with green foliage.

Improving the food security and livelihoods of smallholder communities

The coastal region in Kenya is well known for its coconuts but production remains low. Photo Credit: perabeats

Reviving coconut growing at Kenya coast

By Halima Gongo

FOR years, farmers in Kwale County on Kenya's coast have been practising subsistence farming. But the production has always been low due to lack of know-how, poor agronomic practices and use of poor quality planting materials.

More than 80 percent of coastal farming households derive their livelihood either directly or indirectly from the coconut tree. But the sector has not been doing too well over the years.

Kwale has more than 2,600 coconut growers but almost 10 million coconut trees have become less productive due to old age.

Most farmers still rely on the old coconut trees and are not planting new ones.

To address the problem, the Agriculture and Food Authority (AFA) has started the distribution of coconut seedlings to Kwale and other farmers in the coastal part of Kenya.

Former Agriculture Principal Secretary Hamadi Boga, who has roots in the county, emphasised the need for farmers to adopt high-yielding seedlings to improve production of food and cash crops in Kwale.

Prof Boga told participants at the recent Global GAP TourStop 2023 conference in Nairobi that the government was working with various stakeholders to equip coastal farmers with modern farming skills that will improve the supply of coconut to the international market.

"This is a very important conference because we are talking about national

criteria for agriculture so that we can get food that is safe for consumption. Each country has its own policies when it comes to food and we want our farmers who want to export to European and American markets to understand these policies and work hard to maintain them," he said.

The government, he said, is determined to ensure small-scale farmers are empowered to produce high-quality products and have access to better markets.

"Since agriculture in devolved [to county governments], there is need for our coastal counties to come together and have talks about agriculture and form strategies to ensure that we revive the cultivation of trees such as coconuts, cashews and mangoes and modernise our farming, and make it in line with the market," Prof Boga said.

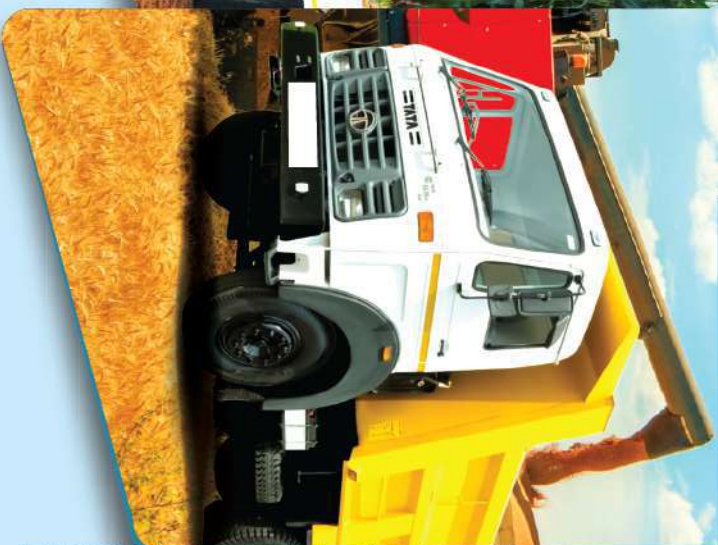
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