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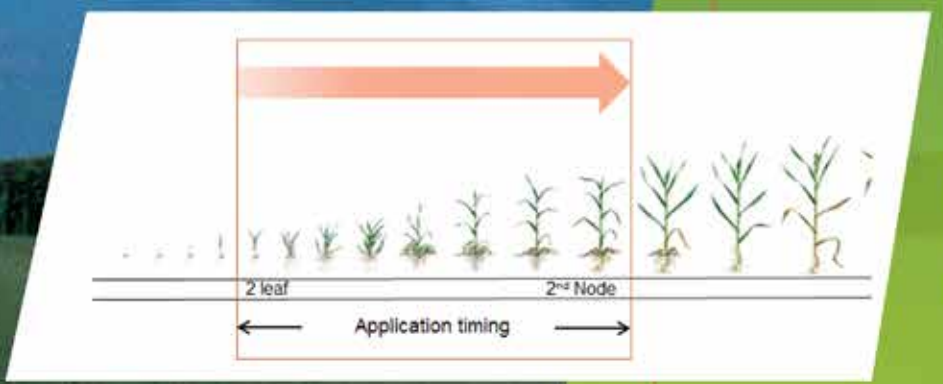

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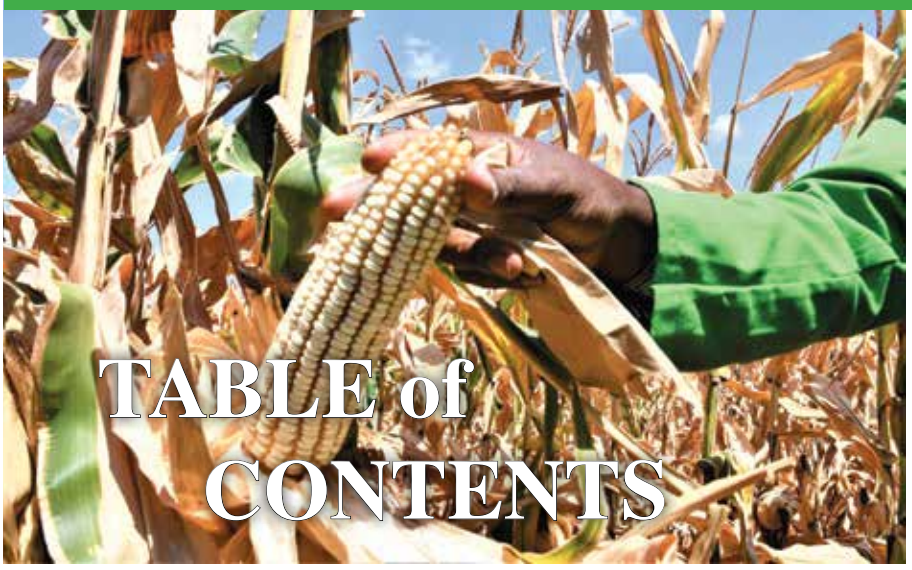

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How does herbicide resistance develop?

Herbicide resistance occurs naturally in the population, it is the inherited ability for a weed to survive a herbicide application that would normally control it. Surviving plants then pass on the genetic advantage to future generations, until resistant plants dominate the population, making weed control challenging.

Cereals

January - March 2025

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Editorial

Imaginary and Extraordinary Desires

Well yes. We start 2025 and we want to celebrate it for all but also we want start with three clear wishes for agriculture in the new year. They are not imaginary or extraordinary desires. But because they are repetitive, they are no less desired by all professionals who, directly or indirectly, are dedicated to agriculture and its needs.

We are sure that *Cereal Magazine's* three wishes for agriculture for the new year are also wishes that, almost unconsciously, millions of people around the world ask for. Because agriculture and its sustainable productivity concern those of us who are related to the sector. But also, to the entire population that continues to grow and needs solutions to its diet, whose demand grows in a directly proportional way.

May it rain moderately and constantly.

We want to take the umbrella. Or forget it and let the rain get us wet. The severe drought that affects the fields of our country and much of the planet has reduced agricultural production by half or less in many crops and hampered many others. And yet, farmers face the new year with the same objectives: producing food, taking care of the landscape and protecting the environment.

For that commitment also needs the help of meteorology, which, unfortunately, is not in our power to control. Yes, it is possible to make their work easier for producers. And there the support of the administrations is essential. It is also important that research continues working to find the best natural and sustainable solutions to this water deficit that can be so harmful to crops.

Masila Kanyingi
Editor

STAK Annual Congress Tackles Climate-Smart Seed Systems and Counterfeit Challenges

The Seed Trade Association of Kenya held an annual congress at the Kenya School of Monetary Studies, themed "Leveraging Technologies that Strengthen Agricultural Resilience and Climate-Smart Seed Systems."

The forum brought together diverse array of stakeholders from the seed industry to discuss the current state of the sector, emerging trends, and key themes including climate resilience, biotechnology, digitalization, and sustainability.

Held on the build up to the United Nations' Conference of Parties in Baku the following week, production of seeds resilient to the adverse effects of climate change to assure food security was extensively discussed including, challenges affecting the seed industry, and solutions to the challenges.

Speaking during the congress, STAK chairman, Wellington Wasike from Seed Co Kenya, said, "This association is critical in ensuring food security in the nation by ensuring quality seeds are stocked and critically advising the government through the Cabinet Secretary on the best policies to employ."

He further encouraged the registration of more members to join the organization in order to enjoy the rewards of collective bargain and also improve the association's competitive edge across the continent through quality production.

"The seed sector needs better regulation in order to expel counterfeit seeds that bring loss to the farmer and ultimately threaten food security," he added. He further highlighted that the agrovet industry is long overdue for regulation through training and certification of agrovets operators.

"Agrovets are the loophole through which fake seeds and counterfeits access our market. I believe by the end of this congress, we shall have come up with policies and forward them to the cabinet secretary for discussion and being passed into law to help curb this problem," he said.

The Kenya Plant Health Inspectorate Service's MD, Prof. Theophilus Mutui said that in order to strengthen the inspectorates mandate and improve service delivery, collaboration with stakeholders in the sector was crucial.

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"The inspectorates mandate is to ensure that seeds in our market are quality to mitigate loss to the farmer and also secure the nations food. However, to achieve this mandate efficiently, collaboration with stakeholders is important. We are more like an intelligence organization and to gather the intelligence needed to protect the industry, we heavily rely on stakeholders to notify us on any prevailing issues in order to act accordingly," he said.

He further highlighted that since the funding from government to the agency is limited, STAK was a crucial partner in its operations, further adding that through collaborations with the private sector, service delivery should be optimal.

"Fighting counterfeit seeds is also pegged on farmer awareness. It is important that the value chain is strengthened to improve efficiency of information flow." He also commended the inspectorates shift

Dr. Andrew Karanja, Former Cabinet Secretary of Agriculture and Livestock development

> "The seed sector needs better regulation in order to expel counterfeit seeds that bring loss to the farmer and ultimately threaten food security,"

Prof. Theophilus Mutui, KEPHIS Managing Director

to digitization of services which has greatly improved its efficiency. "Farmers investing on certified seeds is investing in quality," he added.

The former Cabinet Secretary of Agriculture and Livestock development, Dr. Andrew Karanja echoed the professor's sentiment on collaboration. "Collaboration enables stakeholders to be part of the conversations in the national level, owing to collective bargain. It is also crucial that seed traders'

Wellington Wasike, STAK Chairman

associations are trained to improve the value chain. More awareness is needed," he said.

He also asked stakeholders to come up with ways to overcome barriers in seed production. "Encouraging community growers and training private inspectors is a commendable mileage by KEPHIS," he highlighted.

Climate change, coupled with other factors like counterfeit seeds, reduced arable land and high production cost ensures Kenya has never been 100% secure in terms of, and seed production is crucial in order to realize this.

Specialization in seed production and licensing is a step towards making this a reality. Creating awareness through education on seed class to potential producers, learning from the past, zoning growers, and introducing cheaper seeds of high quality are among the objectives the STAK should prioritize.

Strengthening Agricultural Resilience Through Collaboration in Seed Systems

The 2024 STAK Congress and Expo, attended by stakeholders in the seed industry, sought to strengthen Agricultural Resilience and Climate-Smart Seed Systems by leveraging technology. During the congress and sideline discussions among the stakeholders, ways of countering counterfeit seeds in the market, and other prevailing issues were the main objectives, and solutions were proposed.

Kenya has never been 100% food secure and with the effects of climate change being felt in the agriculture sector, the call to action has never been more urgent.

“Food security in the continent heavily depends on smart agricultural practices, where seeds play a crucial role. As a result, collaboration along the value chain goes a long way in encouraging innovation through sharing knowledge,” says Miss Catherine Langat, Technical Manager of the Africa Seed Traders Association.

Collaboration can be employed in several areas to achieve optimum output from the value chain and for farmers to get high-quality seeds. For instance:

Research and Development (R&D) with Public and Private Sectors: Joint R&D can ensure that seeds are suited for local conditions, addressing drought tolerance, disease resistance, and high yields. Public research institutions like the Kenya Agricultural and Livestock Research Organization (KALRO) and universities can collaborate with private seed companies to develop new, climate-resilient seed varieties.

Regulatory Harmonization and Policy Advocacy: During the Congress, Agatha Thuo, CEO, ASNET pointed out that to achieve growth in the sector and enable Kenya companies to compete in the international market, there is a need to reduce bottlenecks in seed certification.

“Seed companies, farmers’ associations, and government agencies like the Kenya Plant Health Inspectorate Service (KEPHIS) can work together to streamline regulatory processes,” she said. She further added that this collaboration can reduce bottlenecks in seed certification, improve quality control, and ensure compliance with international standards, enabling export potential.

Capacity Building and Farmer Training: NGOs, government bodies, and private sector players can team up to train farmers on best practices for seed selection,

handling, and storage. Extension services and training programs can increase farmers’ knowledge of certified seeds, contributing to higher adoption rates.

Financial Support and Access to Credit: Financial institutions, microfinance bodies, and agricultural insurance companies can collaborate with seed companies and cooperatives to provide tailored credit products and insurance options. These partnerships could make certified seeds more accessible to small-scale farmers, helping them overcome financial constraints.

Promotion of Climate-Smart Seed Technologies: With Kenya’s vulnerability to climate change, partnerships between environmental organizations, the government, and the seed industry can promote climate-smart seed technologies. This includes seeds that are drought-resistant, pest-resistant, and adaptable to varying climatic conditions, which are essential for food security.

Seed Distribution Networks and Infrastructure Development: Agriculture in Kenya is mainly practiced in the

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rural areas, where in most instances access to quality seeds is limited due to poor infrastructure. Due to improper logistical practices, farmers usually suffer losses as they fail to get their produce to market in time. Government agencies and private sector logistics companies can enhance distribution networks, especially in remote areas ensuring even rural areas benefit from certified seeds.

Data Sharing and Digital Platforms: During the congress, KEPHIS was commended for digitization of its services, and optimizing delivery. Collaborations around digital technologies and data sharing can help track seed performance, weather conditions, and crop yields. Digital platforms that bring together seed companies, agritech firms, and farmers can facilitate informed decision-making, enabling better adaptation strategies and fostering transparency in the seed market.

Public Awareness and Anti-Counterfeit Efforts: To reduce the prevalence of fake seeds in the market, ensuring farmers have access to quality products, NGOs, consumer protection groups, and seed industry stakeholders should create public awareness campaigns about the importance of certified seeds and the dangers of counterfeit seeds.

> "We need to ensure that research informs our strategies and that we leverage the latest innovations to enhance productivity."

The 2024 STAK Congress and Expo highlighted the critical role of collaboration, innovation, and technology in addressing challenges in Kenya's seed industry. From combating counterfeit seeds to promoting climate-smart technologies and improving regulatory frameworks, stakeholders must unite to ensure the availability of high-quality seeds. By leveraging these solutions, Kenya can advance its agricultural resilience and food security in the face of climate change.

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Transforming Seed Systems for a Resilient and Food-Secure Future

Seed systems are important in combating food insecurity resulting from climate change. However, despite significant progress in recent times in agricultural innovation through the development of resilient seeds, hunger and extreme poverty persist as critical global challenges. Therefore, agroecology is a key part of the global response to this climate of instability, offering a unique approach to meeting significant increases in our food needs of the future while ensuring no one is left behind.

How can agroecology be used to enhance seed systems? One may ask. Agroecology is an integrated approach that simultaneously applies ecological and social concepts and principles to the design and management of food and agricultural systems. By providing a sustainable approach to farming that embraces farmer-managed seed systems, and empowering farmers to take control of their seeds, agroecology represents a departure from dependency on corporate entities.

During the 2024 STAK Congress, Gloria Mutheu, a seed merchant at Dryland Seed Company said, “Agroecology prioritizes farmers’ empowerment, enabling them to make informed decisions based on local conditions.”

She added that it reduces reliance on external seed sources as farmers can cultivate and improve their seeds through observation, testing, and adaptation. Each seed thus becomes a knowledge reservoir, integrating years of information about the environment and enhancing resilience.

The industrial seed system is fragile, owing to vulnerability to adverse conditions. In contrast, the seeds from a farmer-managed seed system demonstrate their ability to thrive and adapt, reflecting their close alignment with the local ecosystem. Consequently, agroecology, rooted in traditional knowledge and sustainable practices, outperforms industrial agriculture on multiple fronts.

According to the Food & Agriculture Organization, by 2050, our planet will need to feed close to 10 billion people. We must transform our agricultural and food systems so they work with and not against nature. As more people go hungry and malnutrition persists, we need to transform the way we do agriculture to achieve Zero Hunger by 2030.

By promoting on-farm seed diversity, agroecology strengthens genetic diversity, improving resilience against pests, diseases, and climate variability. It also helps preserve traditional and indigenous seed varieties adapted to local ecological conditions, providing farmers with a broader range of options for sustainable farming.

Moreover, Community-based seed banks play a central role in agroecology by preserving locally adapted seed varieties, serving as reliable sources of quality seeds during crises, and facilitating equitable access through seed-sharing and knowledge exchange among farmers.

These initiatives reduce dependence on external inputs such as genetically modified seeds and synthetic fertilizers, empowering farmers to save and exchange seeds while lowering production costs, and making farming more sustainable and profitable.

Additionally, agroecology enhances resilience to climate change by supporting the development of drought-tolerant and flood-resistant seed varieties through participatory breeding programs. Practices such as crop rotations and polycultures also improve soil health and mitigate the impact of extreme weather conditions.

Participatory breeding programs, a hallmark of agroecology, engage farmers directly in seed development, ensuring new varieties meet local needs and preferences. These programs strengthen the collaboration between research institutions and farming communities. Agroecology also promotes policy advocacy and capacity building, pushing for seed sovereignty and the protection of farmers’ rights to save and exchange seeds. Farmer-led research and training programs further enhance seed production skills.

By encouraging circular economies, agroecology supports practices such as seed recycling and the use of farm-saved seeds. It also backs local seed enterprises that prioritize biodiversity and sustainability.

Ultimately, integrating agroecology into seed systems shifts the focus from industrial monocultures to resilient, sustainable, and farmer-centered practices, ensuring long-term food security and ecological health.

Machakos Farmer Reaps Prosperity With New Pigeon Pea Variety

Festus Muthoka's story reflects broader efforts in the agricultural community to introduce more resilient crop varieties that meet the needs of farmers in challenging environments

By Marion Aluoch

Ndeini village in Machakos County, a region in Kenya known for unpredictable weather and difficult farming conditions—farmer Festus Muthoka's story is a testament to resilience and innovation.

Festus Muthoka, a pigeon pea farmer in Machakos County, shows one of his pigeon pea crops on his farm. (Photo: Marion Aluoch/CIMMYT)

Festus transformed his livelihood by making strategic crop choices and adopting new pigeon pea varieties, resulting in higher yields and incomes. "When I couldn't find a job in Nairobi, I returned to the countryside and realized that the fields held more potential for me," said Festus. For seven years, he had been growing maize, beans, and local pigeon pea, but inconsistent rainfall made it difficult to achieve the desired yields. Pigeon pea offered new hope, particularly when Festus discovered the new variety 'Mituki.'

Mituki as a gamechanger

Unlike traditional pigeon pea, which takes up to nine months to mature, the Mituki variety matures in four and a half months and can be harvested two to three times a year. "The first year, I planted three lines of Mituki and saw its potential. It is more profitable to sell pigeon pea when it is green. This variety stays green for a long time, and the demand, especially in local hotels, is very high. I sold it for a good profit," said Festus.

Now in his third year of cultivating Mituki, Festus has expanded his farm to 4-5 acres with plans to increase it to 10 acres in the next planting season. The financial gains have been substantial. "For my first harvest, I made over US $1,500 by selling green pigeon pea. Even after harvesting, the crop remains lush, allowing ongoing sales," he said. Festus's story shows the importance of pigeon pea as an opportunity crop that meets the needs of farmers in challenging environments as well as in challenging economic times. Rael Karimi, a researcher and breeder at the Kenya Agricultural and Livestock Research Organization (KALRO) in Katumani, played a key role in developing the Mituki variety. "When I first started working on the pigeon pea breeding program, we identified a gap in the local varieties, which took a whole year to mature. The commercial

Festus Muthoka harvests the pigeon pea pods on his farm. (Photo: Marion Aluoch/CIMMYT)

short-duration variety, which matures in three months, had small pods and grain, therefore not acceptable to farmers. Farmers needed early- to medium-maturing varieties with market- and farmer-preferred traits, such as larger grains and pods for ease of shelling for green vegetables. This resulted in the development and release of the Mituki variety in 2018," she said.

The development and promotion of new pigeon pea varieties involve extensive testing and active farmer participation. "We conducted on-station trials, followed by on-farm testing with farmers to ensure the varieties had the farmer-preferred traits. The Mituki variety is a medium-duration variety, giving two harvests per year, making it very popular among farmers," Karimi added.

Creating awareness during field days

Promoting new varieties is equally important as developing them. "It's one thing to release a variety but another to ensure promotion and popularization. If you release it and put it on the shelves, farmers will not be aware that a better variety is available," said Rael. This is where on-farm demonstrations and field days are crucial.

Field days are critical in ensuring that new, improved varieties reach the farmers who require them the most, bridging the gap between varietal development and practical application in the field. They also emphasize the importance of using high-quality seeds rather than recycled seeds, which often come with significant challenges.

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> "It is more profitable to sell pigeon pea when it is green. This variety stays green for a long time, and the demand, especially in local hotels, is very high." Festus.

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A field day held in July in Ndeini village effectively raised awareness among numerous farmers about the benefits of the Mituki variety and how it can provide two harvests per year compared to their long-duration local varieties, which only give one harvest in a year.

Seed purity for improved yields

Chris Ojiewo, seed systems lead for the Dryland Crops program at CIMMYT, emphasizes the importance of maintaining seed purity and good farming practices. "Farmers often recycle seeds for years, resulting in cross-pollination and loss of desirable traits. We encourage them to regularly buy new seeds, which ensures high yield and disease resistance. With support from CIMMYT and the Accelerated Varietal Improvement and Seed Systems in Africa (AVISA) Project, we are now able to produce and distribute quality seeds to farmers," he said.

Rael Karimi, a researcher and breeder at the Kenya Agricultural and Livestock Research Organization (KALRO) in Katumani, engages with farmers during the pigeon pea farmers field day in Machakos County. (Photo: Marion Aluoch/CIMMYT)

Farmers and community members purchase the Mituki seeds during the farmers field day. (Photo: Ganga Rao/CIMMYT)

Chris highlighted the challenges of recycling seeds. Genetic impurity is a significant concern due to pigeon pea outcrossing. It prevents such grains from entering the formal value chain and, as a result, reduces farmer profits.

Additionally, recycled seeds may accumulate diseases and pests, diminishing crop health. Stored seeds can also have low germination capacity and vigor, leading to poor crop performance.

To address these issues, Chris advocates for behavior change communications to educate farmers on the benefits of using pure seeds. Linking farmers to formal seed value chains ensures that they understand the financial incentives of using pure seeds. Moreover, improving the production, availability, affordability, and timely supply of quality seeds can prevent the need for recycling.

Collaborative efforts in pigeon pea breeding

Ganga Rao, a pigeon pea breeder with the Dryland Crops program, explains how CIMMYT provides support to both farmers and researchers. "CIMMYT has been instrumental in advancing pigeon pea breeding programs by providing technical support and resources. We collaborate closely with local researchers at KALRO to ensure that the new varieties are tailored to the specific needs and conditions of the farmers," he said.

Through the collaborative efforts of the pigeon pea CGIAR-NARES network, CIMMYT, under the AVISA project, has supported KALRO in producing pigeon pea seed for the

Mituki variety. The promotion of this seed used small seed packets of 200g. This approach created demand for the new variety, with many farmers purchasing the seed ahead of the short rains 2024 cropping season. This is an indication that farmers are willing to buy certified seeds when they are made aware of improved varieties that offer both farmer- and market-preferred traits.

Ganga emphasized the importance of continuous improvement and farmer engagement. "Our goal is to develop varieties that are high yielding and resilient to climate stresses and diseases. Through on-farm trials and demonstrations, farmers provide us with valuable feedback, which informs our breeding programs. This collaborative approach ensures that the varieties we release meet the market demands and preferences," he added.

The future of pigeon pea is bright

Festus's success with Mituki variety demonstrates the potential of strategic crop selection and good agricultural practices. "I now see pigeon pea as a major agro-enterprise for food security and as a significant source of income. The market demand for green pigeon pea is high, and with proper seed management farmers can sustain and improve their livelihoods," Festus concluded.

Looking ahead, Karimi is optimistic that more farmers will adopt this new variety. "The future for pigeon pea is bright. We aim to have farmers producing throughout the year, meeting the high market demands and ensuring food security. By aggregating their produce, this will ensure adequate tradable volume which helps farmers negotiate for better prices and achieve greater financial stability," she said.

> "Farmers often recycle seeds for years, resulting in cross-pollination and loss of desirable traits. We encourage them to regularly buy new seeds, which ensures high yield and disease resistance."

Ganga added, "CIMMYT's ongoing support in seed production and farmer training is crucial. We are committed to empowering farmers with the knowledge and resources they need to maximize their yields and improve their livelihoods. Pigeon pea has the potential to transform the agricultural landscape in dryland regions."

As Festus prepares to expand his farm and continue his journey, his story serves as an inspiration to many farmers in Ndeini and beyond. With support and innovations in crop breeding, farmers such as Festus are not only surviving but thriving, turning challenges into opportunities and paving the way for a prosperous future in agriculture.

Ganga Rao, a pigeon pea breeder with the Dryland Crops program in CIMMYT interacts with farmers during the farmers field day in Machakos. (Photo: Marion Aluoch/CIMMYT)

Yara Commits to Support Farmers Boost their Yields Through Smart Technologies

Leading crop nutrition company Yara East Africa has affirmed it's commitment to continue adoption of technology to create a future where farmers thrive, communities flourish, and food security is assured.

Speaking during the 2024 Agitech Expo in Mwea, Kirinyaga County on October 11, 2024, Yara East Africa Country Director William Ng'eno said the firm believes that empowering farmers with knowledge is the greatest subsidy one can get.

Yara East Africa has been providing farmers in Kenya and Uganda with knowledge and best practices to sustainably improve crop yields, quality, and farmers' profits, with over 30 years in agricultural development.

The theme for the third edition of Agitech Grand Expo is "The Use of Smart Technologies in Scaling up Agricultural Value Chains from Seed to Market,"

The two-day Expo which brought together exhibitors, and stakeholders in the agriculture, trade, and broader food security sectors.

Also in attendance were former Agriculture Cabinet Secretary Dr Andrew Karanja and Principal Secretaries Ephantus Kimotho (State Department for Irrigation) and Gitonga Mugambi (State Department for Forestry).

Agitech Expo chairman Julius Mureithi said the event is committed to uplifting farmers' livelihoods.

"We aim to plug in the gaps in the agriculture value chain, thereby holistically empowering our farmers. This initiative will ensure our farmers farm profitably and sustainably, thereby ensuring food security, food safety, and foreign exchange earnings through exports," Mureithi said. Mureithi also highlighted some of the gaps in the agricultural value chain in the country that the Expo seeks to cure.

"The first gap is the seed multiplication and bulky, we continue to import maize seeds from Zambia, Zimbabwe, and other neighbouring countries. This is actually a very bad thing; we need to be producing our seeds locally," he said. "

"Another challenge is mechanisation which will remain an important tool in driving agriculture into the next century as it makes farming activities easy and convenient."

PS Kimotho said the government is also seeking further collaborations with entrepreneurs to adopt technology to improve yields.

"The best way to increase yields is to make sure we mechanise our land, and through that, we see many ways in which we can increase our yield," Kimotho said.

His counterpart PS Mugambi emphasized the15 billion tree-planting initiative spearheaded by President William Ruto.

"Let us plant trees in this country it is big business. It will create jobs and spur industralisation," he said.

The Yara East Africa Country Director said knowledge sharing on improving crop nutrition and yields is the principle at the heart of the Yara farmer education programmes.

"Barely 5 years ago, we entered into a partnership with Mazao na Fanaka to establish one of our 11 Agri-business knowledge centres. As we speak, this particular farmer knowledge centre has reached over 5,000 farmers in this and neighbouring counties," Ng'eno said.

"Technological transformation in agriculture is no longer just an idea—it is becoming a reality, influencing every stage of the agricultural value chain and ultimately going to be the determinant of our next meal at tea break and lunch today."

The knowledge-sharing programme entails field days, demonstration plots, and digital platforms like FarmCare.

Yara has 10 Knowledge Centres across the country and the centre next to Agitech Seedlings in Mwea is open 24 hours where farmers can visit to ask questions and see practically what is happening. "We connect farmers to the expertise necessary for making informed, sustainable crop nutrition and land management decisions," Ng'eno said.

The FarmCare App can be downloaded on Google PlayStore for Android phone user and on App Store for iPhone users.

The App equips a farmer with smart digital tools to farm more easily, apply fertilisers effectively, and achieve higher yields at lower costs.
A farmer can also buy farming products directly from the App.

Ng'eno shared a success story on the transformative impact of smart agriculture at a farm in Kericho county.

"Cheres Farm in Litien, Kericho County. Utilizing Yara's crop nutrition solutions, this farm has produced a bountiful variety of cereals, legumes, and brassica crops. By applying sound agricultural practices combined with our advanced products, they've achieved impressive results," Ngeno said.

Ng'eno added that the Cheres Farm team said, "Good agricultural practices paired with Yara's solutions have not only transformed our harvest but have shown our community what's possible when knowledge meets the right inputs."

The success of Cheres Farm has inspired neighbouring farmers, and the recent Harvest Field Day drew widespread interest from farmers eager to replicate their methods.

The Yara Knowledge Centres also serve as hubs where farmers engage directly with agronomy experts to ensure they optimise fertiliser use, maximise yields, and protect soil health for future generations.

> **"We aim to plug in the gaps in the agriculture value chain, thereby holistically empowering our farmers. This initiative will ensure our farmers farm profitably and sustainably, thereby ensuring food security, food safety, and foreign exchange earnings through exports."**

Ng'eno further affirmed that their work aligns closely with Kenya's national food security objectives.

"Products like MiCROP, designed to improve soil health and boost yields, help farmers produce more with fewer resources. This sustainability-centred approach ensures that we are not only feeding today's population but also safeguarding the future of Kenya's farmlands," Ng'eno said.

Yara also reiterated its commitment to supporting farmers across the country as it scales agricultural value chains with smart technologies. "We are here to walk alongside our farms like the Cheres Farm and many others in this and other counties to replicate evidence of what we can accomplish together," Ng'eno said.

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Path to Agricultural Resilience through GMO Adoption

Kenya is on the brink of a transformative agricultural revolution as it takes bold steps to embrace Genetically Modified Organisms (GMOs). Recent milestones, including the lifting of a decade-long GMO ban by the High Court, coupled with new government regulations, has set the stage for widespread adoption of this technology. This marks a significant shift in addressing the nation's perennial food insecurity and agricultural challenges.

Kenya has already adopted the cultivation of Bacillus thuringiensis (GMO BT) cotton and has completed clinical trials for BT maize and cassava and was just waiting for the court's determination of the cases that filed before it so as to release them to the market.

Government Implements Robust Regulatory Framework

Following the court ruling, the National Biosafety Authority (NBA) introduced stringent guidelines for individuals and entities wishing to engage in GMO activities before engaging in any dealings with genetically modified organisms (GMOs). The authority emphasized the necessity of obtaining official approval before engaging in activities such as rearing or conducting business involving GMOs.

"By virtue of the High Court ruling, the Authority draws the attention of persons wishing to deal in GMO products to the provisions of the Biosafety Act, 2009—Sections 18, 19, 20, 21, 22, 23, and 50—and the related Regulations. These require such persons to apply for approval from the Authority before proceeding," the NBA stated.

The notice further highlighted that the NBA's mandate includes supervising the transfer, handling, and use of GMOs to ensure the safety of human and animal health and to provide adequate protection for the environment. Under the Biosafety Act, individuals involved in the importation, rearing, or introduction of new GMOs into the environment must secure government authorization. Violations of these guidelines can result in severe penalties, including fines of up to Ksh20 million, imprisonment for up to ten years, or both.

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The regulations also apply to those seeking to import GMOs. Prospective applicants must obtain detailed application procedures and forms from the government before receiving authorization to proceed.

The NBA has also streamlined the application process for GMO approvals through online platforms, making it accessible to farmers and businesses eager to adopt these innovations.

The Economic Cost of Delay and the Urgency to Act

The urgency of GMO adoption is underscored by a groundbreaking report presented at the Kenya Editors Guild convention, titled Genetically Modified Crops in Kenya: The Cost of Delay, the report reveals that Kenya has already lost $157 million due to delayed implementation of GM technology. It projects potential benefits of $467 million over the next 30 years from Bt maize, Bt cotton, and biotech potatoes. These crops promise not only to enhance farm productivity but also to reduce poverty, improve livelihoods, and ensure food security for millions.

The environmental gains are equally compelling. Adoption of GM crops like Bt maize and cotton could cut global CO2 emissions significantly, aligning with Kenya's sustainability goals.

Clergy Lead the Charge in Demystifying GMOs

In a surprising yet powerful alliance, Kenyan clergy have emerged as strong proponents of GMO technology. At a forum organized by the Kenyatta University Biotechnology Consortium (KUBICO), religious leaders expressed their commitment to educating their congregations on the benefits of GMOs. Reverend Fredrick Ngugi, chairman of the Association of Pentecostal and Evangelical Clergy of Kenya (APECK), emphasized the need to dispel myths surrounding GMO foods, highlighting that they are scientifically modified to resist pests, diseases, and adverse weather conditions, not harmful substances as previously feared.

Bishop John Chere echoed these sentiments, urging leaders to unite in embracing GM technology to combat food insufficiency. The clergy's endorsement positions them as key messengers in reshaping public perception, a role they have successfully played in past public health campaigns.

> "By virtue of the High Court ruling, the Authority draws the attention of persons wishing to deal in GMO products to the provisions of the Biosafety Act, 2009—Sections 18, 19, 20, 21, 22, 23, and 50—and the related Regulations.."

A Collaborative Approach

Experts from institutions such as the Breakthrough Institute, ISAAA AfriCenter, and the International Potato Center stress the necessity of collective action. They advocate for partnerships between government, academia, and civil society to drive adoption and combat misinformation. Sheila Ochugboju of the Alliance for Science notes that biotechnology offers a lifeline for farmers grappling with climate challenges.

Kenya's decision to lift the GMO ban positions the nation at the forefront of agricultural innovation in Africa thus laying the groundwork for a more resilient, food-secure future. The collaborative approach not only dispels long-standing myths but also paves the way for sustainable farming practices that can mitigate climate challenges, reduce poverty, and boost economic growth.

The adoption of GMO technology serves as a powerful example of how knowledge, responsible governance, and scientific progress can converge to empower communities, enhance livelihoods, and secure a sustainable future for generations to come.

Coming Years Will See Tighter Margins for Agri-Input Market, Rabobank Says

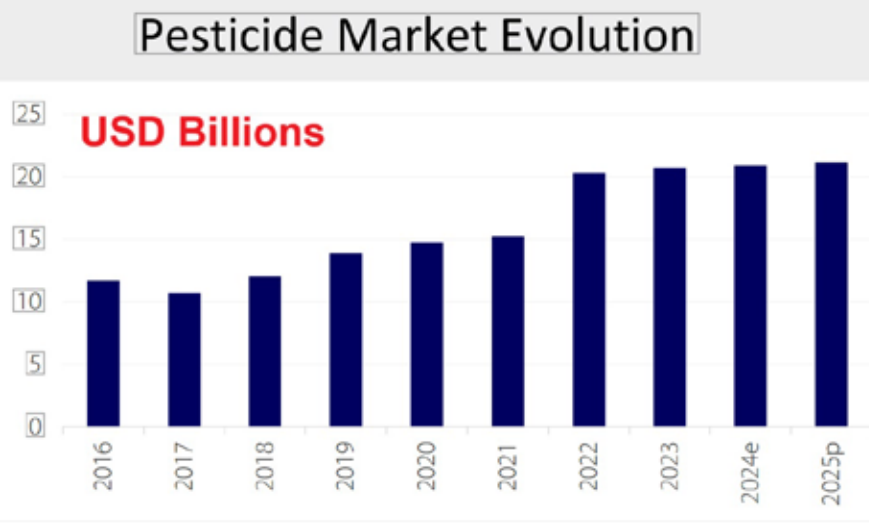
Rabobank estimates that falling commodity prices will result in a contraction in operating margins for agri-inputs, especially grains, in the coming years. The information was confirmed to Agropages by the global bank's market analyst team specializing in agribusiness.

"Tighter grain margins should lead producers to cut costs. In this scenario, agrochemical companies are trying to recover from the high inventory crisis," a report signed by Rabobank analyst Bruno Fonseca pointed out.

Regarding chemical pesticides, 2024 is the year when most companies in this sector face the problem caused by high product inventories built since the beginning of the COVID-19 pandemic. This became notorious after the release of financial results for 2023 in early 2024. Tighter margins for producers are an additional challenge for companies, as evidenced by quarterly results. However, in Rabobank's opinion, despite this difficulty, companies are expected to resolve much of their physical inventory during the second half of 2024.

The financial solution should occur in 2025 when producers begin payments for products in April. "Only then should we begin to see a better situation for companies that were more efficient in equalizing inventories," the bank's analysts projected.

According to the National Union of Plant Protection Products Industry (Sindiveg), the Brazilian chemical pesticides market was worth US$20.7 billion in 2023. According to Rabobank analyses, this market should reach $20.9 billion in 2024, an increase of 1.00% compared to the previous year. For 2025, the expectation is that the market will grow by 1.20%, reaching $21.1 billion. According to our analyses, the seed and bioinput markets should face some difficulties throughout 2024 but should continue to show reasonable growth rates, maintaining this trend in 2025.



"The coming years should be a bit tighter for agri-input companies and also for producers. However, we should see the recovery of these sectors over the next few years. Positive cycles end, but most importantly, bad cycles also end," Rabobank's market analysts said in conclusion.

Fertilizers

The bank's report also pointed out that monoammonium phosphate (MAP) and other phosphate fertilizers should remain above the historical average, given the tightness in the global supply-demand balance. The absence of Chinese products combined with changes in this market's dynamics has made the balance tighter.

Among the primary nutrients, Potassium Chloride (KCl) is experiencing the most stable situation. "Despite good global demand for the product, international prices remain between the historical average and historical minimum. In Rabobank's opinion, we should not see a continued retreat in international KCl prices, as the current market value is already close to the fertilizer's production cost," the analysts said. "With this entire scenario, Rabobank's estimate for fertilizer deliveries in 2024 continues to be 45.5 million tons of fertilizers, a slight decrease compared to the 45.85 million tons delivered in 2023. For 2025, we estimate that 46.6 million tons of fertilizer will be delivered to the end consumer, an increase of 2.5% compared to the 2024 volume," the report said in conclusion.

Managing Herbicide Resistance in Broad-Leaved Weeds

Herbicide resistance in broad-leaved weeds (BLW) is relatively rare when compared to resistance in grass weeds such as blackgrass or ryegrass, but incidence is on the increase and there is concern that it may now be found in further species. First identified in the year 2000, target site resistance to aceto-lactate synthase inhibitor herbicides (ALS) is most common in poppy, chickweed and mayweed. Triazinone-resistant groundsel populations have also been discovered in UK asparagus fields, but to date, ALS resistance in groundsel has not yet been identified.

The problem remains confined mainly to the ALS herbicides, namely the sulfonylureas and the triazolopyrimidines. Both herbicide groups are extremely important for cereal broadleaf-weed control and together represent greater than 60% of the area treated. Currently, control of ALS resistant weeds is dependant on the continued availability of herbicides with alternative modes of action.

However, there is always a risk that key active ingredients may be lost as products come up for regulatory renewal, making control of resistant populations more difficult, exacerbating the pressure on existing molecules.

How does herbicide resistance develop?

Herbicide resistance occurs naturally in the population, it is the inherited ability for a weed to survive a herbicide application that would normally control it. Surviving plants then pass on the genetic advantage to future generations, until resistant plants dominate the population, making weed control challenging.

There is often no single factor in the development of resistance and a combination of factors may be at play. Repeated use of herbicides with a single mode of action across the rotation will encourage resistance development. Similarly, lack of tank-mixing with herbicides of an alternative mode of action may cause the same outcome.

Failing to implement an effective rotation, monocropping and ignoring instances of poor weed control will also increase the likelihood of resistance.

How do I spot the early signs of herbicide resistance?

Early detection of resistance relies on keeping good farm records and observing and recording what

> “ Herbicide resistance occurs naturally in the population, it is the inherited ability for a weed to survive a herbicide application that would normally control it. Surviving plants then pass on the genetic advantage to future generations, until resistant plants dominate the population, making weed control challenging.”

happens in the field. Signs of herbicide resistance include:

- Healthy plants alongside dead plants of the same species following an herbicide application.
- Poor control of a susceptible weed species, whilst other susceptible weeds are well controlled.
- A gradual decline in control over several years.
- Sudden appearance of weed species not previously seen.

Poor weed control is not always down to resistance though. Suboptimal use rates, targeting weeds that are too large or applying herbicides in very cold or dry conditions, will also affect the performance of an herbicide. This is especially true of Acetolactate synthase (ALS) inhibitor herbicides, which interfere with protein biosynthesis and require the target weed to be actively growing for maximum effectiveness. Other factors affecting herbicide performance include application conditions and increased leaf waxing, which may occur after prolonged cold periods resulting in the inability of the herbicide to penetrate the plant effectively.

Hugh Guinan, Field Technical Manager at Corteva Agrisciences, has this advice:

- Target weeds when small and actively growing. Control should start early with and follow up with an alternative mode of action.
- If you are applying complicated, multi-way tank mixes, don’t be tempted to split out the herbicides if there are too many products in the tank. Keep the herbicides together.
- Minimise the use of ALS herbicides in the rest of the rotation, only use them where you really need them.
- Maintain good spray records and always investigate cases of poor weed control.
- Consider spraying off patches of poorly controlled weeds before seed set if you suspect resistance. This will avoid seed return and problems later down the line.
- Collect seed or tissue samples and get them tested if resistance is suspected.

BESTFIELD

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Writeshop to Draft National Pesticide Residue Monitoring Framework for Kenya

A writeshop has led to the creation of a draft National Pesticide Residue Monitoring Framework for Kenya aimed at coordinating pesticides residue monitoring for domestic and export value chains.

This writeshop follows a series of virtual meetings held in the months of May and July 2024 that aimed at examining the situation on pesticide monitoring programmes for Kenya, a Member Country of CABI. This included the general steps needed to establish a national pesticide residue monitoring framework and the roles and responsibilities of parties among other important issues.

The writeshop was attended by representatives both public and private institutions including, the Ministry of Agriculture – Plant Protection and Food Safety Directorate (PP&FSD), Ministry of health Food Safety Division, Pest Control Products Board (PCPB), Kenya Plant Health Inspection Service (KEPHIS), Ministry of Agriculture, Agriculture and Food Authority Horticultural Crops Directorate (AFA-HCD), aak-GROW, Bureau Veritas, MicroEnterprise Support Programme Trust (MESPT), Fresh Produce Exporters Association Of Kenya (FPEAK), COLEAD, ReTraK, County Governments of Nyeri, Nandi, Makueni, Nyandarua, Mombasa and Meru.

The writeshop was facilitated by Dr Reddy Shanker, USDA Agricultural Marketing Service, Science and Technology Program Monitoring Programs Division – Pesticide Data Program (PDP), USDA (AMS S&T MPD PDP).

The draft National Pesticide Residue Monitoring Framework for Kenya focused on six key areas including laws and regulations, national Maximum Residue Limits (MRLs), pesticide screening and risk assessment, and data management and reporting.

Other areas highlighted were the importance of the analytical laboratory and budget and funding arrangements that will support and sustain the national sampling and testing during the national residue monitoring process.

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CEO of the PCPB stressed the mandate in regulating

The writeshop was officially opened by Mr. Frederick Muchiri, CEO, PCPB, who highlighted the mandate of the PCPB in regulating the manufacture, importation and exportation, distribution, sale, use and disposal of pesticides.

He said the Board "ensures compliance with quality standards through analysis of formulated products in its Analytical Services Department." This department conducts both quality analysis of pesticide formulations and monitors pesticide residues in food commodities and environmental samples.

The detection of pesticide residues on crops can signal problems – for example, when they are present at levels exceeding the maximum residue level, they indicate that a pesticide was used incorrectly and may also signal a food safety concern. When pesticides are detected on a crop that they are not registered for, then this may signal issues such as residues of persistent pesticides in the soil or water, spray drift, off-label usage or counterfeits.

Important testament to quality assurance

Furthermore, when banned or illegal pesticides are detected, this is a sign of larger market problems such as illegal imports and fake products. The compliance to residue levels was applauded as the key achievement that PCPB, its partners aspire to maintain in both domestic and export value chains.

CABI, USDA, KEPHIS and PCPB representatives during the group discussions (Credit: CABI).

At a previous meeting, Dr Melanie Bateman, CABI's Integrated Crop Management Advisor, said the PlantwisePlus programme is supporting the Government of Kenya and the creation of the framework as part of its Pesticide Risk Reduction pathway.

The Pesticide Risk Reduction pathway is focused on raising awareness of, access to, and use of affordable integrated pest management solutions. This includes identifying and implementing classical biocontrol methods and harnessing the potential of augmentative biocontrol and biopesticide solutions to reduce the impact of priority pests.

By working closely with national and local government entities, commercial enterprises, and farmers, it seeks to identify opportunities to reduce pesticide-related risks. Information on pesticide residues in food can help to identify risks and opportunities for risk reduction.

The next steps for the draft National Pesticide Residue Monitoring Framework for Kenya are to finalize it ensure that stakeholders are aware of the framework for review and validation and, pilot it before aiming to implement it fully. PlantwisePlus will continue to provide support for the implementation of the new framework.

In her closing remarks, Ms Brendah Obura, Ministry of Health, Food Safety Division encouraged collaboration among institutions to enable building on synergies that will enhance implementation of the national pesticides residue monitoring framework including sharing of information for decision making.

Participants of the writeshop held at the Azure Towers Hotel in Nairobi (Credit: CABI).

AFA's Collaborative Efforts for Kenya's Food Security & Growth

During the 2024 STAK Congress & Expo, the Agriculture and Food Authority (AFA) addressed the growing demands and evolving dynamics of agriculture in Kenya by fostering value chain collaboration among numerous stakeholders.

AFA, focusing on ocean and coastal agriculture as well as horticulture, emphasized that collaboration across various governmental departments, county governments, and the private sector is essential to ensure sustainable agricultural practices and improved food security.

Building Sustainable Value Chains through Multi-Stakeholder Collaboration

As the agricultural landscape evolves, AFA recognizes that involving a broad network of stakeholders is crucial to developing resilient value chains.
From seed producers to government agencies, all players in the agricultural sector must work together to ensure that farmers can access quality seeds and inputs that boost productivity and profitability.

AFA's approach includes close cooperation with county governments, which are instrumental in extending support and resources to farmers at the grassroots level.

The organization is also actively involved in improving access to high-quality horticulture seeds, acknowledging that seeds are a fundamental input in agricultural production. By collaborating with importers and monitoring the quality of imported seeds, AFA works to ensure that only superior seeds reach the market. This effort helps smallholder farmers maximize their yields and, in turn, improve their income and contribute to national food security.

Regional Collaboration with County Governments

Given the devolution of agriculture in Kenya, AFA has established 26 stations throughout the country, allowing for closer partnerships with county governments. The stationed officers facilitate seed and input distribution, ensuring that farmers in remote areas benefit from high-quality agricultural resources.

This close coordination between AFA and counties ensures that local governments are empowered to support farmers with training and resources tailored to regional needs, helping to optimize production and income generation.

In addition to seed distribution, AFA provides training and capacity building for county technical staff, producers, and growers. This initiative ensures that those on the front lines of agriculture have the knowledge and skills to produce vegetables and fruits that meet the nutritional needs of their communities.

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Enhancing Nutrition through School Feeding Programs

AFA is also addressing the country's nutrition needs by working alongside the Ministry of Education and the Ministry of Health on the school feeding program. The initiative aims to provide highly nutritious food to school children, which is especially crucial in areas where food insecurity is prevalent.

By collaborating with county governments, AFA helps ensure that local farmers can provide high-quality, nutritious produce for the program. This collaboration not only supports students' health and learning but also stimulates local economies by creating a reliable market for smallholder farmers.

> " AFA provides training and capacity building for county technical staff, producers, and growers. This initiative ensures that those on the front lines of agriculture have the knowledge and skills to produce vegetables and fruits that meet the nutritional needs of their communities.."

- A Call for Collective Action to Advance Agriculture

The AFA highlighted the importance of further collaboration with the private sector and non-governmental partners, especially in seed production and distribution. With the continued support of its stakeholders, AFA is optimistic about enhancing agricultural productivity and resilience, ensuring that Kenyan farmers are better equipped to face climate challenges and market uncertainties.

AFA's multi-stakeholder approach illustrates how collective efforts across the public and private sectors can transform agricultural practices, drive economic growth, and improve the well-being of Kenyan communities. Through value chain collaboration, capacity building, and strategic partnerships, AFA is paving the way for a more sustainable and secure agricultural sector in Kenya.

STAK Annual Congress 2024

Improving Soil Health and Crop Nutrition Management is Essential

Land is an important means of production and home to various ecosystems. Therefore, soil health is a key issue for many countries around the world.

According to researchers, the current average land area per capita is low, which is further exacerbated by intensive and monocultural agricultural practices and is affected by unbalanced use of fertilizers and pesticides. In many regions, soil health has dramatically deteriorated due to the development of industrial areas and handicraft villages, as well as the effects of climate change that cause drought, salinization and soil acidification.

Given the declining soil health, the increasing demand for food and the urgent need for sustainable production, many management and technical measures need to be implemented. The legal framework on soil health also needs to be completed to meet practical requirements.

However, there are still many issues in soil health management that require special attention. The risk of soil erosion and desertification is rapidly increasing. This is due to both objective and subjective factors. Subjective factors include agricultural practices using multiple crops per year, excessive use of inorganic fertilizers, imbalance between organic and inorganic inputs, use of chemical pesticides, and lack of measures to prevent erosion and runoff. As for the reduction of soil biodiversity, harmful microorganisms in the soil multiply faster, accelerating the deterioration of soil quality.

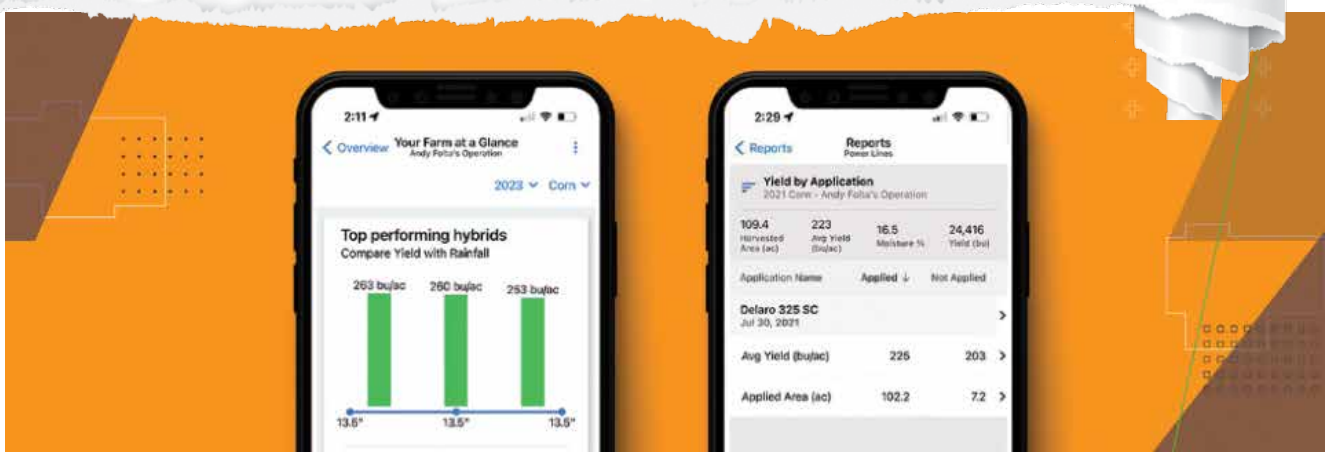
As for the criteria for assessing soil health, different countries have different criteria for assessing soil health. However, many regions lack a set of indicators to assess soil quality in crop production. The indicators used in studies do not fully reflect the various aspects of soil health and quality as is done worldwide.

> "There are still many issues in soil health management that require special attention. The risk of soil erosion and desertification is rapidly increasing. This is due to both objective and subjective factors."

The ultimate goal should be to increase the value of land use and effectively manage crop nutrient supply, thereby contributing to the restructuring of the agricultural sector and the creation of new rural areas. Therefore, key elements such as the development of legal and technical standards need to be included. The aim is to introduce a national standard system for assessing soil health and crop nutrient supply, meeting international standards. Also work to build a National Soil Health Database to monitor and track soil quality across the country.

Also, focus on research and development of advanced technological solutions, such as the use of beneficial microbes, biofertilizers, and slow-release fertilizers. And, focus on research into sustainable farming practices in problem soils, especially in nutrient-poor areas and areas prone to erosion.

Bayer Digital App for Climate-Smart Agriculture



Sustainability has become a guiding principle for the agricultural industry worldwide as the climate crisis has led to an increase in crop pests and diseases and reduced yields due to unpredictable weather. Industry players have therefore played a pioneering role in adopting climate-smart agricultural practices and new technologies. Bayer Kenya recently launched the Bayer Farm Digital App at the Bayer Centre of Excellence in Mwea; a technology set to revolutionise the horticulture sector in Kenya.

Designed to support smallholder farmers, the user-friendly app offers a range of real-time solutions, including advisory services where farmers can receive insightful advice on the right practices for their farms depending on their specific needs. This saves time and also reduces costs associated with field work for agronomists, significantly strengthening the value chain by increasing farmers' profit margins.

In addition, the app has a tool called Crop Doctor, which provides analysis of crop pests and diseases. "You just take a photo of the affected crop and upload it. The tool runs the analysis and provides a diagnosis and an accompanying advisory service," said Bayer's Audrey at an event where farmers were trained on how to use the app.

Counterfeiting is one of the biggest problems affecting Kenya's agricultural produce and seed markets. The Bayer Farm Rise Digital App provides solutions for Bayer Kenya products through an in-app product validation tool. Currently, the app validates only Bayer products, but industry representatives at the launch on November 29 suggested that other value chain crops should also be included in the app to cover a wide range of agricultural needs.

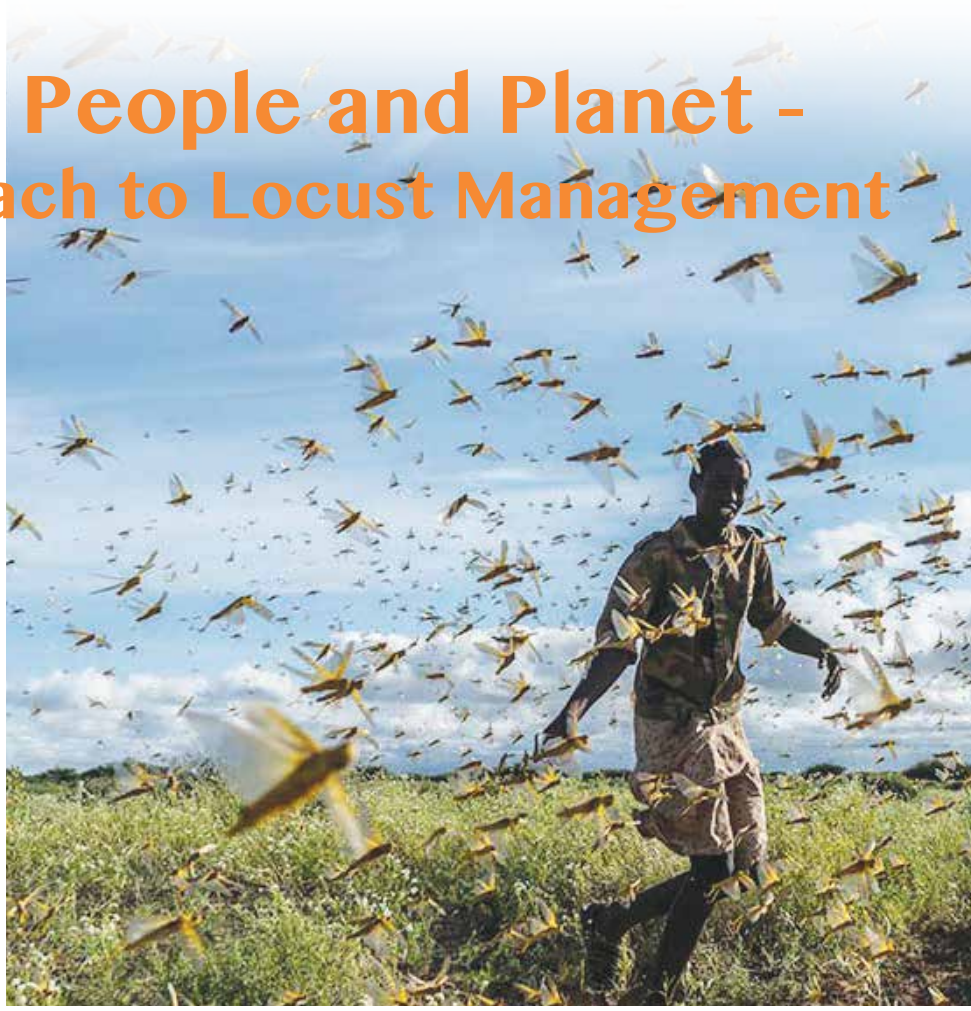
Unpredictable weather has caused smallholder farmers in Kenya to suffer low yields and heavy losses. The app will attempt to solve this problem through weather advisory services.

"We need to build strong partnerships and ensure that this app serves farmers in all counties," said Vitalis, Bayer's head of Africa smallholder partnerships. He also stressed the importance of intensifying efforts to pool demand for agrochemical products.

The app promises to revolutionize the horticulture industry by providing real-time solutions to farmers. Efforts are underway to include other value chain crops in the app. This will reduce losses due to counterfeiting, extension services and weather unpredictability, thus improving food security and living standards of farmers.

The event was attended by Bayer Global team in India, Bayer Kenya team, members of Grain Growers Association, Forest Stewardship Council and over 250 farmers.

Protecting People and Planet – FAO's Approach to Locust Management



Locusts are one of the oldest migratory insects with devastating consequences. These ravenous pests can turn farms and ranges into desolate wastelands in hours, threatening food security, livelihoods and ecosystems. A single square kilometre swarm can consume the same amount of food in one day as 35 000 people, devastating communities in its path. The 2020–2022 locust upsurge in the Greater Horn of Africa and Yemen put the livelihoods of millions at risk and serves as a stark reminder of the scale of the challenge. In response, the Food and Agriculture Organization of the United Nations (FAO), working closely with governments and partners, mobilized a coordinated response. Leveraging early warning and forecasting systems, rapid interventions were carried out which saved 4.5 million tonnes of crops and the food security of 41.5 million people. The fight against locusts is not just a regional concern but a global responsibility to protect food security.

FAO takes a One Health approach to locust management. By acknowledging the interconnectedness of human, animal, plant and environmental health, this strategy not only manages locust outbreaks but also safeguards long-term planetary health.

Food, environment and human health at risk

Forming massive swarms, locusts devour crops and pastures, leaving communities without sustenance or income. During the outbreaks in East Africa, the livelihoods of farmers and herders across the region were pushed to the brink, with ripple effects felt across local economies, as heavily ravaged pastures left livestock struggling for food.

The environmental toll of locust infestations can be severe. While traditional pesticide control methods may be effective, they have significant side effects.

Overusing pesticides can impact biodiversity by killing other species of wildlife, including pollinators essential for ecosystems. These chemicals can lead to soil degradation, reducing its fertility, and can contaminate water supplies, leading to long-term environmental damage.

The potential impact on human health is equally concerning. When chemicals are improperly applied or managed, this can lead to pesticide exposure, causing direct harm to the people involved in locust control operations. The chemical residues in food and contamination of drinking water further increase health risks.

A holistic solution: The One Health approach

Recognizing the interconnected nature of these challenges, FAO's One Health approach has become a guiding principle in locust management. This strategy promotes environmentally friendly practices while managing pests and safeguarding human and ecosystem health.

Central to FAO's efforts is prevention.

Monitoring and early warning systems are essential for identifying and addressing potential threats before they develop into disasters. The Desert Locust Information Service (DLIS) continuously monitors the global desert locust situation, analyses data, and provides forecasts, early warnings and alerts about the timing, scale and location of breeding and migration across Africa and Asia.

To address the risks associated with pesticides, FAO adopts a comprehensive approach to the entire pesticide lifecycle. This includes promoting the selection of the most appropriate pesticides, their safe use during application by well-trained and equipped staff, proper handling, transportation and storage to prevent leaks or spills, and environmentally conscious disposal methods to avoid contamination. These practices ensure that the benefits of pest control are achieved and harmful effects on human and environmental health are minimized.

Biological control agents, an environmentally sustainable solution, are also employed. These methods include the potential use of natural predators to manage locust populations, but they can be slow acting due to rapid movement of locust swarms. Current efforts focus on utilizing microbes such as pathogens that specifically target locusts. Among these, the fungal species of Metarhizium acridum shows significant potential as a biopesticide, offering a safe and effective option for locust control. This approach aligns with the preventive control strategy advocated by FAO.

FAO is working to minimize the harmful effects of chemical pesticides by promoting early warning and early reaction systems. These involve locust control by skilled agents at the early stage of locust development, before they pose an immediate threat to cropping areas, with local communities informed in advance to ensure preparedness. Specific effort is also made to expand the use of biopesticides wherever possible, providing a safer alternative to chemical pesticides. For an in-depth look at FAO's approach to pesticide risk management in locust control operations, the publication "Manual for the implementation of environmental, health, and safety standards for the control of locusts" offers valuable insights and recommendations.

Additionally, the "Practical guidelines on pesticide risk reduction for locust control in Caucasus and Central Asia" provides region-specific strategies to minimize the risks associated with pesticide use while ensuring effective locust management.

A path forward

As the impacts of climate change become more evident, locust outbreaks may become more frequent. That is why continued investment in early warning systems, biological control methods and capacity building is essential to protect communities and ecosystems.

Learn, act and stay informed

Protecting people and the planet from the devastating impact of locusts is a shared responsibility. FAO offers a wealth of resources to help you stay informed and get involved. Visit Locust Watch to access real-time updates on locust outbreaks, monitoring tools, and early warning systems. For insights and resources specific to Caucasus and Central Asia (CCA) visit the Locust Watch in CCA webpage.

By working together, we can build stronger systems to address locust threats now and in the future.

Tanzania Marks Agricultural Achievement

- Each youth is given 10 acres of land and is supported by training, already 11,000 have benefitted and this year's harvest has begun.
- Tanzania achieves 128% food self-sufficiency, one of continent's two successful cashew nut processors
- If you are not investing in Africa, what are you doing? – Akinwumi Adesina
- Tanzania is setting new benchmarks in food self-sufficiency across Africa, raising hope that the fight against hunger and malnutrition on the continent is achievable.

President Samia Suluhu Hassan of Tanzania said her country had reached 128 percent food security and is now exporting surplus to neighbouring countries. She was speaking during a high-level session at the World Food Prize Norman E. Borlaug International Dialogue in Iowa, moderated by the president of the African Development Bank Group, Dr Akinwumi Adesina. The session, entitled "Bold Measures to Feed Africa," also featured the President of Sierra Leone, Julius Maada Bio.

President Suluhu Hassan told a packed auditorium, that after achieving food sufficiency, "we are now working on quality, accessibility and affordability, and how to minimize post-harvest loses." Adesina praised President Suluhu Hassan's leadership and strong political will for Tanzania's success. He said the growing commitment of other African nations, underscores the continent's readiness for large-scale investment in agriculture and food production.

He recalled how the African Development Bank's 2023 Dakar 2 Food Summit ignited commitment across Africa for country-specific food and agriculture compacts. The summit, co-hosted by the government of Senegal and the African Union, was attended by 34 African Heads of State and Government. It has mobilized more than $72 billion to date.

President Suluhu Hassan said Tanzania left Dakar 2 summit with a signed compact and determination to implement increasing productivity as well as the political will to

Dr Akinwumi Adesina (left) and President Samia Suhulu Hassan of Tanzania discuss bold measures to feed Africa during the World Food Prize Norman E Borlaug Dialogue Iowa

create institutions and support structures for its farmers. “We realized that not investing in agriculture is much more costly than investing in the sector,” she said.

Tanzania has broken another record by becoming a processor and net exporter of cashew nuts, which for nearly all African countries, are processed in Asia. The country has also succeeded in rural electrification with nearly 100 percent of its 12,300 villages with electricity, President Suluhu Hassan said.

Backed by investment from the African Development Bank, Tanzania’s Creating jobs for Youth and Women programme is targeting the country’s 65% youth population with training in farming, agriculture, livestock and crop farming.

The Tanzanian leader said each youth is given 10 acres of land and is supported by training, already 11,000 have benefitted and this year’s harvest has begun. “We thank the African Development Bank for supporting that program,” she said.

Joining Adesina on stage, President Bio of Sierra Leone shared his country’s success with the Feed Salone program, which has cut rice imports by 20 million tons and spurred agricultural productivity.

Tanzania marks record agricultural achievement as African Development Bank President Adesina urges investment in Africa

> “The growing commitment of other African nations, underscores the continent’s readiness for large-scale investment in agriculture and food production.”
> *Dr Akinwumi Adesina*

Until then the nation had not paid enough attention to food security and Bio said he had focused on education during his first term. “Agriculture is the basis of development,” President Bio stated.

The Feed Salone programme has helped boost agricultural productivity to feed the nation and to enable them export. “Already we have reduced rice imports by 20 million tons,” he said.

“We are here to share the Sierra Leone story and invite investors. We are an ambitious nation and want to succeed to attract investors,” President Bio said.

Adesina highlighted the African Development Bank’s efforts to reshape global perceptions of Africa and drive investment in critical sectors like agriculture.

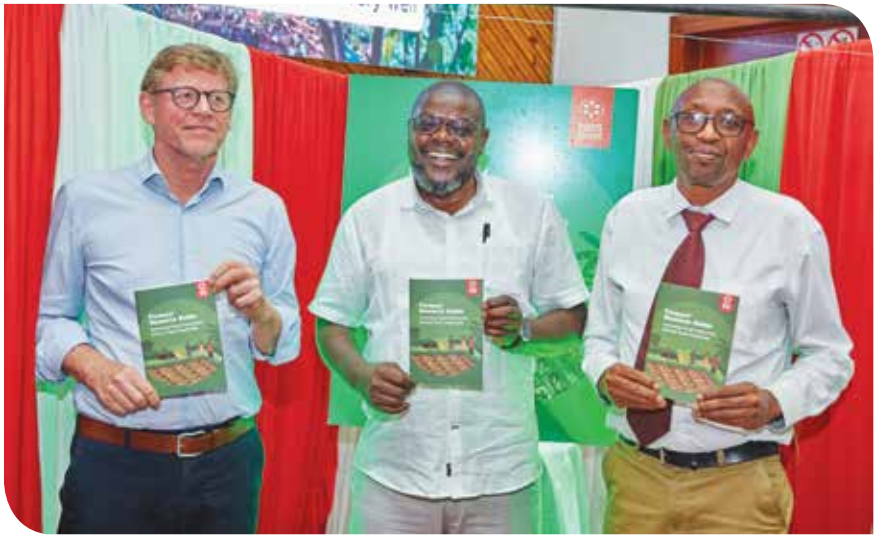
He said the event and the Africa Dialogue, also hosted by the African Development Bank in Iowa, was intended to break stereotypes and showcase Africa’s potential, a continent that is home to 65% of the world’s remaining arable land and has the technology to turn Africa into a global food basket. “This is why we bring African leaders here so you can hear from them directly,” Adesina said.

The 2024 Norman E. Borlaug Dialogue gathers experts worldwide to inspire innovative solutions to global hunger. This year’s theme, “Seeds of Opportunity, Bridging Generations and Cultivating Diplomacy,” champions collaboration, legacy, and hope in the fight for food security.

Adesina recalled the words of Norman E. Borlaug to him shortly before his death in 2009 at 95 years old. “He told me keep on scoring goals for Africa,” Adesina said. “If you are not investing in Africa, what are you doing?”

Growing a Greener Tomorrow

Kenya is taking significant steps to reduce the use of Highly Hazardous Pesticides (HHPs) by introducing innovative initiatives that support farmers in adopting safer and more sustainable farming practices. The recently launched Resource Guide, developed by the Route to Food Initiative (RTFI) under the Heinrich Böll Foundation, ' Food Production without Toxic Pesticides' promises to transform Kenya's agricultural landscape while safeguarding public health and the environment.



Pesticide residues are frequently exceeding safe limits in local food markets, including staples like tomatoes and kale. Moreover, only one in six Kenyan farmers use adequate protective gear, exacerbating the risks. With actionable steps on agroecological farming, the guide empowers farmers to harness biodiversity, improve soil health, and adopt eco-friendly pest management practices. Joachim Paul, Director of the Heinrich Böll Foundation in Nairobi, hailed the guide as "a beacon of hope" that proves farming without toxic pesticides is possible and practical.

The guide features contributions from experienced organic farmers like Sylvia Kuria, who describes sustainable farming as "effective and rewarding." It includes strategies such as crop rotation, intercropping, and using natural resources to create eco-friendly pest solutions.

While the Pest Control Products Board (PCPB) has committed to banning select pesticides by the end of 2024, much remains to be done. Regulatory gaps allow some harmful substances to infiltrate Kenyan agriculture. Advocacy groups and scientists are calling for stricter enforcement of Integrated Pest Management (IPM) policies and greater investment in biopesticide research to bridge the gap.

Marie's Organic Farming Journey

Marie Nga'ng'a, an organic farmer from Laikipia County, has proven the transformative power of sustainable agriculture. What began as a simple backyard experiment in Nairobi has turned into a thriving 60-acre organic farm in Nanyuki, inspiring countless others to embrace organic farming practices.

Marie's journey into organic farming started with a desire to provide healthier meals for her family. "We wanted to eat healthier and be self-reliant," she shares. Her early experiments in her Nairobi kitchen

garden proved successful, leading her family to lease land in Nanyuki to expand their organic farming ventures. On this larger scale, her commitment to sustainability and quality shines. “Our exporter has never had issues with the quality of our produce because it’s organic and has no synthetic chemicals,” she says proudly.

Beyond fulfilling market demands, Marie’s farm shares surplus produce with local schools and the community, reflecting a holistic approach to agriculture that prioritizes both profit and purpose. Speaking at the Farmers Resource Guide launch, Marie highlighted the numerous advantages of organic farming. “Organic farming not only improves soil health but also protects the environment and our health,” she emphasized. Her insights resonate with the guide’s findings, which showcase practical ways to grow crops without toxic pesticides and underscore the long-term benefits of sustainable practices.

Marie’s farm employs innovative techniques like companion planting and natural pest control, which harmonize with nature to ensure robust harvests. She echoes the guide’s sentiment that “building healthy soils and leveraging biodiversity is key to sustainable farming success.”

For Marie, collaboration is the cornerstone of thriving organic farming. She encourages farmers to work with their neighbours, sharing knowledge and resources to enhance collective success. “Neighbouring farms are the greatest resource for furthering the success of organic farming in the community,” she advises. This cooperative spirit not only strengthens local farming networks but also fosters a culture of mutual growth and resilience.

Marie’s accomplishments counter the common belief that organic farming is impractical or less productive. Her flourishing farm demonstrates that sustainable agriculture can be both achievable and economically viable As Dr. Silke Bollmohr, co-author of the Farmers Resource Guide, affirms, “Alternatives have always existed, and safe, sustainable farming methods are achievable.”

The Resource Guide goes beyond being a manual—it’s a rallying cry for policymakers, agrochemical companies, and farmers to unite in creating a resilient food system. Embracing agroecological practices can help Kenya safeguard its biodiversity, reduce health risks, and secure food sovereignty for generations to come.

The Resource Guide goes beyond being a manual—it’s a rallying cry for policymakers, agrochemical companies, and farmers to unite in creating a resilient food system. Embracing agroecological practices can help Kenya safeguard its biodiversity, reduce health risks, and secure food sovereignty for generations to come.

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Gender Equality and Youth Inclusion

Women comprise around 43% of the agricultural workforce in low- and middle-income countries. However, their responsibilities and capacity are too often diluted by gender inequalities. Breaking down the barriers to women and youth employment in agriculture can benefit the sector, food security, and communities. As such, gender and youth are now a central feature of all CABI development work and a significant component of the CABI PlantwisePlus programme.

A newly published report pulls together recent gender research commissioned by CABI. The synthesis report highlights ten key focus areas where CABI projects and programmes can significantly impact the goal to 'reduce inequality through better opportunities for rural women and youth'.

1. Information and Communication

Communication and information sharing are essential for sustainable development. Since men and women access agricultural information differently, communication campaigns must adopt a gender-responsive approach to address these barriers. Culturally appropriate communication methods, such as drama, songs, drawings, and symbols, can help bridge the knowledge gap for women and youth. Expanding outreach and improving extension services can further empower these groups and reinforce their roles in sustainable agriculture.

Women are farmers and we must reflect this in all forms of communication. The language and visuals used to represent farmers should not assume that all farmers are men. Additionally, sharing success stories and promoting role models can inspire change and challenge misconceptions.

2. Extension Advisory Services

Advisory services do not always meet the needs of women and young people. Adjustments like scheduling around other commitments and providing gender training for extension staff can improve accessibility. Increasing female extension workers supports more inclusive services, while training that combines technical knowledge with market dynamics can equip women and youths with skills to mentor farmers toward profitable enterprises.

Collaboration with national agricultural departments can ensure equitable access to inputs, training, and technology while shifting social norms improves women's access. Moreover, joint efforts between male and female workers can model inclusive practices and encourage shared decision-making.

3. Digital Advisory

Technology can help farmers access information and increase productivity. However, the digital divide stops women from having

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equal access to advisory services, digital devices, and the Internet. Moreover, cultural norms often restrict technology use.

Targeted interventions are needed to provide rural women with the opportunities, tools, and information required to access and benefit from digital agriculture services. By prioritizing digital inclusion, a more equitable adoption of innovative agricultural practices can be planned, leading to increased productivity and empowerment for women farmers.

4. Farmer Cooperatives

Farmer cooperatives help farmers gain access to capital, information, technology, networks, and markets. However, these groups often exclude women and youth, undermining their potential and diluting their voices.

In many countries, women-only cooperatives successfully bridge resource and access gaps. This reaps economic gains and fosters a supportive network that amplifies women's and youth's voices. As a result, women and youth are more likely to gain control over agricultural production, underscoring the transformative power of community support and shared knowledge.

What is more, research suggests that farming cooperatives support increased uptake of new and improved technologies, such as the use of biocontrols. As such, introducing new technologies through women's collectives, significantly increases uptake.

5. Youth Engagement

The future of agriculture depends on youth participation, but many are drawn to urban jobs, leading to labour shortages and a loss of traditional knowledge. In most cases, it is young men who leave for off-farm work, leaving women to handle both an increased agricultural workload and their domestic responsibilities.

To attract young people, farming must offer opportunities for growth by developing skills and improving resource access. This challenges policymakers and industry leaders to rebrand agriculture as a technology, sustainability, and entrepreneurship sector.

Gender analysis highlights gender gaps in youth employment and opportunity. Promoting young women in new sectors through community sensitization, role modelling, and showcasing female entrepreneurs can challenge gender-based job segregation. Without an intentional focus on young women's employment, we risk replicating existing disparities.

6. Financial innovations

Women and youth farmers face barriers to accessing financial services due to limited assets and collateral, compounded by gender and age bias. Without traditional collateral, formal institutions are reluctant to engage with them. Inclusive and responsive financial products are required to support their role in sustainable agriculture.

Village-based saving committees promote pooled resources and investments, enhancing financial access. Empowerment workshops and digital financial education further boost their understanding of banking, savings, and credit, providing autonomy in transactions and reducing barriers to formal financial institutions.

7. Leadership and decision making

Empowering women and youth in decision-making boosts agricultural productivity and community well-being. Limited confidence and insufficient information hinder

their participation. Targeted interventions such as education, training, and support systems are needed to strengthen their capacity and confidence, enabling active roles in decision-making.

Comprehensive empowerment and mentoring programs, including leadership development and farming collectives, can cultivate communication, strategic planning, and assertive leadership skills. Women should be seen and heard as leaders, taking on decisive leadership roles in which they direct agricultural interventions, fostering resilient and adaptive agricultural practices.

8. Livelihoods Diversification and Nutrition

Women and young farmers are more vulnerable to external shocks, particularly those brough about by climate change. By integrating livelihood diversification with nutritional support programs, women can ensure a steady food supply. Simultaneously, strategies to reduce home and farm input costs can free up resources for reinvestment into diversified income streams. This helps stabilize income and fortify households against the impacts of climate change, food insecurity, and economic uncertainty.

9. Policy Reform

Empowering women and youth in agriculture requires elevating their profiles to provincial, national, and regional dialogues and recognizing them as key stakeholders in policy-making. This validation supports their labour, entrepreneurship, and capacity for agro-biodiversity innovation.

Policy reforms are needed to address barriers like access to land, capital, and resources. It is crucial to establish inclusive frameworks that integrate their perspectives and advocate for land rights and social security. Collaboration with NGOs and advocacy groups can push for reforms, ensuring women's and youth's contributions are valued and compensated.

10 Gender Norms

CABI's gender research reveals profound disparities in women's access to agricultural resources, from land to financial services and technology, all perpetuated by social norms. Shifting these norms is critical to address the other nine areas of impact outlined above.

Social norms limit women's economic autonomy and productivity, keeping them in cycles of dependency. Shifting these norms requires engaging both men and women in community dialogues to transform perceptions of women's roles in agriculture.

CABI's Community Conversations (CC) in Burundi successfully shifted social norms, increasing women's empowerment and access to agricultural advisory services. This highlighted the need for targeted, long-term interventions to achieve gender equality and transform gender norms in agriculture.

What's next?

The untapped potential of women and youth in agriculture awaits transformation. The challenges identified, ranging from harassment to limited digital engagement, highlight systemic issues that prevent women and youth from accessing the full benefits of agricultural trade and processing.

The ten areas outlined in the report emerged from the respondents to CABI gender research as requiring critical and ongoing focus. CABI must reinforce its focus on these as unique components of the agricultural landscape and as each interacts with and overlaps the others. These findings support existing CABI work and the future trajectory for CABI's commitment to gender equality and social inclusion.

Agventure Receives Support to Expand Canola Oil and Seed Processing

AgDevCo, an agriculture-focused investor, has announced its latest investment in Kenya, in Agventure, a farmer-owned company leading regenerative agricultural practices for non-irrigated cereal crop-based systems.

Agventure was founded in 2010 with the mission to enable Kenyan farmers to develop more sustainable agriculture. Agventure is a collective of farmers, researchers, educators and entrepreneurs committed to modeling, promoting and sharing regenerative production methods across the food system.

The Group currently supplies over 45,000 tonnes of food crops to the local market, including wheat, barley, maize, canola, sunflower, green peas, chickpeas, lupin, fava beans and more. Through its Centres of Excellence, the company reaches out to and trains over 700 small and medium-sized farmers across the country, encouraging them to introduce rotational crops such as canola into their farming systems to improve soil health. Agventure will then guarantee the purchase of the Canola, process it and sell it in the Kenyan market.

AgDevCo's $9.5 million mezzanine loan will enable the company to further expand itscanola oil production capacity, sell the oil under the "Pure Mountain" brand in Kenya, and increase purchases from contract farmers. It will also help build Agventure Seed's platform to provide farmers with high-quality certified seeds.

Rebecca Sankar, AgDevCo's Managing Director for East Africa, said, "We are pleased to support Agventure's efforts to produce higher-value commercial crops, increase the availability of high-quality locally grown food for the domestic market and reduce import dependency."

Agventure CEO Don White said, "Agventure looks forward to working with AgDevCo to grow and strengthen our business and make regenerative agriculture solutions available to more farmers."

AgDevCo is a specialist investor in African agriculture, building sustainable, impactful agribusinesses with $280 million under management. Its vision is a thriving commercial agriculture sector that benefits both people and the planet by investing in and supporting agribusiness growth, job creation, food production and processing, and farmer-market linkages. AgDevCo supports its partners in working towards climate sustainability and, where possible, regenerative solutions. AgDevCo has made over 65 investments to date.

Yara and Asili Agriculture Partner to Boost Sustainable Farming in Uganda

In a significant step toward advancing sustainable agriculture in Uganda, Asili Agriculture joined forces with the Yara Knowledge Centre (YKC) to equip smallholder farmers with advanced training and sustainable crop management practices. This partnership, centered within Asili's expansive operations, focuses on empowering farmers with tailored support for essential crops like maize and soybeans.

The collaboration blends Yara's expertise in crop nutrition with Asili's commitment to regenerative agricultural practices and farmer education. Together, they aim to enhance productivity, soil health, food security, and economic resilience across Uganda's farming communities.

"Our mission at Asili is to uplift farmer livelihoods through advanced crop nutrition solutions, regenerative farming practices, and innovations that foster soil health," said William Ng'eno, Country Director of Yara East Africa. "We believe this initiative will become an invaluable resource for farmers striving to build sustainable and productive farming systems in Uganda."

Practical Solutions for Farmers

At the heart of this partnership is the YKC within Asili, offering hands-on demonstrations of optimal crop fertilization and nutrition techniques. These practical training sessions are complemented by cutting-edge tools such as the Yara FarmCare app and Yara Connect, enabling farmers to make data-driven decisions for improved crop management.

Federico Tonelli, Director of Development and Sustainability at Asili Agriculture, highlighted the importance of the initiative:

"At Asili, our goal is to transition smallholder farmers in our network to commercial, resilient, and regenerative farming systems. The knowledge transfer facilitated by the YKC is crucial to achieving this transformation."

Farmers will benefit from tailored input recommendations, soil testing services, and access to financial and mechanization

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Ugandan farmer tending to his soy beans

> "Yara Knowledge Centres play a pivotal role in driving the adoption of modern farming technologies. Through our collaboration with Asili Farms, we aim to uplift millions of farmers."

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resources. The construction of an upgraded training hall, expected to be completed by early Q1 2025, will expand the program's reach and offer structured learning opportunities to address pressing agricultural challenges.

A Shared Vision for Sustainable Agriculture

The partnership reflects a shared vision between Asili and Yara to promote sustainable growth in Uganda's agricultural sector. "Yara Knowledge Centres play a pivotal role in driving the adoption of modern farming technologies. Through our collaboration with Asili Farms, we aim to uplift millions of farmers," said John Rotich, Yara Uganda Commercial Manager.

The impact of improved crop management is evident in Uganda's rising agricultural productivity. Soybean production has expanded from 144,000 hectares in 2004 to 200,000 hectares today. Similarly, maize production has surged from 800,000 tonnes in 2000 to over 2.57 million tonnes.

These advances have also translated into significant export earnings. Uganda generated US$244.6 million from maize exports in 2023, a notable increase from US$88 million in 2022.

By empowering smallholder farmers with sustainable practices and modern tools, the Asili-Yara partnership is poised to make a lasting impact on Uganda's agricultural sector, ensuring resilience and prosperity for farming communities.

Machine-Vision Technology Shows Promise to Reduce Herbicide Use

Farmers and land-managers seeking to reduce their herbicide applications now have another promising option via machine-vision technology. That's the summary from a recently published research article in Weed Technology.

Recent research shows machine-vision targeted spray technology can significantly reduce herbicide applications compared to traditional broadcast applications. Credit: Michael Dodde, 2023 University of Arkansas graduate assistant.

"Our research showed that, on average, this technology's targeted sprays saved a range of 28.4 to 62.4% on postemergence herbicides compared to traditional broadcast applications," says Tristen Avent, University of Arkansas, Senior Graduate Assistant in the Crop, Soil, and Environmental Sciences Department, and corresponding author of the study.

"In addition to significant opportunities to lower herbicide costs and improve profits, our research also showed that the targeted applications from machine-vision technology can be utilized to provide some soybean health benefits and improve environmental stewardship."

In this study, researchers used John Deere's See & Spray Technology to compare machine-vision targeted spray technology with traditional broadcast applications. Researchers conducted the experiments for two years in Keiser, AR, and Greenville, MS, to compare residual herbicide timings and targeted spray applications versus traditional broadcast herbicide programs in glyphosate/glufosinate/dicamba-resistant soybeans.

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