



Policy Brief

Time to Run: Leveraging an enabling biosafety environment for a food-resilient Kenya

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Executive summary:

Kenya has a robust biosafety framework with a fully-functional biosafety regulatory system. The National Biosafety Authority, in collaboration with other seven agencies, is mandated to regulate research, development and commercialization of biotech crops in the country. One biotech crop – Bt cotton – has already been commercialized and it is showing promising results two years after getting into farmers' hands. Two food crops – Bt maize and disease resistant GM cassava are in advanced stages of research and have already been approved for environment release.

The country is also endowed with sufficient capacity to conduct research into genetically modified crops and animals. The Kenya Agricultural and Livestock Research Organization and international organizations under the auspices of the Consortium of International Agricultural

Research Centers (CGIARs) and other international institutions have competent local scientists in the area of modern biotechnology.

Efficacy trials (to test the performance) for Bt maize are underway in different agro-ecological zones in the country. The trials are managed by the Plant Health Inspectorate Service (KEPHIS), a competent national regulatory agency. The GM maize is now one step away to commercialization.

This notwithstanding, there have been bottlenecks on the path to progress. One is the 10-year ban that was lifted in 2022 followed by a myriad of court cases. Aggressive anti-GMO activism has also stifled progress of agri-biotech research placing a hurdle on the progress of Bt maize commercialization process.



Further, there exists a gap in public awareness about the potential of Bt maize in addressing intractable challenge of food and nutrition security in the country.

Despite these bottlenecks, there is light at the end of the tunnel. The most recent judgment dated October 12, 2023, reaffirmed the safety of GM crops. The landmark ruling stated that there is no evidence that GMOs are harmful to the environment and human health.

Whilst acknowledging this positive development and commending government's positive gesture to move

into the future with the technology, there is huge awareness gap on biotechnology and biosafety among the Kenyan public. A barrage of misconceptions about GMOs dominates public sphere. Misinformation, rumors and lies about GM-derived products are rife. They have created public fear and mistrust of biotechnology.

Due to lack of an organized public awareness strategy, the voices of agri-biotechnology experts have been fragmented and weak. Pseudo-scientists opposed to the technology have stolen the limelight to disparage biotechnology.



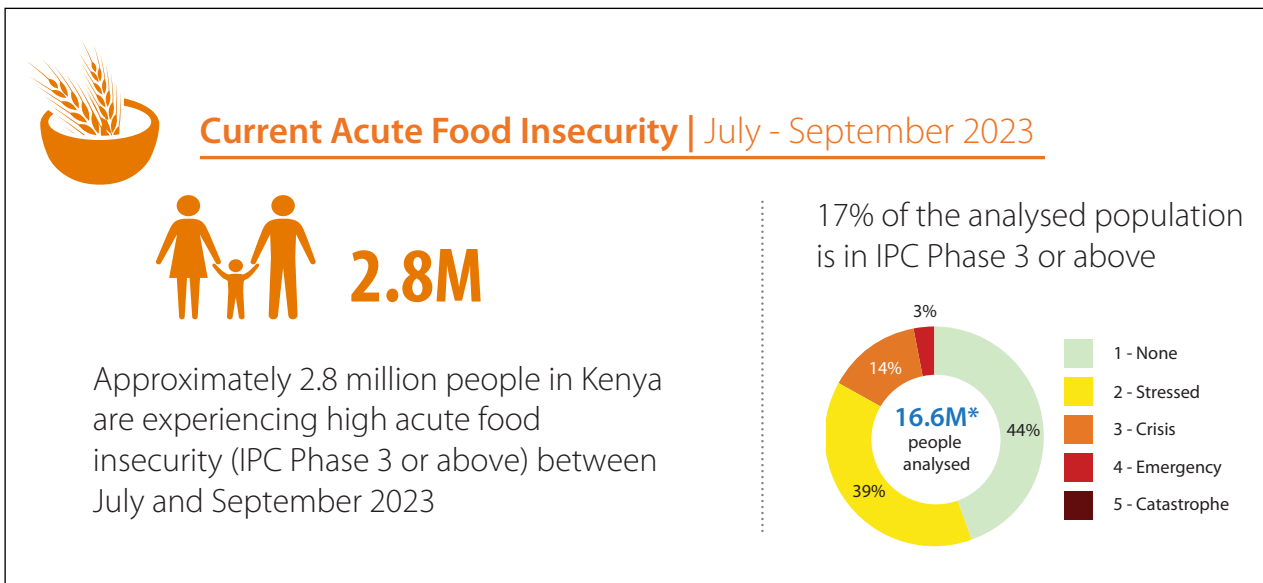
Introduction

Agriculture accounts for about 21% of the Kenya’s gross domestic product (GDP) and employs more than 40% of the total population most of whom live in the rural areas.

Despite the great role agriculture plays in the country’s economy, agricultural productivity has stagnated over the years with food insecurity being one of the key challenges facing country. According to Integrated Food Security Phase Classification initiative approximately 946,000 children under the age of five and around 145,000 pregnant/lactating women in Kenya’s arid and semi-arid regions are likely to suffer from acute malnutrition and will be in need of treatment through October 2023.



Muasya displays maize ear severely devoured by FAW



Source: [Integrated Food Security Phase Classification \(IPC\)](#)

Several challenges persist in crop production in Kenya, hindering the sector’s optimal growth and development. Some of the main challenges include: climate change and unpredictable weather patterns, limited access to quality inputs and technology, pests and diseases, land degradation and soil erosion. The growing population, limited resources, and pressure on ecosystems needs Kenya to re-think how to sustainably produce, process, distribute, and consume food while reducing food loss and waste.

Furthermore, given the ageing farming population in Africa, it is now a necessity to find ways of attracting the youth back to farming who require efficient, smart and pleasurable tools for farming.

Agricultural biotechnology presents intriguing possibilities for improving food security in Africa. It can make significant contributions towards the development of better health care and food security through sustainable agricultural practices as recognized by Agenda 21 of the United Nation Conference on Environment and Development, and African Union’s Agenda 2063 strategies.

Therefore, building the capacity of Kenya to develop and utilize biotech innovations will spur the countries’ ability to produce enough food and improve livelihoods. It will also open up space for entrepreneurship and regional markets with increase in industrial raw materials.



Table 1 shows the role that Biotechnology can play in achieving some policies and addressing some challenges faced in the agricultural sector.

Policy	What issues it seeks to achieve or challenge to address?	The relevance of agricultural biotechnology in achieving and/or addressing the challenge
Vision 2030	<ul style="list-style-type: none"> • Modernizing agriculture • Improving productivity • Promoting Value addition 	<ul style="list-style-type: none"> • Biotech crops are engineered to tame pests and diseases and in some cases are drought tolerant these traits enable plants to produce more. • We can maximize on production with less or the same resources. • Reduction in the cost of production while protecting the environment from chemical hazards that which is enabled by biotechnology. • Biotech crops plays a critical role in reduction in carbon emission and environmental protection Reduction in post-harvest losses and exposure to contaminants like aflatoxins. • Biotech has a potential to avail more raw materials for industrial use. • Biotech crops enhance nutritional value eg vitamin A enriched banana.
Agricultural Sector Transformation and Growth Strategy (ASTGS)	<ul style="list-style-type: none"> • Increasing productivity • Market access • Value addition 	<ul style="list-style-type: none"> • Biotech crops have the potential to lower the price of farm produce due to increased production. • Biotech crops reduce insecurity and human/wildlife conflict. • Improving farmer incomes can lower the cost of food, and increase employment. • Adoption of Bt cotton will significantly bolster industrialization/manufacturing in the cotton value chain thus creation of 500,000 jobs for women and youth. • Commercialization of Bt cotton has given farmers economic freedom. Allowing them to venture into other sectors like dairy production which also increases the household income.



Agricultural biotechnology in the economic sector?

The biotechnology industry is generated an estimated \$34.8 billion in revenues and employed about 190,000 people worldwide (Sasson, bk. 2005). Therefore, Biotechnology offers a huge opportunity for industrialization and job creation. Farmers also benefit economically from the development of GM crops that are herbicide-tolerant, pest- and disease-resistant, and have high nutritional value and yields.

There has been increased awareness and appreciation of GM crops among African farmers. This is evident by the number of countries planting biotech crops from three in 2018 to seven in 2019. Despite this progress, the adoption of GM crops in Africa has been slow and contentious. Investment in research and development in agricultural biotechnology has been unpredictable, with majority of countries lagging in adoption of biotechnological products with only few crops advancing to commercialization.

In Kenya Bt Cotton has been commercialized. Bt maize and GM Cassava are in the pipeline towards commercialization. There is need therefore to integrate biotechnology into Africa's agricultural development agenda to ensure food and nutrition security is attained across the continent.

Capacity for Agri-Biotech Research in Kenya

Kenya has sufficient capacity to conduct research into genetically modified crops and animals. Institutions such as Kenya Agricultural and Livestock Organizations have a Biotechnology Research Institute that works on the development of agribiotech products such as Bt Maize and GM Cassava that are solving challenges faced by farmers. Various universities within the country have courses on Biotechnology with students graduating annually. There is potential to build the number of experts in biotechnology research and increase innovations within the agri-biotech space.

However, the development and commercialization of biotech innovations in Kenya has been slow. There is need to facilitate transition of biotech crops in research and development (R&D) pipeline to commercial release. The role of policy to translate research into scalable innovations cannot be overlooked. Policies determine funding and adoption of biotechnology innovations in countries.

Enabling innovation through funding Research & Development (R&D) is key to facilitating the commercialization of biotech crops. Investing in local R & D capacity which would involve working through public - private partnerships, allowing opportunities for technology transfer, strong intellectual property protection that building of local capacity and infrastructure to boost the effectiveness of national agricultural research systems.

Stewardship is also key to biotech innovations. Strong in-country stewardship support facilitates commercialization of biotech crops. The stewardship support would include having technical capacity and local infrastructure for product stewardship, government support and commitment to product stewardship and the flexibility of seed systems to support stewardship needs.

Therefore, to increase capacity for biotech innovations in Kenya, the government needs to allocate resources for research in biotechnology and creating science-based policies to facilitate the commercialization of biotech crops.

Status of Biotechnology Regulation and Biosafety in Kenya

Less than 30% of African countries have functional biosafety frameworks and the number of biotech products getting to farmers is still very low.



A distraught Elizabeth Nduku assesses the damage of the FAW on her maize farm

Political goodwill, legal and policy framework are key enablers that facilitate commercialization of biotech crops. **Kenya has a robust biosafety framework with a fully-functional biosafety regulatory system.**

The National Biosafety Authority (NBA) in Kenya was established by the Biosafety Act No. 2 of 2009 to exercise general supervision and control over the transfer, handling and use of genetically modified organisms (GMOs). The Authority was established to regulate research and commercial activities involving GMOs with a view to ensuring safety of human and animal health and provision of an adequate level of protection of the environment.

Having a functional biosafety authority places Kenya ahead of other African countries that do not have set systems. By leveraging on this, Kenya should be able to adopt and commercialize GM innovations to ensure that farmers have crops that have increased productivity to increase income and improve their welfare.

Misinformation on Agri-Biotech

The disparities in how countries view agri-biotech is a result of expert ignorance, media hype, and exaggerated health risks. All these raise confusion and misinformation. As a result, there is a critical need to disseminate accurate information about the use of GM crops and create public awareness on the technology. This will ensure that there is ownership of the technology both by farmers and consumers leading to increased adoption.

Women and Youth in Agri-Biotech

The youth have been brought up in both rural and urban areas, but those in rural areas have seen their parents struggle with old farming methods where agriculture was associated with poverty.

To actively involve the youth and bring them back to agriculture there is need for them to access better tools and ways of farming and demystify the fact that agriculture is a poverty-driven activity. By doing so young people will participate in agriculture as a business to earn a living.

Food production has long been recognized as primarily a woman's activity. Women represent a considerable share of the agricultural labour force, either as individual food producers or as agricultural workers. Women are, therefore, prominent economic



Students at Kenyatta University engage in an enzyme manufacturing masterclass, honing their skills for a future of scientific breakthroughs and innovation

actors in land-related activities, with a major stake in crop and small stock husbandry, crop preservation, processing and marketing, and food preparation for both domestic consumption and sale.

Biotechnology therefore, offers an opportunity for women to raise agricultural productivity. It helps reduce post-harvest losses, lower women's domestic care burden and improve the food and nutrition security of women family farmers.

Conclusion

Application of innovative agricultural technologies has revolutionized the agricultural sector globally, leading to improved agricultural productions. However, Africa has been left behind in this upward trend due to several factors that constrain access to Biotechnology.

The adoption of agricultural technologies has been identified as critical for increasing agricultural productivity and reducing hunger and poverty in Africa (Arslan et al., 2020).

Synergy among all key stakeholders in the agri-biotech value chain is paramount in the research, adoption and commercialization of these innovations. Partnerships are also critical for quality results. No single organization can undertake the development and commercialization of GM crop alone.

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Political goodwill; legal and policy framework; and predictable decision-making processes are key enablers that facilitate commercialization of biotech crops in Africa.

Scientists should stop working in isolation from the society, they should learn to communicate to the public to increase their confidence in the country's capacity. Policy makers need to make evidence-based decisions and listen to experts within the biotechnology space.

Kenya needs to leverage on the current enabling environment to increase the adoption of biotechnology in the agricultural sector.



A maize ear damaged by the fall armyworm in one Kangundo farm

Recommendations:

In view of the existing knowledge gap, the following recommendations are made:

- **Revival of Bio-aware Programme:** Government to support establishment and operationalization of a robust biotechnology and biosafety awareness programme. This supports public sensitization of biotech and biosafety at grassroots level.
- Government needs to increase investment and create a platform for a harmonious and coordinated approach, and awareness of co-creation among like-minded players/partners.
- Government and its partners should build biotech champions who comprise industry players, farmers and policy makers.
- There is need to involve women, youth and marginalized group in agricultural production and value chain to gain from the progress.



A farmer in Kirinyaga County, Kenya, reaps the benefits of Bt cotton

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