

GENETICALLY MODIFIED CROPS IN KENYA:

THE COST OF DELAY

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THE
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 **ALLIANCE FOR SCIENCE**
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Executive summary

Despite delays and widespread misinformation, genetically modified (GM) crops show tremendous potential in Kenya and across much of Africa. After over 20 years of research on GM crops in Kenya, **Bt cotton** became the first GM crop available to Kenyan farmers in 2020, making the country's cotton crops less vulnerable to bollworm pests. Shortly after, three varieties of **Bt maize** became ready for commercialization in 2021, which could protect farmers' crops from stem boring pest damage but are still awaiting cabinet approval for commercialization. Kenyan scientists are also developing disease-resistant GM varieties of cassava and potato.

The approval and commercialization processes for GM **Bt cotton** and **Bt maize** have faced significant delays in Kenya due to a ten-year ban on the importation of GM crops (2012-2022) and subsequent court cases challenging the lifting of the ban. Though the ban was specifically on importation of GM crops, it was interpreted as a ban on commercial adoption as well. These delays have had notable economic repercussions and have hindered progress in agricultural innovation.

This report assesses the potential economic and environmental benefits of three GM crops in Kenya—**Bt cotton**, **Bt maize**, and **late blight-resistant potato**—and the economic cost of these delays. Our simulation of benefits starts with the beginning of research and development of each GM crop variety for Kenya, and continues

through commercial adoption — the exact years vary between crops due to their different development timelines. We estimate that all together, delays in approval of **Bt cotton**, **Bt maize**, and **late blight-resistant potato** have cost Kenya USD 157 million, and they have the potential to create USD 467 million in benefits over 30 years.

We estimate that five years of unnecessary delays in Kenya's commercial adoption of **Bt maize** cost the country's farmers and consumers USD 67 million. Without these delays, **Bt maize** could have been available to farmers as early as 2019, generating significant economic benefits by reducing pesticide costs, increasing farmer yields and profits, and reducing food prices for consumers. We project that, by 2030, the total economic benefits of **Bt maize** without delay in release could have reached USD 218 million. The increase in domestic production could also improve food self-sufficiency by replacing some of Kenya's maize imports and food aid, and could strengthen the country's crop yields compared to Tanzania, its closest competitor in East Africa.

Due to five years of delay in the release of **Bt cotton** in Kenya, we estimate a cost to the country's farmers and consumers of USD 1.2 million. Without five years of delay, **Bt cotton** could have been released in Kenya in 2015 rather than 2020, and could have benefited Kenyan farmers and consumers by a total of USD 2.6 million by 2025.



These projections are based on the current state of Kenya's cotton sector, with decreasing area and production. **Bt cotton** has the potential to help revitalise Kenya's textile industry, and earlier release of the variety may have helped prevent some of the ongoing decline in the sector.

We estimate that the release and commercialization of the **late blight-resistant potato** variety would lead to an increase in farmer and consumer surplus by USD 163 million and 84 million respectively, over a period of 30 years. A 5 year lag in the release of the **late blight-resistant potato**, which could occur due to delays in the regulatory process as observed in Uganda, would reduce the benefits to farmers and consumers by USD 59 million and USD 30 million respectively. The increase in domestic potato production could also strengthen the country's food security.

In order to feed a growing population, crop production must increase — and both increases in crop yields and farmland area can contribute to increasing production. On a global scale, farmland area is increasing through deforestation, which increases greenhouse gas emissions, destroys wildlife habitat, and reduces ecosystem services like water filtration. Agriculture has a huge impact as the sector is the biggest driver of deforestation globally. In contrast to farmland expansion, increasing crop yields can increase food production without causing additional deforestation. In addition, policies like land use zoning and payments for forest protection can be effective for reducing deforestation.

We project that if **Bt maize** and **Bt cotton** were widely adopted in Kenya, the increase in yields would reduce global deforestation and land use change due to agriculture, resulting in enough land-sparing to reduce global greenhouse gas emissions by 0.24 million metric tons of CO₂ equivalents per year, equivalent to 18% of emissions from Kenya's aviation and shipping industry in 2020. We did not estimate the potential for **late blight-resistant potato** to reduce global greenhouse gas emissions because the crop is used almost solely as subsistence in Kenya, and therefore is not part of global agricultural trade that impacts global emissions.

Finally, adoption of GM crops can have many other benefits including reduction in pesticide use, which benefit both human health and the environment; decreased increased food aid and imports which increase the country's food security and economic self-sufficiency; and increased competitiveness within trading blocs like COMESA.

“ To capitalise on the full potential of GM technology, it is imperative that Kenya streamline its regulatory processes to avoid further costly delays and ensure the timely review and approval of future GM crops. This approach is essential not only for enhancing agricultural productivity but also for reducing the sector's sizable global carbon footprint.

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Though **Bt cotton** has been commercialised in Kenya, the approval and commercialisation processes for both **GM Bt cotton**, **Bt maize**, and late **blight-resistant potato** have faced significant delays in Kenya due to a ten-year ban on the importation of GM crops (2012–2022) and subsequent court cases challenging the lifting of the ban.



We estimate that delays in approval of **Bt cotton**, **Bt maize**, and late **blight disease-resistant potato** have cost Kenya **USD 157 million**.



Even with delays, these **GM crops** still have the potential to create **USD 310 million in economic benefits over 30 years**.



We project that if **Bt maize** and **Bt cotton** were widely adopted in Kenya, the increase in yields would reduce global deforestation and land use change due to agriculture, resulting in enough land-sparing to **reduce global greenhouse gas emissions by 0.23–0.72 million metric tons of CO₂** equivalents per year, equivalent to 17–54% of emissions from Kenya's aviation and shipping industry in 2020.



To capitalise on the full potential of GM technology, it is imperative that Kenya avoid further costly delays and ensure the timely review and approval of future **GM crops**.



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Full Report will be launched in December at the OFAB Media Awards