


Kenya opens the door to GMO cultivation

 geneticliteracyproject.org/2021/09/14/kenya-opens-the-door-to-gmo-cultivation/

September 14, 2021

Steven Cerier | September 14, 2021



Credit: Antony Njugna/Reuters

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On December 19, 2019, the Kenyan government approved the cultivation of GMO cotton after five years of field trials and in March of 2020, commercialization began. Kenya joined a growing list of African countries that cultivate GMO crops. These countries include South Africa (cotton, corn and soybeans), Nigeria (cotton and cowpeas), Eswatini — formerly Swaziland — (cotton), Sudan (cotton), Malawi (cotton) and Ethiopia (cotton).

Other countries in Africa appear to be on the verge of sanctioning the growing of GMO crops. Ghana and Burkina Faso, for example, have conducted confined field tests of GMO cowpeas and there are expectations their governments will soon approve full-scale commercialization of the crop.

Since 2017, Mozambique has been conducting field trials for GMO drought-tolerant, insect-resistant corn under the auspices of the Water Efficient Maze for Africa program. A US Department of Agriculture (USDA) report noted, “Mozambique is considering using innovative biotechnologies in product development, such as disease diagnoses on animals (Newcastle disease) and plants (cassava, tomato viruses) and bio-fortified crops, like orange sweet potato...Animal genetic improvement, biodiversity studies on forestry and poultry studies are other innovative biotechnologies” that are being considered.

Although no GMO crops are presently grown in Senegal, in 2017, President H.E. Macky Sall indicated his strong support for the application of biotechnology to crop production, provided all the necessary biosafety measures are instituted.

The Kenyan government is hoping that growing GMO cotton will help revive the domestic textile industry which was once a major employer. Cotton production was about 28,000 bales in 2020, well below the 49,000 bales produced in 2010, and was inadequate to meet domestic demand of around 200,000 bales, thus necessitating large scale imports of cotton. The textile industry has been decimated by declining cotton production and a flood of imports from China. In addition, imports of second-hand clothing, low labor productivity and the high cost of production have also hurt the sector. At its height in the 1980's the textile industry employed about 500,000 people but that has fallen to around 20,000.



Credit: Hussein Abdullahi/Kenya News Agency

Kenyan Agriculture Cabinet Secretary Peter Munya indicated the Government has set a target of having over 200,000 acres under commercial *Bt* cotton cultivation by 2022 which will create over 25,000 jobs along the value chain. He said, “These job opportunities will be in cultivation, processing or trading in locally manufactured garments and clothes... Cultivation of *Bt* cotton by our farmers will guarantee a constant supply of raw materials to ginneries and cotton processing industries thus supporting value addition and job creation up the value chain.”



Peter Munya. Credit: MT Kenya Daily

The approval of growing GMO cotton is a major turnaround from recent government policy which was very hostile to crop biotechnology. In November 2012, for instance, the government dealt a severe blow to scientists working on GMO solutions when it banned the importation of all GMOs. President Kibaki directed the public health minister to take such action until the government was able to certify they had no negative impact on people's health. In a press release, the cabinet said there was a "lack of sufficient information on the public health impact of such foods...The ban will remain in effect until there is sufficient information, data and knowledge demonstrating that GMO foods are not a danger to public health."

The ban was prompted by the publication of a study in the September 2012 issue of *Food and Chemical Toxicology* by Gilles-Eric Seralini, which indicated rats fed GMO foods developed cancer. The study was hailed by anti-GMO proponents as highlighting the truth about the toxicity of GMOs, and it helped to undermine support for them. The study, however, was deeply flawed and debunked and ultimately retracted by *Food and Chemical Toxicology* for its poor methodology. Nevertheless, it did serious damage to the development of GMOs in Kenya (among other countries) by fueling anti-GMO sentiment and making it difficult to conduct scientific research because of expectations the government would refrain from agreeing to sanction the commercialization of GMO crops. The ban on importing GMO foods remained in place until late 2019, at which point the government was encouraging GMO research and was on the verge of approving the commercialization of *Bt* cotton as part of a plan to bolster the textile industry, thus spurring industrial development.

In addition to approving *Bt* cotton, the government on June 15 approved performance trials for GMO cassava that is resistant to cassava brown streak disease. The cassava was developed by the Kenya Agricultural & Livestock Research Organization (KALRO). The Kenya National Biosafety Authority (NBA) approved the application after conducting a thorough safety assessment that demonstrated the cassava is unlikely to pose any risk to human and animal health or to the environment when consumed as food or feed or when cultivated in open fields. The approval by the NBA is valid for a period of five years. The National Performance Trials that will be conducted are the penultimate step before full commercialization.



Credit: EBTi

At present there are no cassava varieties that have natural resistance to brown streak disease, which is spread by whiteflies and infected cuttings and can result in the loss of 98 percent of production. Cassava is a very important crop throughout sub-Saharan Africa. Of the top 12 producers of cassava in the world in 2019, seven were African nations, with Nigeria in first place followed by the Democratic Republic of the Congo.

GM insect-resistant corn has been field tested successfully with expectations that full commercialization will start in 2023. The director General of the KALRO, Dr. Eliud Kireger, highlighted the importance of developing insect-resistant corn by noting that Kenya “is losing about 40% of the 42 million bags of maize to stem-borer and other pests and we have to import to make up for the losses.”

In addition to conducting research and commercializing GMO crops, Kenyan scientists are engaged in projects involving gene-editing. One project that Kenyan scientists are working on is to build resistance in the sorghum plant to the parasitic striga weed and to make the plant more palatable and digestible. Sorghum is an important source of food and fodder and is used in the brewing industry.



Credit: ICRISAT

In another project, scientists are using gene-editing technology to curb the losses to corn from lethal necrosis. Other work in gene-editing being conducted involves developing a disease resistant banana, drought resistant corn, vaccines against African Swine Fever Virus and East Coast Fever which affect pigs and cattle respectively and virus resistant sweet potatoes.

The decision by Kenya to pursue a strategy of encouraging GMO and GE crops could have a major impact on the decision of other African nations to approve their cultivation given Kenya's importance in Africa. It is the third largest economy in sub-Saharan Africa after Nigeria and South Africa and is the sixth largest populated country. It is also the lynchpin of the East Africa Community, a regional intergovernmental organization that in addition to Kenya consists of Tanzania, Uganda, Rwanda, Burundi and South Sudan.

Uganda has an extensive scientific research program for the development of GMO crops. Scientists have conducted numerous successful field trials on many crops such as vitamin A bananas, disease-resistant bananas, blight-resistant potatoes, drought-resistant corn and virus-resistant cassava. To the great disappointment of scientists and farmers, commercialization has been stymied by the failure of President Yoweri Museveni to sign the Biotechnology bill which would authorize cultivation of these crops. He does not believe there are enough safeguards in the bill to guarantee the safety of human health, biodiversity and the environment.

Kenya's sanctioning of GMO crop production could possibly serve as an impetus to President Museveni to finally sign the bill. If not, GMO seeds will probably make their way to Uganda from Kenya via smuggling.

Steven E. Cerier is a freelance international economist and a frequent contributor to the Genetic Literacy Project

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