

## Can TELA maize solve the acute food shortages in sub-Saharan Africa?

Sub-Saharan Africa remains the most food-insecure region in the world, with an estimated 237 million throughout the region [suffering from chronic undernutrition](#).

Frequent droughts are partially to blame for the persistent food shortages and the dry conditions make farming particularly challenging for the region's smallholders. The TELA Maize Project has been working on commercializing genetically modified (GM) drought-tolerant and insect-resistant maize varieties for more than a decade and field trials are now beginning to raise hopes for finding a long-term solution to the region's food insecurity.

GM maize hybrids providing insect protection — commonly known as Bt (*Bacillus thuringiensis*) — and drought tolerance (*Bacillus subtilis*; *DroughtGuard*®) have shown better yields than traditional maize varieties in field trials in multiple countries, particularly when stressed by drought and insect pests such as stem borer and fall armyworm, said Sylvester Oikeh, TELA project manager at the Nairobi-based African Agricultural Technology Foundation.

"Bt maize has shown a 52 percent advantage over non-Bt maize when they are both grown under the same stem borer insect pest conditions," Oikeh recently told a group of agricultural biotech scientists at the National Crops Resources Research Institute, Namulonge (NaCCRI).

TELA is a progression of the [Water Efficient Maize for Africa](#) (WEMA) project that has been running in several Sub-Saharan countries. In South Africa, where TELA maize was commercialized in 2016, it has helped farmers produce yields even in the face of very unfavorable conditions, including the fall armyworm invasion.

The TELA varieties are bred to tolerate the moderate drought that has long plagued the region. Droughts can often lead to total losses for maize farmers, but the dry conditions are not the only challenges they face. The TELA varieties are also developed to resist the stem borer pests that can decimate fields, as well as the fall armyworm that has become a growing threat to food security throughout the region.

Godfrey Asea, principal investigator of the Uganda TELA project and director at NaCCRI, told the Alliance for Science that NaCCRI will soon forward a request to Uganda's National Biosafety Committee to implement multi-location testing of the Bt varieties that would lead to deploying the varieties to smallholder farmers in Uganda.

Asea said that field tests in Uganda have shown that the TELA varieties are not only drought-tolerant but also display significant resistance to the fall armyworm that has been a prevalent scourge in the nation's maize fields.

He said the varieties can yield up to 10 tons per hectare under favorable conditions and between three and four tons per hectare in drought-tolerant conditions. Non-GM varieties, meanwhile, struggle to produce one ton under these unfavorable conditions.

Despite the successful field trials, TELA maize still faces significant hurdles before it can reach farmers in many African countries.

Efforts to advance TELA varieties in Uganda took a significant blow in late August when President Yoweri Museveni refused to sign a biosafety bill that parliament passed in 2017. This was the second time that Museveni has sent the bill, formerly known as the National Biotechnology and Biosafety Bill but now rebranded the Genetic Engineering Regulatory Act (GERA) Bill, back to parliament for further review and amendments.

In Kenya, President Uhuru Kenyatta has signaled support for biotechnology, but formal adoption has been slow. However, an application to [approve the TELA maize varieties](#) for widespread use was recently submitted to the National Biosafety Authority, following the board's 2015 decision to grant a conditional approval for variety performance trials.

Oikeh indicated that Kenya is currently losing around 400,000 tons of maize worth \$90 million each year to stem borer pest, equivalent to the amount spent annually to import maize to meet the demand in the country.

Of the seven countries in the TELA project — Ethiopia, Kenya, Mozambique, South Africa, Tanzania, Uganda and Nigeria, which joined in April 2019 — only South Africa has commercialized TELA maize. Trials have been completed in Mozambique and the varieties will be made available to farmers pending approvals by the relevant government agencies. Trials also are ongoing in Ethiopia, Nigeria and Tanzania.

Drought-tolerant conventional maize varieties (TEGOs) that were released under WEMA have performed well in Uganda, helping maize production increase from one million tons in 2005 to the current three million tons annually. Anthony Okello, a maize farmer in the Kole district in northern Uganda, said he is anxious to get his hands on the new TELA varieties.

"I am very much willing to start growing them," he said, adding that his 20 acres of maize were recently hit by the fall armyworm.

David Wanzala, a farmer and seed dealer in the Masindi District in the Western Region of Uganda, said any variety that would help farmers reduce the amount of chemicals they spray on their fields would be welcomed.

"Farmers are always asking me if there are new varieties that are resistant to fall armyworm and stem borer, so I believe a resistant variety urgently made available to farmers with the support of the government would be good news," he said.

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