

GM crops can lift farmers out of poverty, study shows



n a continent where [more than 80 percent of the people living in extreme poverty](#) are rural farmers, some have managed to escape the grip of a hard-scrabble life through the use of improved seeds.

[Motlatsi Musi](#), a South African maize, beans and potato grower who considers himself an entrepreneur, is one of them. He lives well above the poverty line, in a good house, with ample food for his family and sufficient money to educate his children.

Musi is among the millions of farmers worldwide who earned direct benefits to the tune of US\$18.95 billion from growing genetically modified (GM) crops in the year 2018 alone, according to a new global report.

By growing GM insect-resistant [Bt crops](#), Musi has reduced the amount of expensive pesticides that he uses on his farm and enjoyed higher yields, ensuring a good profit.

“My yield increased by 30 percent,” Musi told the Alliance for Science. “Throughout these years, 2005 to 2019, I had hands-on experience with [army worm infestation](#) in 2015. This pest went into my fields, ate some leaves but did not damage my crops” because they were protected by the Bt gene.

“Economically, I managed to send my children to school,” said Musi, who is a member of the Global Farmer Network and winner of the 2017 Kleckner Award. “One of my sons has a degree in biomedicine and is now working in a laboratory as a senior quality controller. My wife, son and I managed to give our home a facelift. My contribution is from my GM maize sales.”

Musi is not alone in his success. The [report](#), authored by Graham Brookes and Peter Barfoot of PG Economics in the United Kingdom, reveals that farmers who grew GM crops earned an extra US\$225 billion, cumulatively, between 1996 and 2018.

The report found that for each extra US\$1 invested in GM crop seeds (relative to conventional seed costs), farmers gained an average US\$3.75 in additional income. The World Bank [defines extremely poor people](#) as those living on less than US\$1.90 a day. This data means that every dollar a farmer invests in GM technology on any given day brings him returns that lift him twice above the extremely poor level.



Credit: Daniel Abowe.

Cumulatively, since 1996, GM insect-resistant technology has added US\$59.5 billion to the income of global maize farmers. In 2018, cotton farm income levels in countries that had adopted GM crops increased by US\$4.57 billion, with the sector benefitting from an additional US\$65.8 billion since 1996. The GM herbicide-tolerant technology in soybeans boosted farm incomes by US\$4.78 billion in 2018, and since 1996 has delivered US\$64.2 billion of extra farm income. Growing GM canola, primarily in North America, generated an additional US\$7.1 billion for farmers between 1996 and 2018.

The benefits of using GM crops are even greater in the developing world, where the average return was US\$4.41 for each extra US\$1 invested in GM crop seed, compared to US\$3.24 in developed countries. This is significant, because 21 of the 26 countries where GM crops are grown are developing nations. Still, they comprise only a fraction of the world's 195 countries. Expensive regulatory barriers have made it difficult for GM technology to reach more of the world's farmers since it was first introduced in the United States in 1996.

"One of the main reasons there's been limited adoption is the high cost associated with bringing the technology to market because of the regulatory requirements that have to be gone through," Brookes told a webinar session organized by [ISAAA](#) on the global impact of GM crops.

“When the technology was first brought in in the 1990s, there was concern about the need to have it properly regulated,” he explained. “Then the regulations came in. And so, in most countries, there are those complicated regulatory requirements which make bringing in the technology very expensive.”

Of the 53 countries in Africa, only South Africa, [eSwatini](#) and South Sudan farmers are currently growing GM crops commercially. Nigeria has approved GM cotton and cowpea and is now distributing the improved seeds to farmers. Kenya and Ethiopia are also in the process of deploying Bt cotton. Though GM crop research is under way in other countries across the continent, regulatory barriers have prevented farmers from accessing the seeds.

“It always sends shivers down my spine to learn that this greener pastured land flowing with milk and honey that colleague farmers in other parts of the world are enjoying from GM crops is something we in Ghana can only see from afar but our feet cannot get access to that same promised land,” young Ghanaian farmer Evans Okomeng of the Graduate Farmers Network told the Alliance for Science.

“It’s unfair. It also represents denial of a basic human right,” he said. “For example, how come a government official who is a novice to my field of experience and lacks skills in nurturing even hot pepper seedlings is the one who sits in an office somewhere to decide what seed I grow on my own field and then chooses to limit my choices?”

Okomeng does not understand why the technology being used by farmers in South Africa, the US, China and some South American nations cannot be made available to Ghanaian farmers to solve problems like pest infestation. He wants African governments to change their stance on GM technology for the benefit of ordinary farmers.

ghana

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Credit: AFS Ghana

“The plight of farmers keeps worsening by the day through annual crop loss, poor yield and long-term impact of pesticides on the health of farmers when health itself is wealth. My appeal to government would be to fast track all processes that would lead to the rapid commercialization of GM crops for farmers to

have a legal choice of planting without any harassment,” Okomeng said.

“Once GM crops have proven themselves economically wise for colleague farmers elsewhere, I believe that when they are commercialized in Ghana, my finances will do better than now, it will reduce the long term impact to my health of over-spraying [pesticides] and also elevate my dignity among my peers within my community,” he added.

The report said that GM insect-resistant [brinjal](#) (eggplant) — a widely consumed vegetable in Bangladesh — is dramatically increasing farmers’ incomes. Bt brinjal is the first GM food crop developed by public sector scientists in South Asia. It was made available to Bangladeshi farmers for commercial cultivation in October 2013. Since then, more than 30,000 small holder farmers have cultivated the crop.

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Farmers are earning 15 to 20 percent higher yields, getting better quality pesticide-free produce —resulting in a 10 percent higher price at the market — and have reported lower costs of pest control equal to about US\$88 per hectare. The cost of the technology since its introduction has to date been zero, with the technology made freely available by the extension service. As a result, the net impact on farm income has been positive, with an average increase in farm income between 2014 and 2018 of US\$658 per hectare for the benefit of farmers.

“A recent [study](#) states Bt brinjal dramatically reduces pesticide sprays and increases income up to six-fold,” Arif Hossain, executive director of [Farming Future Bangladesh](#), told the Alliance for Science. “To me, this is a fact, not misinformed fiction. I have seen farmers spray pesticides 80 to 100 times for conventional brinjal varieties and the same farmers can grow Bt brinjal sparing that number of pest applications in their field. Consumers also prefer buying Bt brinjal because it’s healthier and safer for environment too.”

Hossain noted that farmers were initially neutral in their attitude toward the new crop.

“But when farmers saw the crop’s yield and low input cost, they did not hesitate to get seeds from other farmers or from government extension system,” he added.

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