Debunking Claims That Gene Editing Will Revolutionise Crop Breeding in Africa

Debunking Claims That Gene Editing Will Revolutionise Crop Breeding in Africa

> *"They remind us that older-style GM was also claimed to be precise until gene editing emerged – when GM advocates suddenly turned against older-style GM and admitted it wasn't precise at all. "In reality," the authors point out, "aspects of both genome editing and older techniques of genetic modification are imprecise and haphazard".*"

Article debunks claims that gene editing will revolutionise crop breeding in Africa

by **GMWatch**
January 24, 2023

Gene editing has captured the imagination of academics and professionals working on agricultural development in Africa. They claim the technology has the potential to revolutionise crop breeding, based on assertions of precision, cheapness and speed.

However, these claims are strongly challenged in a new peer-reviewed article by an international group of development experts led by Joeva Sean Rock, Professor of Development Studies at the University of Cambridge, UK. The authors review the evidence and experience of older-style GM crops in Africa, as well as the research findings to date on gene editing. They conclude that unless hard lessons are learned from experience with first-generation GM crops, gene editing projects "are in

danger of repeating mistakes of the past”.

The article is open access and written in an easy-to-understand style, and we recommend reading it in full.

We’ve heard it before

The authors find that the narratives around gene editing closely echo the earlier ones underpinning the introduction of older-style GM crops into Africa: “But the reality of GM crops in Africa has not lived up to the hype”. Problems include the introduction of seeds that demand costly inputs and restrictive crop management regimes, limited inclusion of African scientists and farmers in research and breeding programmes, public–private partnerships (PPPs) that prioritise donor interests over farmer priorities, and inadequate evaluation of the compatibility between GM seed technologies and the farming systems they are supposed to enhance.

Precision? Not exactly

Regarding the supposed precision of gene editing compared with older-style GM techniques, the authors point out that gene editing tools like CRISPR are often used with older-style techniques and that gene editing can insert foreign DNA, either intentionally or unintentionally. In a withering swipe at those who claim gene editing is totally different from, and superior to, older-style GM, they state, “The effort to distinguish genome-edited organisms from GM crops, due to the claimed absence of transgenes, is a goal-oriented discursive strategy deployed by stakeholders who find it expedient to highlight technical differences between the two technologies rather than acknowledge their similarities, or overlaps between them.”

They remind us that older-style GM was also claimed to be precise until gene editing emerged – when GM advocates suddenly turned against older-style GM and admitted it wasn’t precise at all. “In reality,” the authors point out, “aspects

of both genome editing and older techniques of genetic modification are imprecise and haphazard".

Costs and patents

The authors state that genome editing is claimed to have minimal infrastructure requirements and low production costs, making it a widely accessible technology that "democratises" plant breeding. Interestingly, they show that the same claims were made for older-style GM crops as well. But what actually happened is that "Any hope of genetic modification serving as a low-barrier, decentralized technology was dashed by the rise of a highly concentrated biotech industry fortified by strict patent enforcement." Today, four firms – Bayer-Monsanto, ChemChina-Syngenta, BASF and Corteva Agriscience – control over 65 per cent of the global seed market.

Attempts to make some GM crops accessible to African farmers have failed, say the authors: "Only one of these projects – Bt cowpea in Nigeria – has reached the stage of commercialization while several others… remain mired in scientific and regulatory delays". The delays, the authors say, stem from public-private partnerships that prioritised the interests of multinational corporations over those of African scientists and farmers, relied upon unstable funding from international donors, and attempted to operate in countries that lacked permissive legal and regulatory policies regarding biotechnology.

Contrary to claims that gene editing will democratise plant breeding and make it widely accessible, the authors explain that the rapid pace of patenting of the technology "circumscribes the space available for future humanitarian and public-good ventures in genome editing". They write, "The broad array of CRISPR-related patents held by Corteva Agriscience means that future ventures seeking to apply its proprietary techniques or constructs will need to enter into licensing agreements with the company." Summarising the

situation, they state, “The patenting trends underway could result in a concentration of corporate control similar to that which constrained the release of GM technology.”

Speed questioned

The third and final claim underpinning genome editing that the authors challenge is that it is faster, in terms of technical facility and the time it takes to get from lab to market. The authors recall that first-generation GM was also claimed to speed up plant breeding – “But with the advent of genome editing, GM is now being depicted as slow, clunky and cumbersome.” Some advocates claim that gene editing can halve the amount of time needed to complete the breeding process. They also hope that gene editing will escape regulation, further cutting the time needed to get crops to market.

However, the authors caution that these expectations might be unrealistic, due to lack of acceptance of GMOs by politicians and the public in many African countries.

Need to move beyond the genome

The authors conclude that “proponents of new technologies such as genome editing ought to temper big promises” and “move beyond the genome” to “prioritize the co-development of technologies with farmers, seek out non-patented material and acknowledge that seeds are a single component of highly complex agroecological and production systems. Otherwise, no matter how well funded or how valiant the effort, genome-editing projects are in grave danger of repeating mistakes of the past.”

–

The new article:
Rock JS et al (2023). Beyond the genome: Genetically modified crops in Africa and the implications for genome editing. Development and Change https://doi.org/10.1111/dech.12750

Connect with GMWatch

Cover image credit: Royalpixelz