Genetically modified food crops yet to crack India's vast farms

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As the world's second-largest producer of rice, wheat, vegetables and fruit, India is a country that no multinational corporation involved in genetically modified (GM) crops can ignore.

Genetic engineering of crops—where genes are inserted from the same or another organism—can boost a plant's resistance to pests, help it grow in difficult conditions such as drought, and increase its nutrient levels.

So, how is it that multinational firms have failed to make a dent on any leading farm food producer and consumer in India?

The U.S. multinational Monsanto, through an Indian subsidiary, Mahyco, did manage to push through Bt cotton, a non-food. Genetically engineered to produce proteins borrowed from the soil bacterium Bacillus thuringiensis, it is intended to kill the deadly pink bollworm pest.

But that was 20 years ago and no other GM crop, food or non-food, has since gained entry into Indian farms.

Food crops are proving particularly difficult to crack for GM companies. For a start, India's large population of vegetarians, reckoned to be 40% of its 1.4 billion people, do not take kindly to the idea of engineered food in any form on the table.

Secondly, while GM crops are being promoted as a way to save on toxic pesticides, most require the use of herbicides with glyphosate and glufosinate, which are no less toxic.

In 2015, the World Health Organization identified glyphosate as a probable human carcinogen, adding fuel to the debate over the safety of GM crops.

Moreover, additional genes from foreign species are layered in to protect the plants from herbicides which makes them more costly to produce.

The way in which Bt cotton surfaced in India, catching the country's

regulators off-guard and forcing them to approve an accomplished fact, also did not inspire public confidence.

Bt cotton now dominates the 12,000 hectares that India has under cotton farms. However, the pink bollworm pest is beginning to show signs of resisting the Bt proteins, prompting some farmers to return to pesticides.

The stealthy entry of Bt cotton into India galvanized environmentalists and activists into approaching the Supreme Court in 2004 to ensure tighter regulation of all GM crops.

So far, the court, which set up its own expert committee, has not been sympathetic to pleas by government counsel that GM food crops are essential to feed India's large population.

At the last hearing on 29 August, the Supreme Court indicated that it would not be rushed into allowing the planting of GM mustard in the September sowing season.

"One year here or there does not matter," Justice BV Nagarathna, a member of the bench, said.

"This is only one season. Next year there will be another season. However, environmental harm cannot be reversed."

The court was hearing affidavits filed by litigants against the government approval in February of the "environmental release" of GM mustard. Environmental release is a step away from full commercial cultivation.

The government did, however, caution that the matter was under adjudication before the Supreme Court.

U-turn on GM

GM mustard was not the first genetically engineered food crop developed in India and then banned.

Mahyco used genes from the same B.thuringiensis to produce Bt eggplant (also known as brinjal or aubergine) only to see the government ordering a moratorium on sowing, based on feedback from consultations with stakeholders.

Mahyco, though frustrated by the moratorium, successfully negotiated with neighboring Bangladesh to accept Bt eggplant. In 2018, the German conglomerate Bayer bought out Monsanto, gaining control over Mahyco and by 2022 the new owners had secured a similar deal with the Philippines.

The FAO acknowledges concerns over potential risks of GM crops raised by scientists, the public and regulators, including pests becoming resistant to pesticides and GM foods posing safety issues to humans and animals. However, it insists the benefits outweigh these risks.

The FAO says that more than 17 million farmers are planting GM crops in 29 countries and "reaping higher yields with reduced use of pesticides and better management of weeds among other benefits." But that does not sound convincing in India which alone has 120 million farmers.

Pro-vegetarian sentiments, farmers' fears that the accompanying weedicides could destroy other crops planted on a rotational basis, and the demands for tighter and more transparent regulation by litigants have stayed the government's hand.

Litigants cite the case of the herbicide-tolerant (HT) variety of Bt cotton, or HTBt cotton, compelling Indian cotton growers to add weedicides to their growing list of costly farm inputs.

India, a major edible oil importer, was expected to buy up to 14 million tons of edible oil during the September 2022 to October 2023 season. Paradoxically, India is also the world's leading exporter of edible oils—especially mustard oil.

Glyphosate concerns

But closer examination shows that the "white" mustard oil that Indian traders import is actually canola, extracted from rapeseed, a variety of mustard genetically engineered to be herbicide tolerant.

In Canada, where canola is one of the country's leading crops, herbicides, especially glyphosate, save growers the cost of uprooting weeds. Citing the apparent laxity over glyphosate use, a study published January charges Canada's regulators with "embracing industry narratives" and resorting to "opaque decision-making and lack of transparency" to promote commercial interests over the imperatives of public health and environmental protection.

Those are also the charges that litigants are leveling at India's regulators—granting clearances for GM mustard and the glufosinate herbicide that goes with it. Banned in the EU since 2020, glufosinate presents additional dangers to Indians who use not only the oil but also the seeds and leaves in traditional cuisine.

Switching to GM crops to save on pesticides has resulted in growers having to use herbicides—so that it is a toss up between one type of toxic agrochemical and another. GM also typically addresses only a single pest when there are several that demand the use of pesticides.

With the pink bollworm becoming resistant to Bt proteins, the reality is that farmers are far from being free of pesticides—already a costly farm input to which herbicides will need to be added.

For now, the main stumbling block for the proponents of GM food crops is the fact that the Supreme Court's own technical expert committee has strongly recommended a complete ban on herbicide-tolerant crops in the country.

Since the government has preferred to leave the matter to the court, it is safe to say it could take years before GM food crops enter India's farm gates.

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