

The GMO Issue Reaches Boiling Point in India. The Devastating Impacts of Genetically Modified (GM) Crops

Conversation with Aruna Rodrigues

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In a [recent article](#) published on the India-based News18 site (CNN), prominent US biologist Nina Federoff was reported as saying it is time for India to grant farmers access to genetically modified (GM) crops. In an interview with the site, she says there is no evidence that GM crops are dangerous when consumed either by people in food or by animals in feed. Federoff says that the commercial release of various GM crops in India has been halted by the Indian government due to opposition from environmental activists.

She adds that we are rapidly moving out of the climate regime in which our primary crops were domesticated, arguing that that they do increasingly worse and will yield less as temperature extremes become common and pest and pathogen populations change. She says GM will become more or less essential in an era of climate change.

In recent weeks, aside from Federoff's intervention, GM has been a hot topic in India. In late November, a paper appeared in the journal [Current Science](#) which argues that India doesn't need GM crops and that the track record of GM agriculture is highly questionable. The paper is notable not just because of what it says but because of who is saying it: distinguished scientist P.C. Kesavan and M.S. Swaminathan, renowned agricultural scientist and geneticist and widely regarded as the father of the Green Revolution in India.

I recently spoke with prominent campaigner Aruna Rodrigues about developments surrounding the GM issue in India, particularly the views of Federoff. Rodrigues is lead petitioner in a case before India's Supreme Court that is seeking a moratorium on GM crops and selective bans.

CT: What do you make of Nina Federoff's recent comments advocating for GM in India?

AR: Nina Federoff is a long-time supporter of GMOs. The last time she offered advice to India (in her role as scientific advisor to Hilary Clinton) was when Bt brinjal (eggplant) was being pushed for commercialisation. She advised that Bt brinjal would be good for India!

CT: She is a high-profile scientist. Did government officials take her advice?

AR: Her advice was straightforwardly ignored by the then Minister of the Ministry of Environment and Forests Jairam Ramesh. He instituted a unique four-month scientific enquiry and public hearings. His decision to reject the commercialisation of Bt brinjal was

supported by advice he received from several renowned international scientists. Their collective appraisals demonstrated serious environmental and biosafety concerns, which included issues regarding the toxicity of Bt proteins resulting from their mode of action on the human gut system.

CT: What were some of the other reasons they put forward for rejecting Bt brinjal?

AR: Genetic contamination was the outstanding concern. India is a centre of origin of brinjal with the greatest genetic diversity. Contamination was a certainty. In his summing-up of the unsustainability of Bt brinjal and of its implications if introduced, one of the experts involved, Professor Andow, said it posed several unique challenges because the likelihood of resistance evolving quickly is high. He added that without any management of resistance evolution, Bt brinjal is projected to fail in 4-12 years. Jairam Ramesh pronounced a moratorium on Bt brinjal in February 2010 founded on what he called “a cautious, precautionary principle-based approach.”

CT: So, it is clear that, despite Federoff’s claims, there are valid reasons why GM has not been commercialised in India, aside from cotton that is. Can you say something about the health safety aspects of GM crops? Federoff says GM crops are safe for human and animal consumption. Is she correct?

AR: She is wrong. There are numerous studies that indicate the possibility of harm. All the major scientific bodies of the world, including the US National Academies, the World Health Organisation and the American Medical Association, agree that the potential for adverse effect is real and that these crops, both existing, but especially any new ones, need to be tested more thoroughly than they have been in the past (for example, for long-term toxicity for cancer). Meanwhile, agroecology that minimises the use of pesticides and uses no GMO has a proven safety and nutritional record and out-yields GMOs at a fraction of the cost.

CT: Federoff makes a blanket claim about safety. But each genetic modification poses unique risks and as a technology, according to molecular geneticist Michael Antoniou, GM is [fundamentally scientifically flawed](#). So, it is impossible to say up front that they are all safe – or in fact that the ones on the market have been rigorously tested because they have not. But a food crop isn’t just eaten. There are effects on the environment too.

AR: Federoff fails to address all the ways GM crops can be unsafe. Existing GM crops do not have a history of safe use in the environment. Even a cursory examination of the US cropping system is enough to prove that the legacy of pesticidal GM crops has fuelled the epidemics of herbicide- resistant weeds and emerging insecticide resistant pests. This proves that you cannot rescue scientifically flawed ways to farm by introducing GM technologies that only exacerbate the most damaging farming practices.

CT: Federoff claims that we need GM if we are to mitigate the effects of climate change and produce sufficient food.

AR: This is rubbish. Agroecology has demonstrated far more effectiveness already than even the best hypothetical hopes of GM crops. But more to the point: it is the machine we call industrial agriculture that is a major cause of climate change. Giving that machine more fuel in the form of GM crops is not a solution but a dangerous distraction from what is needed to halt climate change.

CT: The paper by Kesavan and Swaminathan coincided with a mass march by farmers in Delhi at the end of November. Farmers in India have a list of grievances, with the effects of Bt cotton being a prominent one. Surely, given the devastation caused by Bt cotton (which these two authors say “has failed in India”), to introduce more GM crops at this time would cause further hardship for farmers. The paper by these two eminent scientists could be seen as a timely intervention.

AR: It is certainly courageous of Nina Federoff, given the failure of Bt cotton and her earlier unfortunate advice, to indulge in yet another round of misconceived guidance to the Indian government. I must also express disquiet and surprise that a bold charge has been levelled against that paper by Prof Vijay Raghavan (Scientific Advisor to the PM), which he says is “deeply flawed”. It is expected that any such statement is buttressed with sound data and science, especially when addressing scientists of the stature of Swaminathan and Kesavan. Therefore, without substantiation, a specific response to Raghavan is not possible.

However, it is relevant to the context to state that Bt cotton has failed and within a time-scale of less than 12 years. We need only look at the work of [Dr. K Kranthi](#), ex Director of the Central Institute for Cotton Research, and [Prof Gutierrez et al](#) in the paper ‘Deconstructing Indian cotton: weather, yields, and suicides’.

CT: It was predicted that Bt brinjal would fail within 4-12 years. It seems that’s precisely what has happened to Bt cotton in India. So, the last thing India needs is another ill thought out GM experiment pushed through without proper independent assessments that consider health and environmental outcomes or the effects on farmers’ livelihoods and rural communities. But isn’t this what is on the horizon? You have for many years been highlighting flawed regulatory mechanisms in India where GM is concerned. I have been following the current case concerning herbicide-tolerant (HT) GM mustard. It is disturbing to say the least to read about deep-rooted conflicts of interest across the entire regulatory framework and what you describe as ‘regulatory delinquency’ as well as scientific malfeasance on such a massive scale.

AR: Collective regulatory misadventures with Bt cotton must indict the regulators for ‘connected’ farmer suicides in rain-fed Bt cotton cultivation. They must take responsibility. Despite this history of regulatory adventurism with hybrid Bt cotton and Bt brinjal, this has not deterred our regulators as they attempt to introduce HT GM mustard. It is sobering that documents in the public domain reveal clear cover-up, invalid and even fraudulent field trials, the results of which were nevertheless accepted by the regulators. Perhaps, the greatest regulatory mystery surrounds the fact that the regulators themselves admit that there is no claim made by the government that HT (GMO) hybrid mustard out-performs non-GMO hybrids. Therefore, there is no ‘need’ for this GM Mustard. ‘Need’ must be established as a prior regulatory step in risk assessment.

CT: Nina Federoff says that what is preventing the widespread adoption of GM in India is political disagreement and activists. This is a well-worn tactic: try to cast valid criticisms of GM as ‘unscientific’ and politically motivated. But as you have outlined, there are valid reasons why the introduction of GM food crops is being prevented in India.

AR: It is proven in copious evidence in the Supreme Court in the last 13 years that our regulators are seriously conflicted: they promote GMOs openly, fund them (as with HT mustard and other public sector GMOs) and then regulate them. Truth is a massive casualty. This is not lightly stated. It would also be prudent to recognise that unsustainable HT and Bt

crops (Bt maize in industrial systems in the West) and failed hybrid Bt cotton in India serve to put farmers on a pesticide treadmill as increasing levels of pest resistance becomes manifest. In fact, a [new paper](#) in the journal Pest Management Science based on research over a seven-year period shows progressive field-evolved resistance of pink bollworm to Bt cotton in India.

We also have a [new paper](#) by Prof Andrew Paul Gutierrez in which he concludes that extending implementation of the hybrid GM technology to other crops in India will only mirror the disastrous implementation of Bt cotton in the country, thereby tightening the economic noose on still more subsistence farmers for the sake of profits.

CT: Federoff and others are fond of making claims about what GM has or will achieve. GM crops have been on the market for over two decades. Do you see any validity in these types of claims?

AR: Most GMOs on the market now provide technological fixes to kill weeds or pests. They have no trait for yield. Together, they account for nearly 98% of all GMOs planted worldwide. 25 years of official US data on HT crops show they have led to intractable problems of super weeds, significant increases in herbicide use because of resistant weeds, higher farmer costs and no yield advantage. Claims made for GMOs with various traits, for example, drought or saline resistant or providing yield or nutritional enhancement, are futuristic. The few that have been tested for drought resistance and some other traits are according to prominent scientist Doug Gurian-Sherman [out-performed by traditional breeding techniques hands-down](#).

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