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Pushing GMO Crops into India: Experts Debunk High-Level Claims of Bt Cotton Success

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On 6 July 2020, an article extolling the benefits of genetically modified (GM) crops appeared on the BloombergQuint website based on an interview with Dr Ramesh Chand, a member of the key Indian Government think tank Niti Aayog (National Institution for Transforming India). On 17 July, another piece that placed a positive spin on GM crops and gene editing technology (Feeding 10 Billion People will Require Genetically Modified Food) appeared on the same site.

According to Prof Andrew Paul Gutierrez, Dr Hans R Herren and Dr Peter E Kenmore, internationally renowned agricultural researchers, the pieces reported "sweeping unsupported claims" about the benefits of and need for genetically modified organisms (GMOs) and related technologies in agriculture in India.

The three academics felt that "a responsible and factual response" was required and have written a letter – containing what could be described as the definitive analysis of Bt cotton in India – to Dr Ramesh Chand, Dr Rajiv Kumar (Niti Aayog Vice Chancellor) and Dr Amitabh Kant (Niti Aayog CEO).

Chand is reported as saying that there is no credible study to show any adverse impact of growing Bt cotton in the last 18 years in the country (India's only officially approved GM crop). This is simply not the case. Moreover, Gutierrez et al argue that all of the credible evidence shows any meagre increases in cotton yield after the introduction of Bt cotton in 2002 were largely due to increases in fertiliser use.

Before proceeding, it is pertinent to address the claim that 'feeding 10 billion people will require genetically modified food'. If we take the case of India and its 1.3 billion-plus population, it has achieved self-sufficiency in food grains and has ensured that, in theory at least, there is enough food available to feed its entire population. It is the world's largest producer of milk, pulses and millets and the second-largest producer of rice, wheat, sugarcane, groundnuts, vegetables and fruit.

However, food security for many Indians remains a distant dream. Hunger and malnutrition remain prevalent. But that is not because farmers don't produce enough food. These problems result from other factors, including inadequate food distribution, social and economic policies, inequality and poverty. It is a case of 'scarcity' amid abundance (reflecting the situation globally). India even continues to export food while millions remain hungry. Productivity is not the issue.

And while proponents say GM will boost productivity and help secure cultivators a better income, this too ignores crucial political and economic contexts; with bumper harvests,

Indian farmers still find themselves in financial distress. India's farmers are not experiencing hardship due to low productivity. They are reeling from the effects of neoliberal policies and years of neglect. It's for good reason that the calorie and essential nutrient intake of the rural poor has drastically fallen.

Yet the pro-GMO lobby has wasted no time in wrenching these issues from their political contexts to use the notions of 'helping farmers' and 'feeding the world' as lynchpins of its promotional strategy.

Valid concerns

The Chand interview occurred at a book release event for a new volume titled 'Socio Economic Impact Assessment of GM crops: Global Implications Based on Case Studies from India' edited by Sachin Chaturvedi and Krishna Ravi Srinivas of the Delhi-based Research and Information System (RIS) for developing countries – a policy research think tank in the Ministry of External Affairs.

Gutierrez et al state that what Niti Aayog and RIS representatives say and write are existentially important because of their deep links to Indian policy makers: their views can have a large impact on the future development of policy in the area of genetic engineering and related technologies such as genomic editing, which will affect the long-term health, livelihood and welfare of Indian farmers and the nation.

Chand posits that opposition and uncertainty to GM technology lingers because it has created fear in the minds of people. He appears to imply this is one reason why the Indian government did not embrace the technology and that media reporting has relied more on activists than on scientists.

GMO biotech lobbyists have often stated that science has been sidelined by activists who have swayed the policy agenda.

In the journal Current Science (September 2019), Dr Deepak Pental responded to a previous paper in the same journal by eminent scientists P C Kesavan and M S Swaminathan, whose piece cited good evidence that questioned the efficacy of and the need for GMO agriculture in India. Pental argued that the two authors had aligned themselves with environmentalists and ideologues who have "mindlessly" attacked the use of GM technology and that aspects of their analysis are a reflection of their "ideological proclivities".

However, in India it was a unique four-month scientific enquiry, not activism, that led to the rejection of the commercialisation of Bt Brinjal in 2010. And if we look at Europe, robust regulatory mechanisms are in place for GMOs as it is agreed they are not substantially equivalent to their non-GM counterparts. Numerous studies have highlighted the flawed premise of 'substantial equivalence'. Furthermore, from the outset of the GMO project, the sidelining of serious concerns about the technology has occurred and, despite industry claims to the contrary, there is no scientific consensus on the health impacts of GM crops.

Both the Cartagena Protocol and Codex share a precautionary approach to GM crops and foods in that they agree that GM differs from conventional breeding and that safety assessments should be required before GMOs are used in food or released into the environment.

These concerns cannot be brushed aside as being non-science based. Such accusations are

political posturing, part of a strategy to slant the policy agenda and divert attention away from evidence that leads to the questioning of the safety, environmental impacts and record of GM crops.

False narrative of Bt cotton

Gutierrez et al also comment on the Chaturvedi–Srinivas book in their letter and note that, in contrast to pro-GMO statements about the book reported in the press, most of the chapters contain some points that temper or criticise this over-simplified enthusiasm.

In reviewing the book, the three researchers note the general policy position, that Bt cotton benefits smaller and poorly connected farmers, is not always supported by the case study data presented. Moreover, Bt cotton yields were not necessarily higher (than non-Bt cotton) for all farmers and even when economic gains occurred, it was not demonstrated that those gains came from Bt traits: higher fertiliser levels usually increased yields.

Bt cotton is also not scale neutral: it has mainly benefited larger farmers and high Bt cotton seed prices are a big concern for many farmers as are monopolistic pricing practices.

Gutierrez and his colleagues conclude that the RIS volume cited gains in yield and reductions in insecticide use in Bt cotton that are inaccurate.

They add:

> "… a failed picture emerges of an unsustainable eco-social Bt cotton system based on a dystopic relationship between those who control and sell the inputs, and the vast majority of farmers… Nowhere in the volume is there mention of potential viable non-GMO alternatives."

The three researchers note that at least 25-30 peer reviewed papers have been published recently in India from almost all the agricultural universities dealing with cotton, validating the short-season high-density (SS-HD) concepts using non-Bt varieties. In all the studies, SS-HD plantings invariably got the highest yields, clearly pointing to the inappropriateness of the current long-season low-density hybrid system. Yet, none of these studies were cited in the Chaturvedi–Srinivas RIS volume.

Gutierrez et al note that hybrid cottons unique to India were introduced in the mid-1970s purportedly to increase yield and quality, but the hybrid seed is considerably more expensive, the plants require more fertiliser and stable water and the hybrid technology serves as a value capture mechanism requiring annual purchases of seed.

They argue that Indian farmers are planting inappropriate long-season hybrid cotton varieties at inappropriate low planting densities due to high seed costs, which contributes to low yield stagnation.

They also provide an overview of how, in long-season hybrid cotton, insecticide use caused ecological disruption, inducing outbreaks of secondary insect pests:

> "Farmers were spending money on insecticides to lose money from (insecticide) induced pests… While the Bt technology initially solved the bollworm problems, outbreaks of secondary pests not controlled by the Bt

> toxins began to occur, again increasing insecticide use in Bt cotton that by 2013 surpassed pre-2002 levels. This caused ecological disruption and induced outbreaks of still newer secondary pests… and increased levels of resistance to insecticides. By 2013, Indian farmers were solidly on both the insecticide and biotechnology treadmills."

The three researchers conclude that Bt cotton did not increase yields but did contribute to increased cost of production in the face of stagnant yields, leading to economic distress.

They argue that hybrid Bt cotton in India is a failure or at best very suboptimal for farmer welfare and say that HD-SS non-GMO pure line rainfed cotton varieties have been developed in India that could double yield and triple net income. The potential exists for development of even higher yielding HD-SS non-hybrid non-GMO varieties in India, which would allow seed saving by Indian farmers.

However, they assert that this approach has been sidelined: we now see hybrid Bt cotton falsely being used as an example of success and as a template for rolling out GMOs, gene editing and other technologies across Indian agriculture.

On 12 August 2013, an article in The Hindu ('Nip this in the bud') noted that the Ministry of Agriculture, the Indian Council of Agriculture Research and the Ministry of Science and Technology were deeply compromised due to their strong and active ties with the GMO biotech industry. Indeed, Monsanto had been granted access to agri-research public institutions, which had placed that company in a position to seriously influence policy. By 2014, 95 per cent of cotton grown in India was GM and non-GM seeds had almost disappeared from the market.

The push is now on to see a similar value-capture scenario take root with genetically engineered food crops based on a myth of Bt cotton success, which has in recent years been promoted by a number of government officials in India. Science and reason (and farmers and the public) are in danger of being sacrificed for the "ideological proclivities" of key figures and bodies directly linked to national policy making.

The letter mentioned in this article can be read in full on the GMWatch.org website. It contains a more in-depth analysis of Bt cotton in India than presented here, including numerous graphics and references to key studies.

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