

Genetically Modified Bt Cotton: Cultivating Farmer Distress in India

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Later this month, India's Supreme Court will hold a lengthy hearing on the commercialisation of genetically modified (GM) mustard, which would be the country's first GM food crop. The court has asked the chair of the Technical Expert Committee to be present and says that the decision on GM mustard cannot be kept pending. The TEC has come out against using genetically modified organisms (GMOs) in Indian agriculture.

As lead petitioner in a public interest litigation challenging the government-backed push to commercialise this crop, **Aruna Rodrigues** has over the past few years submitted much evidence to the court alleging the science and field tests for GM mustard have been fraudulent and the entire regulatory regime has been dogged by malfeasance and a dereliction of duty.

To date, cotton is the only officially sanctioned GM crop in India. Those pushing for GM food crops (including the government) are forwarding the narrative that GM pest resistant Bt cotton has been a tremendous success which should now be emulated with the introduction of GM mustard. Ever since its commercialisation in 2002, however, the issue of Bt cotton in India has been a hotly contested issue. Bt cotton hybrids now cover over 95% of the area under cotton and the seeds are produced by the private sector. But critics argue that Bt cotton has negatively impacted livelihoods and fuelled agrarian distress and farmer suicides.

In a recent piece appearing in 'The Hindu', Imran Siddiqi, an emeritus scientist at the Centre for Cellular and Molecular Biology in Hyderabad, argued that India's cotton yields fall behind those of other major cotton producing countries. He attributes this to the decision to use hybrids seeds made by crossing two parent strains having different genetic characters. These plants have more biomass than both parents and capacity for greater yields. But they also require more inputs, including fertiliser and water, and require suboptimal planting (more space). Siddiqi notes that all other cotton-producing countries grow cotton not as hybrids but varieties for which seeds are produced by self-fertilisation.

A key difference is that varieties can be propagated over successive generations by collecting seeds from one planting and using them for the next. For hybrids, farmers must purchase seed for each planting. Using hybrids gives pricing control to the seed company and also ensures a continuous market.

Siddiqi says that the advantages of varieties are considerable: more than twice the productivity, half the fertiliser, reduced water requirement and less vulnerability to damage

from insect pests due to a shorter field duration. He concludes that agricultural distress is extremely high among cotton farmers and the combination of high input and high risk has likely been a contributing factor.

Meanwhile, seed companies and Monsanto that issued licenses for its Bt technology have profited handsomely from an irresponsible roll-out to poor marginal farmers who lacked access to irrigation and the money to purchase necessary fertiliser and pesticides. Bt hybrids perform better under irrigation, but 66% of cotton in India is cultivated in rain fed areas, where yields depend on the timing and quantity of variable monsoon rains. Unreliable rains, the high costs of Bt hybrid seed, continued insecticide use, fertiliser inputs and debt have placed many poor smallholder farmers in a situation of severe financial hardship. Prof [A P Gutierrez argues that](#) Bt cotton has effectively put these farmers in a corporate noose.

Cultivating knowledge

It was against this backdrop that Andrew Flachs conducted fieldwork on cotton cultivation over four consecutive cotton growing seasons during 2012-2016 and a later visit in 2018 in the South Indian state of Telangana. His new book 'Cultivating Knowledge: Biotechnology, Sustainability and the Human Cost of Cotton Capitalism in India' (University of Arizona Press 2019) is based on that research.

A trained environmental anthropologist and assistant professor at Purdue University in the US, Flachs draws on anthropology and political ecology to show how the adoption of GM seeds affects livelihoods, values and identities in rural areas. By looking at everyday relationships and how farmers make choices, Flachs avoids falling into the pro/anti-GMO dichotomy that has polarised the debate on Indian cotton for the past 18 years. Instead, he looks at farmers' aspirations, what it means to 'live well' and what 'sustainability' means in the everyday world of cotton cultivators.

Although some critics of GM cotton claim that the technology is directly responsible for fuelling suicides and farmer distress, Flachs is careful to locate the narrative of agrarian crisis against the overall backdrop of neoliberal reforms in Indian agriculture, the withdrawal of public sector extension services and exposure to commercial seed, pesticide and unstable global commodity markets (and spiralling input costs).

In an increasingly commercialised countryside, independent cultivators have become dependent on corporate products, including off-farm commodified corporate knowledge. In the past, they cultivated, saved and exchanged seeds; now, as far as cotton cultivation is concerned, they must purchase GM hybrid seeds (and necessary chemical inputs) each year.

Flachs mentions former Minister of Agriculture Sharad Pawar who once stated that farmers decide to use GM cotton seeds based on rational decision making because GM gives better yields. Indeed, this kind of thinking underpins much of the rhetoric of the pro-GMO lobby. But such decision making is far from the truth (moreover, Prof Glenn Stone [has shown](#) how 'facts' about yields have been constructed and that these 'facts' become mere distortions of the actual reality)

With hundreds of different GM seeds brands available in local seed stores, it becomes clear in 'Cultivating Knowledge' that environmental learning and the type of decision making

referred to by Pawar do not exist. Confusion, social learning, 'herding' and emulation are the norm. Seed choices are not based on rational, cost-benefit decision making whereby farmers plant and compare crop performances and opt for the best ones. Their choices of seeds are based on the advice of (unscrupulous) seed vendors, newspaper reports, advertising and what other farmers are opting for.

Caste and social status play a major role in who is listened to, who is emulated and who is given short shrift by seed vendors. If a (high status) farmer opts for a certain seed, for example, another farmer will emulate. But even the high status farmer is not necessarily basing his seed decision of testing in the field: he too is emulating others, opting for whatever brand is 'popular' that season.

Similarly, Flachs notes that if your neighbour sprays pesticides four times a day, you do it five times to be 'responsible', to make sure you are taking care of your crop; to make sure you don't become infested and are then seen as the culprit for allowing your neighbours' fields to be infested too. This, even though you overuse dangerous chemicals and become contaminated with pesticide spray or your food crop that your kids will eat becomes contaminated.

As Flachs implies – in a runaway neoliberal landscape, these types of risks (the overuse of pesticides, taking out loans, seed preferences) become regarded as 'natural', as the outcome of individual choices, rather than the expression of political structures or macro-economic policies. In the brave new world of neoliberalism that India began to embrace in the early 1990s, responses to the 'invisible' hand of the market, the performance of questionable on-farm practices and financial distress have therefore been internalised and have become associated with a notion of personal responsibility, which can result in self-blame, shame and even suicide.

Flachs notes that many cotton farmers also grow food crops. Here, in stark contrast to cotton, farmers still activate their own indigenous knowledge and environmental learning about seeds and cultivation, not least because they tend to still save their (non-corporate) seeds. For now, at least, the predatory commercialisation of the countryside has not yet penetrated every aspect of rural life.

While Bt cotton farmers are losing their traditional knowledge and skills, Flachs says they still have to make decisions and 'perform' the act of farming, taking into account potential risks and what other farmers are doing.

For cultivators of Bt cotton, chasing the dream of a better life means striving for higher yields, even if this entails greater debt and rising input costs. And each year, as fresh seed brands appear, in the hope of hitting a jackpot yield, Flachs indicates that last year's brand is ditched in favour of a new one. In the meantime, debts increase and maybe one in four seasons a farmer will attain a good enough yield to break even.

In 'Cultivating Knowledge', negotiating risk and gambling on seeds, weather and pesticide use are very much part of what has become a chase for 'better living' and an integral part of the corporate cotton seed and chemical treadmill. Gambling more or less everything certainly does not bode well for poor, marginalised farmers. And it's a treadmill that is difficult to get off – even though Bt cotton was sold under the promise of reduced pesticide use, levels of usage are now higher than before Bt cotton was introduced but non-GM seeds have all but disappeared from seed shops.

Whether farmer's lives have improved because of the GM technology – or to be precise, the way it has been rolled out – is open to debate, especially if we consider what Gutierrez says about the corporate noose around farmers' necks and also consider alternative possibilities (for instance, GM straight line varieties), which could have been pursued. Moreover, as Flachs notes, with a glut of cotton, does the world need more of it anyway? Perhaps farmers – aside from adopting different routes for cotton cultivation – would have been better served by planting food crops. These are the 'counterfactuals' that seem to be overlooked when discussing GM cotton in India.

Cotton cultivation (including organic cotton growing which Flachs also discusses) in India is very much a social performance. Flachs indicates that the field is a stage where notions of community obligation and personal aspiration are played out within the context of heavily socially stratified communities.

Key to this performance is the concept of sustainability. Both sides of the GM debate talk a good deal about sustainable agriculture. But Flachs discusses what sustainability means to farmers. Is it about a quest for higher yields above all else? Or is it about debt-free sustainable livelihoods and ecological care of the land. In the chase for yields – set against rising input costs, debt, the threat of bankruptcy and suicide, a free-for-all GM seed market with often unscrupulous vendors, the increasing use of dangerous pesticides – what are the impacts on farmers' quality of lives?

Is the outcome 'better living' for farmers and their families? Or does an air of desperation or insecurity prevail within cotton cultivating communities? These are the questions that readers will be compelled to ask themselves while reading 'Cultivating Knowledge'. And it will become clear just what the human cost of cotton capitalism for many Indian farmers really is.

When people talk about rolling out GM food crops to uplift the conditions of farmers and make farming more 'sustainable', they should abandon such generalisations and consider how farmers and farming communities face up to the challenges of increasing pest resistance, dependency on unregulated seed markets, the eradication of environmental learning, a lack of extension services and the loss of control over their productive means.

As Andrew Flachs says:

"Given that intimate local ecological knowledge has been shown to be crucial for sustainable endeavors, the GM seed market erodes rather than builds local efforts at sustainability... These seeds make cotton farming less sustainable on Telangana cotton farms because they have created a system in which farmers can't learn much about their seeds or apply that knowledge when they're at the market buying seeds next year."

For Flachs, organic cotton production (that also has its own set of issues to deal with), which provides safety nets and encourages ecologically and socioeconomically beneficial practices on farms, can help redefine what 'success' means in Indian cotton. While this may not in itself address the structural nature of the agrarian crisis, Flachs concludes that it offers some hope for incentivising local knowledge and technology that allows farmers to live well – and most importantly, to live well on their own terms.

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