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**Commentary / Комментарий**

# Genetically Modified Crops: A Step Forward or Catastrophe?

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## Abstract

For thousands of years India has been producing plants with desirable traits by conventional breeding methods. Through controlled cross breeding, several generations of our indigenous farming families have not only identified and selected but have also combined and propagated plants with favorable characteristics. This has been succinctly put by Viva Kermani, the environmentalist, in the following way: 'Indian farmers have legitimate claims to be scientists, innovators, natural resource stewards, seed savers and hybridization experts.' It is, therefore, ironical and agonizing that even though non-genetically modified agriculture is inextricably intertwined with Indian culture, history and ethos, and India produces enough to satisfy the hunger of its masses, there has been a push to promote genetically modified crops [GMCs] in India. Mammoth seed MNCs are greedily waiting to prey upon our multi-billion rupee seed market. This will create havoc with the lives of our farming communities; human, animal and plant life; agriculture and food safety and security; environment; and our rich bio-diversity.

What are GMCs? Is there a need for such crops in India? Are there any risks related to GMCs? Do case studies support the mythical advantages of GMCs? What is the road ahead for India? This paper raises these questions.

**Keywords:** genetically modified crops, agriculture, India, biosafety

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# Генетически модифицированные культуры: шаг вперед или катастрофа?

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**Аннотация**

На протяжении тысячелетий в Индии выращивались растения с желаемыми характеристиками традиционными методами селекции. Несколько поколений семей из числа коренных народов, производителей сельхозпродукции, не только находили и отбирали, но также объединяли и разводили растения с благоприятными характеристиками посредством контролируемого скрещивания. По словам защитника окружающей среды Вивы Кермани, «индийские фермеры имеют законные претензии на то, чтобы быть учеными, новаторами, распорядителями природных ресурсов, хранителями семян и экспертами по гибридизации». Хотя генетически не модифицированное сельское хозяйство неразрывно связано с индийской культурой, историей и этикой и Индия производит достаточно, чтобы утолить голод своих масс, в Индии наблюдается тенденция к продвижению генетически модифицированных культур (ГМК). Огромные транснациональные корпорации с жадностью ждут возможности захватить наш многомиллиардный рынок семян. Это создаст хаос в жизни наших фермерских сообществ; жизни людей, животных и растений; сельском хозяйстве и продовольственной безопасности; окружающей среде и нашем богатом биоразнообразии.

Что такое ГМК? Есть ли необходимость в таких культурах в Индии? Существуют ли какие-либо риски, связанные с ними? Подтверждают ли тематические исследования мифические преимущества ГМК? Какой путь ждет Индию? Данная статья поднимает эти вопросы.

**Ключевые слова:** генетически модифицированные культуры, сельское хозяйство, Индия, биобезопасность

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## Introduction

With its huge pool of bio-diversity, India is the owner of innumerable seeds, plants, crop varieties and other genetic material. Under the traditional farming system and mixed cropping pattern, our small-scale subsistence farming communities have generated this bio-diversity by identifying, domesticating, breeding, improving and conserving plant varieties. These farm families have also identified unique traits such as: high yields, disease resistance and resistance to environment conditions in these plants; and modified and improved agriculture by crossing and selection.

It is a paradox that at a time when sustainable farming and low-input agriculture is the need of the hour, India, instead of adopting an even more sustainable, ecological and organic agriculture as the way forward, is being swayed by the false propaganda that only GMCs, with their increased yields and decreased use of pesticides, will save the country from hunger. In reality this is a result of food inequity and wrong agricultural trade policies and not food insufficiency.

## What are GMCs?

A genetically modified organism is a living organism[1] whose genetic material has been altered by inserting a gene which imparts new properties the organism never possessed earlier. For example, bacteria is not capable of producing human insulin, but if, by genetic engineering, its DNA is altered by inserting in it a gene for human insulin, it becomes capable of producing human insulin in commercially exploitative quantities. Genetically modified organisms are used to produce medications, pharmaceutical agents, bio-fuels, industrially useful goods and genetically modified foods. The first GM mouse was created in 1974; the first GM plant for antibiotic-resistant tobacco in 1983; and the first GM food, the FlavrSavr tomato[2], in 1994.

GMCs are plants which have genes, derived from other species, transplanted into them to impart attributes of those species. The inserted genes can be from species found in the same kingdom,[3] for example plant to plant, or between kingdoms,[4] for example bacteria to plant.

In advanced countries, hundreds of plant varieties, especially cash crops which are in high demand such as soybean, cotton, maize, canola, corn, have been engineered by importing genes from other species. More than ten per cent of the world's arable land is said to be under GMCs. The principal producers of GMCs are the US, Argentina, Brazil, China and Canada. In the US, 94 per cent of the planted area of soybean, 96 per cent of cotton, and 93 per cent of corn are GM varieties.[5]

In 2015, thirty eight countries, of which nineteen from the EU, banned GMCs.

It has been projected that the purpose of genetically modifying a plant is to intro-

[1] It may be a micro-organism or a plant or an animal.
[2] The anti-freeze gene from the cold water fish was injected into the tomato to make it frost resistant, thereby increasing its shelf life by preventing it from softening after ripening. Being unsuccessful, it was withdrawn from the market.
[3] Cisgenic plants.
[4] Transgenic plants.
[5] https://en.wikipedia.org accessed on 26 may 2017.

duce a new beneficial trait, property or function in that plant which does not occur naturally by mating and/or natural recombination in that specie. Examples of new traits in GMCs include: high yield; increase in shelf life[6]; resistance to disease, pests[7] and weeds[8]; resistance to environmental uncertainties such as drought,[9] soil salinity, frost, temperature; reduction in spoilage[10]; and improving the profile, especially the nutrient profile of the crop.[11]

## Mythical Advantages of GMCs Belied

Tall claims such as: higher yields; less use of resources like land, water and pesticides; reduced farm costs; increased farm profits; improved nutritional content in food; improved soil and environment conditions and lower food prices are made to promote GMCs. Most of these claims are based on flawed studies that are not peer reviewed. Often the sample sizes are small or the duration of the study is too short. Further, the majority of these studies are funded by seed corporations with a vested interest. None of the studies are published in academic journals. Further still, claims are made even though the risks related to GM food have neither been adequately examined, nor the GM foods sufficiently tested by independent health experts and scientists.

It is shouted from the roof tops that GMCs will produce more food sustainably whilst using fewer resources, they will provide a healthier environment by saving on pesticides, decrease greenhouse gas emissions and increase crop yields substantially. Advocates argue that the introduction of GMCs will help meet the food demands of the ever increasing world population and eradicate hunger and malnutrition. It may now be known that our planet produces more than enough food to satisfy everyone's hunger. There is a staggering food surplus. The issue is not of food sufficiency but of food justice. Only those who can afford food, can have it. There is hunger amidst plenty. Food is wasted. Half of the food produced in the US is thrown away. The same is the case in many of the European countries. India is no better. This discarded food can be used to feed millions living in abject hunger in other parts of the world. GM food is being cultivated not out of any concern for the distressed millions who go to bed on an empty stomach. It is an attempt to satisfy the insatiable greed of a handful of seed corporations.

Moreover, claims by agri-business that GM seeds will give better yields, benefit soil and agriculture, and counter climatic vagaries have proved false. In the US and Canada, where GMCs were welcomed with open arms, the yields did not increase nor did the dependence on pesticides decrease. On the contrary, Europe which did not adopt GM technology did better.[12] In India too, the non-Bt cotton

[6] FlavrSavr tomato.
[7] Bt cotton, Bt potato, Bt maize.
[8] Tobacco engineered to be resistant to herbicide bromoxynil; soybean engineered to resist weeds.
[9] DroughtGard maize resistant to drought.
[10] Potato engineered to prevent bruising and consequent spoilage.
[11] Arctic apples that prevent browning of the fruit after it is sliced open; wheat free of gluten, a major cause of allergy; vegetables with higher vitamin A content to fight heart diseases; golden rice genetically engineered to contain vitamin A and iron to prevent nutritional deficiency.
[12] Hakim, D. (2016). Doubts About the Promised Bounty of Genetically Modified Crops. *New York Times*, 29 October.

varieties gave similar quantities of yields as the Bt-cotton variety. The use of pesticides has gone up tremendously in India with the cultivation of Bt variety. Even in China the farmers have had to apply twenty times more chemicals to control cotton pests. It is ironical that the Bayer-Monsanto combine will now sell both, the harmful GM seeds as well as the toxic pesticides.

Consequently, farm costs have increased, farm profits reduced and food prices increased. Instead of the cotton farmers earning more, Bt cotton resulted in suicides by huge numbers of Indian cotton farmers, who were indebted due to high prices of Bt cotton seeds and the failure of the Bt variety. The soil and environment too have borne the brunt of genetic engineering. Our scarce and valuable resource like land is being endangered by open air trials of GMCs resulting in shrinkage of bio-diversity and contamination of our organically grown food crops by the GMCs.

Monsanto, the champion of GMCs, was compelled to leave Europe because of the mass protest against GMCs. The company had to cut its workforce and pay millions in compensation for the irreparable damage caused by its GM seeds. India too should insist on compensation from Monsanto for all the damage it has caused to our farmers, agriculture and environment.

## Risks related to GMCs

GMCs have raised valid concerns all over the world. The loss caused by them can have cascading effect on health, agriculture, indigenous farm communities, environment and biodiversity. This loss can be irreversible.

Star Link corn injected with Bt toxin pesticide in the US was released in a small area, and when it was realized that the objective had not been achieved, the US government spent millions of dollars to recall it but the recall was not successful. Pushpa M. Bhargava, the nominee of the Supreme Court on the Genetic Engineering Appraisal Committee [GEAC], explained that encouraging the use of bio-technology for production of drugs does not create problem. If the drug does not achieve its objective, it can be easily withdrawn from the market and its production can be stopped. However, in the case of GMCs, once a plant is released in the environment, it is practically impossible to recall it if it is harmful to human, animal or plant life; or environment or bio-diversity. He has given two striking examples of water hyacinth that choke our water bodies and parthenium grass which causes allergy, both of which came to India when we imported wheat under the US PL 480.[13]

GMCs pose the danger of introducing allergens and other anti-nutritional factors in food. The reason is obvious. The process of expressing a foreign gene in a plant is in itself highly mutagenic. It disturbs the genetic composition of the host plant. This disruption in the bio-chemistry of the plant in turn results in production of novel toxins and allergens in the food.

Jeffrey M. Smith in his book 'Genetic Roulette'[14] writes cautiously that GMCs have caused serious health problems to the subjects who were fed on those crops. Rats administered with GM tomatoes developed stomach lesions and some died a premature death.

[13] Bhargava, P. M. (2016). Genetically Modified Mustard and India's Future. *Economic and Political Weekly*, 51(44–45), 40–43.

[14] Smith, J. M. (2007). *Genetic Roulette: The Documented Health Risks of Genetically Engineered Foods*. Yes Book Publishers.

Those fed on GM potato exhibited abnormal and potentially pre-cancerous cell growth in their intestines, as well as an impaired immune system, and under-developed brain, liver and testicles. While the rats who ate GM corn suffered from impaired blood cells, kidneys and liver, and those reared on GM canola were found to be heavier. Other GMCs fed animals had bleeding stomachs, inflamed kidneys and lungs, reduced digestive enzymes, higher blood sugar levels, increased mortality rates, especially in their off-springs.[15]

It is quite possible that the genes injected into the food crop could also negatively affect human health. For example, anti-biotic resistant genes, inserted in the GMC, may be transferred from the food to the cells in the gastro-intestinal tract in the human body and cause irreparable harm. One study revealed that a gene inserted into the soybean spontaneously was transferred from the GM food into the DNA of the gut bacteria of the subjects who were fed on GM soybean.[16] The gut bacteria in the intestine may create a novel protein. If this protein turns out to be toxic or allergic, it will create irrevocable havoc in the body even after the subject stops eating GM soybean.

Another threat which arises from the use of GMCs is the contamination of the non-GMCs with the GMCs. Cross-pollination between GM plants and their wild relatives is inevitable. Traditionally cultivated crops cannot remain isolated from the impact of GMCs, once the latter are released, even in open air field trials. In Mexico, which is the global centre for bio-diversity of wild maize, genes from GM maize had contaminated its wild variety by cross-pollination. In the US GM herbicide-resistant creeping bentgrass was found several kilometers away from its place of plantation.[17] According to the environmentalist, Sailendra Nath Ghosh,[18] isolation distance is needed both in terms of space and time. According to him, a minimum isolation distance of three to four kilometers of space isolation needs to be maintained to prevent contamination by cross-pollination. In order to satisfy time isolation requirement, the land on which GMCs are planted should lie fallow during the preceding and succeeding years, since the gene introduced may persist in the soil even after the GMC is harvested. This will entail a huge loss of use of land, something which any country can ill-afford. So the tall claim made by agri-business that GMCs will require less use of natural resources such as land lies shattered. In some cases, GMCs approved for animal food and industrial use have been detected in products for human consumption. This escaping of the genes from the GMCs to the conventional crops will have a cataclysmic effect on food safety and food security. The contamination may also result in creation of hybrid super-weeds resistant to the most toxic herbicides.

Added to the list of risks related to GMCs, is the potential for pests to develop resistance

[15] Ibid

[16] Sharma, B.P. (2014). *Field Trials of GM crops: UPA's mischief against Biosafety and Human Health.* https://doi.org/10.13140/RG.2.2.28773.91360

[17] Reichman, J.R., Watrud, L.S., Lee, E.H., Burdick, C.A., Bollman, M.A., Storm, M.J., King, G.A., & Mallory-Smith, C. (2006). Establishment of transgenic herbicide-resistant creeping bentgrass (Agrostis stolonifera L.) in nonagronomic habitats. *Mol. Ecol.*, 15(13), 4243-4255. https://doi.org/10.1111/j.1365-294X.2006.03072.x

[18] Sailendra Nath Ghosh (2010). GMO Crops: A Few Questians to the Genetic Engineering. *Mainstream*, XLVIII (6), 30 January.

to toxins produced by GMCs to kill them. It is a well established fact that at a certain stage, pests evolve resistance to the toxins developed to kill them. That is exactly what happened with Bt cotton in India. The bollworm, which the Bt variety was developed to kill, developed resistance to the toxin. Bt cotton farms were ravaged by the same bollworm that Bt technology was designed to destroy. Worse still, Bt cotton was infested with other pests such as mealy bug and whitefly that Bt variety was not supposed to destroy. Consequently the farmers had to step up their reliance on pesticides. These pesticides are highly toxic. These toxins are said to have been used by the Nazis in the Jewish concentration camps, They were also used during the blood-chilling war against Vietnam. Exposing human beings and the environment to these lethal chemicals is a grave violation of human and environment rights.

Yet another unintended effect that could result from the insertion of a novel toxic gene into a plant is the danger of the toxic gene affecting other non-target organisms in the eco system. A GMC could kill and completely wipe out other harmless and even favorable organisms, such as bees, moths, butterflies, grass-hoppers, earthworms and others usually found in the fields and adjoining areas. In the US, maize engineered to express insecticidal Bt toxin harmed Monarch butterflies (a unique American specie), the larvae of which fed on the wild milkweeds growing near the cornfields.[19] This will result in shrinkage of bio-diversity.

## Case study—Bt Cotton

India, the country which domesticated cotton, is the leading producer and exporter of its organic variety. Suicides by Andhra farmers in the early 2000, due to heavy expenditure on pesticides, was unfortunately given as a reason for opening up India's seed sector to foreign seed corporations. Armed with its Bt cotton variety, Monsanto invaded India in 2002. Today it controls 95% of the cotton seed supply. extracting from our hapless farmers huge amounts by way of royalty/technical fees.

Despite several questions raised about its quality, Bt cotton was approved for commercial cultivation in India. Its subsequent failure in almost all the locations where it was planted bears testimony to the fact that it was an erroneous decision and a wrong step taken by the country in 2002. In the opinion of Pushpa Bhargava,[20] the success of Bt cotton was over-emphasized. He points out that it failed in rain-fed regions, and two-thirds of the cotton growing regions in India are rain-fed. Further the non-Bt variety produced a yield similar to that of Bt variety. Worse, in some States pests developed resistance to Bt variety. In other States, harmful pests such as mealy bugs, on which Bt variety does not work, appeared and set about ravaging the crop. Thousands of cattle, grazing on the fields after Bt cotton was harvested, died. Huge numbers of cotton farmers, indebted due to high price of Bt variety seeds and failure of the crop, committed suicide.

According to Vandana Shiva, the Bt variety has resulted in the depletion of nutrients and

[19] Losey, J. E., Rayor, L. S., & Carter, M. E. (1999). Transgenic pollen harms monarch larvae. *Nature*, 399(6733), 214. https://doi.org/10.1038/20338

[20] Bhargava, P. M. (2016). Genetically Modified Mustard and India's Future. *Economic and Political Weekly*, 51(44–45), 40–43.

water in the soil. The increase in the area under transgenic seeds has led to an increase in fertilizer consumption.[21] The beneficial soil organisms being killed by the Bt toxin from repeated Bt cultivation has totally devastated soil health.[22] Not only has the microbial population of fungi, bacteria and nutrifiers reduced drastically but there is also a major decline in species of pollinator population.[23]

## Bt Brinjal

After getting a stranglehold over our most vital cash crop, namely cotton, it was time to target food crops in India. Of the three proposed GM food crops which applied for permission for large-scale field trials in India, brinjal was the first to receive approval from the GEAC in October 2009. The justification offered was to reduce crop loss and thereby increase the yield. But for the efforts of Alliance for Sustainable and Holistic Agriculture [ASHA], Bt brinjal would have found a place in our kitchens and on our platters. ASHA succeeded in furnishing substantial evidence and scientific validation for potential health hazards relating to Bt brinjal. It was pointed out that the Bt toxin used in Bt brinjal was a powerful immunizing agent which actively binds to the gut cells of mammals. Further, the two other genes used in Bt brinjal were antibiotic resistant. Further still, the virus used as a promoter in Bt brinjal could reactivate dormant viruses and give rise to health concerns like cancer. Good sense prevailed and our environment ministry deferred its decision on Bt brinjal release for a few months, so as to enable the civil society to debate on food, life and environmental safety. The ensuing consultations, deliberations and debates fortunately culminated in an indefinite moratorium on the release of Bt brinjal.

## GM Potato

Another aborted attempt was made in 2003. This time it was GM potato, enriched with proteins. This was despite the fact that the country was producing sufficient pulses, containing 20–26% protein. The surprising part was that the country was sold the idea that GM potato would address the problem of under-nourished children suffering from night blindness. Even a school pupil learns in science class that night blindness is caused by deficiency of Vitamin A and not due to a lack of protein! More surprising, even shocking was the promise that the GM variety would be distributed free to the children even when at the experimental stage!! Maybe the intention was to reduce these naïve and unfortunate children to the level of guinea pigs for the purposes of experimentation. It is thanks to food safety and environmental campaigners such as Devinder Sharma and Suman Sahai, who through their prolific writings,[24] averted the disaster of exposing these poor and innocent children to the harmful effects of untested GM potato. They also drew the attention of the government that GM potato would result in neglect of traditional sources of protein and exacerbate protein de-

[21] Shiva, V. (2015). The Future is Organic, not GMOs. Swadeshi Patrika, September, 28–31.
[22] ibid
[23] Ibid.
[24] Sharma, D. (2003). GM Industry and Science. Swadeshi Patrika, December, 26–27; Sahai, S. (2003). Is GM Potato Six Months Away? *Suman Sahai Blog*, 13 June. Available at: https://sumansahai-blog.blogspot.com/2003/06/is-gm-potato-six-months-away.html; Sahai, S. (2003). Splice of Life: GM Potato come a Cropper. *Times of India*, 21 June.

ficiency. The country was cautioned that as the studies on gene insertion were done only in one vegetative generation[25] and not in several sexually reproduced varieties characterized by flowering and seed setting, the stability of the sexually reproduced GM variety could not be predicted. Also if the gene from the protein-rich amaranth plant was not properly integrated in the potato plant, then the protein expression in the GM variety of potato would be unstable and after some sexual generations might even disappear completely.

## GM Mustard

Within just ten years from the launch of yellow revolution in the mid eighties, India transformed itself from being a major importer of oil-seeds to becoming self-sufficient in oil-seed production. However, with WTO mandating tariff reductions[26] and compulsory imports from 1 January 1995, India, once again, became the world's largest importer of cooking oil. Today we import 67 per cent of our cooking oil.[27] Instead of bringing back on track our derailed oil-seed production program by revisiting our mistaken trade policies and reviving the oil-seed technology mission of nineteen eighties, there was a push to get GM mustard commercialized and grown on Indian farms. The illogical reason for the commercial cultivation of the GM variety of mustard was to reduce our dependence on import of cooking oil by increasing our oil-seed production. The alluring promise of higher Bt cotton yield has now been sufficiently belied. What assurance is there that GM mustard will be anything different? Should we not take a lesson from history? It may not be out of place to recall what our former Union Cabinet Secretary, T.S.R. Subramanian, said. Relying on FAO data, he revealed that the highest yields in mustard are from five countries, UK, France, Poland, Germany and Czech, which do not grow GM mustard and not from GM mustard growing countries, such as the US or Canada.[28]

Moreover, the herbicide-tolerant technology used in GM mustard will have a dire effect on small bio-diverse farms which abound in India. Farmers will have to increase their reliance on herbicides, in order to combat the super weeds which GM mustard technology will promote. The increased use of herbicides will have a detrimental effect not only on human health but also on animals grazing on the fields after harvest. Further, the danger of the GM variety contaminating the organic variety in the neighboring farms cannot be ruled out.[29] Further still, the fear of the super weeds becoming resistant to herbicides in the long run, must also not be brushed aside as remote. Above all, there will be a monopoly on mustard seed, just like cotton seed.

It would be folly to overlook the risks of GM mustard just because the technology is de-

[25] In vegetative generation the potato is sliced into several pieces. Each piece serves as a seed and is used for sowing the next crop. This process goes on. There is no flowering, no seed setting as in sexual reproduction.

[26] From 300% to zero level

[27] We import palm oil from Indonesia and Malaysia and soybean oil from Brazil and Argentina.

[28] Subramanian, T.S.R. (2017). Say no to GM mustard. There Formidable social, economic and environmental reasons why it should not be cultivated. *The Hindu*, 25 May. Available at: https://www.thehindu.com/opinion/op-ed/say-no-to-gm-mustard/article18573107.ece.

[29] Fearing contamination of their crop, farmers and activists in Madhya Pradesh, the fourth major State producing mustard, have opposed GM mustard.

veloped by scientists and academicians at an Indian university. Once GM mustard, the first food crop, is approved for commercial cultivation, it will open the flood gates for other GM food crops. Foreign seed corporations have a monopoly on most GM food crops. They have already patented GM varieties of coffee, pepper, cauliflower, cabbage, melons, mushrooms, peas. The list is endless. Agriculture which is the backbone of Indian economy and employment generation, has already been very badly hit by the WTO's Agreement on Agriculture. With the entry of GM food crops it will be completely shattered.

In view of the above it is beyond comprehension as to how and why GM mustard received approval by the regulatory authority. This was despite the fact that proper processes and procedures were side-lined. Four high-powered committee reports were bypassed The recommendation against open air field trials, let alone commercial cultivation, until a robust regulatory authority is in place, was ignored by the Supreme Court appointed Technical Expert Committee. Once again public good overcame corporate greed and permission to GM variety was denied by our ministry, as was done in Bt brinjal.

## Conclusion

The road ahead for India is certainly not GMCs. Introducing GMCs in India, at a time when the demand for organic food is on the rise not only in India but all over the world, is nothing but sheer folly. Especially when the myths enveloping GMCs have been adequately exploded. According to Economic Survey of India, our country produces 100 million tons of rice, 95 million tons of wheat, 170 million tons of vegetables, 85 million tons of fruits, 40 million tons of coarse seeds and 23 million tons of pulses: much more than what we need for our consumption. This amazing feat has been made possible by the ingenuity and hard labor of several generations of our indigenous farming families, who cultivate more than what is required for our masses. So our problem is not insufficient food. Rather it is food equity and the wrong agricultural trade policies.

It is often argued that GM food poses no greater risk to human health than conventional food. However, the myriad formidable social, economic and environmental problems associated with GMCs do raise valid concerns which cannot be wished away. These crops have been labeled 'Frankenstein crops'. According to the French environmentalist and writer, Nicholos Hulot, they are the 'ugliest face of imperialism and capitalism'. Not enough work has been done to establish the long term impact of GM food crops on human health, environment and agriculture. Tests conducted are either flawed or rigged, and mostly funded by giant multi-national seed companies. Tests conducted over short periods of 2–3 months are grossly inadequate to test the negative effects which become patent only after 2–3 decades.

Let us not forget that gigantic MNCs, deeply entrenched in the pharmaceutical sector, are creating havoc with Indian healthcare. Some of these like Bayer AG, along with others like Monsanto are prying open our seed sector, the life-line of our nation. The Patent Act, even after its last amendment in 2005, does not permit the patenting of seeds. These corporations are therefore attempting to strangulate our agriculture through GM food crops. Monsanto has sought patent in India for its Bollgard technology. It has obtained plant variety protection certificates for more than a dozen varieties of corn. The foreign agri-business with its subsidiaries and franchises will lap up

the profits by selling their toxic seeds and even more toxic pesticides and herbicides. The costs for this disastrous technology will be borne by indigenous farm families, society, agriculture, environment and bio-diversity.

India must resolutely cease its dependence on GM technology in agriculture. Let us draw a lesson from Argentina whose economy has been totally dependent on growing and exporting Monsanto's GM soybean and its products for the last two decades. Monsanto has abused its dominant position in Argentina and has threatened to leave the country and throw its economy into turmoil, if the farmers in Argentina do not pay royalty on export of soybean products from second generation seeds. This is in addition to the royalty paid by the farmers in Argentina at the time of purchasing the seeds. The same tactics were adopted by Monsanto in India when the maximum sale price of Bt cotton was being fixed by the Indian government at 800 rupees, in order to give relief to the farmers reeling under severe indebtedness due to high price of Bt cotton seeds. Monsanto, knowing very well that 95% of the cotton grown in India uses its technology, threatened to leave our country.

Instead of wasting our precious resources on GM food we should focus on improving our existing local and hybrid varieties, which produce the same, if not more, yield than GM varieties. Our concentration should be on those farming practices which strengthen our indigenous farm families and assure them of their rights over their own seeds and traditional knowledge. The government should address the issues of: farmers' indebtedness and consequent suicides; availability of quality seeds at affordable prices; depletion of natural and biological resources; support prices for crops; increasing cost of production; and price stagnation. The government should also ensure that the foods imported into the country are non-GM foods. If GM foods are imported, they should be marked as 'GM'.

Let us not be so gullible as to be swayed by the fact that only GMCs can save the country from famine. If that was so then why do millions go to bed on a hungry stomach in the United States, which is the champion of GMCs?

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