CAN OUR REGULATORY SYSTEM DELIVER SAFE GE FOODS: THE BT BRINJAL CASE

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The Supreme Court has passed an interim order directing the Genetic Engineering Approval Committee (GEAC) not to give any further approvals for field trials of genetically engineered crops and other products till further notice. This interim order will hold only until the GEAC has responded, when the Court will review their decision. Too much should not be read into this temporary restriction, the Supreme Court has made it very clear in its statement that it is not inclined to order large scale curbs on field trials.

This interim injunction has a bearing on the proposed approval for Large Scale Trials (LST) for Bt brinjal, which is poised to become India's first genetically engineered food crop. Civil Society Groups had raised objections to granting approval to a food crop because of safety concerns and because it was not clear what kind of safety tests had been done on Bt brinjal, or what their results were. The GEAC has withheld permission to the Mahyco seed company for LST until an expert committee has evaluated the comments sent in by concerned citizens.

According to the GEAC, if approved, the Large Scale Trials will be subject to several conditions ,yet there are many issues that have not been addressed. For instance, the GEAC has proposed the involvement of Gram Sabhas in the LSTs for which the State Agriculture Universities would provide the technical support but the module for such support has not been decided, nor is it clear how it would be provided and what it would include. If the gram sabhas object and do not approve of the trials, would their objections be considered? Would the gram sabhas be informed about the health and environmental implications of the GE crop, or about gene flow and increased risk of weediness ?

The only information available on the website of the Ministry of Environment and Forests (MoEF) is a brief background note on the development of Bt Brinjal and presentations made by the Mahyco company. On the advice of Ministry of Environment and Forest, the Indian Council of Agriculture Research (ICAR) has conducted field trials of Bt Brinjal independently, using its own protocol during Kharif seasons 2004-05 and 2005-06, but the results of these trials are neither published anywhere nor placed on the Ministry's website for public view. Similarly, the comments of the Monitoring and Evaluation Committee which monitored the field trials conducted by the company are also not placed on the website. In the absence of these reports, the claim of the company that Bt brinjal is very beneficial and useful remains purely one sided.

According to the information on the official website, the company would be required to conduct a number of additional studies including foliage toxicity study in goats, analysis of fruit dry matter to determine differences in yield from the agronomic traits and flavour analysis of Bt and non Bt fruits. It is not clear what these studies will achieve but what is striking is the minimal involvement of our vast network of public sector research institutions in conducting any of these investigations. As it is, government laboratories were involved in only four of the large number of studies conducted on environmental effects, soil analysis, substantial equivalence, protein expression in cooked fruits, toxicological and allergenicity assessment and nutritional content. In future studies also, public sector institutions are not being involved nor has GEAC recommended any

independent public sector study on any of these aspects. The concerned companies themselves will provide data on biosafety and food safety.

The GEAC in its meeting considered the demand made by Civil Society that prior to approving LSTs of Bt Brinjal, biosafety data should be posted on the Ministry's website for 90 days to give people sufficient time to give feedback,. But the GEAC decided to post the list of biosafety studies; the data generated by the company and proposed protocol for LSTs and seed production for only 15 days. In any case, the public's comments are not available on the GEAC website , nor is there any commitment from the Ministry that the objections raised by concerned people will be posted on the website for public viewing . This is not a good precedent and makes a mockery of public participation.

Because of the disastrous performance of Bt cotton in several parts of the country leading to the Andhra Pradesh government filing a case against Mahyco-Monsanto, the need to conduct a socio-economic evaluation of any new genetically engineered crop prior to its release , is finally being acknowledged by regulatory agencies like the GEAC. Undertaking socio-economic evaluation became mandatory at least since September 2003 when the Cartagena Protocol on Biosafety came into force. The Biosafety Protocol requires socio-economic assessment of new genetically engineered crops , particularly on small farmers and traditional methods of cultivation, as well as on indigenous knowledge.

No studies have been conducted so far to assess the socio economic impact of Bt brinjal. Mahyco has said that socio-economic studies will be conducted along with the LSTs of Bt brinjal but in the meantime, the company has tried to prove through studies conducted by some foreign Universities that Bt brinjal offers economic benefits over conventional brinjal cultivation. Two studies are quoted in support of socio-economic advantages , one by Mark Chong, a business management graduate from the Singapore Management University who conducted this study as part of his doctoral thesis in Communications ! The other is a study done by Vijesh Krishna and Matin Qaim of the University of Hohenheim in Germany . This study was supported by USAID, the United States Agency for International Development , an aggressive promoter of Agbiotechnology. Matin Qaim is the author of the infamous and widely quoted study on Bt cotton in India which was conducted exclusively on the experimental fields of Monsanto- Mahyco and which (not surprisingly) showed that the use of Bt cotton led to an 87% increase in cotton yield in India. Qaim and Zilberman's dubious paper was roundly condemned by a series of commentators across the world and the abysmal performance of the Mahyco-Monsanto Bt cotton, despite the premature accolades engineered by Qaim and Zilberman, ensured that its provisional release was not renewed.

Mahyco seed company has quoted these two studies to make the point that international scholars have demonstrated that the socio-economic impact of Bt brinjal is positive for farmers and that they will benefit from increased yields and lower use of pesticides.
Let us examine the two papers and see what they say about the socio-economic benefits of Bt brinjal. Chong's paper is an exercise in risk perception, not evaluation of socio-economic impact. The title itself says that, " *Perception of the risks and benefits of Bt eggplant by Indian farmers*". The study is premised on the hypothesis that the moral aspects of risk provide a better explanation of risk perception than the psychometric

paradigm or Cultural Theory. The study uses Bt brinjal as a case study to assess whether moral aspects of risk figure in the risk perception of Indian farmers or whether economic benefits outweigh perceived risks.

The study is a rather simple exercise to elicit responses from 100 brinjal farmers who have been provided certain text containing information they must respond to. Their responses have been interpreted as their perception of risk. The text given to farmers for response is reproduced below. Its suggestiveness is evident.

"As you know, brinjal farmers in Maharashtra such as yourself stand to lose a large portion of their crop each year to pests such as the fruit and shoot borer. These framers – like you – have been trying to control the pests by spraying pesticides, but pesticide application has a number of disadvantages.

To address this problem, a private company and two public institutions in India are now working to develop a new type of brinjal seed. This new seed is expected to offer significant protection against the fruit and shoot borer. At the same time, farmers who use the new seed will not need to spray any pesticide against the borer, nor will they need to invest in new equipment, tools, or fertilizers. The scientists who are developing this new variety say that it will look, feel and taste just like the brinjals you are growing now. But unlike ordinary brinjals, the new variety is 'injected' with a soil microbe that gives the plant its protective qualities. The name of this new variety is Bt brinjal, and it works in basically the same way as the Bt cotton that has been introduced in Maharashtra and elsewhere in India. Bt is not known to be harmful to human or animal health.

However, experts have also cautioned that there are some risks: Bt brinjal seed will cost a few times more than ordinary brinjal seed. Moreover, nobody can predict at this point whether consumers will accept the new type of brinjal. Climactic conditions can also influence the level of yield farmers get from using Bt brinjal.

There are also some environmental risks: farmers adopting the new seed will need to follow strict guidelines, such as setting aside a small part of his plot to growing ordinary brinjals. If not, Bt brinjal will lose its ability to protect itself against the borer after a few years and farmers will then need to use even more pesticide than before to control the damage inflicted by the pest. If not carefully managed, using Bt brinjal may also lead to the growth of "superweeds" and other unforeseen environmental problems. So, while there are benefits in using Bt brinjal, there are also some risks…"

Please share with me any thoughts and feeling you have about this new brinjal seed. Is there anything you find objectionable about the new seed?

This is a fairly straightforward study to understand how farmers perceive risk and what factors will influence them to accept or reject a new crop technology. It says nothing about the socio-economic impact of Bt brinjal.

The other study by Krishna and Qaim is another piece of fiction on allegedly proving the socio-economic benefits of Bt brinjal. In actual fact, this study attempts to study not the socio-economic impact of Bt brinjal at all, but the dynamics of profit in a model of public-private research partnership. The conclusion, not surprisingly, is that a research

partnership of this kind, which aims to develop a transgenic variety out of a proprietary technology (Bt gene) that is licensed to the public sector, will result in profit reduction for the private sector even though ample profit margins will remain. The paper equally unsurprisingly concludes that farmers will benefit when the transgenic variety is made available through the public rather than the private sector. The study has nothing to do with the impact of adopting Bt brinjal but a projection of who will gain and how much, if the private and public sector collaborate in this kind of research. These results would apply as much to Bt brinjal, as to any other proprietary product, a fan or light bulb or a vaccine, developed by private –public partnership. The point is that this study, like the other one by Chong, does not deal with evaluating socio-economic impact and so sheds no light on the likely impact on farmers, particularly small, resource poor farmers if an expensive and complex technology like Bt brinjal is adopted. Nor does it contribute anything to understanding obvious aspects like consumer and market acceptance . or the trade implications of adopting a transgenic food crop. It is disingenuous on the part of Mahyco to pass off these unrelated studies as socio-economic validation of Bt brinjal and it is hapless of the GEAC to accept it as such.

The Indian experience of the first GE crop , Bt cotton has not been a very good one. Several studies have demonstrated that the Bt technology is economically unviable and has failed to fulfil its promise of decreased pesticide use and increased yield. In addition, the biosafety of the Bt cotton plant has been questioned .There have been reports of allergic reactions in people who have been in contact with Bt cotton plants. Mortality of cattle and sheep have been reported from Madhya Pradesh, Andhra Pradesh and Maharashtra, where the animals have grazed on Bt cotton plants left in the field. No pathological studies have been done to determine the cause of death of the animals that died, nor are any studies being conducted on long term feeding impact. It is likely that Bt cotton has invoked both allergic and toxic response in humans and animals, the Bt gene is after all, one that produces a toxin, but this must be properly tested. Without evaluating any of the evidence available on the allergic and toxic aspect of Bt cotton , the GEAC is moving ahead to grant permission to two food crops, Bt brinjal and Bt Okra, both containing the same toxin gene. Rushing ahead to promote GE foods with such disregard for safety considerations is indefensible on the part of the GEAC.

In its defence of Bt brinjal, Mahyco claims that the crop is substantially equivalent to non-Bt counterparts in its chemical composition and that no statistical differences between Bt brinjal and non-Bt brinjal groups were observed. This claim is based on tests carried out almost exclusively in private laboratories and submitted by Mahyco to GEAC, which has elected to accept such tests at face value. There are demands worldwide, as also in India, that data on biosafety testing should be conducted by independent experts with public participation, rather than by commercial companies with a vested interest in the sector. There are a growing number of studies pointing to the negative health impact of GE crops and foods. Monsanto's own experiments on its GE maize Mon 863, showed severe organ damage in rat feeding studies. The Commonwealth Scientific and Research Organisation (CSIRO), Australia recently abandoned its project to develop peas genetically engineered to protect it from a pest called pea weevil. It found that a new protein was formed that caused inflammation in the lungs and increased serum antibody levels of the mice that were fed GE peas.

The government of India recognises the need to label GE food, and its position in the labelling meetings of the Codex Alimentarius, has been consistently in favour of mandatory labelling. Accordingly, the Ministry of Health has drafted rules under the Prevention of Food Adulteration Act to include labelling of Genetically Engineered food and food ingredients.. At the moment there are no mechanisms in place to label GE food and food products, nor have any awareness programs been conducted to explain the nature of GE foods and the need for labelling them. For most consumers, especially rural consumers, GE foods are a black box and unless they are made aware of the nature of GE foods, labelling would be meaningless. Despite these big gaps in preparedness, the GEAC is all set to approve the LSTs of Bt brinjal, which would soon be followed by the approval for commercial production.

There is as yet, no convincing reason to include genetically engineered foods in our food basket, whatever the Agriculture Minister might choose to say .Conventional breeding is still providing adequate choices in all crops; plenty of alternative approaches are available to provide good, healthy food; Integrated Pest Management (IPM) is known to be the only pest management strategy that will endure in the long run. The collapse in China of the Bt cotton crops shows the flaws of the Bt approach to disease resistance which has folded in just a few years.

None of this seems to inform our policy planners and executors of GE technology. Gene Campaign's writ petition in the Supreme Court has asked for a technically competent, transparent and inclusive regulatory process that is capable of taking informed decisions in a sector that is of such crucial relevance to the future of 70 crore farm families in this country. Little has moved on that front. There is no national policy yet, no improvement in the technical competence of the GEAC, which remains a piece of bureaucratic inanity, and little inclination to involve the public in decision . This along with the strong inclination towards the goals of commercial companies rather than its farmers , makes India's regulatory system incapable of taking decisions in the public interest.