A SCRUTINY OF THE DH-11 MUSTARD CONTROVERSY AND THE VARIOUS LOOPHOLES PLAGUING THE REGULATION OF GENETICALLY MODIFIED FOOD CROPS IN INDIA

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ABSTRACT

This article will examine the controversies surrounding the DH-11 genetically modified variety of mustard and the various loopholes pertaining to the regulation of genetically modified crops in India that were brought to light along with those controversies. The article will first explore the various biosafety concerns surrounding the DH-11 Mustard including environmental impact, impact on human and animal health, impact on the economy etc. Followed by this, the issue of whether the Genetic Engineering Appraisal Committee is an effective regulator of genetically modified food crops in India will be analysed. The various challenges in the regulation of GM food crops and pointers on how they can be addressed are then discussed. Finally, suggestions on how the way forward when it comes to the regulation of genetically modified food crops in India are highlighted.

The Controversy Surrounding the DH-11 Mustard:

Natural food crops have always been susceptible to pests, insects and diseases. The rapid technological advances in the field of biology and genetics and the consequent development of the field of genetic engineering is striving to eliminate these susceptibilities and develop pest, insect and disease resistant varieties of food crops. This is done using genetic engineering methods by introducing a new trait which the plant does not possess naturally by transferring or removing genes using various techniques. The crops which are developed through these methods are termed as genetically modified crops. Globally, the perception regarding genetically modified crops has been widely split. While many people see this as an efficient means of increasing productivity, some fear its repercussions on the environment and health and even on moral grounds. The situation is the same in India. While the government has taken a positive stance on the usage of genetically modified crops relying on various scientific reports that attest to their efficiency, many non-governmental organizations, social and environmental activists have protested against the induction of genetically modified crops in our agricultural fields.[1]

Moving on to the DH-11 variety of genetically modified mustard, it is to be noted that this variety was propounded by experts as an answer for the shortfall when it comes to edible oil. This variety supposedly produced a yield that was up to thirty percent higher than the indigenous varieties of mustard. The genetic modification in this mustard was carried out with the intention of inducing a simplified process of breeding which in turn would increase the yield. However, activists and farmers have pointed out that Bt Cotton was released in the Indian markets with similar claims of high yield and pests and insect resistance but later on it fell short of these claims. In fact, it led to an increase in production costs, low fertility seeds and many farmer suicides were attributed to its failure.[2] The failure of Bt Cotton along with the lack of adequate scientific evidence backing the efficiency has caused an uproar against the commercial release of DH-11 Mustard.[3]

The subsequent paragraphs will explore the various biosafety concerns surrounding the DH-11 Mustard including environmental impact, impact on human and animal health, impact on the economy etc. Followed by this, the issue of whether the Genetic Engineering Appraisal

[1] Vandana Shiva, *Defending Farmers' Seed Freedom*, 1 ANTYAJAA 205 (2016).
[2] Manu N. Kulkarni, *Bt Cotton in Karnataka*, 37 EPW 3767 (2002).
[3] Flachs, A., *Cultivating Knowledge: The Production and Adaptation of Knowledge on Organic and GM Cotton Farms in Telangana, India*, ARTS & SCI ELEC. TH. & DISS. 847 (2016).

Committee is an effective regulator of genetically modified food crops in India will be analysed. Finally, suggestions on how the way forward when it comes to the regulation of genetically modified food crops in India will be highlighted.

Addressing The Biosafety Concerns Surrounding DH-11 Mustard:

There were numerous concerns raised regarding the Genetic Engineering Appraisal Committee's approval of DH-11 mustard. Firstly, there were concerns raised regarding the probable impact that induction of DH-11 mustard in our agriculture would have. The genetically modified pest and insect resistant crop could also affect insects and species which were harmless or even beneficial thereby affecting the biodiversity of the region. Species of insects such as bees and other organisms embedded in the soil which do not negatively affect the crops in any way could be wiped out from the regions wherein this genetically modified variety of mustard is planted. Moreover, there is also the question of herbicide and pesticide resistant weeds being developed as a result of pollination between the mustard plant and other species of weeds close to the mustard family.[4]

Secondly, the impact that this mustard variety could have on the health of all those who consume was raised as a concern. There have been discussions regarding this genetically modified crop causing the spread of toxins particularly Glufosinate (a herbicide) and the fact that the plant itself is toxic to an extent to some species has spearheaded these conversations. Even though there is no clear-cut evidence proving that this genetically modified variety of mustard will have an adverse impact on the health of people, there is no evidence pointing to the contrary either. This is due to the fact that there is a dearth of feeding studies which ideally should be conducted on both animals and humans to substantiate that there are no detrimental effects to human and animal health through the consumption of this mustard variety. Furthermore, there have been no blood analysis tests conducted and this attests to the fact that the Genetic Engineering Appraisal Committee's decision was not only premature but also taken without conducting a proper analysis of the consequences of the DH-11 mustard on human and animal health.[5]

While introducing a new genetically modified variety of crops, the onus is on the regulatory authority and the government to demonstrate that the crop is beneficial and not harmful by

[4] Ahuja, V., *Regulation of Emerging Gene Technologies in India*, 12 BMC PROC 14 (2018).
[5] Kochhar, V. K., and Sunita Kochhar, *Need for Management and Risk Assessment of Genetically Modified Organisms*, 102 CUR. SCI.167 (2012).

conducting all necessary scientific studies and publishing the data of the same. However, when it comes to the DH-11 mustard, the lack of scientific studies affirming the government's claim that the genetically modified crop is harmless has raised many concerns among activists and the public. This concern is justified since there is the possibility of new and previously unknown allergens being produced from genetically modified crops due to the changes created in the protein sequences of the original organism through the induction of novel genetic materials.[6] However, for the DH-11 mustard variety not enough studies have been conducted to identify potential allergens. There is also the risk of antibiotic resistance albeit minimal. Another concern with regard to effects of genetically modified food crops on health that is frequently raised is then possibility of decrease in nutrients. It is common knowledge that the genetic material of the organisms plays the crucial role in producing essential nutrients. But when this genetic material is changed, nutritional differences could arise. Moreover, the genetic modification could potentially also lead to an upsurge on the toxins that occur naturally in the crop.[7]

Thirdly, there have been concerns raised regarding the impact of the DH-11 mustard on the economy and our farmers. Big corporations acquiring a monopoly over mustard is a fear among many farmers. Because this could result in farmers having to pay royalties to such corporations to obtain the requisite seeds of the genetically modified crop. Activists are of the opinion that the genetically modified mustard DH-11 is being propounded by corporations such as Monsanto and Bayer for the very reason of driving the indigenous mustard seed varieties out of our markets and to claim patent rights over the DH-11 mustard in order to collect royalties. They support this contention with the farmer suicides which happened as a result of Bt Cotton growth.[8] Moreover, big corporations propounding the use of genetically modified mustard DH-11 is also considered to be in violation of our patent laws. Section 3(j) of the Patents Act, 1970 excludes living organisms such as plants and seeds from being patented. But there are theories that corporations are pushing genetically modified seeds in order to change this legal position and patent their seeds.[9]

Lastly, there is the common argument against all genetically modified organisms i.e., there are moral and ethical issues surrounding modifying and engineering the genetic material of living

[6] Vandana Shiva and Afsar H. Jafri, *Bursting the GM Bubble - The Failure of GMOs in India*, CED Documentation, http://el.doccentre.info/eldoc1/g74a/01jul03eca1.pdf
[7] Lianchawii, *Biosafety in India: Rethinking GMO Regulation*, 40 *EPW* 4284 (2005).
[8] Gopal Naik, et al., *Bt Cotton Controversy: Some Paradoxes Explained*, 40 *EPW* 1514 (2005).
[9] Johnson, D. Gale, *Biotechnology Issues for Developing Economies*, 51 *EDCC* 1 (2002).

organisms. Many people believe that only god has the right to create life. They question how humans who are themselves a creation of god can create or modify other organisms that is different from the form in which they occur in nature. But there is also the counter argument that genetically modified food crops could be the way to alleviate starvation and preserve life.[10] Thus, it is evident that there are many concerns surrounding the approval of the DH-11 mustard. Some contentions are reasonable and some are overreaching but it does not change the fact that the Genetic Engineering Appraisal Committee's approval was premature and without adequate deliberation or contemplation.

The GEAC: A Smokescreen Or A Real Regulator?

The Genetic Engineering Appraisal Committee (GEAC) formed by the Central Ministry of Environment, Forests and Climate Change in the year 1990 is considered to be the supreme regulatory body when it comes to genetically modified food crops in India. However, both the efficiency and the credibility of this regulatory body has been called into question on numerous occasions. The decision of the Genetic Engineering Appraisal Committee to approve the DH-11 mustard has further escalated these allegations.[11] Declaring the DH-11 mustard safe for consumption without enough scientific evidence to back the claim is a dangerous move on part of the Genetic Engineering Appraisal Committee which could prove detrimental to farmers. However, obtaining the approval of the Genetic Engineering Appraisal Committee does not necessarily mean that the DH-11 mustards will be readily introduced in our markets. The Ministry of Environment, Forests and Climate Change remains the ultimate decider of whether the genetically modified crop will be inducted into our markets or not. This raises a question as to the relevance of the Genetic Engineering Appraisal Committee's approval. In order to understand this, the authority that the Genetic Engineering Appraisal Committee has over the usage of genetically modified organisms in India should be analysed. Relying on the Rules for the Manufacture, Use, Import, Export and Storage of Hazardous Microorganisms, Genetically Engineered Organisms or Cells, 1989 which was notified under the Environment (Protection) Act, 1986, it is evident that the approval of the Genetic Engineering Appraisal Committee is absolutely necessary for introducing a new genetically modified organism i.e., seed in this case into our agricultural markets. But in reality, there are numerous genetically modified seed

[10] Activists criticise recommendation on GM mustard by Genetic Engineering Appraisal Committee, The New Indian Express, https://www.newindianexpress.com/nation/2017/aug/26/activists-criticise-recommendation-on-gm-mustard-by-genetic-engineering-appraisal-committee-1648530.html (last visited Feb 8, 2022).
[11] K. Jayaraman, *Activists Bury India's GM Mustard Hopes*, 35 NAT BIOTECHNOL1124 (2017).

varieties in circulation and the Genetic Engineering Appraisal Committee has been unable to do anything about it.[12] Furthermore, the Genetic Engineering Appraisal Committee was supposed to convene through monthly meetings but that has not been the case. Since 2006, meetings have been rare and inconsequential. There have been many instances of distribution and circulation of genetically modified seeds which have not been approved, the Genetic Engineering Appraisal Committee has done little to stop it from happening. There have been numerous inconsistences in test results of genetically modified crop varieties such as brinjal and cotton but the Genetic Engineering Appraisal Committee did not find it rightful to initiate further investigation on these inconsistencies. This has raised numerous doubts as to whether the Genetic Engineering Appraisal Committee was being wilfully ignorant regarding the illegal usage of genetically modified seed varieties due to certain conflict of interests. These doubts have eventually led to the contention that the Genetic Engineering Appraisal Committee has no real power to curb or to introduce the usage of genetically modified crops rather the real power is still vested with the Government of India. The lack of transparency of the scientific studies undertaken and resultant data collected has also further undermined the credibility of this regulatory body.[13] The Genetic Engineering Appraisal Committee's decision to approve the usage of DH-11 Mustard despite the lack of proper field studies and scientific data attesting to the efficiency of the genetically modified crop has made it abundantly clear that the regulator is not functioning in the manner in which it was intended to function when it was originally constituted. None of the decisions taken by the Genetic Engineering Appraisal Committee vis-à-vis approval of genetically modified crops have been short of criticism.[14] If the Genetic Engineering Appraisal Committee which is supposed to be the supreme regulatory authority in the country when it comes to genetically modified plants has no real authority or regulatory power, and is instead wholly reliant on the Ministry of Environment, Forestry and Climate Change, how can it carry out its function efficiently?

Facing the Challenges in the Regulation of Genetically Modified Crops:

[12] For Genetically Engineered Crops, India Is No Country for Regulation, Anu Menon, https://thewire.in/agriculture/no-country-for-regulation-of-genetically-engineered-crops (last visited Feb 17, 2022).
[13] Bhagirath Choudhary et al., *Regulatory Options for Genetically Modified Crops in India*, 12 PLANT BIOTECHNOL. J. 135 (2014).
[14] Bhuvan Bhaskar Jha & Ashutosh Shankar, *Evaluating the Law on Regulation of Genetically Modified Crops in India*, 7 JLJ 119 (2017).

The premature approval of the DH-11 Mustard by the Genetic Engineering Appraisal Committee has highlighted the necessity for a real regulatory authority with real powers so that genetically modified crops that are potentially harmful are not approved without sufficient scientific testing and to curb other illegal genetically modified crop varieties from being brought into circulation in the country. There is also an obvious lack of an accountability regime when it comes to genetically modified food crops in India. It is time for changes in law and policy to ensure the regulation of genetically modified crops.[15]

Even in the case of those genetically modified food crops that have been released commercially after meeting the rigorous safety standards set by the regulatory authority, it is necessary for the regulator to collaborate with the Food Safety and Standards Authority of India. This has to be done in order to run periodic checks on the markets to detect circulation of illegal genetically modified food crops. It is also necessary to bring in stricter food labelling standards and any other requisite processes of approval.[16] Already, in order to commercially distribute genetically modified food crops it is essential to receive approval from both Genetic Engineering Appraisal Committee and Food Safety and Standards Authority of India. Therefore, both the Genetic Engineering Appraisal Committee and the Food Safety and Standards Authority of India working together can bring in some semblance of regulation and curb illegal genetically modified food crops in the market. It is seen that many of these illegal food crops are being marketed in a way that do not divulge what they indeed are i.e., genetically modified. The consumers deserve to know what they are consuming.[17] Therefore, genetically modified food should be labelled accordingly and any effort by the markets or the producers to conceal the same should be dealt with strictly. This is already prohibited by the Legal Metrology (Packaged Commodities) Rules, 2011 but the rule should be enforced more stringently with routine checks being conducted to detect contamination by illegal genetically modified food crops.[18]

But the elephant in the room is the lack of a central legislation on the regulation of genetically engineered plants and food crops in the country. Even though the Rules for the Manufacture, Use, Import, Export and Storage of Hazardous Microorganisms, Genetically Engineered Organisms or Cells, 1989 are assigned with this task currently, a central legislation could prove

[15] Manish Shukla et al., *Status Of Research, Regulations And Challenges For Genetically Modified Crops In India*, 9 GM CROPS & FOOD 173 (2018).
[16] Anton E. Wohlers, *Labeling of Genetically Modified Food: Closer to Reality in the United States?*, 32 P&LS 3 (2013).
[17] Benjamin Senauer, *Mandatory Labeling of Genetically Engineered (GE) Foods: The Showdown Begins*, 28 CHOICES 1 (2013).
[18] Pushpa M. Bhargava, *GMOs: Need for Appropriate Risk Assessment System*, 37 EPW 1402 (2002).

to be more effective.[19] Currently, the roles of Institutional Biosafety Committee and the Review Committee on Genetic Manipulation are minimal when it comes to reviewing genetically modified food crops. The scope of their functions could be expanded accordingly to achieve a balance and not rely wholly on the Genetic Engineering Appraisal Committee.

When it comes to the DH-11 Mustard specifically, the Genetic Engineering Appraisal Committee should righteously revoke the approval that it previously granted until adequate scientific studies attesting to its safety and efficiency have been conducted and their results published. Strict compliance with all the guidelines framed under the Rules for the Manufacture, Use, Import, Export and Storage of Hazardous Microorganisms, Genetically Engineered Organisms or Cells, 1989 should be necessitated. Analysis of toxicity, allergenicity and composition should be conducted and the results should be documented and published. The National Seeds Policy of 2002 should be adhered to in a stringent manner.

The Way Forward:

Rapid technological advances in the field of genetic engineering have proved to be a double-edged sword when it comes to genetically modified food crops. Although it is not fair to reject genetically modified food crops in an outright manner, if there is no proper evidence attesting to their efficiency over other indigenous breeds especially in the case of the DH-11 Mustard, there is no incentive for farmers to prefer a virtually unknown and new genetically modified variety over indigenous varieties of seeds which have been used traditionally. However, if the regulatory bodies and the government conducts a plethora of scientific studies regarding the viability and efficiency of a genetically modified crop variety and arrives to the conclusion that its usage would undoubtedly be beneficial in the elimination of starvation and in boosting the economy, it should definitely approve the crop for commercial usage. The role that the regulatory body would have to play in either of these scenarios is crucial. But it is important for the regulatory body to not just have authority to regulate but also practically carry out its functions. It seems redundant to have a puppet regulatory body which functions according to the whims and fancies of the government or big corporations. If properly regulated and with proper scientific evidence, there is no reason for the people to fear the usage of genetically modified crops. In fact, they could prove to be the key element in eradicating starvation and making the process of farming easier.

[19] Jordan James Fraboni, *A Federal GMO Labeling Law: How It Creates Uniformity and Protects Consumers*, 32 BTLJ 563 (2017).