

Scientific Controversy to Public Engagement with Genetically Modified Crops in India

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Abstract

Genetically Modified Crop (GM) emerged as a scientific controversy and through the commercialization of Bt. Cotton and development GM food crop the debate shifted to a deliberative participatory decision making. After the first performance report of Bt. Cotton anti-GM groups started to provide scientific explanations for their arguments. Thus the nature of debate became more scientific with the involvement of scientists. This paper investigates the socio-historical evolution of the debate and how this shift contributed to public engagement in India.

Key Word: GM crops, Public Engagement, Controversy, Debate

Introduction

In a scientific controversy, experimental or theoretical claims are contested within the expert community and between scientists and laymen (Engelhardt and Caplan, 1987). In the case of GM crops, the perceived risk on society is the source of the scientific controversy. The controversy over a technology extends to its cognitive as well as social issues. Cognitive issues can be settled by revising the methodology of scientific assessment but controversies over social issues may continue indefinitely. Lack of transparency on scientific analysis leads to dissent among scientists (Berg and Singer, 1995) and that spread to society also. The debate became more sensitive when civil society organisations, consumer groups, farmers and various interest groups across the world taken over the issue. The debate over cognitive and social aspects of the technology continues and it got pro and anti-GM dimensions. So, a call for critical engagement

with scientific and social issues has been raised across the world by various interest groups (Martin and Richards, 1995).

The debates on GM crops shifted the traditional notion of generating awareness among the ignorant public to a deliberative participatory decision making. In India, the shift to public engagement has started from the debates of Bt. Cotton and it continued through an experimental deliberative consultation on Bt. Brinjal (Gupta, 2011). Civil society organizations have played a major role in popularizing the concerns regarding the governance issues, social justice and implication for marginalized sections especially women (Motion, Leitch and Weaver, 2015) along with protection of farmer's sovereignty over seeds, protection of traditional systems of seed conservation and preservation, ethical, environmental and health-related issues. The national consultation on Bt. Brinjal reminds the needs to convince the public rather than educate them (Gupta, 2011; 739). Through the legal space of engagement, Supreme Court has also involved in the national narratives of the technology by constituting Technical Expert Committee (TEC) on Bt Brinjal controversy and by considering the issues on commercial release of GM Mustard (Chowdhury, 2014).

Civil society groups intensify societal concerns through a series of campaigns to constitute GM crops as a problem. They have used social media, newspapers, campaigns, conferences, and other formal and informal platforms to spread the concerns over GM crops. The involvement of CSOs by popularizing the future implications and hidden intentions on the introduction of GM crops has opened a space for deliberative analysis of science and technology (Motion, 2015). Lack of transparency and relevant socio-economic concerns have fostered the idea of public participation in decision making and it can create a better support system for Science and its innovations (Mwale, 2008). The awareness-generation may not attribute to the success or

acceptance of the technology since the lay public is already informed of their need and requirement by their experiences. A dialogue on science-related issues and its inherent uncertainties are necessary and there should be a space to recognize other relevant aspects rather than the objective scientific alternative for the future perspective (Jackson, Barbagallo and Haste, 2005). This paper looks into sifts in the debate on Bt Cotton and also looks into the socio-historical evolution of the debate and how this debate contributed to public engagement in India.

Socio-Historical Context of Emergence of Controversy over GM crops

The development and use of GM technology are widely criticised across the world. The US is the first producer of GM crop and still, lead in its production. Public concern and opposition were not much visible in the US except the demand for labeling for the sake of consumer's choice (Lempert, 2016). Contrary to the US, the European Union (EU) rejected the commercial cultivation of GM crops and raised concerns over the environment, consumers over their past experience of BSE controversy, the difference in attitude towards food (Ramanna, 2006). Both in the US and the EU, the rejection and opposition of GM food were based on consumer's interest. But in developing countries like India, the debate was more farmers centric.

In India, Mahyco got formal approval for field trails approval in July- August 1998 in Karnataka, Andhra Pradesh, Punjab, Maharashtra, and Haryana. Prior to that, Bt. Cotton was seen farmers field in Andhra Pradesh. The research and field trials of Bt. cotton was away from the public domain until civil society organisations enquired on farmer's suicide due to cotton failure in Andhra Pradesh. Civil society organisations enquired and they found out a variety of cotton without any flower at all. They enquired about the variety and realized that it's pink bollworm resistant Bt. Cotton. Thus they came to know that field trial is going on. And this cultivation was

without the permission of the government. The illegal cultivation of Bt Cotton started in 1996-97. This is the context of starting the discussion on Bt. Cotton and on terminator technology in India.

The field trials which conducted in farmers land were without giving any prior information of GM crops. Even though India has set up DBT, MoEF and EPA to regulate GM crop research in India, there was no proper monitoring and analysis of field trials at the very initial phase. The illegal field trails are the evidence of it and process were hidden from the public domain. This brought out the question on transparency, the intention of scientists and government.

In 1998 there was a severe cotton failure in Karnataka and Andhra Pradesh, where Bt. Cotton field trails were found, due to heavy infestation, and intensive pesticide application. This scenario hyped the debate on terminator technology. Civil society organisations argued that crop failure is due to terminator technology (Bharathan, 2000) and they fired the cotton field. In 1998-2000 many field trials of Bt Cotton have identified in Karnataka and farmers groups started a protest on it. During that time the debate on GM crops various dimensions apart from terminator technology and monopoly of multinational giants. Issues of biosafety impacts on biodiversity are widely debated in these contexts. In 2001, the company applied for the approval of Bt. Cotton but ICAR denied and asked to do more field trials. In 2002, Mahyco Monsanto joint venture MMBL it got approval.

Through the debates on terminator technology, biosafety, and monopoly of a multinational company, a new group emerges and the whole debate continued through the path of pro and anti-GM. In 1998 Monsanto launched a series of advertisements in the press and, at the same time, NGO groups launched the 'Monsanto Quit India' campaign to heighten. The late KRRS

(Karnataka Rajya Ryota Sangha) leader, Professor M. D. Nanjundaswamy, introduced a series of slogans: ‘Stop Genetic Engineering’, ‘No Patents on Life’, ‘Cremate Monsanto’ and ‘Bury the WTO’ (Scoones, 2008). A group of NGOs and activists was engaged in the issues by burning the trial sites, organizing protests against the agriculture multinational giants. Another group of environmental activists, like Vandana Shiva and Suman Sahai, engaged with regulatory issues. Vandana Shiva took a stand of anti-technology and Dr. Sahai never rejected the technology but questioned MNCs. They approached courts for the illegal approval of RCGM (Ramanna, 2006). GEAC was supposed to approve the open field trials but MMBL trials seem to have been permitted by RCGM. Even though many alliances formed at the local, regional and national level on the controversy of GM crops, coordination among them was lacking. Meantime a strong Pro GM movement started under the leadership of nonresident scientists, other farmer leaders and industry in the frames of Bt. for poor (Ramanna, 2006; p15).

Shifts in the Debate on Bt. Cotton

The performance report of the first three Bt. Cotton, MMBL Cotton, varieties in 2002-03 in various part of the country indicate poor or failed performance. The farmers who sowed cotton seed on over 42,000 hectares across the country were unhappy with its performance. State governments of Madhya Pradesh, Gujarat, Maharashtra, and Andhra Pradesh, and other independent agencies conducted studies on the performance of first Bt Cotton cultivation. Following widespread complaints of failure of Bt. cotton in Madhya Pradesh, the GEAC commissioned a seven-member team of scientists to evaluate the performance of the crop. The

study showed that Bt. cotton failed in Madhya Pradesh and non-Bt plants performed much better (Krishnakumar, 2004). MMBL used outdated cotton varieties in developing Bt. cotton which deepens the poor performance of cotton.

Pink bollworm attack in Andhra Pradesh was low to moderate, even though the number of bolls was higher in Bt, size and staple length was lower, and yield was low compared to other indigenous varieties. Farmers faced difficulty in selling the cotton due to short staple length (Govt. of AP, n.d.; Sahai and Rahman, 2003). In Krishna – Godavari region, Bt. Cotton performed better than Telangana district. But number the pesticide spray was higher almost 6-7 sprays was taken. In the Telangana region, the pest attack was less but the yield was low. Farmers showed great concern over new technology and expressed their unwillingness for raising Bt. cotton during Kharif -2003. In a study conducted by Deccan development society in 2003, most of the farmers expressed that Bt. Cotton could not make any improvement in yield (Qayum and Sakhari, 2003). The reason for performance variation in Krishna – Godavari region and Telangana may be due to geographical parameters.

In the state of Karnataka, the cost of Bt. Cotton cultivation was very high, almost 4-5 times higher than the normal hybrids. Though the incidence of bollworm attack in Bt. Cotton was low compared to other hybrids, the regular plant protection Measures were necessary for other sucking insects. This led to a fear of the emergence of minor pest to major pests in the future. Since Bt. cotton is being the medium staple length cotton, the market price fetched for Bt. cotton is less than the long staple cotton variety such as DCM- 32 (Gov. of KA, n.d).

The performance report of Bt. Cotton heated up the debate. A network formed on both sides. Anti-GM groups formed a network between scientists, farmers groups, politicians, health

experts, environmentalists. Honeybee export industries also have joined with the anti- GM group during GM Mustard controversy. At the same time, pro-GM group also have formed a network of international scientists, industries, and farmers organisations. Meantime, a platform of International Service for the Acquisition of Agri-biotech Applications, a non-profit organisation, formed to promote GM Crops across the world. Formation of these networks strengthened the debate on GM crops and the nature of debate became more scientific with scientific studies from India as well as from other countries.

The pro and anti-GM groups used their own frames of technology. The pro-GM group narrated it as a symbol of development and it has a pro-poor approach. But the anti- GM groups equated the technology with hunger and also the term ‘terminator technology’ spread the fear. This lead to the intensive distraction of Bt. Cotton fields in Karnataka (Bharathan, 2000). But both these polarized debates got another dimension when illegal cultivation of Navbharat seeds found in Gujarat in 2001. Pro-GM group narrated the illegal cultivation as ‘farmers’ choice’ rather than fighting for intellectual property right. The idea of farmers’ choice was well suited in the context of illegal Bt. Cotton cultivation. But, anti –GM portrayed the illegal cultivation as the failure of the regulatory system (Ramanna, 2006). After the commercial release of Bt cotton, the civil society organisation conducted many field studies to give an evidence-based report of Bt. Cotton. They brought out the failure report of Bt. cotton with alternative approach to revive the cotton cultivation. All the documents and data which they have generated as well as reviewed scientific literature from both national and international contexts have made available to the public. Evidence-based arguments of CSOs heated up the controversy and the debate got various dimensions.

Controversy to Public Engagement

Protests and debates started in 1998 when Bt. Cotton was ready for commercial release. Many activists came up with protests and they addressed different issues. A bottom-up approach has initiated during this phase, but a coordinated activity was not visible (Scoones, 2005). Informal lobbying, invited consultation, and court cases had been practiced. And the formal spaces like PIL have paved a way for a transparent and democratic approach to GM technology (Barpujari, 2011). Citizen juries also were practiced. The debate on GM crops opened the door for democratic debate on GM technologies from various dimensions rather than just focusing only on the economic benefits (Visvanathan and Parmar, 2002).

In 2000-01, the controversial issues of GM crops became an experimental site for public engagement in India. Two citizen juries process had been held in the state of Karnataka and Andhra Pradesh under the leadership of civil society organisations and international institutions. ActionAid India organized citizen juries in the dry land area of the Chitradurga district of Karnataka contains a high proportion of marginal farmers and landless peasants. The jury was composed of 14 small and marginal farmers, six men and eight women represented various traditions, income levels and social groups (Pimbert , Wakeford and Satheesh, 2001).

Gov. of Andhra Pradesh released a Vision 2020 document in 1999 which aims transformation in high potential sectors. The implication of vision 2020 on livelihood, agriculture biodiversity, and local food production are raised by local and state partners as well as international donors. In this context, UK based International Institute for Environment, Development, and Institute of Development Studies and the India-based Andhra Pradesh Coalition in Defense of Diversity, The University of Hyderabad, AP and the all-India National Biodiversity Strategy and Action Plan (NBSAP) organised citizen jury in 2001 in Andhra Pradesh. Reflecting the reality of rural

Andhra Pradesh, the jury also included a large proportion of Dalit and Adivasi people. Over two-thirds of the jury members were women, reflecting the greater role women have in agricultural work (Pimbert et.al; 2001). The jury on Andhra Pradesh supported their local food system.

The jury process demonstrates that illiteracy is not a barrier to informed decision making. The jury farmers in Karnataka and Andhra Pradesh proved that they are capable to discuss highly technical issues. They achieved it by hearing each witness rather than learning the basics of genetic engineering. They have made some important recommendations that- all programs should promote farmer-centered technologies and their development, a diet based on diversity of crops should be promoted because it provides better nutrition. Should include farmers in all research on agriculture and rural livelihoods, 'Farmers' councils' could be established in all states to provide guidance on new technologies, community seed banks should be established that would protect traditional varieties, Marketing facilities for organic produce should be developed, thus leading to an increase in organic production (Wakeford and wijeratna, 2000; p.6).

Even though the jury process could not impact at the policy level, it was a great step towards participatory decision making in India on emerging technologies. It gives an insight into the local needs and inclusion of their knowledge in the development phase of new technologies. The jury farmers were not against the technology, but they have given some guidelines for the future research and better outcome with the technology. The conclusion of juries fired the industrial tag of 'GM crops for poor'. The farmers are equally concerned about their economic wellbeing and nutritious diet. They are well aware of their requirements and how the system should change.

In 2003, Gene Campaign organized a national conference on the ‘Relevance of GM Technology to Indian Agriculture and Food Security. Participants at this conference included from industry, research, and academia, civil society, farmers, political leaders, students, and concerned citizens. Twenty consensus recommendations were made by this group and sent to the Department of Biotechnology (DBT). DBT rebutted each one of them and refused to even discuss them (www.genecampaign.org). Some of the key recommendations were a comprehensive biotechnology policy in consultation with various stakeholders, a consultative and participatory process to priorities crops and traits for genetic improvement through biotechnology with the goal of addressing the needs of small farmers and Indian agriculture, post data on research and development of GM crops and products on websites and local newspapers, make GEAC more competent, transparent and accountable. But none of them were accepted by DBT. Even though these initiatives could not make any impact at the policy level, it could generate awareness among the public and some changes competent authorities. People started to talk on the technology, and it leads to a big shift to national consultation in 2010.

A deliberative initiative has taken during the Bt. Brinjal by Ministry of MoEF. A shift to the dialogue model is clearly marked during the Bt. Brinjal (Pandey, 2013; Barpujari, 2011). A platform of Coalition for GM Free India has formed at National level. Along with the expansion of the democratic space for debate, the nature of the debate has also shifted. Biosafety, regulatory, need of the technology and socio-economic issues are widely debated and civil society organizations conducted an independent analysis of the biosafety data. All these contestations demand upstream engagement.

The third crop GM Mustard now is at the commercialization stage. A bundle of issues has been discussed on DMH 11 like unemployment of rural women due to the usage of herbicide, impacts

on honey production and bee population and destruction of water bodies and flora and fauna are the major social issues. Moreover, the need for technology is widely questioned by civil society as well as prominent scientists. The scientific community, as well as the ministry itself, divided on the need of the technology in India (Sharma, 2017). Ministry of Environment had invited public opinion in September 2016 through online forms, but that process limited to the stakeholders those who have access to the internet. Now, the Supreme Court has a major role and approval of DMH 11 depends on SC decision.

Summary

The introduction of the genetically modified crop in India has created a space for public engagement rather achieving its objective of poverty alleviation. Debates on GM crops emerged as controversy on risks and it extended to socio-economic, environmental and health impacts. The debate got pro and anti-GM faces through the debates on performance of Bt Cotton. However, the debate has got scientific nature since both groups argued with scientific evidence. Not only had a remarkable shift occurred in the nature of debate but also an upstream engagement clearly visible in the national consultation on Bt. Brinjal in 2010.

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