Transgenic Food Crops for India? The Politicization of a Controversial Technology

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In 2002, Bt Cotton[1] was introduced to the market as the first genetically engineered crop of India. Since then, it has been debated whether or not to enable the commercialization of transgenic food crops. While proponents argue for the potentials of genetic engineering to improve agricultural productivity necessary for feeding India's increasing population, opponents see the risk that the nation's food supply and the livelihoods of nearly 140 million farmers will more and more rely on expensive, rapidly changing technologies owned by transnational corporations (Kumar 2015). This article provides an overview of the recent political debate about arguments for and against the future commercialization of transgenic food crops in India.

Genetic engineering in India's agriculture

India's fast-growing population is estimated to reach 1.7 billion in 2050; then being the largest in the world (UN DESA 2017). This development is accompanied by an increasing demand for food and less per capita availability of arable land. At the same time, urbanization, rising incomes and dietary changes, e.g. the growing consumption of animal products, will lead to higher requirements of food grains (Kumar & Joshi 2016). In this context, India's agriculture and food sector is facing major challenges that are compounded by insufficient productivity rates in view of the high demand for food, scarce natural resources and adverse changes in climate. Agents of India's seed production sector see the solution to these challenges in the production of more food and other agricultural commodities per unit of land, water, energy and time. In their view, the development of transgenic crops with enhanced tolerance to biotic and abiotic stresses will play a major role in the effort to craft a future-proof agriculture in India (Dibden et al. 2013).

In this context, Mahyco (Maharashtra Hybrid Seeds Co.) signed an agreement with the University of Agricultural Sciences in Dharwad and the Tamil Nadu Agricultural University in Coimbatore in 2005 to develop genetically engineered eggplant (locally known as *brinjal*). Bt *Brinjal* was developed as a strain resistant to lepidopteron insects, in particular the fruit and shoot borer (*Leucinodes orbonalis*).

After the biosafety data presented by Mahyco was examined (2006 and 2009), the Genetic Engineering Approval Committee (GEAC) cleared Bt *Brinjal* for commercialization in 2009. However, due to public protests organized by scientists, farmers and NGOs, the Indian Environment Minister Jairam Ramesh, belonging to Indian National Congress (INC), restricted the responsibility of GEAC and called for public hearings on the issue. As result, he imposed a moratorium on the release of the transgenic *brinjal* hybrid only four months after the GEAC clearance. Until today, Bt *Brinjal* has not been released for commercial use in India.

With Prime Minister Narendra Modi, India seemed to change course and to apply politics favoring transgenic crops again. Shortly after Modi was sworn in on 26 May 2014, eight Indian states mostly aligned with his Bharatiya Janata Party (BJP) approved field trials of genetically engineered crops, allowing tests that include transgenic rice, maize, mustard, eggplant, and chickpea (Kumar 2015). Yet, till date, no additional genetically engineered crop has been released in India – not least due to the heavy opposition of the National Volunteer Organization (Rashtriya Swayamsevak Sangh; RSS), which serves the present government as Hindu-nationalistic spin doctor.

At present, a debate is unfolding on the release of transgenic mustard, known as GM Mustard[2], but due to the prevalence of mutually exclusive perspectives on the crop technology among the ruling parties, no one can forecast when the National Government will come to a decision and what it will look like.

The politicization of genetic engineering in India

As result of the recent political process, the situation today is characterized by a high degree of unpredictability. On the one hand, the introduction of Bt Cotton is described by representatives of the industry as overwhelming success story, since cultivation spread rapidly to major cotton-growing states such as Andhra Pradesh, Maharashtra, Punjab, and Madhya Pradesh (Haribabu 2014). Today, more than 90 percent of cotton cultivated in India is Bt Cotton (Herring 2013: 64). This transgenic hybrid is grown in such quantities that India is today the world's fourth-biggest producer of genetically engineered crops, after the USA, Brazil, and Argentina (Kumar 2015). On the other hand, recent figures show that yields of Bt Cotton are stagnating and that the use of insecticides is back to pre-Bt Cotton levels (Parakh 2018). In this context, the industry is today in great need of a new product to be commercialized soon, in order to present a new success story and to capitalize on their investments in a – from their point of view – promising technology (INT1).

Figure 1: Bt Cotton in Moinabad, Ranga Reddy District, Telangana (February 2018)

Figure 2: Bt Cotton seeds in Moinabad, Ranga Reddy District, Telangana (February 2018)

At the same time, environmental NGOs mobilized masses and influenced public perception, so that today large parts of the population and the ruling party are critical of genetic engineering. In consequence, Jairam Ramesh degraded the relevant institution from being the Genetic Engineering Approval Committee to being the Genetic Engineering Appraisal Committee in 2010. Following this, public hearings were held, preparing the decision on the approval of Bt Brinjal. Thereby, the minister did nothing less than to transform the question of whether to introduce transgenic crops to the Indian market or not from a purely technical to a political issue. While many campaigners read this development as a success story for democratization, others are aware of the risk that comes along with this step: the risk of the entire debate to be pushed into the spheres of ideology, with the (intended or unintended) consequence that facts-based arguments might lose their chance to be heard (INT2).

Mapping the political debate

Against this background, the research project "Agricultural Biotechnology in India: Politics of Knowledge and Non-Knowledge", funded by the German Research Foundation (DFG), serves to examine the *politicization* of the debate about transgenic food crops in India. In this context, politicization means "the opening of something as political" (Palonen 2003: 181) and addresses the process of creating new argumentative and institutional spaces for actors to pursue their goals and gain new power resources. However, in the current debate on genetic engineering in India, it is not only the political interests of different actors, which are under debate. Ultimately, it is their perceptions, definitions, and evaluations of biotechnology. Eventually, the outcome of environmental politics depends on the knowledge claims of involved actors (scientists, governmental officers, NGO campaigners, private business organizations, local farmers, etc.) about nature, agriculture and technology (Goldman & Turner 2011). These claims are constructed from a mix of

scientific findings, accepted standard measurement procedures (e.g. measure of yields aggregated at national level), sets of best-practice management approaches, political and economic prerogatives, and place-specific understandings (e.g. life scientists in the lab vs. farmers on the field), and each of them produces its own results of what is known and desirable and what is not (Böschen et al. 2010).

Based on this understanding of politicization, and as part of the first working package in the research project, the present political landscape in India is mapped in order to disentangle the manifold and dynamic networks that shape the ongoing negotiations in promoting, directing and constraining genetic engineering. For this purpose, stances and arguments of the main political organizations are documented, i.e. of political parties (e.g. Bharatiya Janata Party, Communist Party of India (Marxist), Indian National Congress), farmers' associations (e.g. Federation of Farmers Associations), industrial, business and trade associations (e.g. Association of Biotechnology Led Enterprises), as well as environmental associations (e.g. Navdanya). Until now, 14 expert interviews were conducted with top ranking entrepreneurs (e.g. Dr. K. K. Narayanan, the Managing Director of Metahelix Life Sciences Ltd.), politicians (e.g. Jairam Ramesh, the former Environment Minister) and activists (e.g. Dr. G. V. Ramanjaneyulu, the Executive Director of Centre for Sustainable Agriculture). The interviews are currently transcribed and analyzed. By following the method of *policy analysis* (e.g. Fischer 2003, Lange & Braun 2000, Reinicke 1998), the aim is to look at the political debate around Bt Cotton, Bt *Brinjal* and GM Mustard and to identify the following aspects:

- the changing institutional spaces and political arenas, in which the subsequent debates and decisions have taken place;
- the relevant actors' aims and strategies and their changings over time in the subsequent debates; and
- the arguments and knowledge claims of the different actors and their underlying rationales.

So far, the analysis of the expert interviews revealed two important aspects:

(1) The above mentioned fear of an ideologization of the debate is unfounded. The recent politicization of genetic engineering in the agriculture sector through the policies of Jairam Ramesh has not (yet) led to a loss of fact-based arguments. Just the opposite holds true: there is no activist group, which would bring forward arguments that are not based on scientific findings. As such, it can be concluded that voices to be heard have become more numerous through the process of politicization. Nonetheless, a facts-based discussion is still possible.

(2) Opponents come up with different arguments against biotechnology, which address socio-economic, political, environmental and cultural concerns. While each of these arguments are well founded, they oppose the argumentation of representatives of the agro-industry, who focus mainly on technological aspects. With that in mind, we see the necessity for social scientists to involve themselves more strongly with transgenic crop technologies to see if the products currently available are functioning according to the industry's wishes and if their promises to society are realistic or not. Against this backdrop, in the next step, this project seeks to contribute to the technological debate by examining the use of transgenic crops by smallholder farmers.

Outlook

As part of the second work package, qualitative interviews will produce a differentiated overview of farmers' daily practices of purchasing inputs, sowing, weeding, and harvesting, processing, storing, and marketing produce. It will provide empirical evidence to explain decision-making at the farm and community level concerning the purchase of seeds, crop protection, and fertilizers. Along with that, interviews with local sellers and governmental extension service providers will uncover the different channels and means by which biotechnological industries influence farmers in their attitudes and decisions in regard to technology-based innovations. This will produce empirical data on the strategies and routines of entrepreneurs, traders, and extension agents to translate agro-biotechnological knowledge to farmers.

The third and final work package will rest on ethnographic fieldwork on six Indian-based political organizations, i.e. three political parties, one industrial, business, and trade association, one farmers' association, and one environmental association. The method of participatory observation will be used to learn first-hand about the ways in which the organizations produce and circulate knowledge related to the topic of genetic engineering in agriculture. Informative meetings, rallies, and conferences organized by the political actors will be attended and a comparative analysis will provide rich empirical evidence of those disciplinary backgrounds, scientific cultures, and selected findings that the different organizations refer to in their political work.

In sum, the project will investigate the politics of knowledge related to genetic engineering in agriculture in India and disentangle the manifold and dynamic networks of persons, practices and technologies that together constitute and shape the politics. It will examine how (trans-) national corporations and NGOs, as well as resource managers employed by the state, and local farmer groups produce, circulate and apply environmental knowledge Moreover, it will analyze how these different actor groups co-produce and deal with non-knowledge – understood as intended and unintended side effect of producing knowledge about biotechnological products.

Notes

[1] The acronym "Bt" stands for the soil bacterium *Bacillus thuringiensis*. Bt Cotton features a gene from this bacterium, which provides resistance to different bollworm species, severe insect pests in almost all cotton-growing regions of the world. Thus, growers of Bt Cotton can potentially benefit from more efficient pest control (Kouser & Qaim 2011).

[2] The acronym "GM" stands for genetically modified. Since literally all cultivated crops are genetically modified, this term is imprecise. We thus prefer to speak of genetically engineered or transgenic crops to address the involved transfer of genes from an organism belonging to one species of a taxonomic group to a crop that belongs to a species of another taxonomic group (Haribabu 2012).

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Interviews

INT1: Interview with Dr. Shivendra Bajaj, Executive Director of the Association of Biotechnology Led Enterprises, 23 February 2018.

INT2: Interview with Dr. Suman Sahai, Chairperson of Gene Campaign, 26 February 2018.

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