The Changing Terrains of Regulatory Science in Developing Countries: NGOs, Controversies and "Opening-Up" of Regulatory Governance

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Introduction

NGOs and "controversies" (scientific, social, ethical or political) are the common denominators in most of the cases which have contributed to the changing relationships between science and society over the last few decades. The "opening-up" of the regulatory governance for public engagement in its various formats all over the world is generally associated to one or the other factors, sometimes to the extent of fantasizing as well as demonizing.

This paper taking the example of three case studies, that are CSE (Centre for Science and Environment) report on the presence of pesticides in bottled water, the agribiotechnology debate and the nanotechnology situation in India, tries to understand the relationship between NGOs and controversies in (re-) defining the science-society relationship in India, particularly in relation to regulatory science and its governance. The three cases illustrate how NGOs and controversies by their presence or absence at various stages of technology development shape the various aspects of science society relationship such as public perception and support, funding, media coverage, regulatory structures and governance of technology.

Methodology

The paper is based on research conducted by the first author since 2009 on regulatory aspects of biotechnology and nanotechnology in India for her M.Phil and Ph.D. It also draws from the research carried by the second author between 2007-2014 on multiple aspects of regulation making for bottled water quality standards in India for his M.Phil and Ph.D. It involved extensive interviews with different regulatory actors, farmers, consumers and firms; extensive literature review and analysis of various policy documents.

Conceptual Background

The modern regulatory era, which begin in the 1960s', primarily worked on the basic premise that technological risk can be restrained by regulations (Wiener, 2004). These regulations, regulatory structures and the process of regulatory decision-making involved scientists and engineers as experts and custodians of authentic and objective knowledge (Jasanoff, 1990).

During the last few decades several regulatory decisions (such as GM debate, Stem Cell, mad cow diseases) and a number of industrial tragedies (Chernobyl nuclear tragedy, Bhopal Gas Tragedy) were inflamed by controversies (Millstone and Zwanenberg, 2000; Levidow and Marris, 2001; Leach and Scoones, 2006). Controversies opened a space, where several actors raised question on the "objective" regulatory knowledge produced by scientist and experts. It also questioned the processes of regulatory decision-making and called for an "opening-up" of regulatory governance to scrutinise the context and purpose of innovation (Stirling, 2008).

Regulatory science as studied through prominent scholarships in STS (Weinberg, 1985, Jasanoff, 1990; Leach et. al., 2005; Murphy et. al., 2006) is a hybrid activity which involves scientific aspects enmeshed with social and political judgements. This requires the umbrella of regulatory governance to "open-up" in order to bring-in the aspects of transparency, accountability, accessibility and agency in science and technology innovations (Stirling, 2008).

In the process of "opening-up" of regulatory governance of technological innovations, various equations of controversies and NGOs had a major role to play worldwide. NGOs also emerged as crucial actor advocating broader public engagement in regulatory decision-making processes (Rayner, 2003). They not only raised issues around the scientific merit of regulatory decisions but also highlighted the social, ethical and political aspects of different issues (Scoones , 2005)

Conceptual Background: The Indian Situation

In the Indian situation, over the past few decades the changes in the science-society relations are getting visibly apparent. These changes are motivated by global-interactions as well as local and context specific micro-struggles and movements. NGOs in India, enter the domain of socio-political decision-making in relation to these micro-struggles.

Technological developments such as rapid industrialization, building of large dams, clearing of forests and acquisition of agricultural lands for industrialization displaced many people and threatened the life and livelihoods of significant others. NGOs in this context sprouted from the soils of controversial situations as a groups of individuals (big or small, short run issue oriented to long run organised) who coordinate and collectivise as a response to discontent in the formal mechanisms of interaction, articulation and addressing of specific issues related to society (Sethi, 2002).

However, until very recently, the primary activities of NGOs were mostly concentrated around developmental and social justice aspects of technologies with very negligible concern towards the "science" and processes of regulatory decision-making for technological innovations. Post 1970s, with the formal recognition of NGOs by the government (Sethi, 2002), increased interaction with the international agencies and intensifying health and environmental problems of technological innovation, the focus of NGOs activities diversified to engage with the aspects of regulatory governance of technologies.

CSE Controversy and the Pesticides Debate: A Neglected Sparkle Can Burn the House

National water quality standards or voluntary market based standards in general had hardly ever drawn attention of common public or policy makers at sustained level in India.

In the absence of any regulatory standards, the unregulated market in the post-liberalization phase of 1990's witnessed rapid growth (Bhushan, 2006). This period also witnessed setting up of voluntary standards for packaged drinking water by the standard setting state institution named Bureau of Indian Standards, which were made mandatory by 2001.

Source: Author

A report by the CSE, an NGO working in the field of environment, based in New Delhi, claimed that the bottled water of many top brands and few other less popular brands were found to be contaminated with pesticide residues.

Source: CSE, ND

Source: The Hindu, 2003

The report got wider coverage in national media and led to huge public outcry. As the initial response, the bottled water industry and many government institutions rejected these findings. The CSE report primarily questioned the scientific validity of the standards set for pesticide residues in bottled water. The controversy revolved around the use of different scientific methods and validity of Indian standards. Issues of risk, and public health were raised, primarily based on scientific reasoning to counter the existing methods of testing by Indian Standards.

This controversy led to the establishment of Joint Parliamentary Committee (JPC) to analyse the whole issue and further down the line new standards were published for pesticides contaminants in packaged drinking water (CSE, 2004).

The earlier regulatory model, which was completely drawing expertise by recruiting scientists and experts from public funded institutions, was shaken up. The authority of NGOs and other civil society groups both as an institution capable of producing scientific knowledge in the domain of regulatory science and as an actor representing general public concerns was accepted by the state. The controversy led to "opening-up" of regulatory decision-making process. After this controversy, the standards setting agency started providing representation of NGOs, Consumer Groups, and persons in individual capacity in standard setting committees.

NGOs were taken as proxy of "public". The process of "democratizing" the decision-making was initiated; however, it remained limited up to that. The role of NGOs does not increased at any other level (such as, implementation, monitoring).

A recent study, argued that, common public supported democratization of regulatory decision-making for setting bottled water quality standards in India, yet, NGO's are one of the least favored regulatory actors (Bhaduri and Sharma, 2014).

The "opening-up" was partial and remained limited to increase the role of few institutional actors. There was no other major institutional effort taken by the regulatory agency to further increase the public participation and increase the transparency of decision-making process.

Agribiotechnology Saga: All Set to Play

The agribiotechnology debate in India in the context of "opening-up" of regulatory governance could be understood through three specific cases that are the Bt cotton cultivation, public consultation for to be commercialized Bt Eggplant (Brinjal) and the proposal for a single window system of regulatory mechanism (Biotechnology Regulatory Authority Bill from here on BRAI bill), now pending in the parliament. These three cases illustrate the role of NGOs and controversies in changing the terrains of regulatory science in India.

Risk assessment and management were one of the primary concerns about the GMOs in India since the starting of the debate in late 1990s. Owing to the expert-oriented knowledge of scientifically defined risks, they were mainly discussed in the closed circles of academia and policy rooms, with negligible involvement of NGOs and the concerned public. Working majorly on the developmental aspects, the primary contention of NGOs at that time was the hollowness of claims about food security and corporate control of agriculture (Shiva, 2000a, 2000b; Sharma, 2000; RAFI, 2000).

Source: https://makanaka.wordpress.com/tag/bt-cotton/, ND

Being lost in the turmoil of nationalistic science, distrust on multinational corporations and bureaucratic structure, the government was incapable of deciding on the official release of Bt Cotton for 12 years (Scoones, 2005). In the environment of indecisiveness of the government and desperation of the farmers (to the extent of many farmers suicides) to look for alternatives of the green revolution, a huge controversy erupted as a result of illegal planting of Bt Cotton seeds in Gujarat (Scoones, 2005).

This brought the science, procedure, values and politics of the risk assessment, management and the regulatory system for Agribiotechnology in India under close scrutiny (Scoones, 2005). After its commercial release and massive cultivation, the incapability of Bt Cotton to reduce the distress of cotton farmers in Maharashtra and Andhra Pradesh leading to increased cases of farmers suicides in these regions led to enrolment of many more NGOs to work on the issues of GMOs.

The enrolment of NGOs , along with regular coverage in popular media resulted in a lot of information available to the general public about the various aspects of regulatory science for Bt Cotton. As a result of the sustained effort by farmer groups and NGOs, a nationwide public consultation was organized in India in February 2010 before the release of Bt Brinjal (the first genetically modified, insect resistant , food crop in India).

Source: http://meowlife.blogspot.in, 2010

The consultation organized by the then Minister of Environment and Forest (MoEF), Mr. Jairam Ramesh was taken up as a positive sign of the "opening-up" of the process of regulatory decision-making (Shiva , 2010).

The exhaustive effort, involving scientists, NGOs, farmer groups, media, research organizations, multinational seed companies, was conducted in seven states who are major producers of Brinjal.

The output of these consultations resulted into a moratorium on the commercial release of Bt Brinjal on the grounds of insufficient scientific evidence on different aspects of risks of GMOs (Gupta , 2011).

The moratorium led to a lot of discontent among scientific community, who strongly questioned and criticized the ability and involvement of "public" in regulatory decision-making and thus the validity and suitability of attempts such as public consultation (2010).

Source: The Hindu, 2010

The growing discontent of the scientific community about the involvement of "other" actors in regulatory decision-making process was captured through the various Drafts of the BRAI bill, which went various revisions due to its controversial nature in curbing democratic rights on science by privileging scientific expertise, lack of information disclosure during the process of decision making, provisions to convict people or organizations on the basis of promoting rhetoric and not facts based on "sound science", and weakening of the Public Interest Litigation (PIL) Mechanism (Gupta, 2011; Kuruganti, 2010; Jishnu, 2010; Sahai, 2009).

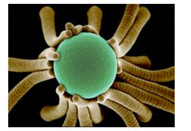
The agribiotechnology debate in India shows that in the wake of many controversies related to the regulating of GM crops, the arena of regulatory governance "opened –up" for public scrutiny. NGOs played a major role in this process where the terrains of regulatory science moved from being a black-boxed, elite scientist activity with factual outputs available to the public to an open process of constant deliberation and exchange.

This "opening-up" , however , condensed in the form of BRAI bill, where science was removed from the public arena and put back in the close custody of elite scientists and "opening-up" was limited to involvement of NGOs, social scientists and media for downstream engagement with implementing regulations and communicating Information to the public.

The Nanotechnology Situation: But There is No Controversy!

The 10 years of development around nanotechnology in India, first through the pilot Nano Science and Technology Initiative (NSTI) 2001-2006 and latter its extension through Nano Science and Technology Mission (NSTM) 2007-2012 show the enthusiasm of the government towards nanotechnology. The key features of the nanotechnology initiative (2001-2006) was the promotion of basic research through promotion of capacity building in infrastructure and skilled manpower (DST, 2007). This was later furthered to promotion of public-private partnership and applied research in the Nanomission (2007-2012) phase.

The discussions about risk, governance, and ELSI issues were completely absent in the first phase with very little focus in the second phase (TERI, 2010; Jayanthi et al., 2012). Though the capacity building programmes assisted in setting up infrastructures and research units but a core institutional structure for regulation and governance is still missing leading to a messy coordination between various agencies (Jayanthi et al., 2012) leaving no one directly accountable to the public. Limited research focusing only on scientific aspects of possible health and environment hazards is being conducted at various government and private institutions.



Source: Thoreau, F., 2011

The nanomission website only addresses the technical and factual issues related to project applications, primary institutions, and an advisory board of senior scientists, with no intention to cater to public concerns of social, economic, legal and ethical aspects (www.nanomission.gov.in).

Like the biotechnology situation, debates about regulatory mechanisms for nanotechnology are prominent in the academic circles (Chaudhary, 2006; TERI, 2010; Jayanthi et al., 2012).

The policy-makers and scientists, though considering regulatory aspects of nanotechnology important, seem disinterested in initiating a dialogue about it (Patra et al., 2011; field work, 2014) due to the reasons of technology being in a very early stage and discussion might attract controversies leading to eventually hampering investment and market interest (Beumer and Bhattacharya, 2013; Chaudhary, 2006; Chaudhary and Srivastava, 2008; Fieldwork, 2013-14). NGO involvement in the whole situation is still very minimal. Those NGOs who are engaged are being co-opted by the private and public organizations to provide information to the public.

Source: cartoonstock.com, ND

This whole situation could be analysed in the light of messages which are implicit in the science and society relationship in India.

In the absence of any controversies, or rather as a result of the successful attempts to avoid controversies, the debates on "opening-up" of regulatory governance and public engagement are generally missing.

The situation has reverted back to "deficit" model where public is understood as ignorant and lacking proper information, and the reasons of controversies are absence of proper mechanisms of communicating the "right" information to the public. This understanding of public discontent has also resulted into co-option of many NGOs by state agencies and private companies to serve as 'information providers' to the public.

Thus in the absence of a productive space created through controversies for regulatory decision-making there are no attempts to initiate dialogue at the beginning of the decision-making process.

The regulatory science for nanotechnology till now has not been "opened-up". The NGOs and the public, rather than being active contributors in the creation of knowledge of regulatory science in the above two cases have now become the passive communicators and receivers of the knowledge respectively.

Conclusions

This paper argues that rather than thinking about controversies as damaging and disturbing to the structure of science and its organization in India, there is a need to re-think controversies as sites of democratic dissent and fertile grounds for constructive engagement. Rather than reverting back to the "deficit" model and thinking of controversies arising as a result of "incorrect" or lack of information to an "ignorant" public, there is a need to recognize the "public knowledge ways" (civic epistemologies) and public knowledge as valid form of inputs to scientific and regulatory decision-making.

As evident from the above three cases, the intensity of controversy, the issues on which it erupted and the stages of technology development at which the controversy emerged, has a great and direct role to play in attracting attention of diverse actors and "opening-up" of regulatory governance.

It should be noted, however, that controversies have limited role in sustaining a long-term dialogue for science-society relationship. There is a need for stakeholders, more specifically those who play prominent roles in facilitating regulation, to steer the constructive energies of controversies in that direction.

In the Bottled water case, the controversy revolved around standards, and thus, the "opening-up" of regulatory governance was focused on "democratization" of standard setting process, with involvement of NGOs and other actors. However, the "opening-up" was partial and remained limited to increase the role of few institutional actors. There was no other major institutional effort taken by the regulatory agency to further increase the public participation and increase the transparency of decision-making process.

The agribiotechnology debate led to "opening-up" of various avenues of regulatory governance. The Bt Brinjal consultation showed the promises of fruitful engagement on issues of regulating technology not only with experts from NGOs but also with general public such as Individual farmers and consumers. Many regulatory committees have now "opened-up" to involve NGOs, social scientists and media representatives in the process of implementation of regulatory decisions. The role of these actors, as evident from the BRAI bill, is not much acknowledged in the arena of regulatory science.

The avoidance of controversy as observed in the nanotechnology situation by various means along with co-opting NGOs for information dissemination has undermined the potential of multiple knowledges to contribute for a robust risk assessment mechanism. The absence of controversies paralleled with an absence of dialogue on regulatory aspects of nanotechnology shows possibility of constructive energy in controversies for initiating a two-way dialogue and promoting the spaces for these dialogues between science and society.

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