Expertise at the 'Deliberative Turn': Multiple Publics and the Social Distribution of Technoscientific Expertise

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DIALOGUE
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Abstract

The scholarly debate on technical expertise in the context of the changing configuration of science is largely informed by the empirical contexts of the west, and a transition of the meanings and practices of expertise towards a more socially distributed and context-dependent form has been identified. In the context of public controversies over technoscientific projects, it is generally argued that expertise becomes more diffused among the citizen-publics who actively participate in the deliberation, and official expert advice is challenged and renegotiated in the process. What crisis does this changed scenario at the 'deliberative turn' in public engagement with science and technology create for the governance of technoscientific projects in India? The paper looks at how expertise is understood and employed in two technoscientific controversies — the public debate on the environmental release of Bt brinjal and the commissioning of nuclear power plants at Kudankulam, Tamil Nadu. The study contends that there are more democratic and technically and politically robust alternative modes of technoscientific decision making envisaged by social movements. Unfortunately, these alternative democratic imaginations are not taken seriously by the state-technoscience duo in India. The contrasting meanings and distribution of expertise during the public controversies in focus, the paper argues, are to be understood in relation to the political contract between the neoliberal state and technoscience, and the techniques of governmentality employed to manage different publics.

Keywords: Bt Brinjal; Kudankulam; Mode II Knowledge; Multiple Publics; People's Movement Against Nuclear Energy (PMANE); Public Engagement with Science and Technology; Transgenic Crops

Introduction

Seeking technical expertise for solving societal problems is a common practice of liberal democracy. This is paralleled by the professionalization of science since the mid-nineteenth century and increasingly the nation-states began to expect the scientific community to produce not only the technical knowledge to the benefit of society, but also expert advice for better governance of the problems of society. This has created conditions for the emergence of a specific practice of science which, in policy discourse, is often christened as 'science for public policy'. The scientific community has accepted its responsibility to provide expert advice on policy matters on a variety of areas of public governance in addition to their conventional role as cultivators of knowledge. Governmental mechanisms were created and specific institutions were established to channelize technical advice from the scientific community. This has also created the new category of 'experts' who are more visible in public discourses than those who perform their primary role as knowledge seekers. Expertise, in this sense, has a new, additional meaning at least since the early decades of the twentieth century, for scientific knowledge directly aided liberal democratic governments to find solutions to a variety of social problems from poverty to public health, and national security to population control. It should also be noted that the boundary between science proper and policy-relevant science has been very thin and porous for when new problems emerged the state turned to science for solutions from new areas of scientific research.

The present paper makes a detailed attempt to critically engage with the debate on technoscientific[1] decision making in Science, Technology and Society (STS) Studies with the help of two empirical cases from India. The first part of the paper examines the theoretical debate on technical expertise and its key role in liberal democracies, and the emerging question of democratisation of technoscientific governance. Against this backdrop, the second part of the paper discusses two such cases of technoscientific decision making — the public controversy over transgenic egg plants ('bt brinjal'), and the public protest against the nuclear reactors in Kudankulam village in Tamil Nadu. While the former is a case of the government actively seeking public involvement in decision making, the second case demonstrates a strong demand for public participation in context of its suppression by the state. Through these case studies, the emerging models of and contestations over the social distribution of expertise are examined to make some basic observations about the politico-epistemological contract between the state and science in the neoliberal period (cf. Varughese 2012).

The Problem of Expertise

As classically suggested by Don K. Price (Price 1967), the relationship between technical expertise and government in a liberal democracy was conventionally a smooth one. The policy advice from the scientific community was based on a clear definition of the scientists' role as expert advisors, founded upon a distinction between truth and power. Experts were experts because they spoke truth to power, while the dualism was kept intact. The idea was that at the technical stage, the solutions to the problems are created apolitically (by

the experts) and delivered to the political domain in the form of expert advice for political consideration. From this perspective, "[t]echnical input to policy problems has to be developed independently of political influences; the 'truth' so generated acts as a constraint…on subsequent exercises of political power (Jasanoff 2003 b)." Science thus is the most authentic source of truth, and politics is the domain of power that can be the most effective by relying on the truth of science accessed through the intermediary estates of professions and administration (Wang 1999: 294-5). Price asserted that this distinction between truth and power is quintessential for enhancing democracy (ibid: 296).

Secondly, expertise was clearly defined in its connection with science. Expertise could be claimed by someone only if s/he represented a 'scientific' institution. New areas of expertise emerged when new scientific institutions became legitimised through complex political and epistemological negotiations. A good example is the emergence of public administration experts advising the government. This had been attained by the promotional activities of funding agencies like Rockefeller Foundation in the 1920s and '30s who pushed the agenda of starting training programmes in the American universities and schools of public administration which gradually transpired into the emergence of public administration as a technical area of expertise (Turner 2001: 137).[2]

However, scholars have noted that by the 1970s the conviction about the role of expert advice in liberal democracies have started eroding off, both politically and academically (Ezrahi 1990). In the main, this was triggered by the rise of ecological consciousness and counter-cultural movements all over the world, and a gradual realisation that the ecological crisis was deeply linked to the technical decisions governments had made exclusively with the help of scientists. In this context, a strong epistemological critique of science was posed by the newly emergent social movements of the 1970s. This was manifest in a critical public attitude towards the close linkages between the scientific community and the liberal state. Against this backdrop, many scholars have proposed that expert advice actually reveals a paradox of liberal democracy; privileging of an elite group's opinion (expert advice) in democratic decision making subverts the very democratic principle of equal representation (Fischer 2005, Turner 2001). At the same time, there was a realisation that expert advice cannot be shunned by any democratic society, as in-depth knowledge about a problem can only be achieved through its close examination by experts. Everybody in a democracy cannot study each problem in detail and hence expert advice is essential for its better resolution.

It is also noticed that the normative questions on the relationship between technical expertise and democracy are deeply intertwined with transformations in science as a social system and its relationship with the social environment. These changes are manifested in the form of public controversies over technoscience. Controversies may erupt following cognitive disagreements among technical experts, thereby exposing the internal ambivalences and complexities of regulatory science to the public. Sometimes expert advice is sought by the government amidst growing public demand for the same in the backdrop of a public controversy. This may end the controversy, but in many cases, the expert advice becomes contested in public, leading to the erosion of credibility. Expert advice to governments or the general public in certain cases may be challenged by citizen groups or other

stakeholders, leading to a public controversy. In all the three situations, technical advice is publicly audited, and the experts' epistemological authority is challenged and renegotiated.[3]

It can be noted that public controversies over regulatory science have steeply increased in recent decades and the sharp distinction between science and politics collapsed. Scholars have proposed two major reasons (which are mutually supportive) for it. Some researchers argue that science is facing an internal reconfiguration in the neoliberal phase in terms of its knowledge production practices. These transformations are related to the emergence of a new mode of knowledge production in post-industrial societies, which led to a growing contextualisation of science (Gibbons et al. 1994; see also, Ravetz 1999, Ziman 1996). The 'mode-II knowledge production' is "socially distributed, application-oriented, trans-disciplinary, and subject to multiple accountabilities" against the old, 'mode-I science' "characterised by hegemony of theoretical or, at any rate, experimental science; by an internally-driven taxonomy of disciplines; and by the autonomy of scientists and their host institutions, the universities" (Nowotny, Scott and Gibbons 2003: 179). Such an on-going reconfiguration of science is deeply linked to its growing corporatisation and a resultant privatisation of knowledge (compromising its status as public, shared knowledge) and the changed nature of the state in the neoliberal period. Scholars who proposed the rise of Mode II suggest that the social distribution of expertise and the emergence of multiple locations of expertise in late modernity have created a new situation wherein the individual has more stakes in decision making (Nowotny, Scott and Gibbons 2001: 221). This manifests as increased public deliberation and citizen participation in decision making related to public issues and controversies where technoscience is involved. They also suggest 'extended peer review' by stakeholders in addition to the assessment within the scientific community as a mechanism to ensure inclusiveness and robustness of knowledge. The notion of expertise thus gets extended beyond the sphere of science.

A second group of scholars emphasises the social transformation that initiated such a reconfiguration of science — Ulrich Beck's thesis of 'risk' as an organising principle of contemporary societies is the prominent one. He suggests that the emergence of reflexive modernisation in late modernity has initiated a more socially oriented, self-reflexive science that acknowledges ambivalences and uncertainties in understanding and governing risks (Beck 1992). The social contract of science has been affected by these changes in science and society. The public is no more appreciative of science; rather they demand more public participation in the regulation of their social worlds in the context of risks and seek information from multiple sources of expertise as these risks are created by technoscience; therefore, scientific experts alone cannot technically solve them (Hagendijk 2004).

Though the reasons for the demand for public participation in technoscientific decision making vary, both the approaches discussed above concede that technoscientific governance today demands a wide spectrum of expert opinion to be sought due to the complexity of the issues involved as well as science's inability to account for the technical, socio-economic and cultural consequences of the problems at hand. The proponents of mode II knowledge production argue that the networking of these different sites of expertise is essential for contemporary liberal democracies to enhance a more socially robust process of knowledge production. In a similar vein, the risk society thesis recognises the need for a self-

reflexive science that can contribute to understanding and participating in risk management in late modernity (Beck 1992). In other words, there is a growing cultural understanding today that *the technical* is the very site of *the political*, in contradistinction to the conventional insulation of the technical from the political under the liberal contract between the state and science. This shift towards a more inclusive understanding of expertise and the role of deliberation in technoscientific governance has opened up a new debate on how to develop effective democratic mechanisms for decision making with regard to technoscientific projects.

However, this novel understanding of expertise as socially distributed triggered a debate on what kinds of expertise are relevant in a context of decision making, and the need for a mechanism to decide on this. Some scholars argued that it is important to take into account a large pool of expertise that is dispersed in society, in which scientific expertise is just one kind. Lay persons acquire a certain degree of technical expertise through their constant interaction with the scientific community during public controversies.[4] Governmental authorities and the scientific community, scholars suggest, hence should seriously engage with lay experts to produce better knowledge. This indicates that expertise is plural and dissipated, and for deepening democracy, the overdependence on scientific expertise should be substituted with a more inclusive notion of expertise. Wider public deliberation through various means is hence recommended, incorporating more localised committees and forums where experts of different hues can be included in specific contexts (see Irwin 1995, Jasanoff 2003 a, Wynne 1994, Wynne 1996).

Distinct from this Habermasian position that insists on the inclusion of all the stakeholders in the democratic deliberation, there is a John Rawlsian standpoint that emphasises on *decision making* (Durant 2011). This position has its best articulation so far in the 'Third Wave debate' in STS. Harry M. Collins and Robert Evans (Collins and Evans 2002) opine that wide public deliberation is essential, but decision making has to reach a final stage where the scientific experts should have the final word. This is achieved, as they suggest, through a complex discursive mechanism in which a separation of the early political phase of deliberation (where diverse interests and opinions are debated in public) from a later technical stage (where experts on various aspects of the issue are exclusively involved) that aims at achieving a final decision on the issue under deliberation. Here the technical phase is reckoned as in need of inclusion of a wider range of expertise unlike the conventional understanding of the same. Without such a mechanism, they argue, any consensus on S&T related issues and controversies would be difficult to accomplish. They point out that only 'interactional' and 'contributory' expertises are relevant for decision making in the technical phase of deliberation. The former can be achieved by "acquiring the language and understanding, and thus tacit knowledge, through interaction with the expert community" (which is not restricted to scientific expertise) (Collins and Evans 2015:122). However, the latter is available only with the esoteric community of experts who produce knowledge. In the technical phase, those who do not possess either kind of expertise cannot be included, while the preceding political phase can be open to public opinion and criticisms, which can inform expert deliberation in the technical phase (see also Collins and Evans 2002, Collins and Evans 2007, Collins, Evans and Weinel 2016). However, this mechanism raises several questions regarding who to decide who can

be involved in the technical phase as well as how to democratically decide (who decides?) the separation of the phases.

Against this conceptual backdrop, several researchers have examined how expert advice works in a variety of micro-sociological contexts. Sheila Jasanoff's study on the emergence of 'regulatory science' as a separate institutional and discursive mechanism in the American context in order to take into account the uncertainties and risks that demand mobilisation of a wider spectrum of expertise was an early move in this direction (Jasanoff 1990). Similarly, Stephan Hilgartner examines controversial technical reports of the US Academies of science to see "how science advisors work to achieve credibility and defend themselves against critics who challenge their objectivity, expertise, or integrity" (Hilgartner 2000: 3). There are a wide range of studies which similarly looked at citizens' engagement with experts in a variety of contexts such as citizen juries, consensus conferences, deliberative mapping activities and science shops, and their findings endorsed either of the Habermasian or Rawlsian standpoints.[5] All these studies invariably looked at American or European contexts of public engagement with and social distribution of expertise.

These studies have examined risk perceptions in the northern empirical contexts and operated with a "normative, standardised model of citizens" (Wynne 2005: 67), while omitting the non-western contexts of expert advice. Also, theorisations in the field generally fail to address the constraints of liberal democracy as a political paradigm. Even those studies aware of its limits end up being apologetic (Turner 2001 for example). In most of the world, the liberal political paradigm operates quite differently from the way it is generally theorised by the western STS scholars (cf. Kaviraj 2010). Though this problem cannot be addressed at length in this paper, an important question that concerns us is how publics of different kinds relate with expert advice in various social contexts as discussed in the next section. Recent studies focus on the relational aspect of expertise, challenging the conventional conceptualisation of expertise as 'a possession' of the specialist, for technical advice is orchestrated *in relation to* clients and their needs, hence shaping expertise itself (Grundmann 2017: 26). The relationality of expertise becomes significant in empirical contexts where multiple publics of technoscience exist. Unfortunately, the empirical studies on the social distribution of expertise cited earlier fall into the trap of perceiving the public as a homogeneous category generated by civil society.[6] However, as I have theorised elsewhere (Varughese 2012), the relationship between the state-technoscience duo[7] and different population groups constitutes at least three radically different categories of public –'scientific-citizen publics', 'quasi-publics', and 'non-publics'. Their engagements with the state-technoscience duo are distinct from each other, but relational:

> Scientific-citizen publics are mobilized in the civil society *in contrast to* the quasi-publics and *with reference to* the non-publics. While the quasi-publics reside in the shady zone of political society, establishing a paralegal relationship with the state-technoscience duo, the non-publics exist at the threshold of the political community in an extra-legal relationship with the duo when the state of exception is declared. The categories of quasi-publics and non-publics come into being in connection with two different modalities of engagement

> with technoscience, evident more in the non-Western contexts. The state-technoscience duo operates through pastoral and bio-political functions of governmentality respectively with the quasi-publics and non-publics, while offering full legal rights and entitlements to the scientific-citizen publics of the civil society (ibid.: 252. Emphases are as in the original).

It is now evident that irrespective of their varying vantage points, the studies anchored in western empirical contexts presuppose the civil society publics as the singular category of public, mainly because of their inability to think beyond the liberal political paradigm, and due to an inadequate conceptualisation of the paradigm that does not account for its complex mutations and trajectories in most of the world. Conceptualisation of multiple publics and their varied engagements with the state-technoscience duo complicate the question of expertise in liberal democracy.[8]

The rest of the paper explores the social distribution of expertise in Indian contexts of technoscientific decision making. Many of the assumptions of the mode II thesis including the withering away or the dilution of the powerful nation states as well as the theory's attempt to set aside the larger structural contexts of neoliberalism are noted as flawed even in western contexts (Elzinga 2004, Weingart 2004), which makes the exploration of Indian situation more challenging and interesting. How social actors involved in two recent public controversies perceived the question of expertise will be examined here and the mechanisms of decision making at work in these contexts will be traced. Rather than venturing into a normative debate on what ought to be a democratic mechanism of technoscientific decision making, the paper's approach is empirical. Contestations on the ground are examined here to argue that there are alternative models of democratic decision making already available in India, but the state-technoscientific duo has miserably failed to engage with these proposals.

Public Controversies over Expert Advice in India

As mentioned above, my attempt in this section is to do a quick mapping of how scientific expertise is understood and practised in India, a country where a strong politico-epistemological contract between the state and science catalysed by a Bernalist-Nehruvian vision of science that emerged in the post-colonial reconstructive phase (Raina 1997: 11). During this phase, the strong alliance between scientists and politicians inaugurated a path of national development propelled by science and technology, its epistemological engine (ibid). Scientists turned out to be the unchallenged heroes of the nation, and their epistemological authority was upheld in the decision making process. However, by the late 1970s and early 1980s this confidence and trust in scientific experts started deteriorating, following the rise of environmental and anti-developmentalist movements and industrial disasters like Bhopal Gas Tragedy. The wider shifts in the global discourse on science, technology and development also influenced this attitudinal change in India, inaugurating a new phase of public engagement with science and technology. This trend has gained momentum in the post-

liberalisation phase with the threat of corporatisation of everyday life as well as the plundering of natural resources and the implementation of large scale 'development' projects.

As mentioned earlier, two recent instances of decision making on techno-scientific projects are examined here with the objective of understanding the changing meanings and practices of expertise in India. First, the moratorium declared by the Ministry of Environment and Forests (MoEF) on the decision of the Genetic Engineering Approval Committee (GEAC)[9] to allow the environmental release of the genetically modified Bt brinjal following a series of public consultations. Second, the government's decision to continue with the commissioning of the first two nuclear reactors at Kudankulam, Tamil Nadu, amidst a strong public reaction to the same in the post-Fukushima context. Analysis of these cases suggests that without understanding the state-technoscience duo that came into being through the politico-epistemological contract between technoscience and the state and the multiple modes of governmentality that cater to different publics (Varughese 2012, Varughese 2015), it is difficult to capture how expertise is employed or distributed across various sites. The duo in the current context is willing to engage with the scientific citizen-publics (who are considered as an authentic public with moderate concerns about risks) while turning its governmental attention to placate (through welfare measures) and/or silence (by coercion) the 'unruly' quasi-publics whose livelihood is deeply affected by technoscientific projects (Varughese 2012).

The Bt Brinjal Controversy

The public controversy surrounding the expert advice in favour of environmental release of Genetically Modified (GM) Crops reveals the mechanisms and procedures involved in policy relevant science in India. The source of the controversy was the GEAC's recommendation to the government to approve field trials of Bt brinjal, developed by a private company that was behind the earlier propagation of genetically modified cotton seeds (Bt Cotton). The GEAC in its 97th meeting on 14 October 2009 evaluated the Bt brinjal developed by the Maharashtra Hybrid Seeds Co. Ltd (Mahyco), the Indian subsidiary of Monsanto, "for its efficacy and safety as per the protocols and procedures prescribed under the [Environment Protection Act] Rules 1989 and relevant biosafety guidelines" and concluded that "Bt brinjal is affected in controlling target pests, save to [sic] environment, non non-toxic in toxicity and animal feeding tests, non-allergenic and has potential to benefit the farmers."[10] Based on this assessment, the expert committee granted approval for its large scale field trials, which raised a strong public hue and cry. In the meeting, Pushpa M. Bhargava, a renowned biotechnologist who was a special invitee to the committee as a nominee of the Supreme Court of India,[11] argued that the safety assessment was not perfect and hence more tests should be conducted, but his arguments were not endorsed by other members. The committee also examined and rejected the oppositional claims of various national and international NGOs.

The GEAC's decision was based on two technical (expert) committee reports (EC I and II) along with the report of the Review Committee on Genetic Manipulation (RCGM). The technical committees claimed that they had examined even the scientific reports generated by civil society organizations, but none of the arguments of these organisations was appreciated by the committees.[13] The RCGM in its 40th meeting held on April 25, 2006 had assessed

the data generated by the Mahyco and recommended approval for large scale field trials. The GEAC in its 68th meeting held on June 1, 2006 considered the recommendations and constituted EC-I under the chairpersonship of Dr. Deepak Pental, a well-known geneticist and the then Vice Vice-Chancellor of the Delhi University. The mandate of EC-I was to review the biosafety data provided by the company and submissions received from different stakeholders. The committee also recommended field trials, and the 79th meeting of the GEAC conducted on August 8, 2007 granted permission to perform large scale field trials under the direct supervision of the director of the Indian Institute for Vegetable Research (IIVR), Varanasi. Based on the feedbacks from the field trials thus conducted, and under the Supreme Court's directives, the GEAC has further constituted the EC-II under the chairpersonship of Prof. Arjula R. Reddy (who was the co-chairperson of GEAC), in its 91st meeting on January 14, 2009, to give expert advice on the environmental release of Bt brinjal. It was on the basis of the recommendations of EC-II that GEAC recommended that the government allow the environmental release of the transgenic crop.

The constitution of the committees was strongly criticised for lack of transparency and public accountability by civil society organisations and activists (Shah 2011). While the EC-II did not have even a single social scientist or representative of the farming community or civil society movements or consumers as part of it, the EC-I had two social scientists among its thirteen members. The inclusion of social scientists was required by the mandate of the latter to recommend a protocol for socio-economic study.[13] Other than this, both the committees lacked a wider mandate as well as expertise to examine all the relevant aspects of this complex issue. The escalating public anxiety was also due to the fact that Bt brinjal was the first attempt in the country to introduce GM food crops. It was pointed out that there is evidence for a strong conflict of interests in both the committees. Firstly, the chairperson of the EC-I himself was allegedly an ardent promoter of biotech industries, and his university was involved in similar kinds of research on GM crops.[14] It was pointed out that his own research would influence the recommendations of the committee.[15] Representatives of civil society also argued that half of the EC-I were already members of the GEAC, and this has affected the credibility of the entire regulatory mechanism. A conflict of interest was observed in the appointment of the director of the IIVR as member of EC-I, for the institute was involved in the project with Mahyco. The director of the institute was further appointed by the GEAC to scrutinise the field trials, another factor that raised public concerns.

Following strong protests from civil society organisations against the decision of GEAC, the Ministry of Environment and Forests (MoEF) requested the Science Academies of the country[16] to look into the matter and provide expert advice, which was unprecedented as Indian science academies do not have any prominent role in the regulatory science apparatus of the government, unlike their western counterparts (Menon and Siddharthan 2015). These six academies thus collectively produced a report that endorsed the GEAC's recommendations for environmental release of Bt brinjal and proclaimed that it is safe for human consumption and sans serious environmental impacts (ibid, Byravan 2010). The report was rejected by the ministry when it was found that the report's content was heavily plagiarized from an already published study by a plant biotechnologist named Dr. P. Ananda Kumar (ibid).[17] He himself was a member of the EC-II of the GEAC that recommended the environmental release of

Bt brinjal, further revealing the conflict of interests that the entire process of expert advice was mired in. The shocking realisation that Kumar's article itself showed similarities in part to a report prepared by an international lobby organisation for the biotech industry,[18] raised strong concern regarding the lackadaisical and unethical approach of the Indian science academies towards delivering expert advice and the possible conflict of interest arising from the linkages between the scientists and the biotech industry. The production of the report was not based on any established, transparent procedures (ibid). This incident was central to the rise of public criticism against the environmental release of Bt brinjal. The case also revealed the need for better ethical procedures and institutional mechanisms for the effective delivery of scientific advice.

The recommendations of GEAC were made available in the public domain by the MoEF. In the wake of strong public criticism and demand for more inclusive procedures to decide on the commercialisation of transgenic plants, Jairam Ramesh, the then minister of MoEF, initiated public consultations in seven cities across the country during the months of January and February 2010, inviting active participation of a wide array of stakeholders like farmers, consumers, scientists and NGOs along with the representatives of Mahyco. An assessment of the whole process of decision making, in this case, suggests that it set new procedures in the history of S&T related decision making in the country, indicating changes in the science-society relationship. This was the first time in recent history that a decision made by a scientific expert committee was thrown open by the state for wider public deliberation,[19] although the procedural requirement for a limited 'public hearing' has been part of the Environmental Impact Assessment (EIA) process since 1997.[20] This event is a significant one because of the absence of a strong regulatory science mechanism embedded in democratic values and practices in the country, as we have seen in the case of government seeking expert advice from Indian Science Academies. On the other hand, in its existing form, the regulatory mechanism lacked transparency and credibility. The public also was concerned about the close linkages between the biotech industry and the experts of government committees.

The public consultations organized by the ministry were massive in nature. According to the official report, "nearly 6000 participants registered for the seven consultations and an estimated 2000 more attended or demonstrated outside the venues. More than 9000 written submissions, some of them of book length, were presented to the Minister."[21] Wider deliberation through media and other informal public events occurred parallel with the official consultations as a fallout, besides the public opinion solicited by MoEF through email. This initiative created a new, three-tier structure of social distribution of expertise: at the core, there was the GEAC and its technical committees who have taken the decision; then this decision was deliberated in structured public forums, and a wider, informal deliberative sphere emerged around it. Following the public consultations, MoEF declared a moratorium on field trials of Bt brinjal in India. The governmental attempt to constitute the Biotechnology Regulatory Authority of India (BRAI) to regulate the research, commercialization and use of GMOs in the country gained momentum after the event.[22]

The MoEF insisted that the whole debate was supposed to be held in (structured) public consultations limited to the environmental release of Bt brinjal, and the larger ethical and epistemological questions could not be discussed. The minister in his note made it clear

that the issue he was concerned with was 'limited to what to do with the GEAC recommendation on the commercialisation of Bt brinjal,' and 'not with the larger issue of genetic engineering and biotechnology in agriculture.'[23] However, these issues were perceived as inseparable in the outer tier of the deliberative process, that is, in the media and informal citizen forums. The GEAC was constituted exclusively of scientists from related scientific fields, and did not include any representative of civil society organisations or farmers' unions. One of its members was an economist,[25] although the socio-economic analysis was considered outside the committee's mandate. There were only two dissenting members— P.M. Bhargava and Ramesh V. Sonti.[25] Both of them were not against the environmental release of GMOs *per se,* but pointed out certain technical flaws in the scientific procedure.

The emergent structure of decision making was new for its two outer tiers catered to public opinion. The core of this structure (tier 1) exclusively consisted of scientific experts who took key technical decisions. As we have discussed, the meaning of expertise was more parochially decided since it was limited to a few scientific disciplines. While keeping this inner core intact, the second tier was proposed as more inclusive of expertise from a wide range of areas and disciplines including lay-expertise (of farmers and other actors involved in the controversy). Nevertheless, the discussions in the second tier of public consultations, as we have seen, were restricted to questions directly and exclusively related to the socio-technical aspects of Bt brinjal, and broader issues related to the development of GMOs and commercialization of agriculture were precluded.

At the same time, these public consultations were different in their reach and scope from the public hearings usually conducted by government officials before sanctioning development projects. Unlike such procedural public hearings, the public consultations of MoEF were well-organised and inclusive of a wide range of stakeholders. The consultations also catalyzed a wider public deliberation, especially through the media. The public sphere thus constituted was far more inclusive and diverse in its deliberative content, and influenced and informed the formal public consultations in the second tier, while remaining open and informal. A suspension of field trials of Bt brinjal was the immediate result of the public consultations.

The case of Bt brinjal becomes important in two ways; it clearly indicated the limitations of the machinery of regulatory science in the country to advise the government in the context of technoscientific problems which are highly complex, risk-prone and multi-dimensional. The conventional regulatory mechanism developed during the Nehruvian period of public appreciation of science proved to be largely a failure in contemporary times in engaging with complex socio-technical problems like the case of transgenic crops, which can only be dealt with through a larger pool of diverse kinds of expertise. Also, such cases revealed a strong erosion of public credibility of experts and accentuation of distrust in expert advice.

Controversy over Nuclear Reactors in Kudankulam

Unlike the case of trangenic crops wherein the state was more open to pooling in a wide range of expertise, the controversies over the installation of nuclear reactors indicate a

completely different governmental strategy, despite a strong public demand for a better regulatory mechanism. The construction of the first two nuclear reactors in Kudankulam reveals the nuclear establishment and the state's callousness to the local public's demand for establishing democratic, inclusive procedures to assess the viability of nuclear energy projects. The Indo-Russian collaborative project faced strong protest from the local villagers, who were organized in 2001 under the banner of the People's Movement against Nuclear Energy (PMANE). The protest of the villagers attained national attention in the wake of the Fukushima Daiichi nuclear disaster on March 11, 2011 in Japan, gathering strong and wide support from civil society.[26]

Against the backdrop of intense public resistance to the project, the Department of Atomic Energy of the Government of India set up a fifteen fifteen-member Expert Group (hereafter, EG) in 2011 consisting of scientific experts from various related fields of specialization with a mandate to "explain the factual position on various aspects of the project and… also [to] dispel apprehensions of some sections of the local people."[27] The EG met the representatives of local villages and government officials nominated by the Tamil Nadu state government and discussed various issues included in its mandate.[28] Unlike the Bt brinjal case, here the expert committee (EG) was not for decision making, but to educate the 'unruly' local public. The EG was not a committee with the mandate to conduct a neutral technical assessment nor was it a decision decision-making committee like the GEAC in the Bt brinjal case. Instead, this was a tentative strategy worked out by the government to neutralize the growing opposition to the commissioning of the power plant as part of the state's larger strategy to curb the anger of the local villagers and the general public in the wake of the Fukushima nuclear disaster (Abraham 2015, Bhadra 2013). Nor did the government initiate any public consultation regarding KKNPP as in the former case. The decision making process in the context of nuclear energy is heavily shrouded in the national security discourse and hence completely insulated from public domain in India (Abraham 1998). The mandate of the EG was to pacify the local villagers who were protesting, and to enhance public awareness of the safety aspects of the nuclear reactors. This is why the EG met three representatives of the villagers in the presence of the government officials in charge of administration (the District Collector) and Law and Order (Superintendent of Police) as well as the head of the Catholic Church (The Bishop of Thoothukudi) who had a strong spiritual influence over the protesting fisher folk.[29] Other than this, no serious public engagement was sought by the EG. Nor did the EG interact with the expert committee constituted by the people's movement. The entire exercise seemed to be a tactical intervention to conciliate local resistance.

Three consecutive meetings were organized by the EG. The PMANE representatives demanded that the EG must meet the local people in a public consultation and repeatedly requested the EG to meet and discuss the technical issues with the expert committee of the movement. Both the requests were turned down, and the EG trivialized the report prepared by the PMANE Expert Committee[30] on the grounds that the latter based "their observations on wrong calculations, wrong interpretations and skewed statistics to put the observations of the EG in bad light".[31] Clearly, any serious engagement with the technical issues raised by the EC of PMANE was beyond the mandate of the EG, for the state was not willing to acknowledge the availability of a wider network of expertise on nuclear energy, despite the strong presence of a long history of nuclear debate in South Asia.[32] Acknowledging

the presence of such a network of expertise outside the state machinery would have made it explicit that nuclear technology was as complex and multidimensional an issue like transgenic plants that actually can be governed only through the mobilisation of a wide spectrum of expertises. Following three meetings the EG declared it had "addressed all the relevant issues" and concluded that "the KKNPP meets all current safety requirements for safe operation."[33] This sounded like a piece of expert advice, but it was not. The EG did not have any mandate for taking technical decisions or to provide technical advice to the DAE. As we have seen already, it was constituted with the simple objective of pacifying the protesting villagers (the 'unruly' quasi-public).

In sharp contrast to the EG, the expert committee of the PMANE was comprised of 28 members and a coordinator. It consisted of a wider set of expertise than the EG, including social scientists, legal experts, activists and policy makers along with veteran scientists and engineers. Conversely, the expertise of the EG was mostly limited to the nuclear sciences, like the committees which looked into the Bt brinjal case. As we have seen, the EC of PMANE had published a detailed study report on the safety and feasibility of the KKNPP and proposed alternatives to the nuclear project. However, the government never acknowledged this committee or involved it directly in the negotiations as demanded by the PMANE. It should also be noted that the nominated spokespersons of the movement consistently pointed out their non-expertise in technical matters related to nuclear energy and repeatedly persuaded the EG to invite the EC of PMANE for an effective and informed discussion, but their demand was always turned down.

The nuclear establishment avoided any technically informed debate on the project with the highly qualified experts who challenged the official scientific explanations about the viability of the project. Interestingly, (the late) A.P.J. Abdul Kalam, the former president of India who was professionally a science administrator with the Indian Space Research Organization, posed as a spokesperson of the state and addressed the wider public through his writings and talks. He declared the KKNPP to be completely safe and essential for India's future energy security. He even visited the KKNPP under the guise of an 'expert' to give legitimacy to the project. Kalam did not have any contributory or interactional expertise on nuclear energy related issues, but was projected as a technical expert by the nuclear energy establishment, while the EC of the PMANE has never been acknowledged for its expertise on the subject.

Multiple Publics and Expertise

The cases we have discussed reveal the multiple meanings of scientific expertise and its relational employment in specific contexts. While the first case (Bt brinjal) indicates a willingness of the state-technoscience duo to acknowledge the social distribution of expertise and the need for public participation in decision making, the second case (KKNPP) suggests a contradictory trend. The duo in the latter case was completely unwilling to allow public participation in the governance of nuclear technology. Despite the fact that the state invites corporate investment in both agriculture and nuclear energy sectors in the neoliberal phase, nuclear technology is still insulated from public scrutiny due to its role in national

security. The openness to public engagement in the decision-making process pertaining to transgenic plants also was a careful move, though; the scientific-citizen publics of civil society was *formally and carefully* included in the decision-making process and utmost care has been taken to ensure that this does not undermine the basic contract between technoscience and the state. And the same procedure was never repeated in similar contexts afterwards, as demonstrated by the controversy over GM Mustard. In the case of nuclear reactors, the state-technoscience duo had to deal with a different public which was local and unruly because of the direct impact of the technological project on their livelihood and immediate social world. Their perception of risk was primarily related to their livelihood issues, unlike that of the scientific citizen-publics of the civil society. While the governmental attitude towards the scientific-citizen publics is more of participatory nature, the 'quasi-publics' who resist nuclear reactors in their village has to be dealt with pastoral power, through welfare and coercive mechanisms (Varughese 2012). Democratic participation in decision making cannot be granted to the quasi-publics of the political society and they cannot claim full citizenship rights like the scientific-citizen publics of the civil society (cf. Chatterjee 2004).

The social distribution of expertise was deeply structured around the formation of these two kinds of publics with whom the state-technoscience duo interacted in radically different ways. The Expert advisory mechanism at its core was exclusively constituted with members of the technoscientific complex in both the cases we have discussed, and no compromise was made on its strict constitution. In order to deal with the rising public concerns about the lack of transparency in expert advice, the state has created limited conditions for public participation in decision making. The concerns and worries of the scientific-citizen publics were acknowledged in the former case; contrastingly, the public directly affected by the KKNPP were denied any such inclusion and they have never been reckoned as legitimate participants in the deliberative process. Their democratic right to regulate their own social world has seriously been curtailed. The idea of technoscientific expertise was understood as more inclusive and socially distributed in the first case. On the contrary, in the second case, expertise was perceived as vested exclusively on the representatives of the state-technoscience duo. Even those who have technical expertise are not taken seriously if they align themselves with the quasi-publics, as we have seen with regards to the EC of the PMANE. At the same time, non-experts like A. P. J. Abdul Kalam can successfully claim scientific expertise, because of their role as spokespersons of the state-technoscience duo.

Conclusions

Scholarly debate on the social distribution of expertise, as the paper has demonstrated, is not a settled one. The STS scholars who pondered over the normative questions raised by the problem of expertise highlighted the crisis it has created for the liberal democratic ideal. Until the late twentieth century, a clear distinction between science as the domain of truth and politics as of power was maintained in the policy discourses on expert advice. This divide between science and politics was even underscored as essential for the smooth functioning of liberal democracy. However, of late, this conventional understanding was challenged and new scholarship has proposed this division as rather a hindrance for the democratisation

of regulatory science. Debates on the mode-II knowledge production argued for the social distribution of expertise and scholars from different streams and schools observed a growing concern about public accountability of scientific experts in the backdrop of an escalation of uncertainties, ambivalences and risks involved in negotiating socio-technical problems. As Jasanoff (Jasanoff 2003 b: 238) has observed, the issue at this juncture "was no longer *whether* the public should have a say in technical decisions, but *how* to promote more meaningful interaction among policy-makers, scientific experts, corporate producers, and the public" (emphases are as in the original). More robust and effective social mechanisms for mobilising diverse strands of expertise towards decision making are sought after and the significance of public deliberation on science has been acknowledged.

Against this backdrop, this paper examined the public controversy around the environmental release of genetically modified brinjal and the local villagers' resistance to the construction of nuclear reactors at Kudankulam, Tamil Nadu. These cases from India provide fresh insights into and complicate the scholarly claim of social distribution of expertise, and it is found that in the non-western contexts, the question of expertise is intensely coupled with the multiple publics' variegated engagement with the state and technoscience. The state-technoscience duo has become more open to public participation in decision making while acknowledging the multidisciplinary and dissipated nature of expertise with reference to the scientific-citizen publics of the civil society as in the case of Bt brinjal. In sharp contrast, the quasi-publics of the political society have a differential engagement with technoscience. Their attempts to mobilise multidisciplinary expertise to convince the state about the need for better regulatory mechanisms reached an impasse for their political negotiations with the duo are capable enough to challenge the very politico-epistemological contract between technoscience and the neoliberal state. This indicates that the way the notion of expertise is socially distributed is radically dependent on the varied modes of governmentality employed by the state-technoscience duo on different publics. The claim of 'social distribution of expertise' has hence to be more cautiously discussed in non-western contexts. At the same time, public controversies over technoscience foster alternative social imaginations about more viable and inclusive mechanisms for technoscientific decision making.

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Notes

[1]Technoscience is a term used with different connotations in STS. In this paper it denotes, firstly, the inextricable entwinement of science and technology in the post-World War period. Secondly, the term signifies the close epistemic-political linkages between science and the sovereign power of nation-

states. Thirdly, it refers to a certain form of science with immediate socio-political applications and consequences for risk society ('post-normal science', a term used by Funtowics and Ravetz 1994. See also, Ravetz 1999). Hence technoscience replaces the term science in most of the contexts today. Even fields which probe foundational ontological problems such as gravitational wave research are characteristically technoscientific.

[2] For Turner 2001 the case of public administration as a field of technical expertise is but a special kind of expertise ('Type V', according to his categorization) different from expertise in Physics ('Type I'). The epistemological authority of Type I expertise is embodied in the scientific community of the field, and their legitimacy is almost universally accepted in liberal democracies. For Type V (as in the case of public administration), "the primary audience is not the public, but individuals with discretionary power, usually in bureaucracies" (ibid.: 136). A detailed discussion on the typology proposed by Turner (which also includes non-scientific expertise such as theology) is not within the purview of this paper.

[3] For detailed case studies of public controversies over science in India, see Varughese 2017.

[4] See Wynne 1996 for a classic example.

[5]A representative sample of studies include Bijker, Bal and Hendriks 2009 ; Fischer 2005; Irwin 1995; Kerr, Cunningham-Burley and Tutton 2007; Lovbrand, Pileke and Beck 2011 .

[6]'Multiple publics'is a term usually employed by STS scholars to refer to 'mini publics' and 'national publics', which are forms of scientific-citizen publics at different scales. See for example, Sheila Jasanoff's comparison of the national publics of the USA, the UK and Germany in her book, *Designs on Nature* (Jasanoff 2005). Theorization of the 'lay opinion publics', 'counterpublics', and 'official publics' by David J. Hess also refers to three different types of publics within civil society (see Hess 2011), as pointed out by Varughese (Varughese 2012: 246, footnote no. 19).

[7]The state-technoscience duo represents the politico-epistemological dimension of sovereignty manifested in the form of nation-state in liberal democracies. Unfortunately the epistemological dimension of the state is under-theorised in political theory. The argument here is that nation-state exists on the basic of a politico-epistemological contract it maintains with modern science. "The symbiosis between state and technoscientific complex precipitated through the political contract prompts their functional existence as the state-technoscience duo" (Varughese 2012: 244). See also, Varughese 2015.

[8] The relationship between non-publics and expertise is more complex, and not analyzed in this paper. Also, the non-publics do not appear as a central category in the cases discussed here.

[9] The GEAC was later renamed as Genetic Engineering Appraisal Committee.

[10]Decisions taken in the 97th Meeting of the Genetic Engineering Approval Committee (GEAC) held on 14.10.2009, p.1. http://www.envfor.nic.in/divisions/csurv/geac/decision-oct-97.pdf accessed on 26.11.2012. The GEAC was established in May 1990 as a statutory body under the Environment (Protection) Act of 1989 with the mandate to approve field trials and environmental release of GMOs in the country.

[11] A Public Interest Litigation (PIL) was filed in the Supreme Court of India in early 2005 to ensure a transparent and scientifically robust biosafety test protocol for the environmental release of GMOs.

[12] The details of the proceedings in this paragraph are from *Report of the Expert Committee (EC-II) on Bt Brinjal Event EE-1*, submitted to GEAC, MoEF, Government of India, on October 8, 2009.

[13] Thereafter the EC-I recommended the constitution of a three member sub-committee to study the socio-economic aspects of Bt brinjal, "to prescribe a protocol for conduct of socio economic studies and mechanism for evaluation of the data generated from the context of issues projected by the stakeholders". The recommendation was made in the context of rising concerns about the lack of socioeconomic data regarding diverse aspects of Bt brinjal. The suggested names of members were Dr. S. Parasuraman, Director, TISS, Mumbai, Dr. M. N. Murthy, Professor of Economics, IEG, New Delhi and Dr. Mathura Rai, Director, IIVR, Varanasi. See *Minutes of the 2nd meeting of the Expert Committee on Bt brinjal* held on 3.07.2007, p. 20.

[14]See the letter sent to the Chairman of the GEAC by representatives of civil society organizations on September 12, 2006. Later, the GM mustard (Dhara Mustard Hybrid-11) developed by the research team of Deepak Pental in the Delhi University came under public ire when they secured approval from GEAC for environmental release in 2015.

[15] Ibid.

[16]There are three science academies in India; they are Indian National Science Academy (INSA), New Delhi, Indian Academy of Sciences (IASc), Bangalore and National Academy of Sciences, India (NASI), Allahabad. Along with these three main academies, the government also asked Indian National Academy of Engineering (INAE), National Academy of Agricultural Sciences (NAAS) and National Academy of Medical Sciences (NAMS) to jointly produce the report. See Menon and Siddharthan 2015.

[17]Dr. Kumar was Project Director, National Research Centre on Plant Biotechnology (NRCPB), IARI, New Delhi. His article 'Bt Brinjal: A Pioneering Push' appeared in the *Biotech* magazine in 2009 December.

[18]The agency was The International Service for the Acquisition of Agri-biotech Applications, (ISAAA) partially funded by Monsanto. It was Mahyco, the Indian auxiliary of Monsanto that developed Bt brinjal (Byravan 2010; Menon and Siddharthan 2015). Later on it transpired that Kumar had contributed to the ISAAA report as well. See Priya Shetty. 2010. 'Plagiarism Plagues India's Genetically Modified Crops', *Nature News*, September 29. https://www.nature.com/news/2010/100929/full/news.2010.503.html accessed on 27.09.2019.

[19]There was a public debate on the Kaiga nuclear power reactor organized by the Atomic Energy Commission (AEC) in Bangalore in the late 1980s. This was initiated by M.R. Srinivasan, the then chairperson of AEC and Secretary of the Department of Atomic Energy. I thank Dhruv Raina for this information.

[20]Usually such public hearings are poorly organized to restrict public participation. See Mohan and Pabreja 2016 for a discussion on the procedural gaps in the Rule. See Kaur 2013 for an analysis of a public hearing session in connection with the construction of two additional nuclear reactors in Kudankulam, Tamil Nadu in 2006.

[21]Centre for Environment Education, National Consultations on Bt Brinjal: Report. Prepared for the Ministry of Environment and Forests (MoEF), Government of India, 10 February 2010, p. 3.

[22]Even though the idea of constituting a National Biotechnology Regulatory Authority was first mooted in 2003–'04, draft of a National Biotechnology Regulatory bill was made public for the first time only in 2008. The BRAI bill (2013) now awaits approval of the Indian Parliament.

[23] Jairam Ramesh, Minister's Report: Decision on Commercialization of Bt-Brinjal. 9 February 2010, MoEF, GoI, New Delhi, p. 3.

[24] M.N. Murty, Institute of Economic Growth, New Delhi.

[25] Scientist, Centre for Cellular and Molecular Biology, Hyderabad.

[26]For an introduction to the controversy, see Abraham 2015, Bhadra 2013, Kaur 2013, Varughese 2012.

[27]'Department of Atomic Energy Constitutes an Expert Group for Kudankulam Nuclear Power Project'. Press release, Department of Atomic Energy, 20.10.2011.

[28] Expert Group, Supplementary Report on Safety of Kudankulam Nuclear Power Project and Impact of its Operations on Surroundings. 31 January 2012, p.3.

[29] The PMANE had two representatives (Pushparayan and Sesuraj), while another representative of the local community who did not belong to the movement was nominated.

[30]See PMANE Expert Committee, Report of the People's Movement Against Nuclear Energy (PMANE) Expert Committee on Safety, Feasibility and Alternatives to Kudankulam Nuclear Power Plant (KKNPP), 12th December 2011. http://www.dianuke.org/wp-content/uploads/2011/12/PMANE_Expert_Committee_Report_Dec_2011.pdf accessed on 25.11.2012.

[31]See Supplementary Report on Safety of Kudankulam Nuclear Power Project and Impact of its Operations on Surroundings by Expert Group Constituted By GOI, 31.01.2012, p. 4. The EG also confidently proclaims that "it is concluded by experts in our country in the nuclear field that any accident of the type that occurred in TMI [Three Mile Island], Chernobyl and Fukushima can never take place at KKNPP" (p. 5) — a clear indication that their analysis was more an exercise in rhetoric than any serious engagement with the technical points raised by the experts of PMANE. http://www.indiaenvironmentportal.org.in/files/file/KKNPP31.01.2012.pdf accessed on 27.09.2019.

[32] For diverse aspects of the nuclear debate in South Asian contexts, see Abraham 2009.

[33] Supplementary Report on Safety of Kudankulam Nuclear Power Project and Impact of its Operations on Surroundings by Expert Group Constituted By GOI, 31.01.2012, p. 4.

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