Genetically Modified Crops: 
Policy Logjam

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In its interim report to the Supreme Court, the Technical Expert Committee has called for a 10-year moratorium on field trials of genetically modified crops in India. An evolving process, regulation of biotechnology needs to take into account the lessons learnt, current and future needs, changes in laws and rules, and advances in science and technology. While the current regulatory framework can be improved, a blanket moratorium does not help us move beyond polarised debates in biotechnology.

The interim report of the Supreme Court-appointed Technical Expert Committee (TEC) on genetically modified (GM) crops, which was submitted in late 2012, provides yet more evidence of the urgent need for effective communication between natural and social scientists. The polarisation of perceptions has posed serious questions about the role of biotechnology (read science) with regard to our agricultural crops (read society). However, the efforts for reconciliation are not discernible. In fact, the TEC’s report is not the first one articulating the collective understanding and approach towards genetic manipulation. With a narrow narrative, the questions on social and economic relevance of biotechnology sound far more amplified. The report has come at a time, as critics point out, when the nation is still grappling with the moratorium on Bt brinjal, which de facto engulfed the full stream of crops awaiting approval for commercialisation.

The TEC was mandated by the Supreme Court (SC) of India in the course of the proceedings of a public interest litigation filed by Aruna Rodrigues and others challenging the current regulation of biotechnology in India (Writ Petition (Civil) No 260 of 2005). The members of the TEC are Imran Siddiqui, P S Rama krishnan, P C Chauhan, P C Kesavan and B Sivakumar. Hearing the case in November 2012, the Court asked the TEC to submit its final report in six weeks. The TEC met various stakeholders, who provided inputs to the committee in the form of presentations and written submissions. Based on these inputs and its own deliberations, the TEC prepared an interim report with unanimous recommendations.

The TEC stressed the importance of applying precautionary principles in regulating genetically modified organisms (GMOs). It called for a 10-year moratorium on GM trials in India so that the regulatory system could be revamped. It called for many steps to be taken with respect to the current regulation framework inter alia conducting biosafety tests before trials, including studying sub-chronic toxicity in small animals, evaluation of biosafety data of previous and current GM crops by qualified scientists, resolving conflict of interest in the regulatory system, establishing specific sites for monitoring of trials, and examining the socio-economic impact of GM crops. The committee also cautioned against field trials of transgenics in those crops for which India is a centre of origin or a centre of diversity as these could contaminate and affect biodiversity. Regarding herbicide-tolerant GM crops, it called for a moratorium till an independent committee composed of experts and stakeholders could assess the potential impact of this technology and its relevance in the Indian context.

When the case came up before the SC for hearing, it did not concede to the demand for a moratorium on field trials of GM crops as it has not accepted the proposal for a 10-year moratorium. Since the TEC is yet to submit the final report, it is hoped that the recommendations in the final report would be constructive and consist of balanced positions without taking an overtly pro- or anti-GM stand.

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The central question is not whether we approve of GM crops or not; the question is “how we, as a nation, arrive at a decision of this nature”. The question applies not only to GM crops but also to our approach on continuation and location of nuclear plants, use of nanoparticles, applications of synthetic biology, funding of stem cell research, and even building of social utilities like dams and highways. The public policy formulation process has to absorb multidisciplinary approaches for getting the essence of context within which a decision is to be taken. This approach is possible when the system has the ability to deal with various streams of knowledge such as technical, economical, legal, ethical and social. This is easier said than done particularly when even scientists have differing views on safety and social relevance.

Several developed societies with advanced innovation and science and technology (S&T) systems are still struggling with such frameworks but this does not mean that we should not try. Each country has specific context for the need of technology and a very different innovation trajectory. Accordingly, the systemic absorptive capacity also varies. When it came to S&T-related policies, independent India, which grew under Nehru’s idea of creating a “scientific temper”, very conveniently left all decisions to scientists. This cannot be the situation anymore – we should not leave science to scientists alone. This is not to say they be outside the decision-making process; there is a need to make the policymaking process more inclusive. Are we prepared for this new phase required in our decision-making process?

We have had science and society programmes in the Ministry of Science and Technology for several decades now. The spirit with which it was established should be resurrected and placed in the new context where participative decision-making with various stakeholders, including subject experts from other streams, needs to be adopted. This is all the more necessary when technology convergence is appearing as a major trend, e.g., biotechnology converging with information and communications technology (ICT) to give bioinformatics. Convergence of nanotechnology with biotechnology and with ICT has been posing new policy challenges in terms of their governance, e.g., issues related to the environmental sustainability of white goods such as washing machines with nanoparticles. In other words, the need is to move from command and control regulation and top-down approach to anticipatory governance.

**Need for Public Engagement**

Over the years, many organisations including the Royal Society of the United Kingdom (UK) have called for engagement with the public on S&T issues so that the public’s perceptions and understanding of S&T are understood by policymakers. It has been pointed out that the idea that the public needs only education to be convinced and that better communication would do this no longer holds good. Public engagement has to be differentiated from one-way communication, public relations exercises, or marketing (Research Councils UK 2011).

Similarly, the American Association for Advancement of Science (AAAS) has established the Center for Public Engagement with Science and Technology,1

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**Women and Work**

*Edited by PADMINI SWAMINATHAN*

The notion of ‘work and employment’ for women is complex. In India, fewer women participate in employment compared to men. While economic factors determine men’s participation in employment, women’s participation depends on diverse reasons and is often rooted in a complex interplay of economic, cultural, social and personal factors.

The introduction talks of the oppression faced by wage-earning women due to patriarchal norms and capitalist relations of production, while demonstrating how policies and programmes based on national income accounts and labour force surveys seriously disadvantage women.

This volume analyses the concept of ‘work’, the economic contribution of women, and the consequences of gendering of work, while focusing on women engaged in varied work in different parts of India, living and working in dismal conditions, and earning paltry incomes.

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while the European Commission (EC) has funded studies and supported projects on public engagement with S&T, and public perception of S&Ts. Hence, more engagement with the public, which goes beyond top-down communication and promotion of biotechnology, is needed. Public perception surveys, consensus conferences and other modes that promote public engagement and initiatives to promote an objective assessment of biotechnology are necessary.

Such a paradigm shift cannot be expected overnight; it needs to be introduced in the most gradual way. In this context, due lessons may be drawn from China, which is now gearing up its system for such a change, particularly to deal with convergences that are now emerging across various technologies. Initially, select projects were funded in the beginning of this millennium and now the leading science and social science foundations are being encouraged to evolve joint programmes. The current areas of priority are ageing and urban planning. In its Twelfth Five-Year Plan, China has made specific allocations for strengthening linkages between natural and social sciences and specific mechanisms are being evolved at the administrative and disciplinary as well as at the funding (particularly for projects) level.

The process of trust-building among social and natural scientists is required to be rich enough to realise the implications of the decisions they make for society. There can be four different ways this may be ensured: First, there is need to have greater emphasis on subject-specific research that stands out in terms of quality and authenticity; there should be no substitute for excellent disciplinary and interdisciplinary research; for instance, if the safety of GM crops is tested for, then there should be no scope for doubting the validity of the safety results. Second, the process adopted for arriving at such conclusions should be transparent without any undue hurry to reach the market. Third, the commercialisation approval programme should always have embedded the disciplinary knowledge of the concerned stream; this is particularly essential for those areas where the government acts more as a regulator. Fourth, such decisions should have a fair amount of quality control mechanisms, if required, with help of those who are from outside the government system and with due importance to non-subject experts.

**Going beyond GM**

Biotechnology’s role in agriculture is not confined to GM crops. While GM crops represent one generation of technology, new developments are likely to further advance the application of biotechnology in agriculture with new plant breeding technologies being developed (FAO 2011; Lusser et al 2011). Although most of the GM crops cultivated now are genetically engineered for a single trait, in the future multi-stacking or crops genetically engineered to carry more than one trait will be the norm. Thus, biotechnology’s role in agriculture and the regulation of the same cannot be understood solely in the context of the current generation of GM crops. Instead, there is a need to take a comprehensive look, taking into account various aspects, including socio-economic impacts, so that the potential of the technology can be harnessed while minimising negative impacts/side-effects.

Given the importance of biotechnology in developing varieties that can help in climate change mitigation and adaptation, not using biotechnology as a part of the climate change action plan cannot be an option. Hence, it is high time we moved beyond the polarised debate of pro- and anti-GM crops. Domestic regulation of biotechnology cannot be viewed in isolation of trade policy and obligations under various international treaties and conventions. Unfortunately, these aspects figure in neither the current debate in India on GM crops nor the TEC and, as a result, the wider implications of biotechnology in agriculture are reduced to either total rejection or total acceptance, or calls being made for long-term moratoriums.

**Principles for Regulation**

Regulation of biotechnology is an evolving process and there is always a need to compare domestic regulations with best practices elsewhere and enhancing the capacity to regulate. Similarly, the regulation of a technology cannot be determined by a single principle but would need the application of more than one principle depending on the need and context. For example, environmental regulation cannot be based solely on the precautionary principle, or the “polluter pays” principle. Rather, what is required is a carefully developed regulatory policy based on various relevant principles and their application in specific contexts.

In that sense, biotechnology regulation has come a long way since the late 1980s and early 1990s when biotechnology regulation was taking shape. In fact, over the years the global regulation of biotechnology and national regulatory policies has undergone a sea change on account of various factors but there is no harmonisation at the global level. According to a study on global regulation of biotechnology, as many as 15 institutions are relevant for biotechnology regulation while many conventions/treaties/protocols are also applicable in biotechnology regulation (Rhodes 2010). For example, the Cartagena Protocol on Biosafety has many provisions that are directly relevant for the regulation of biotechnology. Of these, Article 26 is important as it enables countries to take into account socio-economic aspects in decision-making. However, there is no consensus on putting it to practice and besides the usual United States and European Union divide, there is a wide variance in putting it to practice among developing countries.

On the other hand, a country while implementing Article 26 can also ensure that its domestic regulatory policy considers socio-economic aspects in decision-making, particularly taking into account impacts in the post-commercialisation phase. Such a policy can be sensitive to both scientific norms on biosafety and socio-economic impacts of biotechnology.

However, such a nuanced understanding is found wanting in the debate on GM crops, particularly in the interim report of the TEC. In our view, the final TEC report should go beyond the polarised debate and may consider following four steps: (1) Improving the current regulatory framework and more engagement with the public.
COMMENTARY

(2) Applying the precautionary principle in the right manner, in the right context.
(3) Enhancing the importance of socio-economic considerations in decision-making.
(4) Prioritising the Biotechnology Regulatory Authority of India (BRAI) Bill and other regulatory issues.

Regulatory frameworks are developed over a period taking into account lessons learnt, current and future needs, changes in laws and rules, and advancements in s&t. The current regulatory framework can be improved but the improvement cannot come from a blanket moratorium. Instead, the TEC should have pointed out the issues in all its aspects, made a comparative analysis of the Indian regulatory framework with those of other countries, looked at best practices used elsewhere and on this basis should have called for corrective action and changes.

In an earlier study, a comparative analysis of different studies on GM impact analysis in India has been made (Chaturvedi et al 2007) and building on that study, regulations of different countries have been also compared (Chaturvedi et al 2012). The TEC report needs to make such comparisons for identifying benchmarks for policymakers. We suggest that the final TEC report should review the regulatory framework for identifying the strengths and weaknesses and make suggestions for improving it in the abovementioned context.

The precautionary principle is an important principle in assessing the risks arising from technology. We appreciate that the TEC has considered applying the precautionary principle in biotechnology and has stressed its importance. It should be used to identify gaps in knowledge, issues that need further study, and the scope for potential harm as recommended by the TEC. As discussed earlier, instead of applying the precautionary principle arbitrarily, its application has to be contextualised and based on an analysis of data and evidence available, potential harm if the proposed measure is undertaken, gaps in knowledge, and what more is needed in terms of data and evidence for facilitating decision-making (van den Belt 2003).

**The Precautionary Principle**

The precautionary principle should be applied in such a way that policy objectives are met and it helps in understanding risks, benefits, uncertainties and gaps in knowledge. For example, the communication from the EC on the precautionary principle advocates that measures taken under the precautionary principle should be proportional to the chosen level of protection, non-discriminatory in application, consistent with similar measures already taken based on an analysis of the potential benefits and costs of action or lack of action, and subject to review in the light of new scientific data (European Commission 2000).

On the specific issue of GMs in developing countries and application of the precautionary principle, a report from Nuffield Council on Bioethics has presented various perspectives that should be explored. The report argues that a reasonable application of the precautionary principle is a better option than bans and moratoriums when they are not warranted and suggests that views of farmers and other stakeholders should be taken into account (NCB 2004: xvii). Further, the report suggests that the precautionary approach can be used and that this approach is “a way of applying a set of interacting criteria to a given situation” (ibid: 59) and argues that the precautionary approach should be applied in such a way that policy objectives are met. Moreover, the report suggests that there is no evidence to suggest blanket bans and moratoriums and instead of such measures it favours continuation of research of GM crops governed by a reasonable application of the precautionary approach (ibid: 82).

In fact, a prominent scholar on environmental risk assessment and the precautionary principle cautions: “The precautionary principle may be a call to move slowly with GMs, but it is by no means a call to ban them in all cases and forever” (Applegate 2001: 258). On the other hand, a de minimis framework for regulating GM crops has been suggested, an approach that uses the precautionary principle for those crops that pose a higher risk (Durham, Doucet and Snyder 2011).

**Conclusions**

We hope the final TEC report will take into account the issues addressed in such literature, the cautions against using the precautionary principle to suggest bans and moratoriums, and the need for contextualising the application of the precautionary principle in biotechnology regulation.

The BRAI Bill is yet to be passed by Parliament, while on account of the moratorium on further commercialisation there is an uncertainty about the future. This does not augur well as, while the old regulatory framework is being criticised, an effective new one is not being put in its place. The BRAI Bill and other regulatory issues in biotechnology should be addressed so that India has a comprehensive and credible regulatory system for all biotechnology-related products, services and marketing.

As a society, we must ensure that s&t advancements are inclusive, accessible and egalitarian in their focus but at the same time we also should allay all fears.

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**EPW Index**

An author-title index for EPW has been prepared for the years from 1968 to 2012. The PDFs of the Index have been uploaded, year-wise, on the EPW web site. Visitors can download the Index for all the years from the site. (The Index for a few years is yet to be prepared and will be uploaded when ready.)

EPW would like to acknowledge the help of the staff of the library of the Indira Gandhi Institute for Development Research, Mumbai, in preparing the index under a project supported by the RD Tata Trust.
related to safety. In this context, due lessons may be drawn from the rich experiences of countries like the Netherlands and others, which have developed institutions for the interface between science and society with due diligence. They have evolved scientific methods to deal with complicated policy choices through relevant indicators, perception surveys and ethical frameworks.

NOTES

1 See http://www.aaas.org/programs/centers/pe/

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FAO (2011): “Policy Options for Agricultural Biotechnologies in Developing Countries”, Food and Agriculture Organisation, Rome.


