What we can learn from the inter-academy report*

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The six major Indian academies of science, engineering and medicine recently submitted a joint report on genetically modified (GM) crops, and in particular on *Bt*-brinjal, to Jairam Ramesh, Minister of State for Environment and Forests, Government of India. The minister has strongly criticized this report[1], pointing out that '[the document] doesn't appear to be the product of rigorous scientific evaluation. There is not a single citation or reference in the report. So there is no way to know how the authors reached their conclusions. The report doesn't even say who all were consulted in this exercise'. Worse, several sections of the report were reported to have been lifted verbatim, without attribution, from an article by P. Ananda Kumar in a Department of Biotechnology (DBT) newsletter[2].

The academies do not appear to have released this report publicly. It has, however, been published on the internet by others (http://www.countercurrents.org/dsharma270910.htm). We examined the section of the report on *Bt* brinjal and found that, of the four pages in this section, every paragraph except one had been copied (sometimes with minor changes) from Kumar's article[2]. As for the rest of the report, our reading is that quite apart from the lack of professionalism and questionable practices noted by the Minister, it is a disappointingly shallow overview of a widely debated topic.

A previous report by the Minister, dated 9 February 2010, is available on the Ministry's website (http://moef.nic.in/downloads/public-information/minister_REPORT.pdf). To us, that report seems far more cogent and compelling than the academies' report. As Devinder Sharma observes (http://www.countercurrents.org/dsharma270910.htm), the academies fail even to address many of the questions that the Minister raises. The Minister questions whether toxins in brinjal, normally suppressed in the mature fruit, can be expressed due to changes in metabolism. This concern is nowhere even mentioned in the academies' report. Concerns about the dangers of a monoculture are dealt with in a single paragraph and socio-economic impacts are discussed superficially. Meanwhile, several pages are spent on high-school biology, such as observing that DNA is degraded by the digestive system and is harmless.

It is disturbing that our top academies, answering a Union Minister's request on a policy issue of international importance, should produce such an unenlightening document.

This report should perhaps be used as a teaching example of how *not* to write a scientific report or a policy recommendation on a scientific issue. In particular, it nicely illustrates the following points:

First, cite your sources. A document full of numbers but no indication as to how they were obtained should not, in general, be trusted.

Second, make authorship and responsibilities clear. The document contains no indication about who was responsible for its preparation, apart from the names of the six Presidents of the academies responsible for it. The usual practice today, especially in the biomedical sciences, is to list, not only the authors, but their individual contributions to the document. As a demonstration of good scientific practice, consider the Intergovernmental Panel on Climate Change (IPCC) report. In this report, the names and affiliations of every scientific contributor to the document are listed, not just the name of the Chairman of the IPCC. We know of no other scientific policy paper or document prepared by the major science academies of the world which leaves out the names of the contributors.

Third, state conflicts of interest, or state explicitly that none exists. Again, this is standard practice and is absolutely crucial in areas in which large commercial interests are involved, such as the pharmaceutical or agricultural industries. Of course, naming the authors is a prerequisite for this.

There have been some attempts at rationalizing the document produced by the academies: First, that since it presumably represents the views of the substantial majority of academy members, no names need be mentioned. The second rationale is that the methodology for the production of this document is explicitly mentioned in the early part of the document. A third and somewhat novel rationalization, addressing the lack of references in the document, has been provided by a former president of the Indian National Science Academy (INSA), New Delhi, who is quoted[3] as saying: 'Just as an "op-ed" in a newspaper does not mention the names of experts the author spoke to while forming his or her view, sometimes committees and academy reports reflect a collective expert opinion and do away with citations'. The lack of statements concerning conflicts of interest has not, so far as we know, been addressed.

We are unconvinced by any of these arguments. Such documents are not prepared collectively by the thousands of members of these organizations. They are prepared by a far smaller group whose task is to collate, check and refine input and feedback, while bringing specialist knowledge to bear on the recommendations. It is thus imperative to list the members responsible, and any conflicts of interest they might have. That the questionable methodology is described in the document does not excuse it. Had the document been an executive summary of a much larger, well-documented report, these arguments would have had some validity. This is not the case here.

We hope that the comparison with an op-ed piece is a misquote. We list several ways in which such policy documents are unlike op-eds: Op-eds are signed by their authors; op-eds present a specific (sometimes, though not always, polemical) view and are not required to evaluate both sides of an argument objectively; op-eds are public documents, placed in the public eye so they may be debated; and, finally, op-eds are not commissioned to provide dispassionate scientific advice on issues of national importance.

We are happy that M. Vijayan, President, INSA, has expressed concern over

*A preliminary version of this article has been posted on http://horadecubitus.wordpress.com/2010/09/29/the-academies-report-on-gm-crops/.

the allegation of plagiarism, commenting to news agencies that 'This is unfortunate – we are devastated. This should not have happened'. Another news report indicates that the National Academy of Medical Sciences, New Delhi, has disassociated itself from the document, citing its unhappiness both with the consultative process as well as issues of possible plagiarism[4]. But the issue of plagiarism is by no means the only problem the document. We note that the presidents of the academies appeared perfectly willing to associate their names with this report until the controversy broke. Apart from Vijayan's statement, we have seen nothing remotely resembling a public apology from the academies.

What does this say about the ethics of scientific practice in India?

There is need for action, and it should start by naming the authors of the document, as well as those who approved its release to the Ministry. After that, the academies should come up with guidelines that set standards for such documents in the future.

Some of the academies have committees on ethics, but little has come publicly about the efforts of such committees. If the ethics committees feel that they have little to work on, perhaps this report is a good place to start.

1. *Indian Express*, 28 September 2010; http://www.indianexpress.com/news/No-scientific-rigour-in-report-on-GM-crops--Ramesh/689268
2. Ananda Kumar, P., *Biotech News*, December 2009, **4**, 108.
3. SciDev, 30 September 2010; http://scidev.net/en/news/indian-science-academies-rebuked-in-bt-brinjal-debate.html
4. *The Times of India*, 29 September 2010; http://timesofindia.indiatimes.com/india/NAMS-distances-itself-from-pro-Bt-brinjal-report/articleshow/6645035.cms

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Empowerment of women professionals for an effective role in national planning and development programmes: a view from the geosciences

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Deliberations on 'empowerment of women' are reiterations of long-known and much-debated issues. Though progress is being made, there is a long way to go before gender parity is achieved in the different spheres of life. The participation of women in policy-making has its roots in much more fundamental issues like equal opportunities for them leading to financial and psychological independence. At present, there is an increasingly widespread and unequivocal recognition of the fact that restrictive and imbalanced structuring of society based on gender leads not only to gross injustice to women, but is a hindrance in the path of progress of human beings.

This note highlights the position of women professionals in geosciences in India. The field of geosciences has been chosen since the special attributes of this discipline often miss out on the attention they deserve.

Planning and development related to scientific growth of women

As human society slowly comes of age, it is making the inevitable change from the feudal structure where a few people decided for all, to the scenario where planning and decision-making is collective. In such a situation active participation of women in all walks of life, including planning and development is vital, both at the micro and macro levels.

Every small and large aspect of our existence now is dictated by scientific knowledge and its applications; even in the role of a home-maker that women most commonly play, logical thinking and decision-making based on information produced from data is a fundamental requirement for the all-round growth and development of the family unit. Knowledge-based industries cannot exist without the technically and commercially qualified individuals who drive them, and they will not thrive in the absence of a scientifically literate society. It is thus inevitable that women become an intrinsic part of scientific progress.

Women have different aspirations, ways of approach, goals and targets compared to men. In the present situation of the shrinking world ridden with strife on the one hand and global concerns over environmental issues and sustainable growth on the other, it is a necessity to probe into alternative ideas and approaches to try and contain and also counter these menaces. Hence it is imperative to include women in national planning and development, not only to be able to address their needs effectively, but equally if not more importantly, to utilize their approaches and sensitivity to achieve a balance in different spheres of human progress. The under-representation of women in science is unjust, and threatens science from achieving excellence. Women can bring a new dimension to science by contributing additional creativity, imagination and intelligence.

Participation at all levels in scientific pursuits is the most logical path by which women would graduate to positions where they would have necessary grasp of national planning requirements and the power to execute them.

Pitfalls of women professionals in geosciences in India

Before the 18th century, geological sciences was not well-formalized. Early geologists, both male and female, tended to be informal observers and collectors. There are records of women in the field of geology; notable examples include Hildegard of Bingen who wrote about works concerning stones and Barbara Uttman who supervised her husband's mining operations after his death. In addition, various aristocratic women had scientific collections of rocks or minerals. In the 19th century a new profes-