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

Kusumita Arora

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-

sional class of geologists emerged that included women, quite commonly from Britain. Inge Lehmann (1888–1993), Fellow of the Royal Society of London, was a Danish seismologist, after whom the Lehmann Discontinuity is named. In 1977, the Association for Women Geoscientists was formed to support women in this field, as they remained underrepresented.

Professionals pursuing geosciences in India are engaged in various mineral resources industries: private or public sector, in research and development centres and in the universities. Women make up barely 10% of the workforce in this field. This number reduces to 1–2% in the highest professional echelons. Undoubtedly this discipline has fared even worse when it comes to the participation of women. Many of the reasons behind this observation are common to all professions, revolving around the standard problem of balancing family and career, where many women put their careers on the back-burner at the early stages and then never catch up, even if they make efforts to return to their earlier professions. A major deterrent is that workplace practices/expectations, strongly reflecting the attitude of the middle class, are often not conducive to certain requirements of women workers and follow mostly old system, which places family responsibilities on the concept of a professional husband with a stay-at-home wife.

In this already demanding situation, the pursuit of a geosciences career poses further complications. It is primarily an observational science, which involves travelling to remote and off-beat areas frequently; this requirement alone is enough to make most parents keep their daughters away from pursuing geosciences. The issue of personal safety often becomes an overwhelming concern and an insurmountable hindrance to the methods of data collection. However, quite commonly the travelling, both for males and females, is not alone but entails group involvement; the schemes and/or instruments on which observations are based need an elaborate set-up, which requires the participation of a team. One would expect this to make things more suitable for the women workers, but unfortunately this turns out to be a stronger barrier. Operating within a team as a leader or a member is both a logistic and cultural hindrance in our country, where easy acceptability by accompanying male co-workers is hard to find. Women geoscientists are often given to understand that their involvement in the work gives rise to otherwise avoidable logistic complications and puts their colleagues through more trouble in general.

Empowerment methods

Empowerment of the individual may be achieved when one acquires the ability to recognize his/her own potential in a realistic perspective and capitalize on it, bringing about a fundamental change in the socio-professional fabric. Empowerment lies in the individual and also the collective psyche, and is a consequence of self-reliance and self-confidence which is achieved through a combination of acquired capability, commitment to deliver and skill to communicate. Special skills regularly required in earth sciences, which lead to building of primary potential in individuals are field work, mapping and sample collection, surveying and navigation, laboratory testing, specialized instrument handling, and rigorous computational work, to name a few.

The sure-fire roadmap to empower young professionals is by increasing and diversifying their experience and exposure at every opportunity. Understanding of the social and academic backgrounds of the young women, their trepidations and aspirations at the initial stages, would go a long way in alleviating their fears and instilling confidence in them, and also a sense of responsibility and commitment through emplacement of a system of pro-active involvement in all stages of work. Strong gender conscious and women-oriented policies need to be formulated and implemented to ensure that women aspirants for a geoscience career are not short-changed. Instead of getting the extra encouragement that would propel them forward, most often women come up against active and passive discouragement right from recruitment processes to routine activities, which leaves them marginalized with respect to their male counterparts when it comes to performance evaluation. This in turn creates setbacks in their career, attracting further disparagement – a vicious cycle that is hard to break.

It must thus be ensured that 'field work' does not become a weapon of discouragement for aspiring young women candidates opting for a career in the geosciences in our country. Effective counselling of the men who plan and sanction projects and frame the work environment at institutional and national levels, as well as a system of incentives for those who practice gender parity are immediate requirements which would allow a fair and democratic order for the geosciences and lead to true emancipation of the professional arena, ushering in an era of liberty, equality and fraternity in the workplace. That assured, the meritorious and deserving women (alongside the men) would naturally advance to positions of authority and decision-making as a normal consequence of techno-scientific and managerial growth and progress.

Conclusion

There is the possibility of tangible gain from the inclusion of women geoscientists, professionally and socially. It is imperative to tap this huge potential and promote the involvement of women professionals in all aspects of geosciences. A two-pronged approach of extra encouragement for aspiring women geoscientists and simultaneous training of senior professionals in effective utilization of the female work-force would result in a gender-neutral work environment.

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