

# CURRENT SCIENCE

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GUEST EDITORIAL

## Women in STEMM: involve the institutions!

On 3 January 2017, the Google doodle celebrated the 186th birthday of Savitribai Jyotiba Phule, who was the cofounder of the first vernacular school for girls in India in 1848. Her memory was recently honoured by renaming Pune University as 'Savitribai Phule University'. It is worthwhile to see how the ripples of this 'innovation' started by Savitribai Phule have permeated our society at large, today after nearly one and a half centuries. The seeds of women's education sown then, grew slowly in Maharashtra and this school was followed by the first high school for girls in 1886. This 'female school' boasts of some famous students, including Indira Gandhi. Trying to track the ones in science among the alumni of this school, I could trace only Kamal Ranadive (Director of the Tata Memorial Hospital), one of the early women scientists trained in India like the famous chemist Asima Chatterjee. So the journey from a 'woman in education' in India to a 'woman in science' took about a century. The large participation of women from the Indian Space Research Organization (ISRO) in the Mangalyan project indicates that slowly but surely 'women in technology' have arrived too.

Let us concentrate first on participation of women students in higher education. The absolute numbers of women with access to university education have grown rapidly in the past 40 years, the growth being close to exponential for medicine. Further, the fraction of women pursuing university education in arts and medicine is almost 50%, whereas for sciences it is about 30–35%. For engineering, it has grown from a dismal 5–10% in the 1970s to 30–35% today. For the Indian Institutes of Technology however, it is still around 5–10%. What is worth noting is that the percentage of women does not decrease with increasing levels of degree, at least for science and engineering. Over the past three decades about 25–30% of the recipients of Ph D degree in science in India are women. However, the fraction of women scientists in faculty positions at our prestigious universities, research institutions and organizations, among speakers at scientific conferences, awardees, fellowships of science academies, editorial boards of journals, memberships of institute councils and governing boards, is at 10% or lower. Very few universities have women vice-chancellors and women directors of science institutes can be counted on the fingers of one hand.

Thus, while we really have no shortage of women learning science and excelling therein as well as in teaching science, their involvement in 'doing' science, in leading and directing scientific investigations is not commensurate with those who train in science. While the small fraction of women in the scientific work force is a reality the world over, the situation in India differs from the West in some respects. In India, the matter of real concern is the precipitous loss in 'trained scientific women power' at the postdoctoral level. In these days of 'Make in India' and/or aiming to accelerate the pace of the country's development with the aid of technology, this is a loss of resources which we, as a country, can ill-afford.

The purpose of this conversation, is not just to lament the small numbers, but rather to take stock of the situation, of the measures that have been taken to change the situation and of those that still need to be taken. It is clear that in India we need to mainly focus on encouraging and mentoring young women for a career in science.

The under-representation of women, particularly in STEMM (Science, Technology, Engineering, Mathematics and Medicine), has become a focus of worldwide attention and action over the last few decades. In fact, I write these specific lines on 11 February, the day that has been declared by the United Nations as the International Day for Women and Girls in Science. A day for Women in Science separate from the International Women's Day, is a reflection of the growing appreciation that the issue of women in STEMM has additional dimensions. As is well known, the crucial difference from other professions to a science career, is the overlap of the time period when one has to focus on creating one's own niche area and the period where the body clock is ticking. So the journey on the path of science has a speed-breaker right at the beginning, unlike in other professions. Hence, some of the solutions towards creating gender equity in science have to focus on this problem as has been done to some extent in India.

Many noteworthy initiatives have been started by the Indian Government and by the three Science Academies of India, to address these issues. In fact it was felt, correctly, that while it is necessary to collect and analyse data about women's participation and access to science in India to address their under-representation, it is really not necessary to wait to have those numbers to start some action. The Department of Science and Technology (DST)

as well as the Department of Biotechnology, put into place many schemes much before the West sprang into action. The Women Scientist Scheme of DST, for example, may have had its critics about the way it was implemented, but has provided opportunities for many a woman scientist to come back to a science career. Its effect was reflected in an increase in the fraction of women principle investigators from 11% in 2001 to about 30% in 2010.

There are many recommendations reiterated in various reports, the latest by the Joint Academy Panel for Women in Science, chaired by Manju Sharma. These include: having a good creche on campus, proactive hiring policies for young couples to manage dual careers, support to them such as on-campus housing, etc. These can be implemented in addition to the schemes that exist at present. The standing committee for Women in Science which has been recently revived, may look into such issues.

So does this mean that we all can be satisfied with the state of affairs and hope that things will improve by themselves as time goes along? Unfortunately not at all. There are various reasons for this. One, as the Secretary of DST himself says, many of these programmes really need to be scaled up. In addition, most of the programmes and initiatives are still formulated with a mindset that the major caregiver of the family is a woman and we need to ease her job of balancing career and family. While it is crucial to raise support structures at the societal and institutional level, which will help the young women scientists to negotiate these early speed-breakers, it is equally important to realize that achieving this balance is not the responsibility of the woman alone, but that of the couple. We have programmes to come back from a break, but not for minimizing/avoiding the breaks and their after effects.

Further, a big step will be to consider these schemes and measures in a 'gender neutral' manner, wherever possible. For example, consider schemes like DISHA and KIRAN which are in place to help women scientists to relocate or redefine their careers and achieve career-family balance. Such schemes should be meant for couples, with either of the partners doing the relocation or the redefinition. Another example is a creche. It is considered to be necessary if the number of women employees is above a certain minimum, the inherent assumption being that it is only the women employees who need a creche, whereas in fact a creche may help a male employee manage dual careers with his partner. It is important to think of these and other steps we take in future in a 'gender neutral' way. Incidentally, many fail to realize that facilities such as creches are now becoming a necessity not just for the permanent employees but also for young postdoctoral fellows, students and participants at scientific conferences.

As seen above, even assuming completely fair and merit-based selection processes, there are handicaps which a woman has to deal with. But question remains whether there are inherent, unconscious biases. While one cannot 'prove' that the under-representation arises due to discrimination, one can also not rule out the possi-

bilities that deep-rooted unconscious biases may be playing a role. This can change only with attitudes and with increasing awareness of the problem. For example, the fact that the number of women speakers at the 'Indian Science Congress' is small (not unlike any major conference) does not strike us till someone like the Nobel laureate David Gross comments on it; we are satisfied with merely holding a Women's Science Congress. This non-inclusivity needs to be addressed. Gender sensitization at all levels is necessary.

Even in scientific institutions which are alive to the need of gender sensitization necessitated by the changing gender scenarios, it is perceived that this consists only of creating awareness of 'sexual harassment'. Sadly, not true. Further, even in this context, often the scientific community is cagey talking about the 'elephant in the room'. In principle, these issues should find a place in a general discussion of scientific ethics and not just in the context of women in science.

How does one achieve changes in attitudes required for all this? These cannot be brought about by Government actions and policy changes, but rather from within the community and institutions. In fact, there exist wonderful examples of such initiatives: Athena SWAN (Scientific Women's Academic Network) charter in Great Britain and SAGE (Science Australia Gender Equity) in Australia. These are evaluation/accreditation programmes where the institutes are charged to make efforts to enhance gender equity and the funding agencies are ready to provide incentives for demonstrated achievements.

Such institution-based efforts might bring more fruits than some schemes implemented centrally to achieve equity, as the definitions of equity and efforts to achieve it, can change from discipline to discipline and institution to institution. The need of the time is for organizations to put their hands up. We have examples of ISRO and DRDO where such measures have been taken and shown to be effective. At least in my own Institute, the beginning of such awakening at the institutional level has happened in the form of a forum WISER – 'Women in Science, Education and Research'. But there is a long way to go from there onwards.

In conclusion, let me just assert the following. Basically consideration of how to increase the 'tribe' needs to be ALWAYS in minds of 'powers that be' and not just restricted to days like the 'International Day for Women and Girls in Science', 'Science Day' or 'International Women's Day'. Then and only then can we come up with solutions which will work for us in India. A day will come soon when we will just speak of scientists/engineers and not their gender. The way to achieve this, surprisingly, goes through the path of being aware of the gender and gender gap for a while.

Rohini M. Godbole

Indian Institute of Science,  
Bengaluru 560 012, India  
e-mail: rohini@chep.iisc.ernet.in