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# Bureaucracy, glass ceiling queer pitch for India's women scientists

Many countries, after realizing that women face difficulty in getting ahead in their career in research, are analysing the "gender dimension" and "gender dynamics" among applicants, recipients and gatekeepers of research funding

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Bangalore: Thousands of years old rodent jaws, 400 of which were recently unearthed in a limestone cave in Kurnool, Andhra Pradesh, almost come alive in yellow shades on Uma Ramakrishnan's computer screen at the National Centre for Biological Sciences in Bangalore.

Fossilized rodents are good indicators of climate change, she says, explaining how the Indian subcontinent is a sink where species from Africa and South-East Asia arrived centuries ago.



Proud precedent: Purnima Sinha.

Population genetics is what Ramakrishnan studies, using genetic data to construct a synthetic picture of evolution in the subcontinent. She is trying to figure out how species have responded to climate change over the years.

And she has riveting stories to tell—when tigers started disappearing from the Sariska National Park in Rajasthan, leopards started growing in number; north Indian leopards differ from south Indian ones, and they arrived from South-East Asia in two different waves. Her team is also trying to establish that the decline in India's tiger population started some 275 years ago.

"It's like being a detective, finding out new things all the time," she says, her eyes crinkling in smiles. She doesn't mind if the forest department officials  
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eyes crinkling in smiles. She doesn't mind if the forest department officials spy on her or the department of science and technology, or DST, drives her to frustration on the phone.

Ramakrishnan is having a blast studying DNA, whether from animal waste, fossils or museum skins. DNA is short for deoxyribonucleic acid, which contains the genetic instructions used in the development and functioning of all known living organisms and some viruses.

Ramakrishnan's is probably the kind of story the Indian Academy of Sciences would like to tell the country, particularly young women, in encouraging them to take up science as a career. But in reality, pursuing science is a mixed bag—of toil and triumph.

The academy's new publication *Lilavati's Daughters: The Women Scientists of India* (named after the 12th century mathematician Bhaskaracharya's daughter Lilavati, for whom he wrote the eponymous treatise) is a book with autobiographical sketches of 98 women scientists of India, some of whom have died. Its editors claim this is the first such documentation of women scientists anywhere in the world.

### **'Journey of joy'**

Indeed, some profiles give a rare glimpse of the scientific culture of pre-independence India. Purnima Sinha, the first woman PhD in physics from Calcutta university, talks about how she was made to fabricate her own X-ray machine by her mentor S.N. Bose (of Bose-Einstein statistics fame), which she eventually managed with World War II surplus.

While she socialized with musicians and artists, including film-maker Satyajit Ray, at home, at work it was a rigorous regimen of fabricating scientific instruments through student-teacher collaborations.

When contacted by *Mint*, Sinha, 81, and somewhat reclusive, said her pursuit of science was "a journey of joy rather than a struggle against any adverse situation". However, she admits that may have been an exception rather than the norm. Now, watching her daughters follow the same path, she finds the field very "competitive".

These stories will inspire young women to take up science as a career, says Ram Ramaswamy, co-editor of the book and professor at the School of Physical Sciences, Jawaharlal Nehru University, Delhi. "It'll also sensitize people about the issues women scientists face."

But Rohini Godbole, co-editor and high energy physicist at the Indian Institute of Science, or IISc, Bangalore, says common people can get a whiff of how "women living and working in contemporary India" do science.

"If you ask a man/woman on the street to name women scientists, I don't think they would go beyond Marie Curie, Rosalind Franklin and the like; great scientists as they are, it is not possible for a young mind to identify with them."

Women scientists constitute less than 15% of the scientific pool in the country—the Indian Academy of Sciences has 57 women and 928 male fellows, and the ratio is no better in the other two academies—Indian National Science Academy (Insa) and National Academy of Sciences (NAS)—says Ramaswamy.

### **Drawing them to science**

There has been a spurt of initiatives to attract more women to science, even globally. Godbole recalls how, in 2002, the Women in Physics group of the International Union of Pure and Applied Physics came up with a set of recommendations for academic bodies, academies and institutions to support participation of women in science, which led to some reform initiatives in India as well.

But Ramaswamy says the issues are far too serious and the mindsets far too rigid to bring about instantaneous change. Women don't even talk publicly, or in formal settings, about the harassment or hurdles they face in the workplace, he says.

"Whether it's a woman scientist at the Tata Institute of Fundamental Research or a worker at a construction site, they both need childcare facilities to be able to pursue a career."

Science works by isolating variables, but scientific enterprise cannot be truly productive—intellectually and financially rewarding—if women are isolated within it. The economic world is coming to terms with it as several studies, including the 2007 and 2008 editions of McKinsey and Co.'s *Women Matter*, have shown that having more women in leadership is correlated with better financial results.

Scientific organizations need to understand this as well, says P. Balaram, director, IISc.

In India, there's no shortage of women studying science, so it is only pragmatic to think about not letting that money and effort go waste, believes Godbole, who has several reform ideas on her table, including a *Junior Lilavati's Daughters*. Others think that as non-science professions become more attractive financially, men will gravitate towards them, leaving more women to enter science.

"It is hence imperative that we make this profession more gender sensitive and create support structures for women to continue their career," says Vijaylakshmi Ravindranath, founder director of the National Brain Research Centre in Manesar, Haryana, who stepped down recently to set up a new Centre for Neuroscience at IISc.

### **'Gender dynamics'**

Many countries, after realizing that women face difficulty in getting ahead in their career in research, are analysing the "gender dimension" and "gender dynamics" among applicants, recipients and gatekeepers of research funding.

The European Commission has come up with two new studies in the last few weeks—*The Gender Challenge in Research Funding* and *Women in Science and Technology: Creating Sustainable Careers*. The studies point out how women are heavily under-represented in research decision-making and hence have fewer opportunities in influencing the research agenda.

This, in India, is due to the significantly small pool of women scientists entering the stream. The organizational culture is no longer the bottleneck, says Balaram, though he agrees that the “faceless bureaucracy” in Delhi, which runs the now well-oiled funding machines, doesn’t make it easy for women (and often even men) to avail of grants and fellowships.



Fired up: Priyadarshini Karve chose to develop new technology to combat pollution, and her Appropriate Rural Technology Institute in Pune won the Ashden Award in 2006 for making charcoal without wood.

intended to attract married women in the 30-50 age bracket back to research.

In its fifth year, the programme, which has an annual budget of Rs40 crore, has given research grants (up to Rs20 lakh) and three-year fellowships to at least 600 women, says DST adviser V. Rao Aiyagiri. “But we fear the

scheme will taper off as we don’t get good applicants; both the number and quality are declining.”

Many scientists say much of the problem lies with the way these schemes are administered in an area already hit by a dearth of permanent academic jobs. Ravindranath, who is inundated with job applications from post-doctoral candidates for her new centre at IISc, is pained to see several PhD holders who have simply “floated from lab to lab”, with no meaningful career path.

### Losing out

Others think that if the programme wasn’t just restricted to married women, it would attract more genuine research aspirants.

Whatever it is—snipe-and-carp remarks rejecting PhD applications of women on the ground that they “disappear” after a point, or an inevitable drift after PhD due to familial and peer pressure—women scientists are losing out.

Ravindranath, who’s a council member of Insa, recalls how at the young

“It’s distressing to see the harrowing experience women have in getting the fellowship money which is, in fact, meant to keep them in research,” he says.

In this bureaucracy bashing, Balaram is referring to the women scientists programme of the department of science and technology, which is

scientists medal programme of the academy, the ratio of men to women is almost equal, but by the time they reach the level of "fellows", it gets terribly skewed.

Unless there are more jobs in science, India will continue to lose women PhDs or potential PhDs, says Meenakshi Banerjee, winner of several awards and a biology professor at Barkatullah University in Bhopal.

"If the government wants to bring more women into science, it should sanction 2,000 posts for women, induct the PhDs at lecturer level in the universities," argues Banerjee, who opted out of the central research grants for fear of navigating the dual bureaucracy—in Delhi as well as at her university.

Then there is the metaphorical glass ceiling, which no woman scientist denies. In fact, it turns out to be more than just one transparent blockade from the top; it is a chain of obstacles all along the way.

"When people are looking for scientists to nominate for high posts or awards, it often doesn't even occur (to them) to think of a woman," says Shobhana Narasimhan, a theoretical physicist at Jawaharlal Nehru Centre for Advanced Scientific Research, though she is quick to point out that at her centre, one of the two deans and two of the five department chairs (including her) are women.

For physicist Supurna Sinha at the Raman Research Institute, it is "a reservation system for the men". Daughter of a scientist mother (Purnima Sinha), she was hit by discrimination pretty late in life, when she returned to India after her PhD at Syracuse University in the US.

"Even if men and women scientists have exactly comparable capabilities and records, women get told—'if she is exceptional, then we'll look at the application'," says Supurna Sinha.

She thinks Indian science is still not as "pragmatic or outcome driven" in research as in the West, which gives more freedom to scientists.

### **Changing tack**

Some women have worked around a system known for giant-sized egos. For instance, oceanographer Aditi Pant fought her way to an Antarctica expedition while at the National Institute of Oceanography (NIO), and that paved the way for women scientists on such expeditions, recalls her colleague P.A. Lokabharathi, deputy director at NIO.

For Priyadarshini Karve, who trained in physics but chose to develop new technologies to combat indoor pollution, changing tack—from academic research to biomass technology development—has paid off in more than one sense.

Karve's Appropriate Rural Technology Institute in Pune won the leading green energy prize Ashden Award in 2006 for making charcoal without wood. She also founded a company, Samuchit Enviro Tech Pvt. Ltd, to commercialize

the in-house technology, and is already exporting cooking stoves to some Latin American and African countries.

“There is now (an) increasing number of women who are interested in doing things differently, though I must say the urban middle class has less freedom,” says Karve, who herself had no pressure to conform. Coming from a family of social reformists—founder of SNDT Women’s University in Mumbai and Bharat Ratna awardee Maharshi Karve was her great grandfather and noted anthropologist Irawati Karve was her grandmother—there was no conventional family road map for Karve. “It (marriage) just never happened... just as not everybody ends up climbing Mt Everest,” she laughs.

But pursuing science is no less than climbing mountains. “Getting more women in science is a long-term problem, you have to keep them all the way through,” says Balaram.

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