

December 1, 2023

## Why Are There So Few Women Scientists In India?

By: Aashima Dogra

*The dominant mindset in India's science community has produced a gruelling culture that casts aside a large proportion of women and other minority groups. Governmental measures to improve diversity do not address this root problem.*

One in six.

That ratio denotes the current strength of Indian women in science. Even though India is one of the most productive scientific nations, the number of women scientists is **far lower than in most countries**.

In April last year, the **Union Minister of Science & Technology** said that women make up 16.6 % of the total number of scientists working in S&T organisations. A **BiasWatch** study confirmed this percentage in a survey of women faculty in STEM disciplines across 98 universities and institutes

The progress to 16.6% has been difficult and slow. One decade ago, women made up around 14 % of scientists in India. The slow rise indicates the schemes the government has put in place to close the gender gap are failing.

This is quite concerning.

Women make up the largest minority group in science. Examining the discourse in the scientific community on ‘women in science’ as well as critically looking at government programmes aiming to bridge the (binary) gender gap, reveals the persistent patriarchal attitudes. The Indian scientific community is still shy to openly embrace diversity, contrary to the spirit of diversity of ideas in science that it purports to uphold.

Most scientists at our research institutions are able-bodied upper-caste, cis-gendered men. Since this demographic is especially dominant at higher levels, it has dictated the culture of Indian STEM and with it the distribution of the meagre funds India spends on scientific research. These persisting biases have implications for other minority groups: those from marginalised castes and communities, LGBTQ and disabled people.

### Lonely at the top

The gender gap in Indian science resembles a pyramid. The greatest number of women are at the lower levels, as students and at state and central universities. As **newer** and **older studies** (R. Godbole and R Ramaswamy, 2015) have shown, most women in science occupy the PhD and graduate levels, their numbers dwindling as we go up to postdocs, assistant, associate, and full professorships. In leadership positions, the strength of women in science in numbers drops further. More eminent the institute, fewer women scientists are likely to be found there. In terms of recognition, the committee that makes the Shanti Swarup Bhatnagar Awards – the top science award in India – **in the last 2 consecutive years failed** to see any women scientists worthy of the honour.

|| A diverse scientific community comes with the promise of changing the research culture to a more open, democratic, and useful one.

The low numbers of women in science and the topology of the gender gap reflect that India’s science leaders have not quite got the memo about the global drive in science to correct historic wrongs that have overlooked women in knowledge-making, as well as realise that **science benefits from diversity**. Not only is there an **epistemic advantage** to social and cognitive diversity but also a boost the translatability of science done in the labs to the wider public.

It has been the intention of the government to make India’s science work for India. There are various pressing issues that our nation faces, for example, the ecological breakdown of several Indian cities, that could greatly benefit from a science sourced evidence-based solution. A diverse scientific community comes with the promise of changing the research culture to a more open, democratic, and useful one.

Since 2016, a collective of science communicators that I am part of and co-founded have been at work on [thelifeofscience.com](http://thelifeofscience.com) – a portal to amass stories of marginalised people in science. The project was dubbed ‘Lab Hopping’, elucidating the process of finding and collecting these stories from labs big and small, up and down the country. (The 300 interviews and several hundred contributions on intersectional issues of diversity in Indian STEM have been spun off into a book titled *Lab Hopping*.)

From the project, we find that the two main reasons for the gaping gender gap are opportunity bias and a lack of inclusive culture within the Indian science community.

Contrary to the defensive retort often heard in science globally: ‘Women are not interested in science’, the main reason behind high attrition is simply that there exists a hiring bias. In India, there is no dearth of interested and qualified women candidates. Yet, hiring processes are highly opaque and the highly competitive permanent positions are more likely to be handed to well-connected male candidates. Some of our interviewees spoke of unlawful sexist questions that they faced from commonly from hiring, funding, and award committees.

They talked of a prevalent ‘mindset’ against women in science that they had to dodge on a regular basis. This mindset ultimately translates to the high attrition rate.

The women scientists who made it through the interviews talked about the routinely faced micro and macro aggressions inside institutes. In interviews, they talked of a prevalent ‘mindset’ against women in science that they had to dodge on a regular basis.

This mindset ultimately translates to the high attrition rate of women in science from PhD to leadership at institutes. Even when positions are offered to women scientists, they are likely not sustained along the academic ladder due to a lack of both further professional opportunities and supportive infrastructure to simultaneously handle personal commitments that more women need than men.

Women scientists we met had survived the academic course strewn with barriers of different kinds – a consequence of this omnipresent mindset. Women work harder and take longer to reach milestones in a scientific career. [A survey study done in 2010](#) (Kurup et al 2010) found there are more single women in science than there are single men, and similarly more childless women in science than childless.

The mindset taking root in the history of science has led to a gruelling scientific culture that cannot be afforded by a large proportion of Indian women. As we argue in our book, women are prone to opt out of strenuous and demanding research life as they tend to embody multiple identities and responsibilities as part of their family/communities.

## Why policies fail

Governmental measures to improve these dismal numbers have often been misdirected. The longstanding Women in Science schemes aim at encouraging girls in science and supporting women to return to science after they have had to break from their careers for childcare. But India does not suffer from a low number of girls choosing science subjects in higher education. Readmission schemes have not led to permanent positions for most women scientists availing these schemes, who already suffer the consequence of age limits for academic positions. Ultimately the attrition rate has mostly stayed the same over the years.

Indian women in science are a very diverse group and hence, one-solution-fits-all would not work to support them all.

Of all the efforts that are currently active to meet the gap, the only one that puts the onus on science institutions to be more inclusive is [GATI](#). Modelled on the ATHENA-Swan charter and built in collaboration with the British Council, the Gender Advancement for Transforming Institutions (GATI) programme is designed to ‘nudge’ Indian institutes to take diversity and inclusion more seriously. Earlier this year, several institutes and universities taking part in the pilot programme announced [in the press](#) and/or their social media channels that they had been recognised as Achievers by GATI. As GATI is a self-assessment programme, institutes and universities have no incentive to openly share their journey and efforts in achieving gender equity. It appears they must only compete to be seen as role models.

A crucial point where initiatives like GATI need improvement is their approach to diversity and inclusion. While the ATHENA Swan highlights that “the Charter is now being used across the globe to address gender equality more broadly, and not just barriers to progression that affect women,” GATI seems to be focussed on women in science, leaving out the burgeoning out and proud trans and non-binary members of the science community.

Indian women in science are a very diverse group (Kurup and Raj 2022) and hence, one-solution-fits-all would not work to support them all.

Ever since the universities opened their doors to women at the end of the 19th century, privileged women have had relatively easier access to these ‘temples’ of knowledge. It is not uncommon to find women from the upper castes with family backgrounds in sciences taking up coveted professorships at top institutes. Yet there are blind spots even amongst these women scientists at the top, who have not pushed for greater inclusion. Anna Mani, a famous women scientist who played a big role in setting up Indian meteorology, even said: “What is this hoopla over women in science?” (Quoted in Sur 2011).

Our interviewees and contributors who are trans women and those from so-called lower castes, do not hold the same view. Several trans and non-binary people whose stories were recorded (and illustrated) on [thelifeofscience.com](http://thelifeofscience.com) opened up about finding themselves invisible in the discourse around women in science.

Perceptions of certain sciences as being feminine and ‘soft’ like biology – and other as harder and more masculine – like physics or engineering – shape the disciplines.

Science has been thought to be ‘masculine’ since its inception. Science is masculine, nature is feminine, and science is the masculine mind’s activity of uncovering feminine nature. This mindset persists, decades after women fought to enter universities and academies and have proved themselves time and again.

Almost everyone we interviewed pointed to this mindset as the reason for the gender gap.

Perceptions of certain sciences as being feminine and ‘soft’ like biology – and other as harder and more masculine – like physics or engineering – shape the disciplines. Indeed, in the [recent BiasWatch study](#) the base rate of women in biology was found to highest and the lowest was in engineering.

A transmasculine scientist's experience sums up the gendered way of thinking and the consequences of it on the ground perfectly. [He has written](#) (Kondiah, Mahadev, and Wahlang 2017): “I am mostly seen by scientists as a masculine woman and my trans identity is erased. And, I feel this is sometimes academically rewarded (if socially disparaged) because it is misunderstood as an acceptance of the equation between masculinity and scientific ability.”

There are several other challenges towards inclusion. Important amongst them are how cases of sexual harassment are hushed and dealt with at our institutes, how marriage can play both an empowering and oppressive role in careers of women in science and the resistance towards necessary affirmative action in form of reservation and quotas in the scientific community. These issues require a sensitivity and depth that is harder to encapsulate here, but we discuss them at length in *Lab Hopping*.

## A culture shift

The legends of mind-boggling numbers of ‘fathers’ in science that we have all heard of saturate public perceptions of science. Hidden behind these are several stories of women of science who not only forged new paths in our understanding of the world around us but also at the same time struggled to survive their life in science. This includes women scientists who put on masculine garb to enter schools and universities, those like Kamala Sohoni who protested until the gates of Indian science were opened, and Lise Meitner, Jocelyn Bell Burnell and so many others whose major contributions to science have gone unrewarded.

Even amongst men from marginalised castes and communities, it is common to experience discrimination and isolation at the hands of their peers from the so-called upper castes, which threatens their survival in STEM. Some scholarly works have shown how Brahminism prevails in our institutes (Thomas 2020) – a remnant of the pre-colonial education system where only Brahmin boys and men were allowed to access forms of knowledge in the ashram system.

True inclusivity in STEM demands a culture shift: from one that celebrates the old genius man in an ivory tower [...] to an open culture where collaboration between different groups, [...] is highly valued.

Handling the complexity of the interacting axis of marginalisation owing to social realities that seep into apparently objective spaces, requires a broader view of the gender gap as a symptom of a lack of inclusive culture.

Our collective challenge is to resist sneaky implicit biases that associate nature with femininity and science with masculinity and put an end to the reproducing practices that have bred a culture of sexism, homophobia and casteism in our institutes. True inclusivity in STEM demands a culture shift: from one that celebrates the old genius man in an ivory tower making personal sacrifices for the sake of science to an open culture where collaboration between different groups, diversity of backgrounds, perspectives and scientific questions is highly valued.

The feminists in science suggest an intersectional approach that imagines a truly inclusive culture in science where those who are often left behind are keenly heard. This will not only positively change the lived experience of everyone participating in the scientific process but also bring us closer to research that translates easily to our everyday lives and can offer evidence-based solutions that are specific to our communities. Envisioning such a culture where all are welcome is indeed an act of necessary resistance and epic positivity. What is a better place to work towards such a vision than a diverse place like India?

*Aashima Dogra is a science communicator with broad interests in diversity in science. She is the co-founder of the feminist science media project [TheLifeofScience.com](http://TheLifeofScience.com) and co-author of Lab Hopping: A Journey to Find India's Women in Science; both with Nandita Jayaraj.*

#### References:

- Godbole, Rohini, and Ramakrishna Ramaswamy (n.d). “[Women Scientists in India.](#)”
- Kondiah, Bittu Karthik, Shalini Mahadev, and Maranatha Grace Tham Wanhleng (2017). “[The Production of Science: Bearing Gender, Caste and More.](#)” *Economic and Political Weekly* 52 (17): 73–79.
- Kurup, Anitha and Anjali Raj (2022). “[Mapping the Life Trajectories of Women Scientists in India: Successes and Struggles.](#)” *Current Science* 122 (2): 144.
- Kurup, Anitha, R. Maithreyi, B. Kantharaju, and Rohini Godbole. (2010). “[Trained Scientific Women Power: How Much Are We Losing and Why?](#)” NIAS eprints
- Sur, Abha (2011). *Dispersed Radiance : Caste, Gender, and Modern Science in India*. New Delhi: Navayana
- Thomas, Renny (2020). “[Brahmins as Scientists and Science as Brahmins’ Calling: Caste in an Indian Scientific Research Institute.](#)” *Public Understanding of Science* 29 (3): 306–18.