

Strategies to promote Gender Equality in STEM

Rohini M. Godbole
Indian Institute of Science
Bangalore, 560012.

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Strategies to promote Gender *Equality* (equity) in STEM

Thoughts of a science practioner who has been working on
gender in STEM on the side.

Aspects of Gender Equity in STEM in India

In India the participation of women in *studying science* or for that matter in *teaching science*, at all levels, is NOT LOW AT ALL.

However, number of women *doing science* is certainly NOT commensurate with their participation in the other two aspects of scientific activity.

Further it is even less when one considers decision making positions or the perceived prestige of the Institutions

Some nos. from AISHE

In 2012-2013 General Enrollment Ratio in HE was 21.5 % whereas now it is 27.1%

For males it has changed from 22.7 % then to 26.9% now

For females it has changed from 20.1% then to 27.3% now.

For SC it has changed from 16.0% then to 23.4% now

For ST it has changed from 11.1% then to 18.0% now

Numbers look encouraging and are increasing. Are we there yet?

Are we getting there?

I could present also present numbers of women's share in teaching. That too will look quite good. In fact, the AISHE Webpage will show you that the Gender Equity Index in Numbers is 1.0

But interpreting numbers is always tricky!

Also, there is further breakup of these numbers in the reports themselves which are quite revealing.

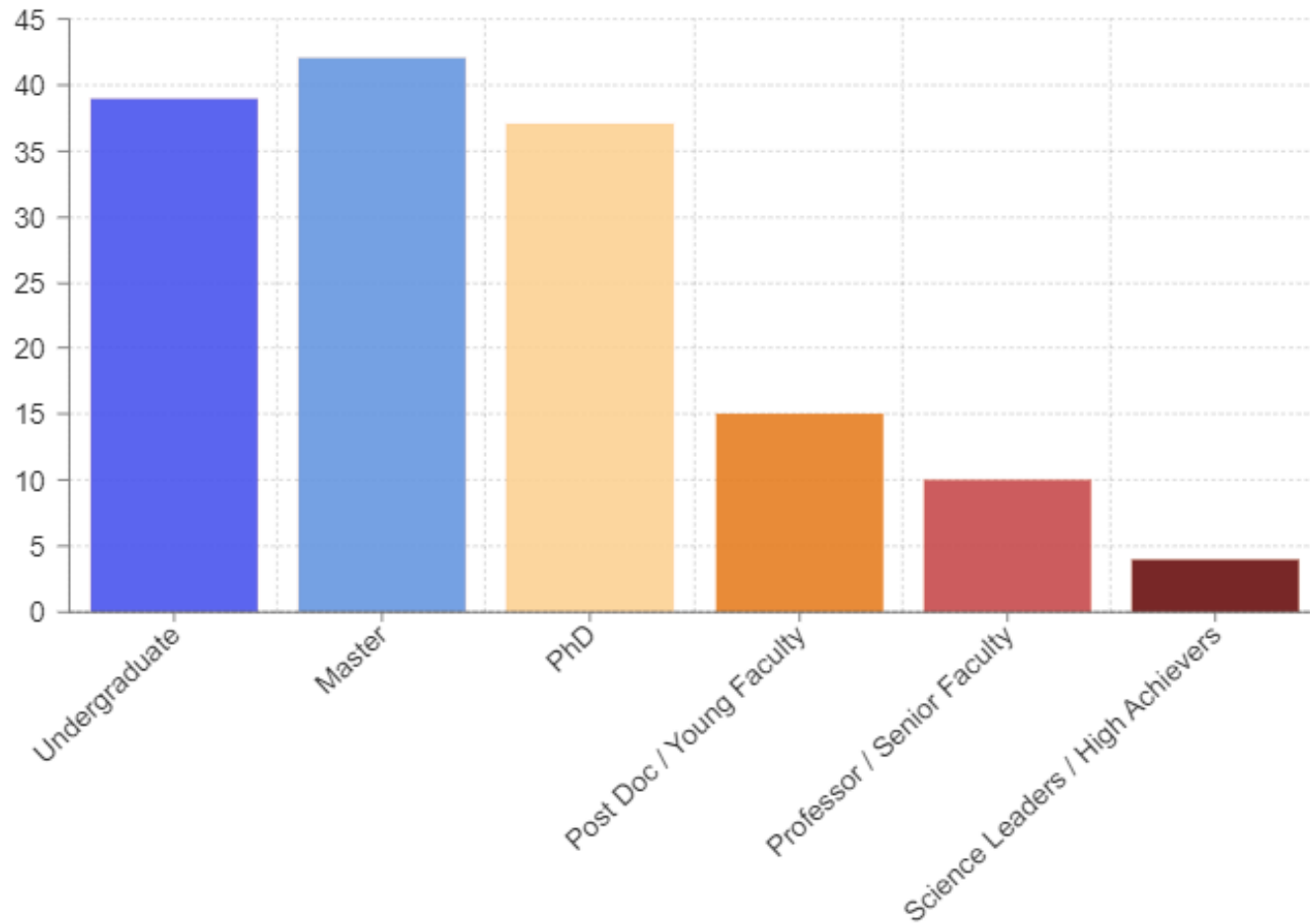
Are we getting there?

Share of female students is lowest in Institutions of National Importance followed by Deemed University-Government and then State Private University (24.7% compared with 43%)

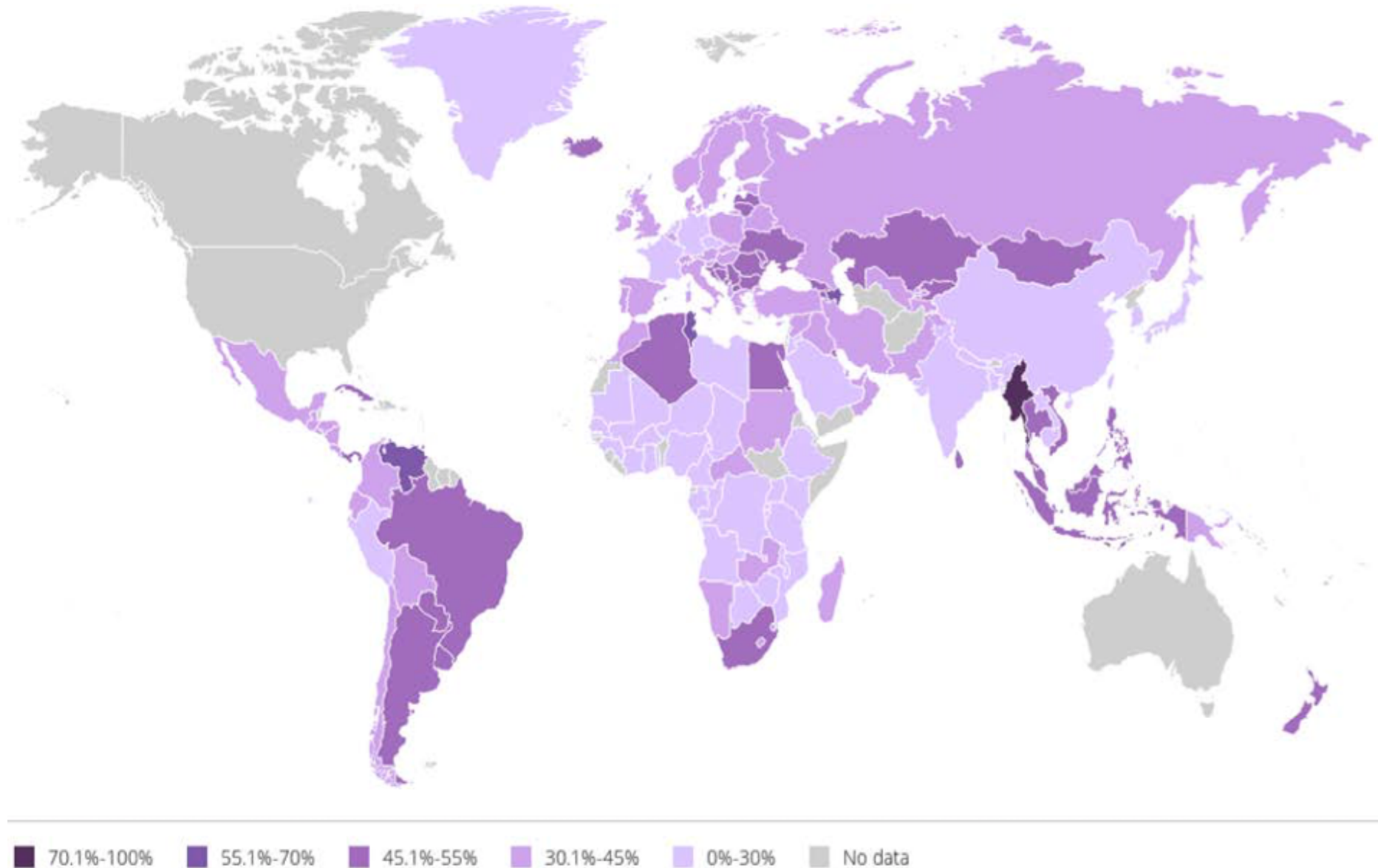
Similarly, the Gender ratio in Faculty is also more skewed and decreases as the Institutions' perceived level increases as well as the position in the hierarchy. (24 % to 15 % in professor's position for example)

Fraction of Women Professors, Directors, Deans, V.C.s etc. not equitable!

Progress of Women in Science Careers



How do we compare with the world? (Unesco report-2019)



For cure important to appreciate the following

Gender diversity is intrinsically good for science. Makes pragmatic and economic sense! STI is the beneficiary.

Gender diversity increases the dimensionality/complexity of the STI ecosystem further.

Achieving equity and inclusion is not to be done ONLY with a sense of correcting a historical wrong.

How to cure?

India is many countries in one and therefore the optimal action plans need to be tailored differently in different parts of India and different sectors of the society

We need policy changes as well as changes in societal level.

Gender divide : Issues to be tackled are not always the same for example in rural vs. urban and so are the solutions.

How to cure (Bottom up)

Karnataka Govt. has launched a program called 'Chetana' for young girls from rural areas.

A cohort of about 280 was chosen and are being mentored for two years. SAMSUNG and INFOSYS supported part of it financially. IISc hosted a group for ten days exposing them to STEM subjects and widened their horizons.

Given India's rural population efforts of this kind need to be widened. (Tata group companies are looking into a similar effort in collaboration with the DST/British High Commission)

How to cure ? (For the elite)

The Government S&T departments have many programs to boost the students in STEM programs (Manad), women students in particular (Vigyan Jyoti) or boost the number of students in the prestigious IIT programs (Supernumerary position). There exists programs of Departments of GOI to promote young women in science careers etc.

These are all necessary but not sufficient.

What policy changes?

What is required is that Gender (in general equity and inclusion) has to be an integral part of science policies.

India's latest national science policy — Science, Technology, Innovation Policy (STIP-2020) — has given a decisive push to make the **S&T** ecosystem more diverse and inclusive by design by providing a renewed impetus to mainstreaming of **equity and inclusion**.

Equity and Inclusion in S&T

In India S&T ecosystem now the Importance of Equity and Inclusion in STEM is fully appreciated and STIP-2020 has a separate chapter on 'Equity and Inclusion'

Science, Technology, and Innovation Policy (STIP)

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Science, Technology, Innovation Policy (STIP)

Executive Summary

8. The policy provides renewed impetus to the mainstreaming of equity and inclusion within the STI ecosystem. An India-centric Equity & Inclusion (E&I) charter will be developed for tackling all forms of discrimination, exclusions and inequalities in STI leading to the development of an institutional mechanism. An inclusive culture will be

Equity and Inclusion Charter

STIP 2020 recommendations

GENDER-NEUTRAL **CHILDCARE BENEFITS**

➤ Creation of **equity-and-inclusion charter** to tackle discrimination

➤ At least **30% women in decision-making positions** across S&T ecosystem

➤ Retirement and **spousal benefits** for **LGBTQ+** community

➤ Flexible timings and gender-neutral childcare benefits



➤ **Dual recruitment policy** so couples don't have to 'choose' spouse's career over theirs

➤ **Equal access to all** irrespective of caste, religion, race or geography

So policy changes?

...most importantly, the policy proposes to set up an "Equity and Inclusive (E&I) Charter", that will tackle all kinds of discriminations — gender, caste, religion, geography, language, disability and other exclusions and inequalities — by drawing essence from different E&I frameworks like the Athena SWAN (Scientific Women's Academic Network) Charter 7 of the STIP-2020.

Need to develop Institutional mechanisms

Development of Institutional mechanisms

Gender Advancing Transformative Initiatives : GATI

In collaboration with the British Council the Department of Science and Technology (DST) a program has been put in place. Pandemic did affect the implementation.

I am neither from British Council or the DST, but chair of the advisory committee for GATI project.

Development of Charter

Groups	UK AS Institutions	GATI Indian Pilot Institutions				
Group 1:	University College of London	Indian Institute of Science	ICAR Indian Veterinary Research Institute	Indian Institute of Technology, Delhi	Indian Institute of Science Education & Research, Mohali	University of Kashmir
Group2 :	Queen Mary University of London	CSIR Central Drug Research Institute	Jawaharlal Nehru Centre for Advanced Research	Indian Institute of Technology, Madras	All India Institute of Medical Science, Bhopal	Jamia Millia Islamia
Group 3:	University of Manchester	CSIR Indian Institute of Chemical Technology	DST Sree Chitra Tirunal Institute for Med S&T	Indian Institute of Technology, Kanpur	University of Delhi	MS University of Baroda
Group 4:	Aston University	ICAR Indian Agricultural Research Institute	DBT Rajiv Gandhi Centre for Biotechnology	National Institute of Technology Durgapur	Indian Institute of Technology, Bombay	Tezpur University
Group 5:	University of West Scotland	MoE&F Wildlife Institute of India	DRDO Defence Bioengineering & Electromedical Lab	National Institute of Technology Rourkela	Birla Institute of Technology and Sciences, Pilani	Banaras Hindu University
Group 6:	King's College London	UGC Inter-University Accelerator Centre	ICAR National Dairy Research Institute	Indian Institute of Technology, Roorkee	National Institute of Pharmaceutical Ed & Research	Chandigarh University

A long way to go

Successful implementation of many policies require both Institutional processes and change as well as change in societal processes and mindset.

Commitment from different structures is necessary

That can come only from creating awareness.

Awareness that this is beneficial not just for the excluded groups but also for science and that It makes pragmatic and economic sense

Invisible Bias

The policies and recommendations address the 'obvious' obstacles.

But Invisible biases are equally important.

Our Gender policies are still not taking into account the invisible bias.

Academic studies of the invisible bias are lacking in India.

A long way to go

The path to go to a situation when we will just speak of scientists/engineers and not their gender, surprisingly, goes through the path of being very aware of the same for a while!

Everybody : the governments, society and scientists have to all work towards this. I personally think that in India the processes which are likely to work are more bottom up than top down.

Women's participation in Education in India

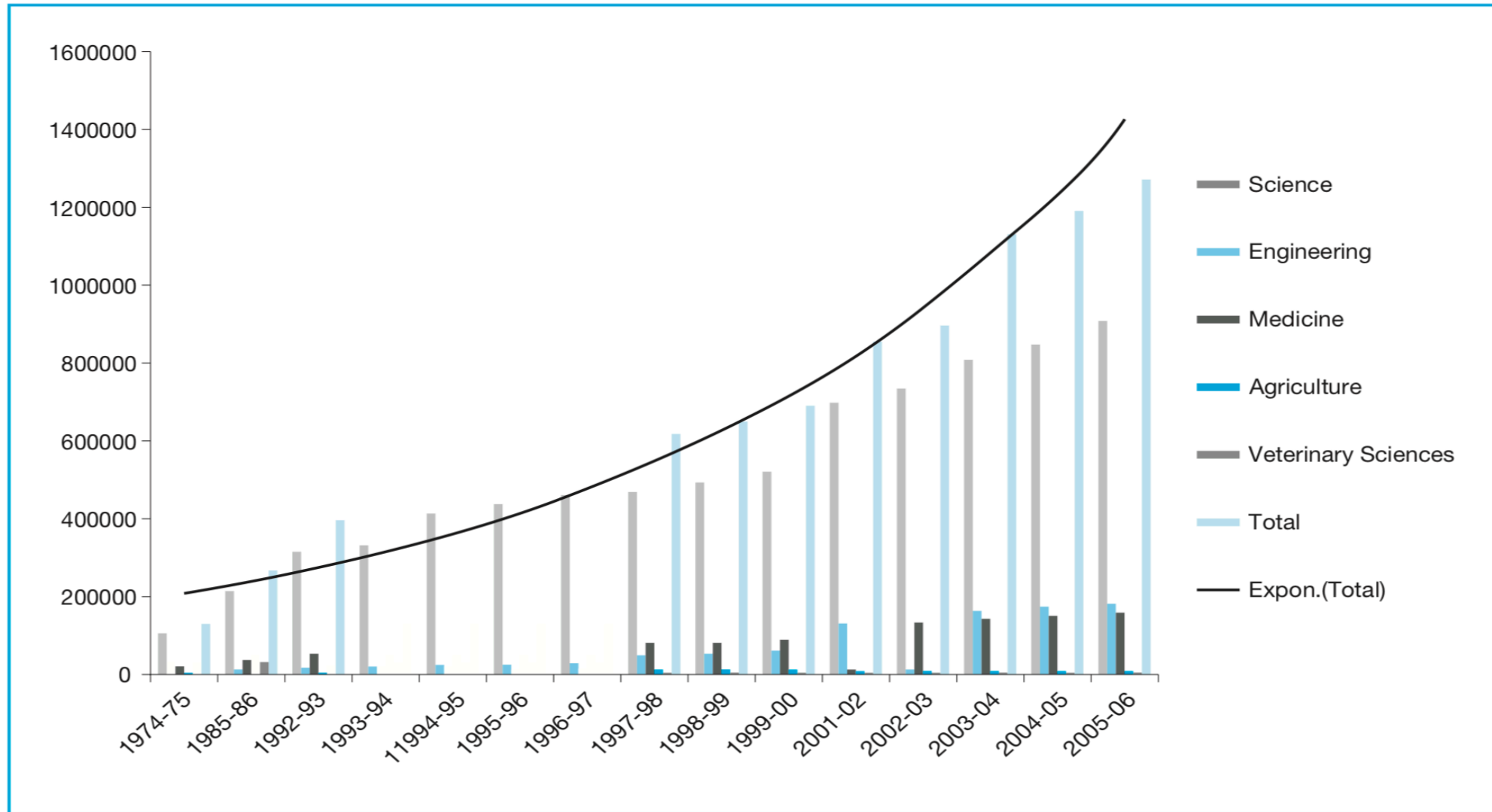
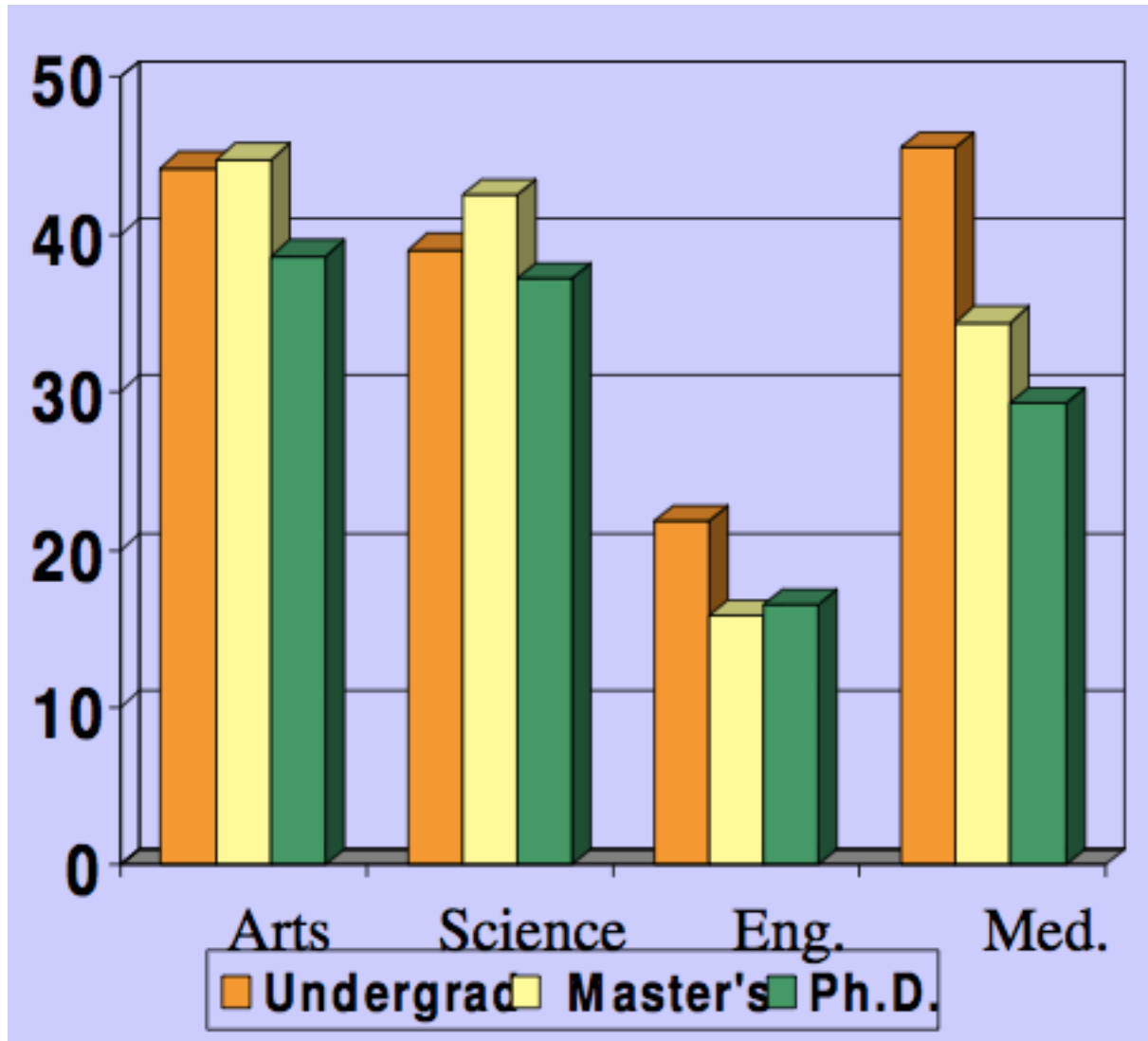


Figure 1. Growth in the absolute numbers of women with access to University education in STEM subjects from 1974-1975 to 2005-2006 [13].

Some Numbers (2000-2001)

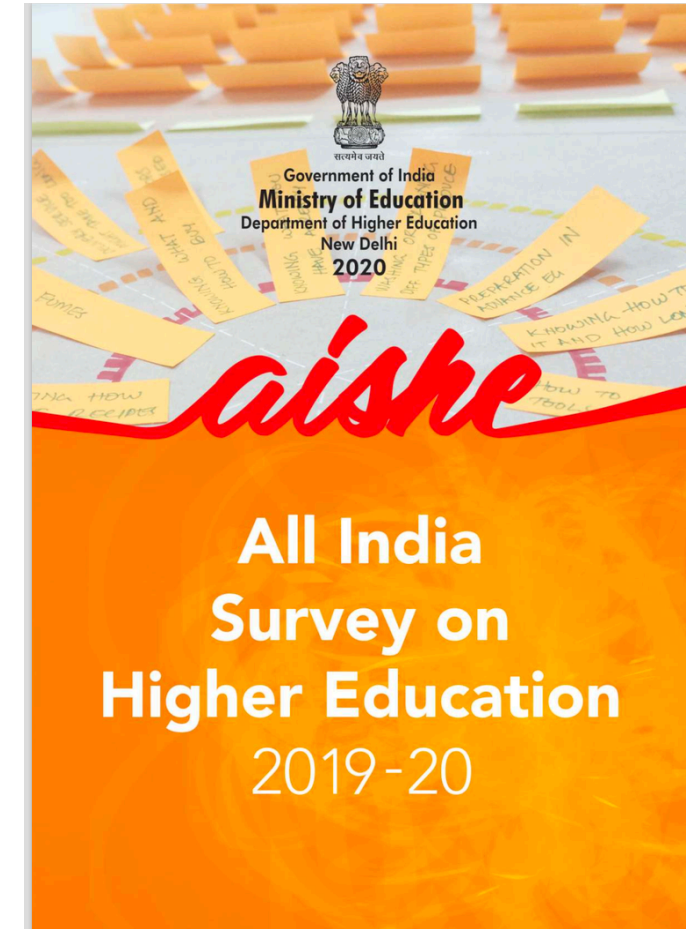
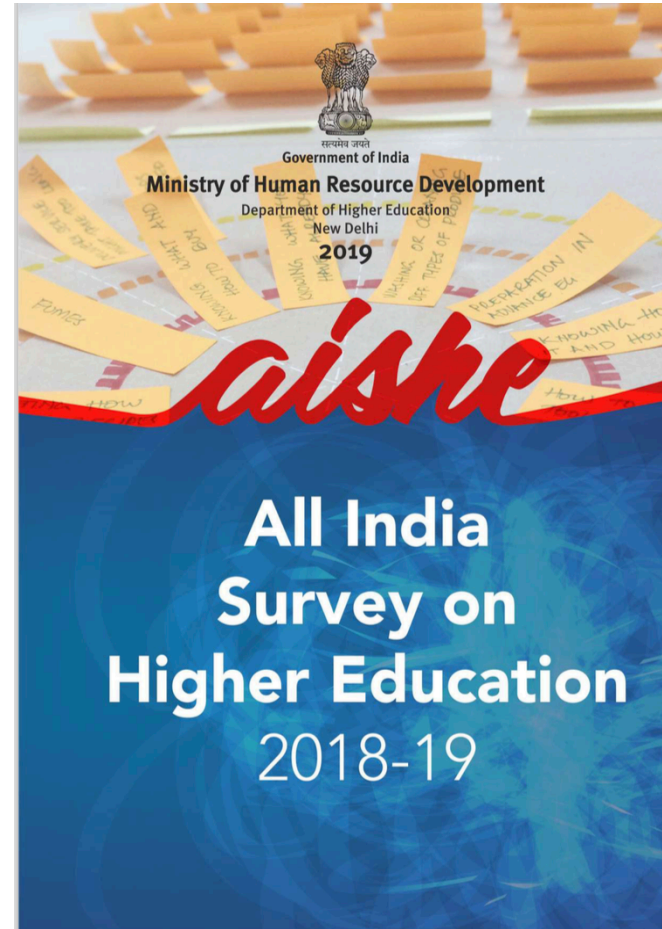
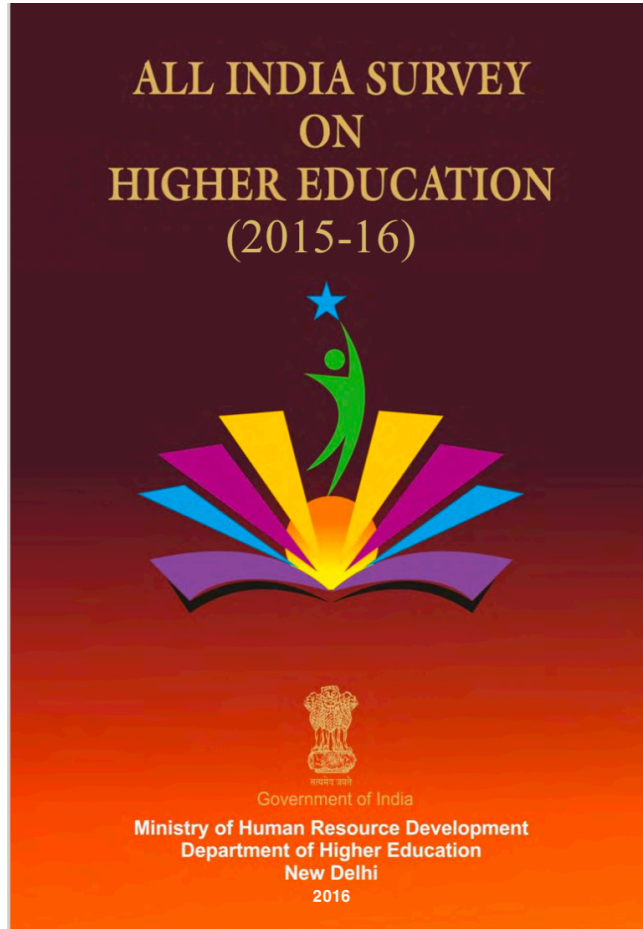


1/3 students in science
women! Increasing!

Drop off not after M.Sc. The
leaking pot is not here!

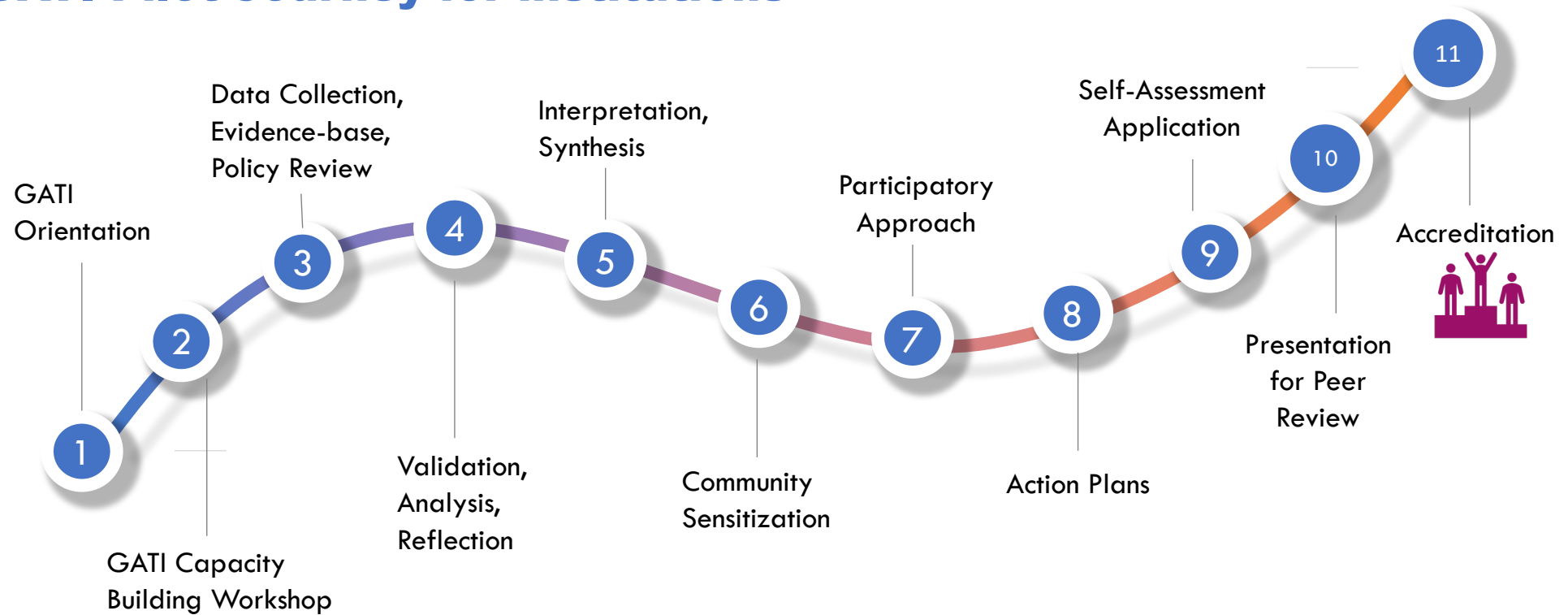
Even at Ph.D. level #
in science not too small wrt
arts and medicine.

Current situation in Higher Education (Recent Nos)

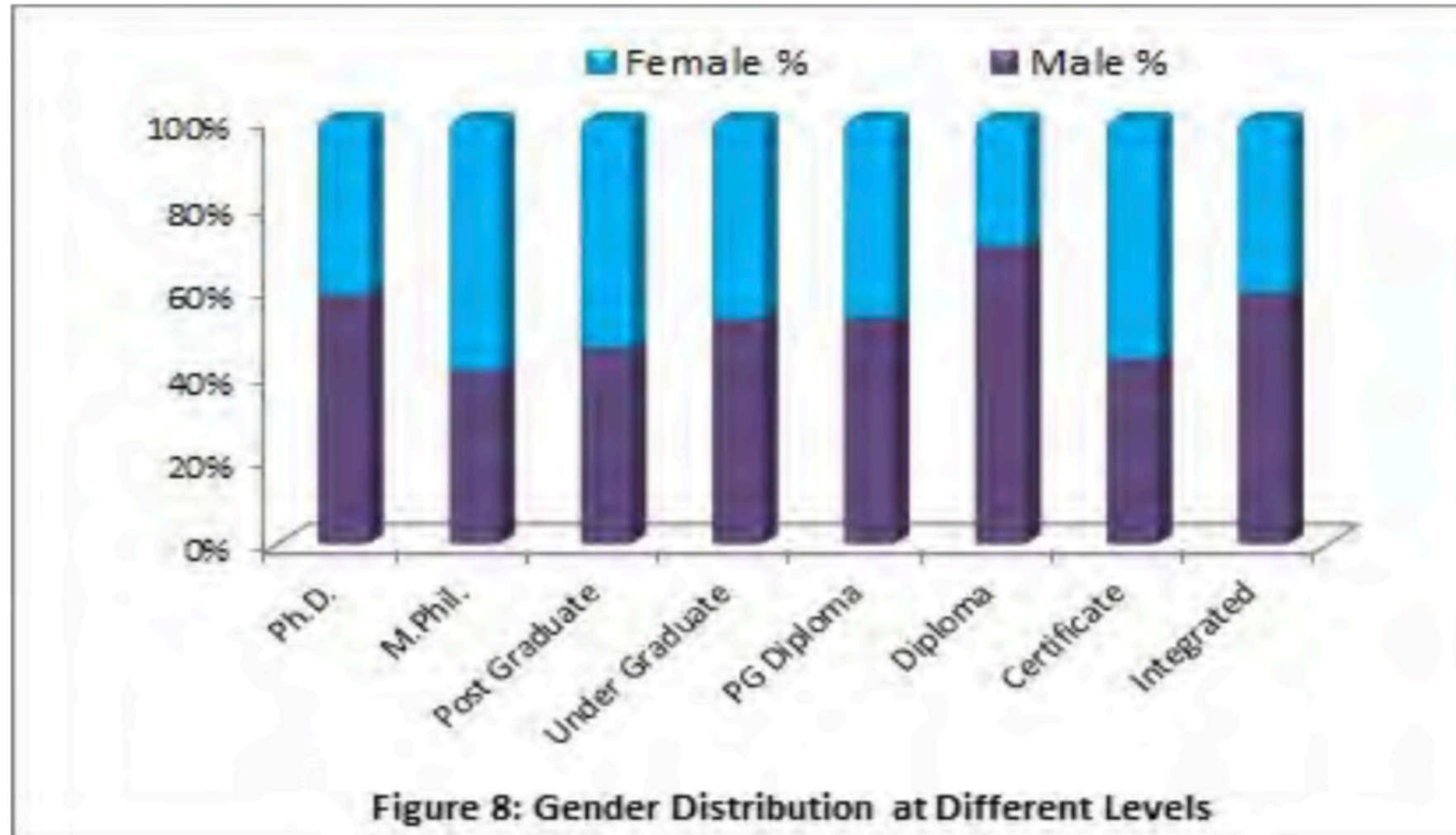


GATI Pilot

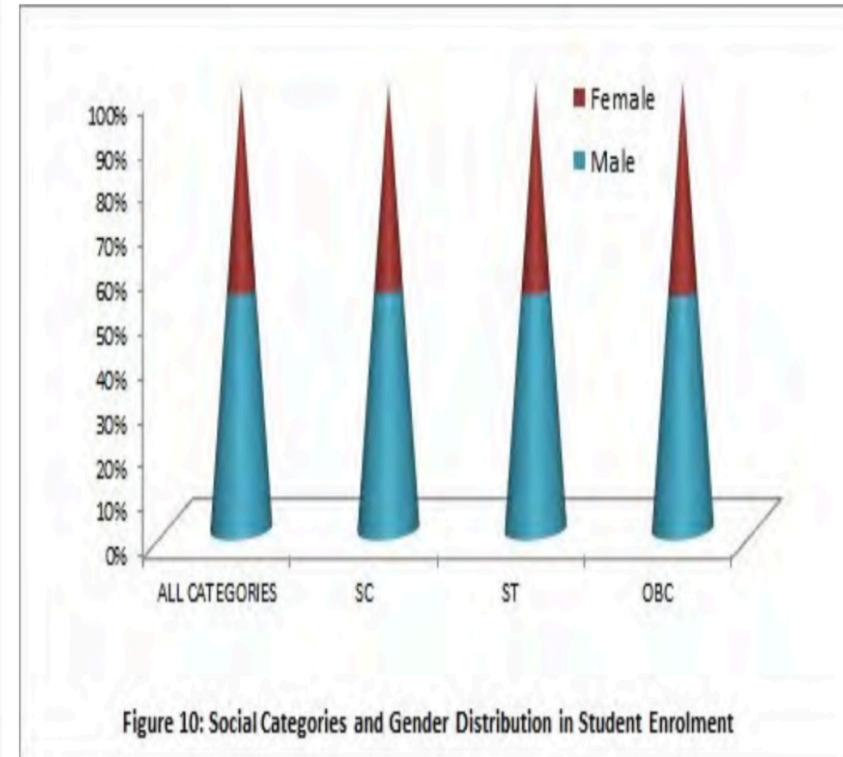
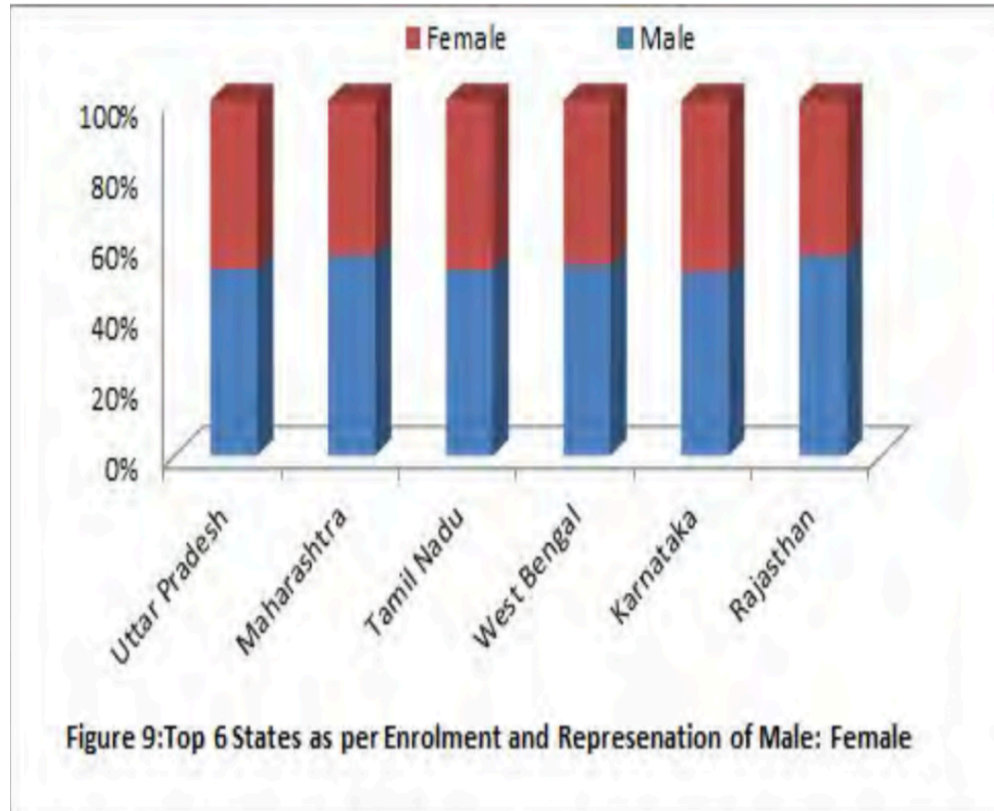
GATI Pilot Journey for institutions



Current situation in Higher Education (Recent Nos)



Distribution among states and categories



54% participation from 6 states, gender distribution more or less the same in all these states. Same is true for gender distribution among the categories!

Equity and Inclusion : general comments

How to cure things and How to judge what level of diversity and equity is correct? Is there such a thing as 'correct' level?

Lack of numerical representation is a symptom and achieving numerical targets does not mean problems are solved!

Achieving numerical targets necessary but not sufficient.

One has to get at the roots of the issue!

Solutions have to address the reasons whenever there is lack of equity!

Equity and Inclusion : general comments

In my mind any discussion on Equity has to be a discussion on Equity AND Inclusion.

- 1) To facilitate inclusion for groups that are under-represented in processes of science.
- 2) To facilitate equity for those groups where inclusion exists to some level.