

Women in Science: the case of India

- incongruities and oppositions during the **historical** as well as the **contemporary** period.
- various superstitions, such as widowhood would surely follow if girls touched books prevailed
- Woman as a **category** constitute a **deprived and discriminated** section - are placed lower to men
- women exist primarily to serve as **wives and mothers** - is widely assumed and a strong cultural tradition

1. Gender differentiation: Gender differentiation is the extent to which a society maximises gender role differences. India and China are reported to have high degrees of gender differentiation. They tend to accord men higher social status and have relatively few women in positions of authority. Table 3 shows the country's rankings on this dimension.

TABLE 3 Country Rankings on Gender Differentiation

Most Gender Differentiation Countries In GLOBE		Medium Gender Differentiation Countries In GLOBE		Least Gender Differentiation Countries In GLOBE	
South Korea	2.50	Italy	3.24	Sweden	3.84
Egypt	2.81	Brazil	3.31	Denmark	3.93
Morocco	2.84	Argentina	3.49	Slovenia	3.96
India	2.90	Netherlands	3.50	Poland	4.02
China	3.05	Venezuela	3.62	Hungary	4.08

Source: Cultural Acumen for the Global Manager cited
http://www.larsentoubro.com/students_portal/news02.asp

some recent trends and shifts in education

- An important finding of the 2001 census count is that more than **half of the females are now literate** and male-female differential has narrowed down to 21.7 percent from 24.8 percent in 1991.
- India has marked an upward trend from **10.5** percent women professors in 1997 to **18.0** percent women professors in 2000 (Association of Commonwealth Universities, 2002)

Female Literacy in India (1961, 1971, 1981, 1991 and 2001)			
(Percentage)			
Year	Rural	Urban	Overall
1961*	10.1	40.5	15.35
1971*	15.5	48.8	21.97
1981**	21.7	56.3	29.76
1991**	30.6	64	39.29
2001**	46.7	73.2	54.16

Note : * : Relates to population 5 years and above.

** : Relates to population 7 years and above.

Source : Statistical Database for Literacy - Vol.2, 1993, National Institute of Adult Education & Rural Development Statistics 2002-03, National Institute of Rural Development, Govt. of India.

Enrolment of Girls as per cent of Total Enrolment in University Education by Faculty

Year	Arts	Science	Commerce	Education	Engg./Tech.	Medicine@
1960-61	18.6	—	1.1	32.5	0.8	20.4
1970-71	33.5	18.5	2.8	37.3	1.0	21.3
1980-81	37.5	27.9	15.2	46.7	4.6	23.8
1990-91	39.8	36.8	24.0	44.2*	10.9*	34.3*
1997-98	41.5	35.6	30.6	43.1*	16.9*	36.1*

Arts and Science figures are combined for the year 1960-61
 @ Excludes dentistry, public health, nursing, midwifery and pharmacy.
 * Only for Degree Level, not Post-Graduate.
 Source: Ministry of Human Resource Development

Enrolment of Girls in Higher Education (General) by Faculty and Level

Faculty	Doctorate/Research				Postgraduation				Graduation			
	1971	1981	1991	1998	1971	1981	1991	1998	1971	1981	1991	1998
Arts	2461* (99.88)	4809 (63.51)	@	@	30791 (78.60)	58763 (75.77)	76896 (66.12)	123722 (65.49)	255753 (72.19)	382291 (63.33)	615393 (54.01)	1154970 (59.89)
Science	**	2613 (34.51)	@	@	8093 (20.66)	15554 (20.05)	24349 (20.94)	44012 (23.29)	92019 (25.98)	136353 (22.59)	281035 (24.67)	403691 (20.93)
Commerce	3 (0.12)	150 (1.98)	@	@	292 (0.74)	3241 (4.18)	15043 (12.94)	21192 (11.22)	6492 (18.33)	84994 (14.08)	242936 (21.32)	369911 (19.18)
Total	9598 (100.00)	7572 (100.00)	9129 (100.00)	11729 (100.00)	39176 (100.00)	77558 (100.00)	116288 (100.00)	188926 (100.00)	354264 (100.00)	603648 (100.00)	1139364 (100.00)	1928572 (100.00)

+ Figures relate to 1989-90
* Includes enrolment in Science.

**Level of Qualification of Women Research and Development Personnel by Sector in India
(1988, 1992, 1996)**

Qualification	Institutional Sector			Industrial Sector			Total		
	1988	1992	1996	1988	1992	1996	1988	1992	1996
Ph. D.	586	1042	2165	78	218	241	664	1260	2406
Post-Graduate	1335	2293	2044	392	818	717	1727	3111	2761
Graduate	544	1104	807	683	1101	821	1227	2205	1628
Diploma Holder	243	445	453*	142	286	303*	385	731	756*
Others	645	179	-	245	251	-	890	430	-
Total	3353	5063	5469	1540	2674	2082	4893	7737	7551

Note: As on 1st April.

Excluding Higher Education Sector.

* Include 'others' also

Source: India Yearbook 2002, Manpower Profile.

Year: Period of fiscal year in India is April to March, e.g. year shown as 1990-91 relates to April 1990 to March 1991.

literature review

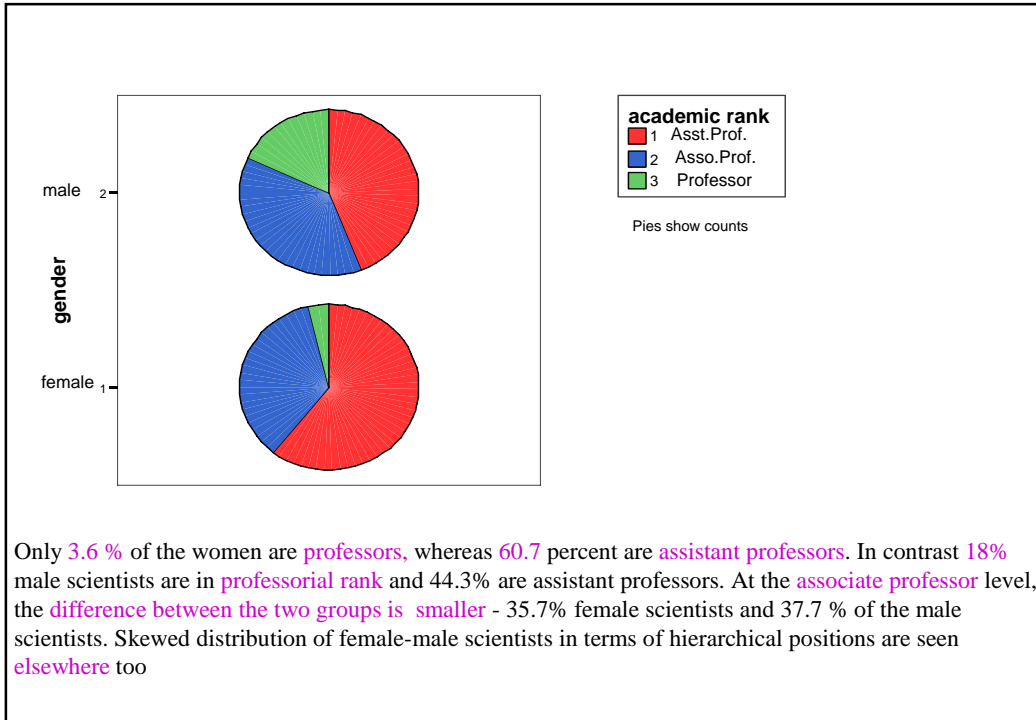
- The literature on women in science in India is rather **sparse**. one of the earliest study in Indian context is by Krishnaraj, 1978
- Chakravarthy (1986) found that despite many barriers and discrimination practices, the **productivity** of women scientists is only **marginally lower** than that of men scientists, and in certain areas their productivity is more than that of men.
- Krishnaraj (1991) found **organizational hurdles** to outweigh family constraints

- Jaiswal (1993) noticed unequal treatment and subtle discrimination in the **behavioural** and **interpersonal relations** apart from the other organizational discrimination.
- Subrahmanyam (1998) noticed overt unequal gender relations in the workplace (besides subtle discrimination) reflecting the **patriarchal** views of male colleagues and subordinates. She has remarked that the question of women in science in India stands out because of almost **complete lack of empirical research** specifically on women scientists

- Duraisamy and Duraisamy (1998) observed **higher discrimination** component in **scientific and technical fields** than the **social sciences**.
- **Gupta and Sharma (2002)** found prevailing **socio-cultural systems** to have significant consequences - gender related difficulties at work - for the career of women academic scientists.
- **Parikh and Sukhatme (2004)** found **unsatisfactory work opportunities and environment** to be the most frequently perceived factor by women engineers to affect their career.

my empirical study

- Using questionnaire a sample, of **490** scientists in assistant professors or higher rank, was collected in eight scientific institutions - four each from universities and national laboratories - situated in four different Indian cities.
- number of women scientists was quite a **low** - out of 490 scientists only 56 were women, which constitutes just **18%** of the entire sample



Comparison of women and men on various research activities, performance and socio- demographic variables

	Women			Men			t	p
	N	Mean	SD	N	Mean	SD		
Academic Rank	56	1.35	.61	61	1.73	.75	2.98	.003
Social-class background	56	8.53	3.67	61	6.16	2.64	4.03	.000
Rural- urban origin	56	1.85	.35	61	1.54	.50	3.91	.000
Research performance	56	49.53	43.10	61	65.60	66.37	1.54	.12
Reviews done for journal articles	56	1.50	2.62	61	2.53	2.99	2.03	.04

* Only differences significant at the .01 or .05 level (except research performance) are included in the table. The comparison also included variables like recognition, time spent on research, scientific values held by them.

Some details

- A breakdown by gender shows that only 14.3% of women scientists were born in villages, as opposed to 45.9 % of men. While 85.7 % of the women scientists were from urban origin, 54.1 % of men scientists do come from cities.
- When each performance measure was taken separately, the men and women scientists did not differ in the mean rates at which they reported having authored books, contributed chapters in books, journal articles, etc.
- women scientists do not differ with men in terms of subscribing to research-related values, such as

- Female and male scientists do differ in terms of reviews done for journal articles. Can this be attributed to the discriminatory practices in the selection of the reviewers? Previous research has shown that women are underrepresented on editorial boards (White 1985) as well. Nepotism and sexism has also been reported in peer review system (Wenneras and Wold, 1997).
- women scientists did not advance to the next rank and remain in the same rank for a long time.
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- One of the woman scientists had worked for nearly nineteen years in the organization and had ten single authored papers in the international journal, still at the age of forty-two was on the rank of assistant professor.
- Another lady scientist had worked in the organization for twenty-three years and had published twenty-three papers in national and four in international journal but she held the rank of assistant professor at the age of forty-six.
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- In another case the scientist did publish ten and twenty-two papers in national and international journals respectively but still after working with the organization for fourteen years held the rank of associate professor at the age of forty-five.
- Another lady scientist had published ten papers in national, fifteen in international journal and after working for nineteen years, till the age of forty-six was working as associate professor.

conclusion

- The **higher proportions** of women at **lower ranks** are not a simple function of **lower research productivity**.
- Only the **urban and very selective** group of women is able to be in the career of science. This supports Marxist feminist analysis in which class is more significant than gender in determining who goes into science
- gender distinctions act as organizing principle in structuring the **hierarchy** within scientific institutions

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