CHAPTER II

FACTORS INFLUENCING SCIENCE CAREER FOR INDIAN WOMEN

Throughout history, social life has been gendered and constructed on the basis of perceived differences between the sexes. This gendering of social life is created by the following three sets of processes in society: 1) perceived assumptions of gender differences, at the ideological level, are exaggerated and justified through arguments that draw from science or religion; 2) these differences, within the socio-economic and political processes of society, are assigned different, though seemingly natural roles and entitlements, to the resources of the family and community; and 3) individual identities are imperfectly correlated with the stereotypical images of gender group identities (Poonacha and Gopal, 2004).

To examine the socio-economic and institutional factors that limit women's participation in science, the INSA contracted a study to the RCWS, SNDT Women's University, Mumbai. The study was premised on the assumption that gender (like other social markers of class and race) is a category of social discrimination. Women have differential access to community resources and have fewer options in life to pursue creative and satisfying careers. The question therefore is: what are the socio-economic constraints of women's lives that restrict their access to and retention in science careers? Are there any limitations in educational/science policies as well as institutional practices that perpetuate women's exclusion? The study cohort was scientists and post graduate students working/studying natural science in representative sample of science research and educational institutions across the country. Due to constraints of resource and time, faculties of engineering and other applied sciences were not included.

Aims and Objectives

The study aimed at understanding the experiences of women pursuing scientific careers, their motivation and constraints. The data were contextualized within the broad framework of higher education and science policies and programmes in the country, to address questions about the impact of neo-liberalization policies of globalisation and privatisation on research and development institutions, and scientists, particularly women. In doing so the study raises questions about the purpose of scientific research and for whose benefit? These questions prompt an investigation into the composition of the organization of scientific establishments, the factors leading to a gendered distribution, and the overall culture of science that retains or rejects people within it.

It is hoped that this study will have policy implications and facilitate the development of a gender friendly environment within scientific institutions.

Research Questions

1. What is the socio-economic background of women scientists across the broad spectrum of scientific research institutions?
2. What makes women opt for scientific careers?
3. What kinds of career paths do women scientists and students take?

4. What are the constraints faced by women in pursuing science education?
5. Do their career goals alter once they enter research institutions?
6. If so, what are the reasons for changing their career paths?
7. What is the prevailing organizational culture of scientific research and development institutions seen through the experiences of women scientists?
8. How far have the existing government policies of higher/science education promoted science education in the country?
9. Are the policies sensitive to gender issues?
10. How far has the changing education policies affected science education with special reference to gender issues?

(For detailed discussion of questions 7-9 the original report of Poonacha and Gopal 2004, may be referred.)

Methodology

Data were gathered through:

1. Focused group discussions and in depth interviews with women scientists as well as science students to understand their experiences and constraints within science education and research institutions.
2. Administration of pre-tested structured questionnaires to the selected cohort of women scientists and students in universities and research institutes.
3. Focused group discussions with girls in pre-university to understand their career options.
4. An examination of secondary sources of data on university enrolment figures and government policies on education (See the original report of Poonacha and Gopal, 2004).

The quantitative data gathered through the administration of a detailed semi-structured questionnaire provided information on the socio-economic profile, educational background, job and research-related organizational practices, career prospects, gender dimensions of the scientific field, and family details.

The qualitative data gathered through in-depth interviews and focussed group discussions with scientists and students at their institutions while introducing the study helped to elicit further information on institutional practices that hindered or advanced their careers. Focussed group discussions were also conducted with girl students in a science college in Mumbai of the junior college and undergraduate science classes, to understand their motivation for career options. Attempt was made to get information on a random sample of 25 women who had opted out of science career, by administration of a semi-structured questionnaire and interviews, but this effort was not very successful since the women were reluctant to speak.

While the present study did not include students at pre-university level to find out gender differences in selection of subjects at the university level, this aspect has been covered in a recent study (Mukhopadhyay, 2001) from India and salient findings from the latter study will also be discussed.

Sampling design

Although the selection of the sample was purposive, the study is fairly representative of women's experiences in science. This is because the respondents were drawn from a wide range of scientific research institutions/university departments in Mumbai, Pune, Nagpur, Akola, Shillong, Gauhati, Aligarh, and Bangalore. The institutions selected covered a geographical and regional spread (Table 1). A majority of the institutions were from Maharashtra, such as Pune, Nagpur and Akola, apart from Mumbai, but an all-India representation was attempted with institutions selected from Aligarh, Shillong, Gauhati and Bangalore. Few responses to the structured questionnaire were also obtained from Delhi and Pune, through the efforts of some committee members.

Profile of institutions

As indicated in Table 1, scientists and students from 19 universities and colleges and 17 science institutions were selected.

Table 1. Typology of the institutions

S. No.	Typology of Institution	Number
1	Central University, Departments of Science	5
2	State University, Departments of Science	7
3	Deemed University with special status/ DST funded	2
4	CSIR Laboratories	4
5	ICMR Institutes	3
6	DBT Institutes	2
7	DAE Institutes	3
8	DST Institutes	1
9	Indian Institute of Technology	1
10	Colleges of Science	6
11	Agricultural University	1
12	State funded research institute	1

Further details about the universities and institutions listed in Table 1 are as given below:

1. Four central universities, namely Jawaharlal Nehru University (JNU), University of Delhi (DU), Aligarh Muslim University (AMU) and the North Eastern Hill University (NEHU);
2. Six universities run by state governments, namely the universities of Mumbai, Pune, Nagpur, Agra, Gauhati, and the SNDT Women's University;

3. Six colleges affiliated to the universities mentioned above;
4. One state-run agricultural university, namely the Krishi Vidyapeeth at Akola;
5. Two deemed universities, namely the Indian Institute of Science (IISc) and the Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR) in Bangalore, the latter is funded by the DST;
6. Three institutions run by the Indian Council of Medical Research (ICMR) along with a centrally funded institute of medical research namely the All India Institute of Medical Sciences (AIIMS) and another funded by the state government, namely the BC Roy Medical Institute at Collate;
7. The Indian Institute of Technology (IIT) funded by the central government; and
8. Twelve scientific research institutions run by the central government and one run by the state government. These included two under the Department of Bio-technology, three under Department of Atomic Energy, one institute under the Department of Science and Technology, six labs of the Council of Scientific and Industrial Research and one under government of Maharashtra.

Process of data collection

The respondents were first contacted through the telephone or emails through numbers and addresses listed in the institutional websites. Heads of institutions also helped to contact the subjects. The initial contacts helped to organise focused group discussions with groups of women scientists and students during the visit of the investigating team to the institutions. During these meetings, the purpose of the study and the possible areas of discrimination were explained. Pamphlets on the Supreme Court guidelines regarding sexual harassment and the recent scheme of the DST to encourage women scientists who had dropped out of science to return to research were also distributed. Following this the questionnaires were handed over to the scientists and students. The respondents were asked to either mail or email the questionnaires back to us. Wherever possible these questionnaires were collected by the investigators then or through subsequent visits. At these institutions, references were also obtained for other institutions.

Some of the scientists were also contacted through the members of INSA committee and they responded through email. Thus a snowballing sampling method with a purposive design was adopted.

Time line and sample size

A pilot study was conducted, to pre-test and finalize the semi-structured questionnaire, between mid-August and mid-September 2003. The process of data collection, from contacting scientists through email to receipt of questionnaires, took place from mid-September 2003 to mid-February 2004. The entire sample for the study was 296, including 149 scientists and 147 students.

Non responses

While majority of those who participated in the study, conscientiously answered all the questions, there were a few who returned the questionnaire partially completed. Many respondents also did not return the questionnaires despite repeated reminders. This has proved to be a limitation.

Observations

Socio-economic Profile of Scientists

About 70 per cent of the scientists were between the ages of 30 and 50 years, of which nearly 44 per cent were in the age group 40 to 50 years. Among students nearly 87 per cent were below 30 years (Table 2).

Majority of the respondents were upper cast Hindus (Tables 3, 4). Some respondents did not want to be identified with any religion or cast.

Table 2. **Age group of scientists and students** (Age[#])

Age group	Scientists	Per cent	Students	Per cent
20-29	6	4.0	128	87.1
30-39	39	26.2	11	7.5
40-49	65	43.7	2	1.4
50-59	35	23.5	3	2.0
60-69	2	1.3	-	-
No response	2	1.3	3	2.0
Total	149	100.0	147	100.0

([#]Each table in this chapter presents data derived from the answers in questionnaires for women scientists or students. The question, inbrief, is mentioned in the bracket.)

Table 3. **Religious Composition of Respondents** (Religion)

Religion	Scientists	Per cent	Students	Per cent
Hindu	117	78.6	118	80.2
Muslim	14	9.4	17	11.5
Jain	-	-	2	1.4
Christian	6	4.0	4	2.7
Buddhist	3	2.0	2	1.4
Sikh	1	0.7	1	0.7
Any other	3	2.0	-	-
Not Applicable	3	2.0	2	1.4
No Response	2	1.3	1	0.7
Total	149	100.0	147	100.0

Table 4. Caste Composition of Respondents (Caste/Ethnicity)

Caste	Scientists	Per cent	Students	Per cent
Forward Caste	103	69.1	93	63.2
Backward Caste	-	-	2	1.4
Other Backward Caste	5	3.4	11	7.5
Scheduled Caste	4	2.7	5	3.4
Scheduled Tribe	3	2.0	1	0.7
Any Other	5	3.4	5	3.4
Not Applicable	22	14.7	20	13.6
No response	7	4.7	10	6.8
Total	149	100.0	147	100.1

This was an interesting contrast to what one of the women scientists from Bangalore had to say, on the day a new set of computers were inaugurated in their lab. She was shocked by the response of some of her male colleagues, who commented that it was not andauspicious' day for the inauguration. She also said that caste and religious backgrounds of scientists matter very much. It does affect the growth of science and the upholding of rationality, which is one of the basic foundations of science. It is reflected not only in the work that scientists do, but also in their training of students, by the examples they set for themselves. In another university, the upper caste lab attendants referred to a Dalit woman professor as Bai, wheras the senior male professors were called 'Sir'. While *Bai* when literally translated refers to a lady, in common usage it means a woman domestic help. It was obviously a way of getting back at the caste of the woman professor by the upper caste employees. A majority of the respondents said that women, or for that matter anyone, who enters science should rid society of superstitions.

Over 78 per cent of the scientists and 18 percent of the students were married (Table 5). In a later section, there will be a discussion on the role that family and its support structures play in women being able to pursue science careers.

Table 5. Marital status of scientists and students (Marital Status)

Marital Status	Scientists	Per cent	Students	Per cent
Unmarried	27	18.1	119	80.9
Widowed	4	2.7	1	0.7
Separated	1	0.7	-	-
Married	117	78.5	26	17.7
No response	-	-	1	0.7
Total	149	100.0	147	100.0

Disciplines Pursued by the Scientists

Table 6 shows that there were more students in biological sciences than in other streams. Both scientists and students were aware that life sciences and biological sciences had always had more women. In some of the group discussions with students on the question of why there were fewer girls in Physics compared to Biology, the students responded saying that, 'Society moulds us in a way, telling us that girls can't be pilots or do things with machines.' University departments tended to offer traditional disciplines such as Zoology and Botany, while the premier science intuitions offered broader areas like Biological sciences, Chemical sciences and Physical scences, and supported research in these areas.

Table 6. Disciplines pursued by scientists and students (What is the discipline in which you have obtained your higher education?)

Disciplines	Scientists	Per cent	Students	Per cent
Agriculture	4	2.7	11	7.5
Biochemistry	14	9.4	24	16.3
Biological Sciences	19	12.8	42	28.5
Space/ Atmospheric Science	-	-	2	1.4
Biometry/ Computer Science	1	0.7	2	1.4
Botany	15	10.0	5	3.4
Ecology	1	0.7	3	2.0
Chemical Sciences	34	22.8	17	11.6
Home Science	4	2.7	-	-
Environmental Sciences	-	-	2	1.4
Mathematics	12	8.0	4	2.7
Medicine/ Life Sciences	4	2.7	9	6.1
Space Science	1	0.7	1	0.7
Pharmacy	7	4.7	3	2.0
Physics	17	11.4	17	11.6
Zoology	14	9.4	5	3.4
Missing	2	1.3	-	-
Total	149	100.0	147	100.0

Nearly 75 per cent of the women scientists had completed their doctoral degrees, while amongst students a similar proportion had completed their master's degree (Table 7). Eleven per cent of those who responded to the students' questionnaire had also obtained their Ph.D.

Type of institution also determined, the way science had developed. Some women

scientists mentioned that certain institutions encourage holistic science (e.g. genetics, biological sciences), which are underrepresented in India. Outside of these progressive institutions, where science is practiced differently, these women scientists saw little professional prospects.

Table 7. Last degree obtained (Qualification –only last 2 degrees)

Last degree	Scientist	Per cent	Student	Per cent
AISSE	-	-	1	0.7
B.A.	-	-	1	0.7
B. Ed.	-	-	1	0.7
B.Sc.	2	1.4	10	6.8
M. Pharm.	-	-	2	1.4
M. Phil.	-	-	3	2.0
M.D.	3	2.0	-	-
M.Sc.	27	18.1	111	75.5
Ph.D.	113	75.8	16	10.9
No response	4	2.7	2	1.3
Total	149	100.0	147	100.1

Motivation and Constraints in Access and Entry into Science

This section summarises the responses obtained in, group discussions as well as those obtained through structured questionnaires.

The study tried to trace the motivational factors and constraints faced by women and girls in entering science careers at all levels. Focussed group discussion (FGD) with students who were on the threshold of pursuing a career in science in the junior and senior college, indicated the factors that motivated young girls to enter science, the career they envisaged, and their perceptions about the reasons students chose to go into or stay away from science (see Appendix I- Poonacha and Gopal, 2004)

Students in the higher secondary and graduate level felt that science offered them more options in terms of future careers. Parental pressure, added to the fact that they had secured high marks at the higher secondary level, prompted them to pursue science. Students also felt that it was still a bit premature for them to decide what careers they would follow, but some of them felt that biotechnology, microbiology, life sciences were some of the preferred options.

Most post graduate students mentioned pursuing science for the love of the subject and making a conscious choice in opting for science as a career (Table 8). Table 9 indicates that most scientists (nearly 60 per cent) had chosen to pursue science while in their secondary school, whereas the students made their decisions only during their graduation and post-graduation (66 per cent). Table 10 suggests that more than 80 per cent of the scientists and students did not face any serious discouragement when they

decided to pursue their science interests. In fact parents and teachers together encouraged a majority. Personal motivation also played a major role in selecting scientific career (Table 11).

Table 8. Conscious choice in opting for science career (Was your entry into science a conscious choice?)

Conscious Choice	Scientists	Per cent	Students	Per cent
Yes	141	94.6	135	91.8
No	5	3.4	7	4.8
Not Sure	3	2.0	1	0.7
Any Other	-	-	1	0.7
No Response	-	-	3	2.0
Total	149	100.0	147	100

Table 9. When was the decision to pursue a science career taken? (When did you plan to pursue a career in science?)

Stage of Planning	Scientist	Percent	Student	Percent
Secondary School	88	59.0	42	28.6
Graduation	35	23.5	45	30.6
Post-Graduation	19	12.8	52	35.4
Ph.D.	2	1.3	4	2.7
No response	5	3.4	4	2.7
Total	149	100.0	147	100.0

Table 10. Discouragement faced by respondents (Did anybody discourage you in science?)

Faced any discouragement	Scientists	Per cent	Students	Per cent
Yes	13	8.7	12	8.2
No	132	88.6	119	81.0
No Response	4	2.7	16	10.8
Total	149	100.0	147	100

Table 11. **Persons who gave encouragement** (Who encouraged you for science education?)

Encouragement from*	Scientists	Per cent	Students	Per cent
Father	60	40.3	53	36.0
Teacher	12	8.1	11	7.48
Mother	26	17.4	26	17.6
Friends	-	-	3	2.0
Brother (s)	7	4.7	8	5.4
Sister (s)	3	2.1	2	1.3
Self	47	31.5	41	27.8
Any Other	3	2.1	4	2.7
No Response	4	2.7	8	5.4

*Multiple responses

Lack of finance was an important factor for fewer girls coming into research. Families were unwilling to invest in girls' scientific pursuits, which included both education and the competitive exams that followed. This was evident in bigger institutions as well as at the college level. Compared to scientists (40.3 %), fewer students (26.5 per cent) had fellowships from the CSIR. However, a greater proportion (51.7 per cent) were utilising other fellowships in the absence of CSIR fellowships. Does this mean that getting CSIR fellowships is becoming increasingly difficult for women? If so why? In the IITs, there is tremendous gender skewedness, among students and even more among faculty. One of the faculty mentioned, that preparation for the Joint Entrance Examination of the IIT requires tremendous investment both in terms of money and time; parents are unwilling to invest in girls. The situation was becoming worse for girls with each passing year. In some institutions students are not admitted for research if they do not pass the NET qualifier exam. This is a kind of barrier which can perhaps be dismantled to make research more student /gender friendly.

Those who were educated in cities and towns and had their education in the English language rather than the regional language definitely had an advantage. A majority of the scientists (73.8%) and students (68%) were educated in cities and towns (Table 12). The higher percentage of students than scientists from smaller towns indicates that more students from smaller towns are coming into science, which is an encouraging sign. In terms of medium of instruction, however, the movement of students from regional language into higher education in English language was less compared to that of scientists (Tables 13 and 14).

Table 12. Where the respondents did their schooling (Where did you do most of your schooling?)

Place	Scientist	Percent	Student	Percent
Village	7	4.7	8	5.4
Town	29	19.5	38	25.9
City	110	73.8	100	68.0
Town/City	2	1.3	-	-
No response	1	0.7	1	0.7
Total	149	100.0	147	100.0

Table 13. Scientists' medium of instruction at school, under-graduation, post-graduation (Medium of instruction)

Medium of Instruction	School	Per cent	Under-graduation	Per cent	Post-graduation	Per cent
English	71	47.7	144	96.6	144	96.7
Regional language	74	49.7	4	2.7	3	2.0
Any other	4	2.7	1	0.7	2	1.3
Total	149	100	149	100	149	100

Table 14. Students' medium of instruction at school, under-graduation, post-graduation (Medium of instruction)

Medium of Instruction	School	Per cent	Under-graduation	Per cent	Post-graduation	Per cent
English	103	70.1	145	98.6	146	99.3
Regional language	37	25.1	2	1.4	1	0.7
Any other	7	4.8	-	-	-	-
Total	147	100	147	100	147	100

In colleges in North India, the motivation for girls and women to pursue science at the higher secondary level and subsequently at the graduate level (or the English language as a second choice) was because it enhanced their value in the marriage market. Girls were encouraged to take up science as it added value, and was useful for them to teach children at home. Thus both family and institutions played a role in the entry and access into science careers. In premier institutions of science, there is covert if not overt gender discrimination. There is hesitation to take girls as students. Supervisors

hesitate to take girls as their discontinuation after marriage is a disincentive. Conditions are put on the girls, 'will you complete or not?'

In colleges (especially in North-east), the load of teaching extends to even the junior college, which leaves no scope for teachers to think of research. Managements of the colleges do not encourage teachers to pursue research, and colleges do not have facilities for research. Therefore college teachers depend on their own motivation to do research. Within institutions, personal contacts also play a role in access to a jobs or positions.

Women continue to have social obligations to family and other commitments after securing jobs. These affect women in the prime period of their career. Family responsibilities leave little time to publish as prolifically as her male colleagues. In fact some women who were older were of the opinion that the scientific field is extremely competitive and since women are biologically different, they have to end up sacrificing their ambitions. One woman scientist said "Once you want equality, you can't be going home. In that case you step out of science." On the query, if she didn't think science had lost out on women's talent, she said "you can't have both."

Some institutions do not allow both the spouses to work in the same unit or institution. This comes in way of women finding employment. While crèches in institutions was an important need for workingwomen, a demand for that facility from women may result in women not getting jobs.

Even if women are serious about pursuing research, at the level of recruitment a less serious man is taken because women would not have enough publications. Hence there is need to recognise that women have special and separate social obligations, which come in the way of their uninterrupted pursuit of research. Support systems to help women with such special needs are essential.

Entry Level Constraints

While 9 per cent students said it was difficult to obtain a post-graduate admission or research position, majority said they did not experience any difficulty (Table 15). In the FGD, many girl students said they were denied Research Associate-ship on the pretext that they will marry and leave. When permanent positions come up, men are preferred. One scientist observed that it was not that men did not leave their doctoral or post-doctoral research incomplete and leave the institution, but women's examples are specifically chosen to build a negative image and use it against them.

Table 15. Difficulty in obtaining post-graduate/ research position for students (Was it difficulty for you to obtain this post-graduate/ research position?)

Difficulty experienced by students	Student	Per cent
Yes	13	8.8
No	128	87.1
No Response	6	4.1
Total	147	100.0

Group discussions in many institutions revealed that women scientists were discriminated against, during selections through interviews and if they are selected motives are attributed. For instance, the selection of the only woman head of a unit in a premier lab was attributed to the fact that she cried and obtained the post due to sympathy, and not because she was meritorious. Table 16 indicates that about 13 percent of the scientists experienced difficulty in getting their first job. Even though recruitments were made through advertisement and interviews (Table 17), it was felt that some amount of personal contacts, played a role in getting a job. This observation may however apply to both the sexes.

Even as a majority accepted their present job because it suited their qualification, many also accepted the job because it was at a convenient location or fitted with household responsibilities (Table 18). One of the scientists noted that she did not move out of her job into a better position in another city, as her husband had a job in a science institution in the same city. If she opted to move out it would have upset the family arrangements, and so she denied herself the opportunity. This is a compromise that women often tend to make, and sometimes sacrifice a brilliant career.

Table 16. Scientists' experiencing difficulty in getting first job (Did you have any difficulty in getting your first job?)

Experience of difficulty	Scientists	Per cent
Yes	17	11.4
No	120	80.5
No response	12	8.1
Total	149	100.0

Table 17. Process of obtaining present job for scientists (How did you get your first previous /present job?)

Process of obtaining scientists' present job*	Scientist	Per cent
Personal Contact	7	4.7
Interview	58	38.92
Advertisement	29	19.46
Through transfer from another dept in same organisation	2	1.3
Promotion	8	5.6
Moving from another organization	2	1.3
Any other	4	2.7
Not Applicable	1	0.7
No Response	30	20.13

*Multiple responses

Table 18. Reasons for accepting present post (Mark three important reasons for accepting your present post.)

Reasons*	Scientists (N= 149) who gave one reason	Per cent	Scientists (N= 149) who gave second reason	Per cent
Suitable to Qualification	129	86.5	6	4.0
Convenient Location	2	1.3	44	29.5
Attractive Salary	2	1.3	14	9.4
Fits with Household Responsibilities	4	2.6	20	13.4
Carries prestige	2	1.3	23	15.4
Congenial Atmosphere	2	1.3	4	2.7
Any other	6	4.0	2	1.3
No Response	4	2.6	36	24.2

*Multiple responses

Personal interest and motivation played a role in majority of scientists taking science careers and their current jobs (Table 19, 20). However, many women scientists noted that retention in their career was as big if not a bigger problem than access and entry.

Table 19. Motivation for scientists to specialize in their particular branch of science (What motivated you to specialise in this branch of science?)

Motivation*	Scientist N=149	Per cent
Interest in Science	137	91.9
Job Potential of the Course	18	12.1
Inclination for Practical Work	7	4.7
Influence of the peer group	2	1.4
Encouragement and Support from Family	19	12.8
Any Other	1	0.7
No Response	3	2.0

*Multiple responses

Table 20. Factors that motivated scientists to work to their present level (What motivated your work for your present level?)

Motivation*	Scientist N=149	Per cent
Interest in Subject	112	75.1
To Improve Career	42	28.2
Availability of Financial Help	7	4.7
Sponsored by Organisation	1	0.7
Any Other	4	2.7
No response	6	4.0

*Multiple responses

Table 21 mentions some of the reasons for women leaving their previous job. While many of them left for better professional prospects, there were those who also left because it was convenient for the family, managing husband's transfer and children's education. Scientists in University departments seemed to move out more compared to those placed in scientific institutions for better professional prospects (16 per cent vis-à-vis 10 per cent, data not shown) as well as to be with spouses and families.

Table 21. Scientists' reasons for leaving previous job (Reasons for leaving))

Reasons for leaving previous job	Scientists	Per cent
Better Professional Prospects	39	26.2
Transfer Not Acceptable	1	0.7
Husband's/ Father's Transfer	5	3.4
Children's Care/Education	2	1.3
Not Satisfied with Type of Job	6	4.0
Any Other	8	5.4
Not applicable	88	59.1
Total	149	100.0

Organisational practices and Workplace discrimination

A majority (over 75%) of the women scientists were in research and teaching (Table 22) since they belonged to both university departments and scientific research institutions. However only 29.5 % were involved in project planning.

Few institutions faced location-specific problems with special implications for women. For instance, in some areas of North East, the threat of militancy prevents movement after dark, particularly for women. This restricts research requiring longer hours of work. In smaller towns, with politico-cultural difficulties, when girls have to stay late, teachers ensure that some boys of the same department stay behind to accompany them to their hostels due to curfew or lack of safety for women in general.

Table 22. Nature of work handled by scientists (Nature of work handled in your present post)

Nature of Work*	Scientists N=149	Per cent
Teaching	112	75.2
Research and Documentation	119	79.8
Scientific Documentation	38	25.5
Technical, Computer	29	19.5
Consultancy	25	16.8
Project Planning	44	29.5
Laboratory testing etc	35	23.5
Laboratory supervision	45	30.2

*Multiple responses

In most institutions both scientists and students were satisfied with working hours in general (Table 23). Many women noted that research is a pursuit which does not have pre-set working hours, and hence most scientists and students have to stay behind after the administrative and official hours of the institute or department (Table 24 and 25).

Table 23. Satisfaction of scientists about working hours (Satisfaction with working hours)

Satisfied	Scientists	Per cent	Student	Per cent
Yes	131	87.9	113	76.9
No	11	7.4	19	12.9
No response	7	4.7	15	10.2
Total	149	100.0	147	100.0

Facilities for work were another area of discontent. While nearly 48-50 per cent of scientists and students were satisfied, considerable proportion (32 and 33 per cent) was satisfied only to some extent (Table 26). Satisfaction of both scientists and students tended to be more in science institutions than in University departments since these organizations have better funding and nurturing environment compared to Universities.

Table 24. Students' requirement to stay beyond office hours to do work (Do you have to work beyond the institute hours?)

Students' requirement	Students	Per cent
Often	45	30.6
Sometime	67	45.6
Never	20	13.6
Any Other	10	6.8
No Response	5	3.4
Total	147	100.0

Table 25. Requirement for scientists to stay beyond office hours to do work (Do you have to stay beyond office hours on your own to complete work on hand?)

Scientists' requirement	Scientist	Percent
Often	39	26.1
Sometimes	90	60.4
Never	10	6.7
Any Other	1	0.7
Not Applicable	1	0.7
No Response	8	5.4
	149	100.0

Table 26. Satisfaction with Infrastructure provided by Organization (Are you satisfied with the basic infrastructure facilities provided by your organization?)

Satisfaction with Infrastructure	Scientist	Per cent	Student	Per cent
Yes	72	48.3	74	50.3
No	26	17.5	16	10.9
To some extent	46	30.8	47	32.0
Any other	-	-	2	1.4
No response	5	3.4	8	5.4
Total	149	100.0	147	100.0

Gender Related Constraints and Sexual Harassment

Discussions with scientists and students revealed quite a bit of gender related discrimination and harassment. Some of the comments follow. “If you dress well they don’t take you seriously. Older men are condescending. But if you challenge them then they become hostile.” These were the words of a promising scientist in a major national institute. If a woman is good in her work, her growth is suppressed. Women scientists were unanimous in their feeling that men just cannot tolerate a woman in a higher position. Equality is not part of their attitude. Others from specific locations noted: In the 50 years of the CSIR and 42 labs across the country, there is not one woman who is the Director. During interviews, if a woman went in to appear before the panel and returned after a long time, there are taunts that because she is a woman they kept her in for a longer time. But if she returned quickly, there would be comments that it was because she was a woman they did not ask her anything.

Students tend to be more vulnerable and harassed. One woman’s supervisor had not signed her Ph.D. thesis after her submission of drafts 6 years ago. While another woman trainee was offered a soft option: work in the computer lab, and not in the control room in the plant, even though she was more than qualified to be in the plant. Some of these complaints may be individual experiences and not necessarily related to gender.

The proportion of male members in the lab varied (Table 27) but there was almost always their presence. Many women students also noted that they often had to bear with uninvited sexual attention while at work in the labs.

Higher percentage of male than female students undertook duties, which are not necessarily part of their work (Tables 28, 29), Women students felt that they were being discriminated against during fieldwork too. Many students expressed the problem of personal safety as a major problem regardless of where they were- library, or the lab, or during fieldwork; half their energies were expended in ensuring personal safety. This indeed is a matter of great concern needing institutional safeguards.

While over 50% scientists said they were allotted tasks that are not part of their job specification often or some times (Table 30), only few women attributed extra duties to their gender.

Students expressed difficulty in obtaining a research position as supervisors would impose conditions or just plainly refuse women students.

While most students did not have a gender preference for the supervisor, where gender preference was indicated, slightly higher percentage preferred a woman as a supervisor (12 per cent) compared to a male supervisor (9 per cent) (Table 31). Women teachers did not perceive much difficulty in students approaching them (Table 32).

Table 27. Percentage of males in the department/ or lab (What is the percentage of male members in your faculty/ department/ section?)

Proportion of men	Scientist	Per cent	Student	Per cent
0	13	8.7	-	-
1-10	15	10.0	17	11.6
11-20	6	4.0	16	10.7
21-30	2	1.3	4	2.7
31-40	10	6.7	9	6.2
41-50	21	14.2	18	12.3
51-60	9	6.1	5	3.5
61-70	11	7.4	7	4.7
71-80	26	17.5	6	4.1
81-90	16	10.6	-	-
91-100	3	2.1	1	0.7
Not applicable	6	4.0	-	-
No response	11	7.4	64	43.5
Total	149	100.0	147	100.0

Table 28. Do women students undertake duties which are not part of their research (Do you have to undertake duties which are not part of the normal duties relating to your research as such or for professors?)

Undertake duties	Student	Per cent
Often	12	8.1
Sometimes	65	44.2
Never	61	41.5
Any other	2	1.4
No response	7	4.8
Total	147	100.0

Table 29. Male students undertaking duties, not part of their research (Do you think male students undertake duties which are not part of their study/research?)

Male students undertake duties	Student	Per cent
Often	36	24.5
Sometimes	73	49.7
Never	19	12.9
Any other	5	3.4
Not applicable	4	2.7
No response	10	6.8
Total	147	100.0

Table 30. Allotment of tasks for scientists other than job specifications (Are you allotted tasks which are not part of your job specifications by your superior?)

Allotting of tasks	Scientist	Per cent
Often	14	9.3
Sometimes	64	43.0
Never	59	39.6
Any other	5	3.4
Not applicable	5	3.4
No response	2	1.3
Total	149	100.0

Table 31. Students' preference as supervisor or guide (In your study/ research work who would you prefer as a supervisor/ guide)

Preference	Students	Per cent
Prefer a man	13	8.9
Prefer a woman	18	12.2
No preference	113	76.9
No response	3	2.0
Total	147	100.0

Table 32. Scientists' perception of students approaching them easily (Do students approach you easily for research guidance?)

Scientists approach	Scientist	Per cent
Yes	97	65.1
No	8	5.4
Not applicable	29	19.5
No response	15	10.0
Total	149	100.0

Though in response to the structured questionnaire 76.5% women scientists and 80% students said they did not face any specific difficulties as women (Table 33), focus group discussions did reveal this problem. Difficulties faced included non-cooperative colleagues, gender discrimination in rules and practices and lack of facilities (Table 34, 35).

Table 33. Facing special difficulties as a woman (Q. 7.5. (Scientist). Are there any special difficulties you face as a woman in your organization or department? 3.13. (Student). Are there any special difficulties you face as a woman student in your institute/ university/ department?)

Difficulties faced	Scientists	%	Students	%
Yes	21	14.1	25	17.0
No	114	76.5	117	79.6
Not applicable	3	2.0	-	-
No response	11	7.4	5	3.4
Total	149	100.0	147	100.0

Women scientists felt that to counter the gender related stress, women required support systems such as flexitime, mid-career break, transfer with spouse, day-care for older people, and crèche, desirable location of work (housing), and a women's cell in their institution (Table 36). About 37 per cent women suggested gender sensitisation of their male scientist colleagues.

Table 34. Nature of difficulties faced by scientists as women (Difficulties faced in terms of:)

Type of difficulty	None		Little		Some		Substantial		Most		Not Applicable		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Gender discrimination in rules and practices	67	45.0	17	11.4	9	6.0	1	0.7	2	1.3	53	35.6	149	100
Non cooperative colleagues	49	32.9	21	14.1	17	11.4	5	3.4	6	4.0	51	34.2	149	100
Lack of freedom in professional practice	59	39.6	12	8.1	10	6.7	5	3.4	2	1.3	61	40.9	149	100
Lack of facilities and technical practice	45	30.2	18	12.1	12	8.1	8	5.4	6	4.0	60	40.2	149	100

Table 35. Nature of difficulties faced by students (Difficulties faced are in terms of:)

Type of difficulty	None		Little		Some		Substantial		Most		Not applicable		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Gender discrimination in rules and practices	79	53.7	10	6.9	8	5.4	3	2.0	2	1.4	45	30.6	147	100
Non cooperative colleagues	57	38.8	34	23.1	9	6.1	2	1.4	1	.7	44	29.9	147	100
Lack of freedom in professional practice	72	49.0	13	8.7	12	8.2	2	1.4	2	1.4	46	31.3	147	100
Lack of facilities and technical practice	60	40.8	12	8.2	14	9.5	7	4.8	7	4.8	47	31.9	147	100

Table 36. What scientists think are special benefits required (What special benefits for women (other than maternity benefit) do you think are necessary in your organisation?)

Benefits required	Yes		No		Not applicable		No response		Total	
	N	%	N	%	N	%	N	%	N	%
Flexitime	82	55.0	15	10.1	10	6.7	42	28.2	149	100
Transfer with spouse	49	32.9	12	8.1	37	24.8	51	34.2	149	100
Mid-career breaks	73	49.0	26	17.4	10	6.7	40	26.9	149	100
Women's cell	81	54.4	12	8.0	11	7.4	45	30.2	149	100
Day-care for older people	63	42.3	19	12.7	17	11.4	50	33.6	149	100
Desirable location of work	55	36.9	20	13.4	22	14.8	52	34.9	149	100
Gender sensitisation of men	51	34.2	17	11.4	22	14.8	59	39.6	149	100

Sexual harassment was a widely prevalent phenomena, reported across institutions by many scientists and students. The guidelines of the Supreme Court and the mandatory order enjoining institutions to undertake steps to prevent sexual harassment seems to have had some impact on institutions. Only 44 per cent scientists and 29% students said they knew that their institution had a policy to prevent sexual harassment (Table 37).

Table 37. The institute has a policy on sexual harassment (Does your organization have a policy for the prevention of sexual harassment)

Institute has policy on sexual harassment	Scientists	Per cent	Students	Per cent
Yes	66	44.3	43	29.3
No	27	18.1	24	16.3
Don't know	50	33.6	68	46.3
Any Other	-	-	3	2.0
No response	6	4.0	9	6.1
Total	149	100.0	147	100.0

In qualitative discussions students were more forthcoming about sexual harassment they faced from other students and teachers, while scientists linked sexual harassment to organizational practices and professional advancement. Girls in a premier lab said sexual harassment from teachers and colleagues was a "top priority problem!!" But nobody talks about it. Initially, their women teachers told them to cope by ignoring and sidestepping the issue. Others reported that there is always some uninvited sexual attention within the work situation. Only few scientists (15 per cent) and students (10 per cent) knew about someone else facing sexual harassment (Table 38).

Table 38. Knowledge of any one who has faced sexual harassment (Have you or any of your colleagues/ Students faced sexual harassment?)

Know of anyone who has faced sexual harassment	Scientists	Per cent	Students	Per cent
Yes	23	15.4	15	10.2
No	96	64.4	74	50.3
Don't know	24	16.1	48	32.7
Not applicable	1	0.7	5	3.4
No response	5	3.4	5	3.4
Total	149	100.0	147	100.0

Scientists in one national lab reported that they faced abusive language during meetings. Sexually coloured remarks are often made in front of women. These are indirect methods of keeping women out. Pregnant women are singled out for harassment, laughed at, and kept out of fieldwork despite their willingness to participate. A teacher at a state university who had recently delivered and returned to work was asked to produce the circular that women could take feeding breaks. At another institution, husbands of women scientists were not allowed to drop their wives at work on their vehicles.

Women would constantly have to face taunts at work such as: "If you have so many problems, why don't you stay at home?" "A woman who gets a job is actually taking a man's job away", "Why are you applying for a higher post, why do you need so much money?" etc.

Professional Growth

Retention within the career was a bigger problem compared to access. Once women were in, there are numerous ways to keep them out. Rules are thrown at them, they are not taken seriously in committees, opportunities are denied to lecture abroad or in India by which people come to know them and their work, etc.

Decisions on committees are made by groups of men. Only those women who "need props, attention from men" are taken in. ndependent women, who can take decisions on

their own are kept out saying they are "moody, rash, temperamental, etc". Even if women struggle to be in these committees, their opinion is not seriously taken. They remain as tokens, as men make the decisions. Often men on the committees take women members' ideas and pass them on as their own. Appropriation of women's work was a matter of course due to women's vulnerability and lesser bargaining power.

Gender- specific problems that arise be redressed only if more women are involved in decision-making e.g. men do not feel the need for crèches, or day care ford ependents, etc.

Male networking was an important aspect of men in professions. Women remain sincere to their work timings while men don't stay in their seats or labs, but are out at tea, or networking with others. "Men are not interested in their work. They just need recognition only from their peers. They don't care to listen to me or my work." "Men rarely discuss science with women colleagues. Women's talent and competitiveness actually threaten men". After submitting proposals, or applications, follow-up has to be done at every level of the university or institution's bureaucracy, for which men rely on their networking and women are handicapped.

While 52% per cent scientists said they were satisfied with their achievement in career, nearly 33.6 per cent said they were not (Table 39). Women scientists felt they enjoyed their science, while men did it for accolades, often mechanically. While most women seemed to be satisfied with their achievements, (slightly higher proportion in scientific institutions than in universities), some felt that they could have done more. Women expressed their inability to achieve their fullest potential since they often had to fight battles at the workplace, within the family, etc. Among students too, while 54 per cent were satisfied, about 26.5 per cent were not satisfied with their career achievements.

(Table 39). Satisfaction with achievement in career/ research (Are you satisfied with your achievement in your career/ your research?)

Satisfaction	Scientist	Per cent	Student	Per cent
Yes	78	52.3	79	53.8
No	50	33.6	39	26.5
Unsure	16	10.7	23	15.6
No response	5	3.4	6	4.1
Total	149	100.0	147	100.0

In qualitative discussions women mentioned several problems that they faced in terms of infrastructure, funds, awards, and incentives, which play a major role in satisfaction with one's career. The women perceived a kind of gender blindness. In University departments in certain towns, women said that pressures to play double roles frustrate their career prospects. Men laugh when such issues are raised. There is a glass ceiling after marriage. Even if women try to come back into careers after a break, institutions do not take them easily. In colleges (especially in North-east), the load of teaching even the junior colleges leaves no time or scope to even think of research. Managements also do not encourage. Colleges too, do not have facilities for research.

Sixteen per cent scientists said that there was a mismatch between their job and their qualification. They were overqualified for their job (Table 40). Nearly 70 per cent scientists preferred a job that was more interesting and responsible in contrast to more paying (Table 41). Among reasons for inability to fulfil career goals, nearly a quarter of the scientists cited household responsibilities. Apart from that, lack of time, and lack of organisational encouragement were among the reasons given by scientists. Students cited lack of finance as an important reason for inability to fulfil research goals in addition to lack of time (Table 42).

Table 40. Perception of mismatch of job and qualification by scientists (How does your job compare with your qualification)

Perception of job	Scientists	Per cent
It is Equal to your qualification	114	76.5
It is Less than your qualification	24	16.1
It is More than your qualification	3	2.0
Any other	1	0.7
No response	7	4.7
Total	149	100.0

Table 41. Type of career advancement preferred by scientists (What kind of career advancement would you prefer most?)

Preference*	Scientists	Per cent
A More Interesting Job	61	40.9
A More Paying Job	12	8.0
A More Responsible Job	30	20.1
Something that will give you more leisure	5	3.3
Any Other	10	6.7
Not Applicable	4	2.6
No Response	25	16.8

*Multiple responses

Thirty two per cent scientists and 19 per cent students mentioned obstacles faced in the progress of their professional and career. A greater proportion of women scientists located in universities, compared to those in scientific institutions faced obstacles in their career growth. Higher percentage of scientists reported being members of

professional societies earlier (54.4%) than at present (45.6%)–probably due to pressure on time.

Table 42. Reasons for inability to fulfil career goals (Why were you unable to fulfil your goal?)

Reasons*	Scientist	Per cent	Student	Per cent
Lack of time	27	18.1	22	15.0
Household responsibilities	38	25.5	12	8.1
Lack of finance	5	3.4	22	15.0
Objection from family	1	0.7	2	1.4
Ill-health	4	2.7	7	4.8
Organisation did not encourage	16	10.8	4	2.7
Any other	3	2.0	26	17.7
Not applicable	57	38.3	14	9.5
No response	17	11.4	43	29.3

*Multiple responses

As many as 35.6% of women scientists had denied themselves career options (Table 43). Greater proportion of these scientists (21.5 per cent) was located in universities than in science institutions (13.4%).

Table 43. Denied oneself any career options (Have you denied yourself any career options such as opportunity to go abroad for conferences, special training programmes, opportunity in improving/ furthering your study, research etc.?)

Denied career options	Scientist	Per cent	Student	Per cent
Yes	53	35.6	25	17.0
No	89	59.7	108	73.5
Not applicable	5	3.4	8	5.4
No response	2	1.3	6	4.1
Total	149	100.0	147	100.0

At least 21.5 per cent women scientists felt that this self denial has affected their career growth (Table 44). Seventeen per cent women scientists also said they were denied career options such as promotions (Table 45). Among those who gave reasons for this

denial of promotion, lack of experience, lack of functional capabilities, and lack of confidence and drive, were mentioned as reasons for the denial (Table 46).

Table 44. Denial of options/ opportunities has affected career (Has this denial affected your career in any way?)

Denial affected career	Scientist	Per cent	Student	Per cent
Yes	32	21.5	15	10.2
No	39	26.2	17	11.6
Not applicable	59	39.6	55	37.4
No response	19	12.7	60	40.8
Total	149	100.0	147	100.0

Table 45. Scientist ever been denied promotion (Have you ever been denied promotion?)

Been denied promotion	Scientist	Per cent
Yes	26	17.4
No	92	61.8
Not applicable	20	13.4
No response	11	7.4
Total	149	100.0

In terms of recognition for work in the organisation, nearly half the scientists (49 per cent) and students (51 per cent) said they received recognition, while about 39 per cent scientists and 32 per cent students said recognition came only at times. Scientists also said that praise and inclusion in decision making (20-21 per cent) was a manner of recognition (Table 47). Students felt that some praise and grades for the work done was the manner of recognition they received (Table 48).

Over 15% scientists mentioned being superseded. Among those who had applied for a better post, 66% had got it. In the absence of comparable data on men, no comment on this success rate can be made.

Table 46. **Scientists' perception of reasons for denial of promotion** (Your perception of why you did not get the promotion?)

Perception of denial of promotion	Yes		No		Not applicable		No response		Total	
	N	%	N	%	N	%	N	%	N	%
Lack of experience	4	2.7	19	12.8	12	8.1	114	76.5	149	100
Lack of qualification	4	2.7	21	14.1	12	8.1	112	75.2	149	100
Lack of functional capabilities	2	1.3	19	12.8	13	8.7	115	77.2	149	100
Lack of managerial experience	3	2.0	14	9.4	17	11.4	115	77.2	149	100
Discrimination on being a woman	11	7.4	13	8.7	12	8.1	113	75.8	149	100
Lack in personality	-	-	16	10.7	17	11.4	116	77.9	149	100
Lack self-confidence and drive	1	0.7	17	11.4	15	10.1	116	77.9	149	100
Lack of personal connections	13	8.7	7	4.7	13	8.7	116	77.9	149	100
Not fitting into organizational culture	5	3.4	15	10.1	14	9.4	115	77.2	149	100

Table 47. Perception of scientists in terms of recognition (Recognition is in terms of)

Recognition	None		Little		Some		Substantial		Most		Not applicable		No Response		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Praise	17	11.4	18	12.1	31	20.8	30	20.1	12	8.1	-	-	41	27.5	149	100
Promotion	30	20.1	10	6.7	32	21.5	24	16.1	4	2.7	1	0.7	48	32.2	149	100
Inclusion in decision making	22	14.8	10	6.7	32	21.5	29	19.5	7	4.7	-	-	49	32.9	149	100
Recommendation for award	43	28.9	12	8.1	14	9.4	12	8.1	4	2.7	1	0.7	63	42.3	149	100

Table 48. Recognition for students is in terms of (Recognition is in terms of)

Recognition	None		Little		Some		Substantial		Most		Not applicable		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Praise	3	2.0	19	12.9	40	27.2	16	10.9	19	12.9	50	34.0	147	100
Grades	14	9.5	11	7.5	33	22.4	11	7.5	6	4.1	72	49.0	147	100
Recommendation for award	26	17.7	8	5.4	17	11.6	11	7.5	3	2.0	82	55.8	147	100

Coping with Family and Career: Support of immediate family

Women scientists, and a large number of students did speak of subtle discrimination meted out to them by their family members. Though in an earlier question, almost 70% scientists and students had said that their parents had encouraged them to take up science career, in the qualitative discussion women mentioned that their brothers received more encouragement in terms of attention and incentives if they wished to pursue science. Families hesitated to invest in girls' education, particularly science education. In many families it was the mothers who discouraged the girls.

Quite often girl students would have to disrupt their career as a student or researcher for marriage. At a premier lab, girls mentioned that if a marriage proposal had come their way, they would have to agree to it, out of loyalty to their parents. "After all, it is because of them that we are here." Only a small percentage of students felt that commitment to career increases or decreases chances of marriage. Few were unsure (Tables 49, 50).

Table 49 – Commitments to career lessens chances of marriage (Does commitment to your career/ higher studies/ research lessen your chances of marriage?)

Lessens chances of marriage	Scientist	Per cent	Student	Per cent
Yes	10	6.7	21	14.3
No	21	14.1	82	55.8
Unsure	7	4.7	16	10.9
No response	111	74.5	28	19.0
Total	149	100.0	147	100.0

Table 50 – Commitments to career increases chances of marriage (Does commitment to your career/ higher studies/ research lessen your chances of marriage?)

Increases chances of marriage	Scientist	Per cent	Student	Per cent
Yes	3	2.0	19	12.9
No	18	12.1	61	41.5
Unsure	14	9.4	31	21.1
Not applicable	103	69.1	27	18.4
No response	11	7.4	9	6.1
Total	149	100.0	147	100.0

Constraints in attending to social & household responsibilities

Qualitative discussions revealed that women found the responsibilities of marriage and family to be an impediment in their science careers. Combining career and research was difficult, and only the more privileged women who received support from their families were able to cope with the dual burden of home and work. Combining family and work did result in neglect of household responsibilities to greater or lesser extent (Table 51).

Table 51. Due to career/ research commitment, cannot attend to household responsibilities (Do you feel whether married or unmarried that because of your commitment to a job/ research, you cannot/ may not be able to attend properly to household responsibilities?)

Inability to attend to household responsibilities	Scientist	Per cent	Student	Per cent
Yes	18	12.1	16	10.9
No	44	29.5	57	38.8
Sometimes	71	47.7	67	45.6
Not applicable	12	8	4	2.7
No response	4	2.7	3	2.0
Total	149	100.0	147	100.0

Attitude of family members

With regard to the attitude of family members to the careers, of scientists, many mentioned encouragement from parents and husband and to a lesser extent from in-laws (Table 52). But there were instances when women said that though they received tremendous support from their husbands, at times they had to curtail their ambitions in order to please their husbands. Students received lot of encouragement from parents (Table 53). Thus once the girl decided to take up science studies, parents did support them, even in this male dominated society.

Do women practice science differently and address different issues

There was a mixed response to this question. Many said "it hardly matters whether the practice of science is by a man or a woman. Science is science for all, and that gender has very little to do with it. By entering science, women like men attain intellectual growth; it provides tremendous confidence, mental maturity, happiness and so on." "It definitely helps other women stand up and gain confidence, and encourages other women to join the field." Students particularly felt that there is lack of role models. "A role model is required; we need an Indian woman scientist, whom every woman can follow as a guiding light. Unfortunately, we have none in India."

Table 52. Attitude of family members to scientists' career (How do your parents/ in-laws view your working? What is your husband's attitude to your working?)

Attitude	Oppose		Dislikes, but not hinder		Indifferent		Barely accept		Encourage		Not applicable		No response		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Parents	3	2.0	3	2.0	10	6.7	2	1.3	119	79.9	1	0.7	11	7.4	149	100
In-laws	3	2.0	7	4.7	24	16.1	8	5.4	79	53.0	6	4.0	22	14.8	149	100
Husband	0	0	4	2.7	5	3.4	8	5.4	98	65.8	3	2.0	31	20.8	149	100

Table 53. Attitude of family members to student's research career (How do your parents/ in-laws view your involvement in higher studies/ research? What is your husband's attitude to your involvement in higher studies/ research?)

Attitude	Oppose		Dislikes, but not hinder		Indifferent		Barely accept		Encourage		Not applicable		No response		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Parents	1	0.7	2	1.4	3	2.0	3	2.0	130	88.4	0	0	8	5.4	147	100
In-laws	2	1.4	3	2.0	4	2.7	1	0.7	27	18.4	0	0	110	74.8	147	100
Husband	0	0	0	0	2	1.4	0	0	24	16.3	0	0	121	82.3	147	100

Women also get the sense of fulfilment of achieving something on their own, to be able to shape the careers of others in a positive manner; however, "women scientists are in a minority and they tend to ape their 'successful' male colleagues." Some women believed that research was teamwork, and therefore there is "less need for personal glory" They were prepared to play second fiddle in collaborative projects so that the work moves along. Some students remarked, "a woman scientist in a group may understand any difficulty faced by women, and will (hopefully) be active enough to sort out any problem."

Table 54 shows that nearly 50 per cent scientists and 33 per cent students said women bring a different consciousness to the practice of science. Many (46.3 per cent scientists and 41.5 per cent students) felt that women's practice of science would have an impact on the way science is currently practiced (Table 55). In some of the discussions at institutes, where certain applied technologies were being researched, women felt that their experience as women did influence the topics chosen or the manner in which they conducted their research. Women would be more sensitive to understanding the pollution in kitchen, or the nature of agriculture cropping that is followed in the country. Agricultural scientists said that men believe in intensification, whereas women have understood the value of integrated farming and conservation. In another institution where research in ecological and holistic sciences was encouraged, students noted that women generally seem to have empathy for living subjects, but "those who are aware of ecology are not necessarily in positions of power."

Table 54. Women bring a different consciousness and temperament into scientific practice (Do you think women scientists bring a different consciousness/ temperament into their scientific practice?)

Perception of women bringing a different consciousness on practice of science	Scientists	Per cent	Students	Per cent
Yes	74	49.7	49	33.3
No	22	14.7	20	13.6
Don't know	17	11.4	44	29.9
Unsure	24	16.0	26	17.7
No response	12	8.1	8	5.4
Total	149	100.0	147	100.0

Many said that "currently science is seen as a predominantly male enterprise… from nomenclature to choice of research topics to paradigms of research, every thing is male dominated… hence the work culture is essentially extremely hostile to women researchers." This led to the feeling that more representation of women scientists was required in academic bodies, decision- making forums, and at policy level.

Table 55. Women's practice of science has an impact on the manner it is practiced (Do you think women scientists practice of science has and can have an impact on the way science is currently practiced?)

Impact on practice	Scientist	Per cent	Student	Per cent
Yes	69	46.3	61	41.5
No	22	14.8	24	16.3
Don't know	20	13.4	31	21.1
Unsure	21	14.1	21	14.3
No response	17	11.4	10	6.8
Total	149	100.0	147	100.0

Bringing more women into science to achieve a critical mass

Women scientists and students felt the need to encourage more women into science careers. Some of the mechanisms suggested were: provision of more scholarships, and information on vacancies, grants etc., flexible policies to enable combining family responsibilities and profession, representation of women scientists at the policy level, and sensitisation to gender equity in science, at all levels of science professionals (Table 56).

Table 56. Factors to address to encourage more women into science (How can more women be encouraged into science careers?)

Factors to encourage women*	Scientists N=149	Per cent	Students N=147	Per cent
Preferential treatment for women during recruitment and promotion	13	8.8	2	1.4
More scholarships, information on vacancies, grants, etc. for women students	58	38.8	53	36.1
Representation of women scientists at policy level	33	22.1	14	9.5
Flexible policies in combining family and professional roles	40	26.8	48	32.7
Sensitisation to gender equity in science, for all levels of science professionals	28	18.8	20	13.6
Any other	1	0.7	6	4.1
No response	19	12.8	13	8.8

*Multiple response

It is noteworthy that only 8.8% scientists and 1.4% students sought preferential

treatment during recruitment and promotion. Thus what the women want are policies that would give them a level playing field and not preferential treatment. Almost one third scientists and students felt that women scientists' work could alter the theoretical contents of science (Table57).

Table 57. Women scientists' work could alter the theoretical contents of science (Do you think women scientists' work could alter current theoretical contents of science?)

Alter theoretical contents	Scientist	Percent	Student	Per cent
Yes	50	33.6	34	23.1
No	42	28.2	23	15.6
Don't know	16	10.7	46	31.3
Unsure	20	13.4	30	20.4
No response	21	14.1	14	9.5
Total	149	100.0	147	100.0

Recommendations Based on Responses

Since the (SNDT) study, is an enquiry into issues of access and retention in science careers, and has addressed numerous issues covering both students and scientists at various levels, such as colleges, university departments, scientific institutions, the recommendations have been broadly categorised into the following three areas:

1. **Science Education**: The essence of science education is to inculcate an attitude of enquiry and a scientific temper, hence attention has to be given to aspects within the education system such as:

1.1 Provision of quality school facilities, required number of teachers, facilities such laboratories, equipment, libraries, etc. along with ensuring access and entry,

1.2 Emphasis on learning by doing, with stress on internalisation of knowledge rather than methods of learning by rote and reproduction in exams. There should be the practice of learning science through simple experiments such as by doing and observation,

1.3 Frequent training courses for teachers so that their capabilities are upgraded and they become role models for students

2. **Higher education**: At the higher level of education and scientific practice, which is the focus of this study, the following measures should be implemented to ensure women's entry and retention at the tertiary level:

2.1 Educational support such as special scholarships for girls, information dissemination at school and college level, mentoring by women scientists, etc. to bring

more women into science. It is important to mention here a relevant clause from the Government of Maharashtra's (Dept of WCD) *Women's Policy, 2001.**

2.2 Opportunities for women to network with other women in the institution. Need more women to be mentors and role models for younger scientists and students to build a strong interest in their work and self-confidence that will take them beyond the marriage trap into a long-term relationship with science.

2.3 All faculty and staff to be oriented to gender issues and to be informed and sensitised to women's social position, which reflects on their location in science. This gender sensitisation should also extend to increase the impact of women's studies and science on family and society.'

2.4 In all educational institutions and campuses there has to be a women's cell to counter sexual harassment/ other problems specific to women

2.5 Women students and staff have to be provided facilities to support their double and triple burden in their day-to-day work – crèche, day care for dependents, etc.

3. Across institutions of science: To ensure greater linkages between institutions of higher education and institutions of science research, and for better access to funding for labs, encouragement for teachers, and collaboration between institutions, these are some of the critical issues to be addressed across institutions:

3.1 At the level of faculty recruitment and student intake there should be provisions to reduce discrimination when woman are being recruited. These include subtle discrimination by supervisors against women students, discrimination based on girls' vulnerability to succumb to social and familial pressures for marriage, etc.

3.2 There should be systemic mechanisms to ensure that women are able to be in the career path, even when they have to take breaks to have children, and when they end up publishing less, etc., which is an obstacle in career advancement.

3.3 In the evaluation (especially via informal methods) in career progress, women are frequently not considered, especially for fellowships, national awards, and international grants, because of highly male-dominated scientific hierarchy. This should be rectified.

3.4 There should be greater attempt to bring more women into policymaking and decision-making bodies, committees, and positions. This will increase the sensitivity and support that women will get in recruitment and career advancement.

3.5 Organisational practices – to build safe spaces/ atmosphere for women students and faculty/ scientists

3.6 Gender sensitisation sessions for all faculty and staff to make them informed and sensitive to women's social position, which reflects on their location in science. This gender sensitisation should also extend to increase the impact of women's studies and science on family and society.

3.7 Mandatory women's cell to counter sexual harassment/ other problems specific to women

3.8 Facilities specifically to help women in their day-to-day work – crèche, day care for dependents, etc.

3.9 Flexitime, mid-career breaks, relaxation in age limit for intake, and in submission of proposals needs to be incorporated. Need for systemic changes supportive of women to ensure that there is no discrimination when women have had a break in career to fulfil her family obligations, even if she is capable and willing to work, and competent, possessing the necessary requirements, such as publications, etc. The sensitivity that scientists also live in society should permeate all levels of science.

* Note: *Women's Policy, DWCD, Government of Maharashtra* – Clause (7) in the section on Education says "Considering importance of higher and technical education for economic development and empowerment of women, Government of Maharashtra has reserved 30 per cent of seats in all courses of higher and technical education vide G.R. dated 17.4.2000. This shall open avenues for girls in services in public and private sectors. 2000 institutions in the State for higher and technical education shall actively promote women's empowerment. Projects for the same shall be taken up under National Service Scheme. Vocational education being important for economic development of women, its promotion shall be a priority concern. Existing courses and curriculum shall be reviewed to ensure benefits to women from all strata of society (pp. 6-7)."

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