

# WOMEN IN SCIENCE, POLICY AND SOCIETY

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## Abstract

This paper shows the sign of the prevailing stereotype thinking of the society in deciding the career of women in India. On the other hand it will also highlight some famous examples across the world where women have broken the bars and set out the examples for girl child. This paper will also reflect the idea that why and how we need more participation of women in science, policy and society.

**Keywords:** Stereotype, Science, Policy, Society, Researchers, STEM.

## INTRODUCTION

### Connection between Science and Society:

Science and Society, both are interrelated, one without the other will lose its significance. We can understand their connection like that of tea and sugar. Scientific ideas should be developed for the upbringing and maintaining the social growth. Unhealthy use of Science is just like spoiled tea for the society. Major sectors of our society that have positive impact of science and technology are physical sciences, information and technology, energy and fuel sectors.

### Connection between Science and Policy:

In simple words 'Policy' is like a connecting bridge between science and society. Without policies the developed technologies can not give the correct benefits to the society. For the implementation of the scientific ideas for our social and technical growth we need effective policies.

### Connection between Policy and Society:

We all are familiar with this connection because policies are made for the societies and social growth of a country is one of the indicators of effective policies.

If we start thinking about the names of women in field of science and technology and policy making, one may name two or three women hardly. Let's have a look some of the unbeatable women across the world, who have changed our lives with their ideas. First we have some examples from science and research fields

1. **Marie Curie:** She was the first women scientist to win the Nobel Prize in Physics in 1903 and the first to win it again for



her work in chemistry in 1911.

2. **Caroline Herschel:** She was a brilliant German Astronomer. She was the first women to discover a comet, she discovered



total eight. Also she was the first British women to get paid for her work.

3. **Dr. Anandi Bai Joshee:** She was the first Indian women doctor qualified to practice the western medicine. The death of



her new born son due to inadequate medical care, inspired her to become a physician.

4. **Fabiola Gianotti:** She was one of the driving forces behind the discovery of Higgs Boson at CERN in July 2012.  
 5. **Ada Yonath:** She was awarded the Nobel Prize in Chemistry for the discovery of atomic structure of ribosomes.  
 6. **Maryam Mirzakhani:** She is the first women to win the field medal, the highest honour a mathematician can receive.  
 7. **Dr. Indira Hinduja:** She delivered India's first test tube baby. She has pioneered the Gameta Infra Fallopian Transfer leading to the birth of India's first GIFT child.

And many more....

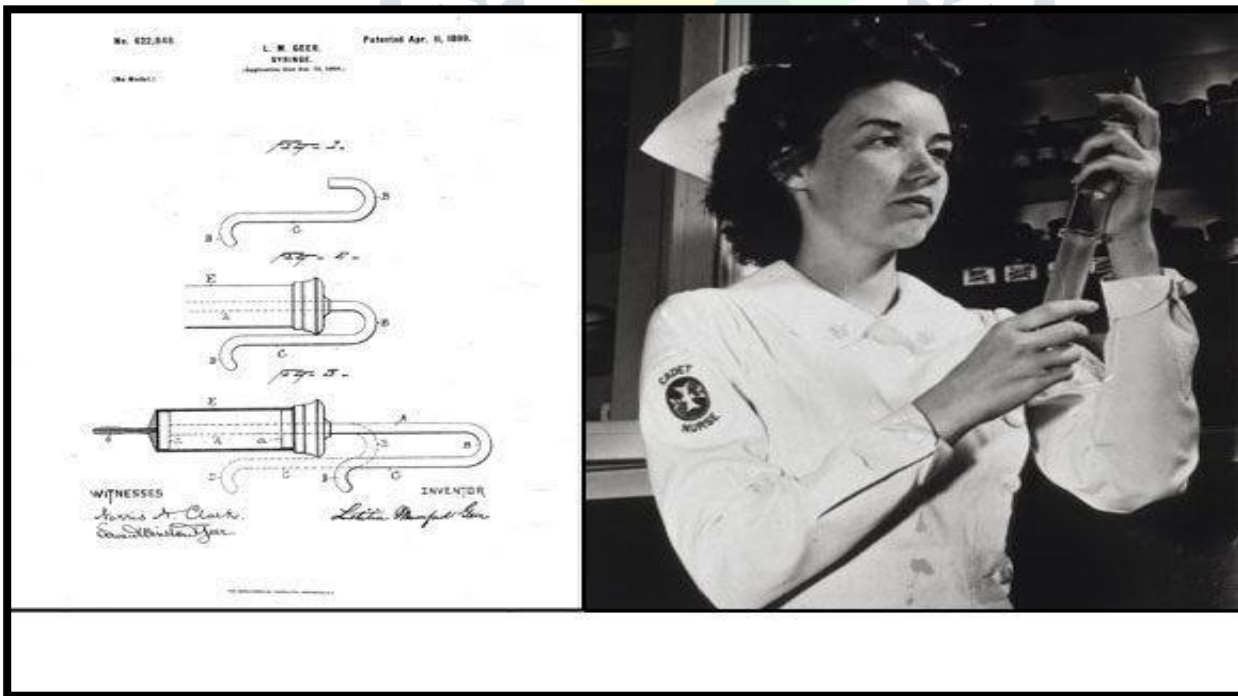
**Now see some of the famous ideas developed by women**

1. **Car Heater:** The first car heater which directed air from over the engine to warm the chilly toes of the motorists in 19<sup>th</sup>



century was discovered by Margaret A. Wilcox.

2. **Residential solar heater:** It was developed by Dr. Maria Telkes in 1947.  
 3. **Medical syringe:** Letitia Geer developed the medical syringe in 1899 that can be operated with one hand only.



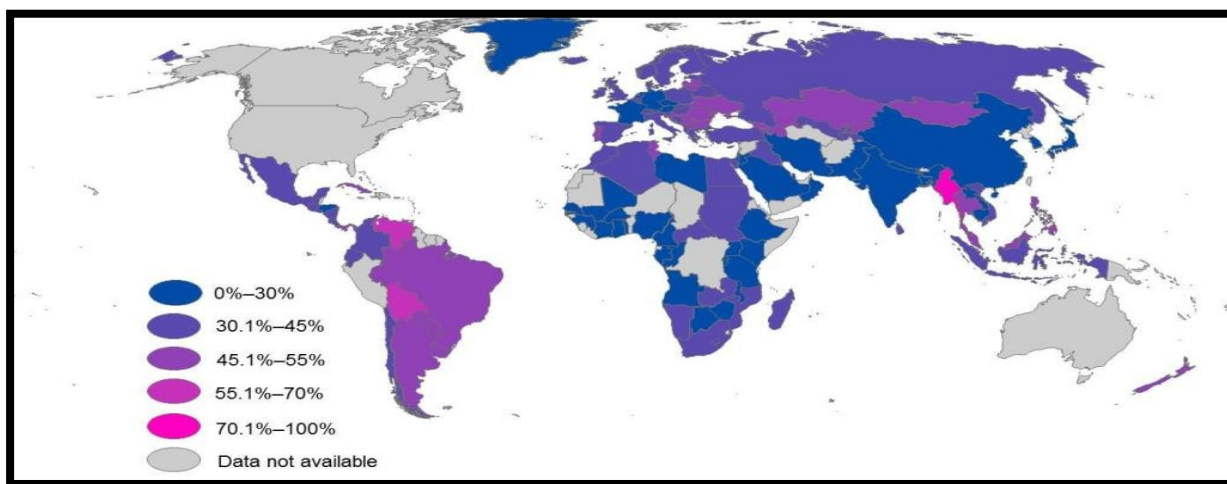
4. **CCTV:** CCTV was first patented by Marie Van Brittan in 1969 which forms the basis for modern CCTV system.  
 5. **COBOL:** Well known computer language was developed by Dr. Grace Murray Hopper. Also she was rear admiral in the US Navy.

These are some of the inspiring examples for those who think that women can work under the defined limits only. Now we see some facts and figures about present situation of women in various streams.

## PRESENT SCENARIO

Comparatively to last decades, there is remarkable participation of women in the fields of decision making, science and society. But still in comparison to male percentage, females are not exploring these fields as much as they should. As discussed above all three – policy, science and society are related to each other. In India government has taken many steps to full fill this gap, some of which are discussed below. But still the condition of women is needed to be improved from the basic primary education to the field of research.

1. First data we are discussing here is from UNESCO which gives the women share of total researcher across the world [1]. The image given below clearly describes only very little portion of the world having the percentage of women researcher above 70. India and many neighbouring countries are at the bottom of the list.



2. If we go through the facts about the women in field of science and technology in India, data is not up to the mark. Percentage of women scientists in different Indian organisation discussed here [2]. Not even a single organisation discussed below has women scientists above 30%.

**TABLE 2.1: Women Scientists Percentage in Different Organisation in India**

Organization	2004		2008	
	Total scientists	Women(%)	Total scientists	Women(%)
CSIR	5,030	13.0	4,556	16.05
DST	-	-	659	20.8
DAE	436(TIFR)	16.5	4,173(BARC)	15.0
DBT	179	31.8	208	27.4
ICMR	615	27.3	561	29.0
DRDO	-	-	6,890	14.0
DOD	127	8.7	-	-
ICAR	2,000	8.5	2,378	14.3

3. India is a developing country, to reach the goal of developed nation one should analyse all the facts and reasons behind it. Unfortunately the biggest problem “gender gap” is still visible in various fields, indicated by the data from Ministry of Statistics and Programme Implementation, Govt. of India [3]. Table 3.1 represents the literacy rate in India after independence in rural, urban and combined in percentage. Table 3.2 is showing the gender gap in getting enrolled at various stages of education from 2005 to 2016. Table 3.3 shows the pass out percentage of females in different courses

**TABLE 3.1: Trends in Literacy Rates in Post Independent India**

Year	Rural			Urban			Combined		
	Female	Male	Total	Female	Male	Total	Female	Male	Total
1951	4.87	19.02	12.10	22.33	45.60	34.59	8.86	27.15	18.32
1961	10.10	34.30	22.50	40.50	66.00	54.40	15.35	40.40	28.31
1971	15.50	48.60	27.90	48.80	69.80	60.20	21.97	45.96	34.45
1981	21.70	49.60	36.00	56.30	76.70	67.20	29.76	56.38	43.57
1991	30.17	56.96	36.00	64.05	81.09	67.20	39.29	64.13	52.21
2001	46.70	71.40	59.40	73.20	86.70	80.30	53.67	75.26	64.83
2011	57.93	77.15	66.77	79.11	88.76	84.11	64.63	80.88	72.98
% Increase in 2011	24%	8%	12%	8%	2%	5%	20%	7%	13%

**TABLE 3.2: Number of Females per 100 Males Enrolled in different stages of Education**

Year	Primary Classes I-V	Upper Primary Classes VI-VIII	Secondary Classes IX-X	Senior Secondary Classes XI-XII	Higher Education
2005-06	87	81	73	72	62
2006-07	88	82	73	74	62
2007-08	91	84	77	76	63
2008-09	92	86	79	77	65
2009-10	92	88	82	80	67
2010-11	92	89	82	79	78
2011-12	93	90	84	81	80
2012-13*	94	95	89	87	81
2013-14*	93	95	89	89	85
2014-15*	93	95	91	90	85
2015-16	93	95	91	90	86

\*Figures related to School Education are provisional

Source: Educational Statistics at a Glance 2016, School Education in India 2015-16: Flash Statistics, U-DISE

**TABLE 3.3: Examination Result: level wise pass outs in higher education**

Level	2014-15			2015-16		
	Male	Female	% Female among	Male	Female	% Female among
Certificate	39391	36574	48%	37321	41467	53%
Diploma	470765	276887	37%	500999	287323	36%
Integrated	12680	9593	43%	12477	10127	45%
M. Phil	9678	13519	58%	8701	14423	62%
PG Diploma	115065	107445	48%	95013	80340	46%
Ph.D.	13252	8578	39%	14887	9284	38%
Post Graduate	693697	726514	51%	665846	739150	53%
Under Graduate	3086332	3208575	51%	3128466	3203533	51%
<b>Total</b>	<b>4440860</b>	<b>4387685</b>	<b>50%</b>	<b>4463710</b>	<b>4385647</b>	<b>50%</b>

4. Let's see the participation of women in decision making in India. We have table 4.1 from the Ministry of Statistics, Government of India [4]. This stream is also deprived of women leaders. It is seen that there are ups and downs in the women percentage year wise.

**TABLE 4.1: Women leaders in Government of India**

Year	Number of Ministers			Number of Women Ministers			% Women in Central Council of Ministers
	Cabinet Minister	Minister of State	Deputy Minister	Cabinet Minister	Minister of State	Deputy Minister	
1985	15	25	0	1	3	0	10.0%
1990	17	17	5	0	1	1	5.1%
1995	12	37	3	1	4	1	11.5%
1996	18	21	0	0	1	0	2.6%
1997	20	24	0	0	5	0	11.4%
1998	21	21	0	1	3	0	9.5%
2002	32	41	0	2	6	0	11.0%
2004	29	39	0	1	6	0	10.3%
2003	30	48	0	1	5	0	7.7%
2009	40	38	0	3	4	0	9.0%
2011	32	44	0	2	6	0	10.5%
2012	31	43	0	2	6	0	10.8%

2013	31	47	0	3	9	0	15.4%
2014	23	22	0	6	1	0	15.6%
2015	23	22	0	6	2	0	17.8%
2016	26	49	0	5	4	0	12.0%
2017	27	48	0	6	3	0	12.0%

Source: Lok Sabha Secretariat, New Delhi.

\*Including Ministers of State with independent charge

## EFFECTIVE GOVERNMENT POLICY

Department of science and technology (DST) of India has launched “DISHA” programme in 2002 for women in science streams to address the issues regarding the break in their career and efforts are made for their re-entry in R&D. In 2014, restructured the programme as “KIRAN”, Knowledge involvement in Research Advancement through Nurturing, aimed at increasing the participation of women in different fields of science, industries and management [5].

With such programs we can provide our female students with a strong platform to complete their researches and develop more scientific ideas.

Also the India's central and state governments has special reserved seats in educational, research and political streams for women candidates. But they remain vacant most of the time. Society and government should come together to bring our women academicians, researchers, scientists and policy makers forward. Some of the ideas are given in upcoming section.

## CONCLUSION

All the figures and facts given above clearly show that on an average women's participation in various fields of science, policy and society does not match the equilibrium on both international level as well as national level. Here we broadly discussed the scenario of India, which is somewhere due to the gender inequality, lack of decision making power in women's hand and unawareness about the worldwide examples of women in politics, research and STEM.

Some of the ideas are discussed below to cure this gender problem in our country and to encourage the girl child toward technical and experimental fields:

1. First step should be taken to remove the stereotype thinking of Indian society that women are bound to domestic life only, by starting some inspiring programs, videos on social networking sites and advertisements on national channels and newspapers.
2. Our social culture should be modified to extend the professional opportunities for the girl students.
3. Our education system should develop some programmes to develop the curiosity and sense of research from the primary education.
4. Government should have well structured programme for all age groups with various streams along with financial and residential help.
5. More women-award categories should be formulated to encourage women participants.

## RESULTS

This paper may be helpful for providing information about women participation in various fields, steps we can take for their social and professional betterment. Also this may cause an increase in percentage of women researchers, they may hold more positions in decision making and their ideas may get a direction of implementation by proper policies for the growth of our society.

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