Role of Women in Indian Space Research Organisation

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Abstract

Past 3 decades onwards the role of women in various fields are slightly increasing especially in business, education, corporate field etc. But we do not know in some other fields also women are shining at present, especially in space research. India has built and launched many satellites into space and explored the Moon, Mars and the stars through its Chandrayaan-1, Mars Orbiter Mission (MOM) and ASTROSAT respectively. Behind these missions is a strong team of scientists and engineers, including a team of trailblazing women. Now a day the contribution of women in ISRO'S victory is remarkably increasing. In this article we are going to analyse the role of women employees in Indian Space Research Organisation.

Introduction

Past three decades onwards the role of women in various fields are slightly increasing especially in business, education, corporate field etc. But we do not know in some other fields also women are shining at present, especially in space research and defence research. India has built and launched many satellites into space and explored the Moon, Mars and the stars through its Chandrayaan-1, Mars Orbiter Mission (MOM) and ASTROSAT respectively. Recently ISRO's achievement of launching 104 satellites but behind these missions is a strong team of scientists and engineers, including a team of trailblazing women. Now a day the contribution of women in ISRO's victory is remarkably increasing.

Working in scientific research has not been easy for women, because of long hours, societal biases, and the need to get married and have children in between. Their role is also being recognized and steps are being taken to promote women scientists and engineers. In this article we are going to see about women doing various works in various centre of ISRO like Scientist, Engineer, Director, Deputy Director, Operator, technical staff, and administrative staff etc. Physically challenged and visually impaired men and women are also working in ISRO.

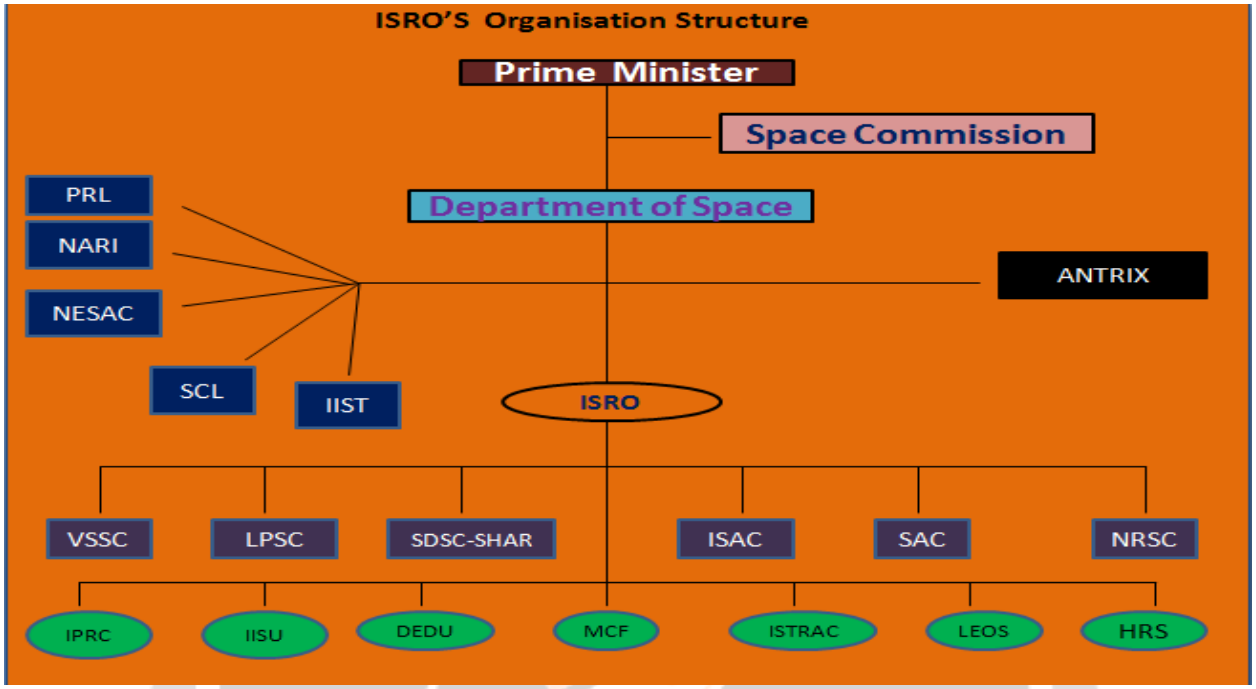
Brief history of ISRO

ISRO was established in the year 1969 to focus the talent of Indian researchers into advancing the space program. There were several fledgling projects that formed the base for setting up the ISRO like the INCOSPAR (Indian Committee for Space Research) guided by Prof Sarabhai and the Tata Institute of Fundamental research (TIFR) and the Rohini Sounding Rocket (RSR) program. The success of the fledgling projects laid the cornerstone and foundation for the formation of the ISRO in 1969.

Initially, there were trying times with the Indian government being unable to focus on solely on expanding the space project. The ISRO however did manage to get active support from the government when the Indian government started a Space Commission and handed over the running of the entire space program to the Department of Space (DoS) in 1972. ISRO came under the DoS management on 1st June 1972. It is the primary research and development body of the DoS.

ISRO develops and delivers application specific satellite products and tools to the Nation: broadcasts, communications, weather forecasts, disaster management tools, Geographic Information Systems, cartography, navigation, telemedicine, dedicated distance education satellites being some of them. Further readiness is the key to maintaining an edge in technology and ISRO endeavors to optimize and enhance its technologies as the needs and

ambitions of the country evolve. Thus, ISRO is moving forward with the development of heavy lift launchers, human spaceflight projects, reusable launch vehicles, semi-cryogenic engines, single and two stages to orbit (SSTO and TSTO)vehicles, development and use of composite materials for space applications etc.,



Indian Space Research Organisation's various centers

1. Vikram Sarabhai Space Centre (VSSC), Thiruvananthapuram.
2. Liquid Propulsion Systems Centre (LPSC), Thiruvananthapuram.
3. Satish Dhawan Space Centre (SDSC-SHAR), Sriharikota.
4. ISRO Propulsion Complex (IPRC), Mahendragiri.
5. ISRO Satellite Centre (ISAC), Bangalore.
6. Space Applications Centre (SAC), Ahmedabad.
7. National Remote Sensing Centre (NRSC), Hyderabad.
8. ISRO Inertial Systems Unit (IISU), Thiruvananthapuram.
9. Development and Educational Communication Unit (DECU), Ahmedabad.
10. Master Control Facility (MCF), Hassan, Karnataka.
11. ISRO Telemetry, Tracking and Command Network (ISTRAC), Bangalore.
12. Laboratory for Electro-Optics Systems (LEOS), Bangalore.
13. Indian Institute of Remote Sensing (IIRS), Dehradun.
14. Antrix Corporation – The marketing arm of ISRO, Bangalore.
15. Physical Research Laboratory (PRL), Ahmedabad.
16. National Atmospheric Research Laboratory (NARL), Gadanki, Andhra Pradesh.
17. North-Eastern Space Applications Centre (NE-SAC), Umiam.
18. Semi-Conductor Laboratory (SCL), Mohali.
19. Indian Institute of Space Science and Technology (IIST), Thiruvananthapuram, (India's space university)

Women employees in ISRO

There aren't more women at ISRO and other research Institutes. In 1982, there were only a few women and even fewer in ISRO's engineering department. Everyone knew them. But, today, 20 per cent of ISRO's over 16,000 employees are women. We have more than 20 per cent women in the technical arena at ISRO. But this gap is primarily because there was lesser number of women who joined the field in the 90s. As Quartz reported, 20 percent of ISRO's employees are women but only 10 percent are engineers, but it's a good situation lower than the 20 percent of NASA engineers who are female.

Women Employees in DOS/ISRO (2014-2015)						
S.NO	**Centre /Unit**	**Total number of Employees**	**Number of Women Employees**			
			Scientific & Technical Staff	**Administrative Staff**	**Total number of women employees**	**percentage**
1	DOS/ISRO HQ	423	25	114	139	10.38
2	VSSC	4489	524	475	999	22.25
3	ISAC	2456	490	148	638	25.97
4	SDSC-SHAR	1961	123	141	264	13.46
5	SAC&DECU	1798	217	100	317	17.63
6	LPSC	1167	78	102	180	15.42
7	NRSC	865	132	59	191	22.08
8	ISTRAC	460	73	42	115	25
9	MCF	324	24	12	36	11.11
10	ADRIN	166	30	10	40	24.09
11	IIRS	123	19	10	29	23.57
12	PRL	209	9	19	28	13.39
13	SCL	545	25	16	41	7.52
14	NARL	65	4	7	11	16.92
15	NESAC	32	7	2	9	28.12
16	IIST	92	20	6	26	28.26
17	IPRC	634	48	42	90	14.19
TOTAL		**15809**	**1848**	**1305**	**3153**	**19.94**

Source: Mars Orbiter Mission, ISRO, Annual report 2014-2015

Women Employees in DOS/ISRO (2015-2016)						
S.NO	**Centre /Unit**	**Total Number of Employees**	**Number of Women Employees**			
			Scientific & Technical Staff	**Administrative Staff**	**Total number of women employees**	**percentage**
1	DOS/ISRO HQ	419	24	116	140	33.41
2	VSSC	4443	519	467	986	22.19
3	ISAC	2377	489	145	634	26.67
4	SDSC-SHAR	1958	128	132	260	13.27
5	SAC&DECU	1798	189	58	247	13.73
6	LPSC	1187	77	99	176	14.82
7	NRSC	857	134	59	193	22.52
8	ISTRAC	447	73	40	113	25.27
9	MCF	312	26	11	37	11.85
10	ADRIN	166	29	10	39	23.49
11	IIRS	89	17	5	22	24.71

12	PRL	209	9	18	27	12.91
13	SCL	567	29	16	45	7.93
14	NARL	64	5	7	12	18.75
15	NESAC	32	7	2	9	28.12
16	IIST	92	18	6	24	26.08
17	IPRC	639	47	41	88	13.77
TOTAL		**15656**	**1820**	**1232**	**3052**	**19.49**

Source: Mars Orbiter Mission, ISRO, Annual report 2015-2016

Women Employees in DOS/ISRO (2016-2017)						
S.NO	**Centre /Unit**	**Total number of Employees**	**Number of Women Employees**			
			Scientific & Technical Staff	**Administrative Staff**	**Total number of women employees**	**percentage**
1	DOS/ISRO HQ	406	23	115	138	33.99
2	VSSC	4494	517	463	980	21.80
3	ISAC	2439	515	140	655	26.85
4	SDSC-SHAR	2002	125	133	258	12.88
5	SAC&DECU	1791	226	88	314	17.53
6	LPSC	1213	78	107	185	15.25
7	NRSC	853	143	60	203	23.79
8	ISTRAC	433	72	36	108	24.94
9	MCF	331	30	11	41	12.38
10	ADRIN	169	29	11	40	23.66
11	IIRS	118	18	8	26	22.03
12	PRL	221	10	18	28	12.66
13	SCL	585	35	16	51	8.71
14	NARL	64	5	8	13	20.31
15	NESAC	32	7	2	9	28.12
16	IIST	92	18	6	24	26.08
17	IPRC	638	39	40	79	12.38
TOTAL		**15881**	**1890**	**1262**	**3152**	**19.84**

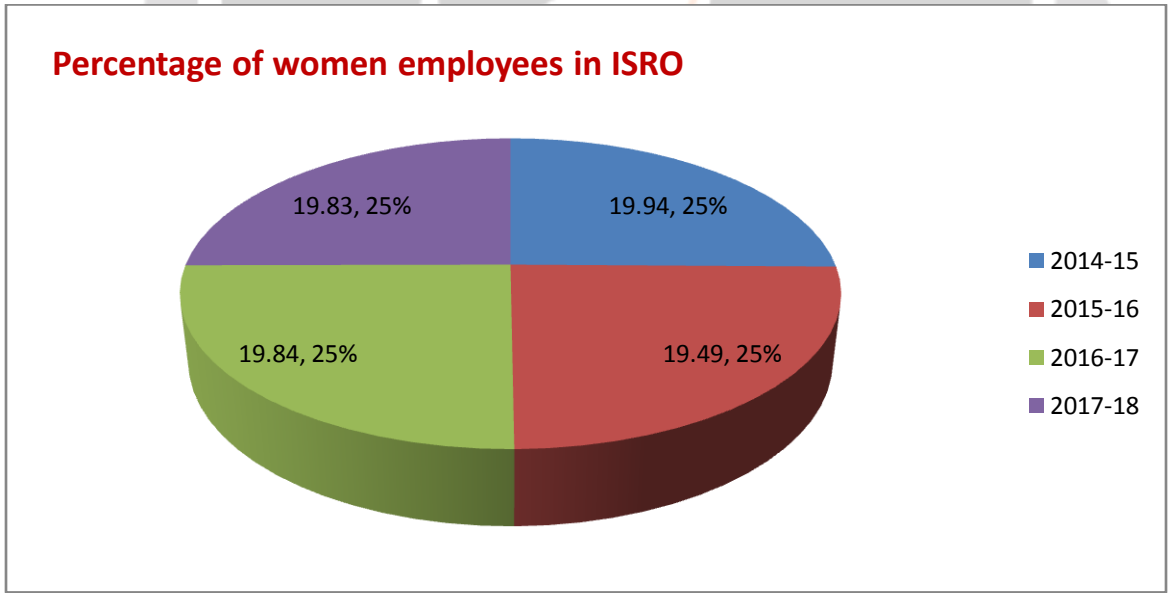
Source: Mars Orbiter Mission, ISRO, Annual report 2016-2017

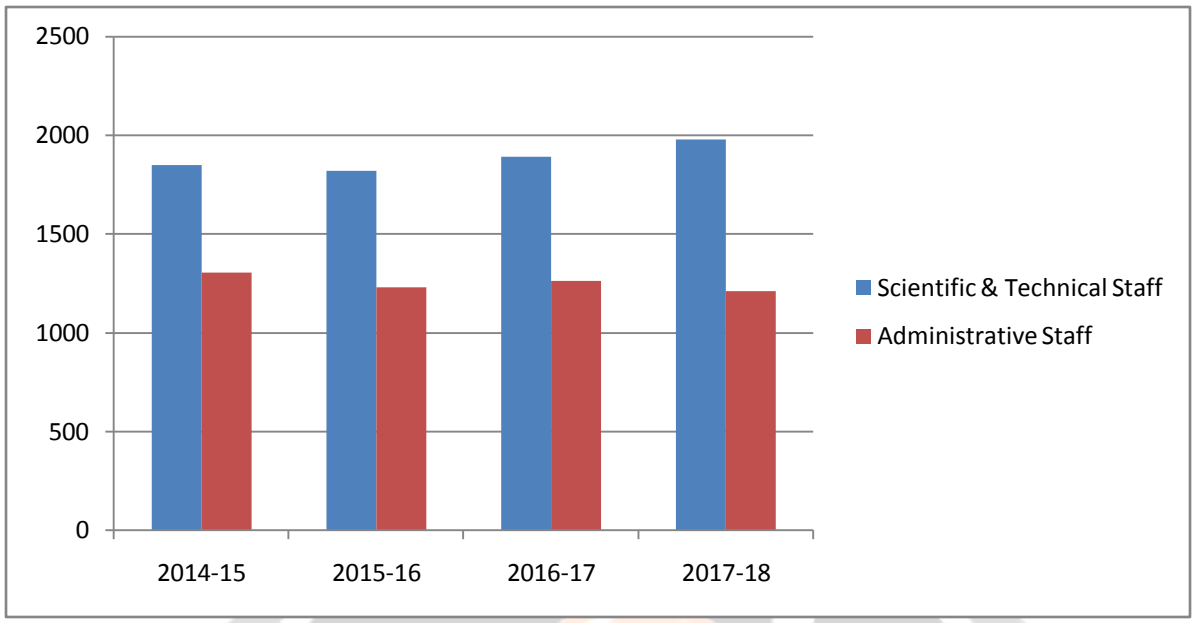
Women Employees in DOS/ISRO (2017-2018)						
S.NO	**Centre /Unit**	**Total number of Employees**	**Number of Women Employees**			
			Scientific & Technical Staff	**Administrative Staff**	**Total number of women employees**	**percentage**
1	DOS/ISRO HQ	393	26	109	135	34.35
2	VSSC	4467	520	443	963	21.55
3	ISAC	2538	544	129	673	26.51
4	SDSC-SHAR	1971	127	129	256	12.98

5	SAC&DECU	1977	260	82	342	17.29
6	LPSC	1211	80	108	188	15.52
7	NRSC	834	146	56	212	25.41
8	ISTRAC	434	70	35	105	24.19
9	MCF	318	32	11	43	13.52
10	ADRIN	162	29	10	39	24.07
11	IIRS	113	17	8	25	22.12
12	PRL	233	19	18	37	15.87
13	SCL	585	35	16	51	8.71
14	NARL	63	5	7	12	19.04
15	NESAC	40	8	4	12	30
16	IIST	97	18	6	24	24.74
17	IPRC	636	42	39	81	12.73
TOTAL		**16072**	**1978**	**1210**	**3188**	**19.83**

Source: ISRO, Annual report 2017-2018

From these four tables we can understand that compared to 2014-15, the total number of employees was reduced in the year 2015-16, not only that, the number of women employees were also reduced both in scientific & technical and administrative sections. Where as in the year 2016-17 the number of women employees were slightly increased in scientific& technical and also in administrative section. Total number of employees was also increased in the year 2016-17. In the year 2017-18,168 Scientific and technical women staff members were recruited by ISRO.





Women employees in ISRO

Years

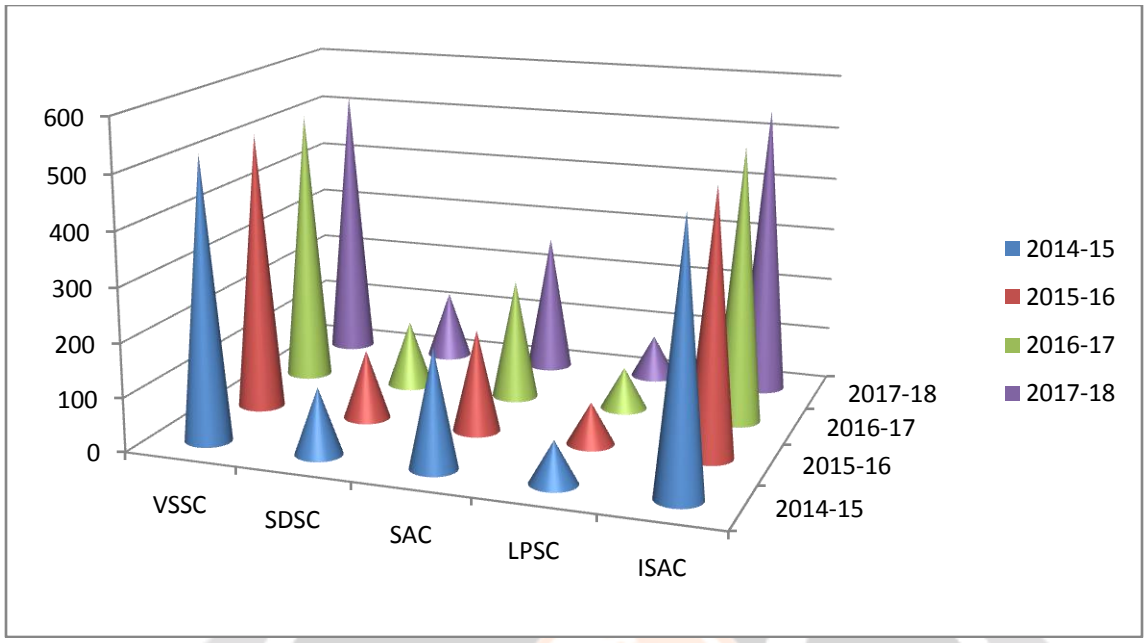
X- Axis is years and Y –axis is number of women employees. Indicates the number of scientific and technical women staff and indicates number of administrative women staff worked in the year 2014-15, 2015-16 and 2016-17.The women employees contribution was slightly reduced in 2015-16 but again it increased in 2016-17 and 2017-18.This change is showing us definitely in future the contribution of women employees will increase in this field.

Scientific & Technical Staff (women) at ISRO'S biggest 5 centre

Name of the Centre	**2014-15**	**2015-16**	**2016-17**	**2017-18**
Vikram Sarabhai Space Centre	524	519	517	520
Sathish Dhawan Space Centre	123	128	125	127
Space Applications Centre	217	189	226	260
Liquid Propulsion Systems Centre	78	77	78	80
ISRO Satellite Centre	490	489	515	544
Total	**1432**	**1402**	**1461**	**1531**

Sources: Mars Orbiter Mission, ISRO, Annual report 2014-15, 2015-16& 2016-2017, 2017-18

Compare to 2014-15 in the year 2015-16 the women scientific and technical staff at ISRO's five biggest centre are 2.09% reduced. But in the year 2016-17 it increased 4.04%.



Indicates the number of women scientific and technical staff in ISRO's top five biggest centre at 2014-15 indicates the number of women scientific and technical staff in ISRO's top five biggest centre at 2015-16. Indicates the number of women scientific and technical staff in ISRO's top five biggest centre at 2016-17. Indicates the number of women scientific and technical staff in ISRO's top five biggest centre at 2017-18.

Out of 5 biggest centers in VSSC and ISAC women share is more level. In LPSC centre and SDSC centre women scientific and technical staff s are low level. I hope in future the number of women employees will increase in this centre also.

Top women in ISRO

Many women scientists achieved their goals and supporting to ISRO because of their sacrifice, hard work, and dedication**.** Some of the famous women scientist in ISRO is RituKaridhal, Mrs.MinalSampath, Anuradha T.K., Seetha S, MinalRohit, B Codanayaguy, N.Valarmathi, Lalithambika V.R, Moumita Dutta, Nandini Harinath and Kriti Faujdar . They received so many awards and their contribution is more in the history of Indian Space Research Organisation.

Conclusion:

Social role prevailing mindsets a woman is primarily still seen as a home maker. Women's employment is increasingly accepted in society; but there is lasting expectation that they should primarily the household/domestic duties particularly, the care of children. Women are giving importance to their family; simultaneously they should give importance to their personal development also. Because compare to man the woman have more will power and self-confidence, not only that due to education at present they have more awareness about various fields. Tolerance, Patience, Sacrifice, hard work, dedication and sincerity for all we can substitute only one word, that is "Woman". We hope in future, women will occupy more important place in Indian space research organization.

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