

Women in Science and Technology : The Path to an Empowered India

Abstract

Science and Technology (S&T) is the key to the development of any nation, as it improves the well-being of the population. Equal opportunities for men & women are essential of economic development of a country. Inclusive development must involve women since poverty is particularly acute for women living in rural households. There is a need to empower these poor women through science and technology (S&T). Socio-economics empowerment of women through S&T would ultimately lead to empowering the nation.

Keywords: Science and Technology (S&T), Women's Empowerment.

Introduction

In the modern age of Science and Technology (S & T), the educated and empowered women in both rural and urban areas are playing an important role towards the development of the country. The participation and recognition of women in science and technology has changed progressively during the past years. Several women scientists are working in different fields of science and technology, making their significant contribution towards the empowerment of India. Science and technology hold immense potential for economic growth and societal development. Now a days women are actively participating in scientific and technological researches. Women have overcome the traditional mind sets and have excelled in professions like teaching, medicine and pure sciences. Women have made important contributions in all walks of life working as doctors, surgeons, scientists, professors, lawyers etc; making the family decisions which has resulted the economic growth of the families with improving the living standards.

Science and Technology (S & T) has been an integral part of Indian civilization and culture. Women are also active in science from inception of human civilization. One of the defining marks of humanity is the ability to affect and predict our environment. Science has played a major role to uplift the status and life style of human being. It has improved the living standard of rural and urban people in India, with homogeneous development of the country. Women and men have researched and solved the emerging need of our society. At a glance, women in general might look simple housewives, but they have also a razor sharp brain, and an uncanny ability to execute, to convert thought into action successfully.

Women have made contributions and sacrifices to science and technology since ancient days. Unfortunately, they have received little or no distinction for their work, because science was generally a male dominated field. The development of Indian society is not possible without empowerment of women. To achieve a sustainable development in any country, each member of the society has to be given equal opportunities, to unfold one's inner potential. The progress of any nation depends mainly upon its human resources, which indeed, is the key behind utilization of all other resources. Women constitute about fifty percent of the population of our country and are indeed, an integral part of our society. All round growth, development and empowerment of the nation with homogeneous growth of our society, would not be possible unless women are brought into the main stream of national development.

Women have the obligation to see that S&T are used in beneficial rather than in destructive ways. This is a key point, in which science and technology should be institutionalized. Women may be more interested in ethics than are men. Women becoming more involved in S&T could mean that science and technology is used more often for constructive purposes than for destructive purposes.

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The development of Indian society is not possible without empowerment of women. Traditionally, they have been given the role of educators in the family with great responsibility of raising human beings with values and attitudes that help them in their individual and social lives. From the first prime minister to present prime minister emphasized that science alone can solve the problems of hunger, poverty etc. and it is very important to the development of society and nation. Scientifically literate women can understand the socio-scientific issues (SSI) and can make better decisions leading to the socio-cultural and economic development of the country.

India is one of the world's fastest growing economies, with women mainly from the middle class increasingly entering the workforce. Urban centres like Delhi and Bangalore have seen an influx of young women from semi-urban and rural parts of the country, living alone and redefining themselves. With successful utilization and application of science and technology, women entrepreneurs have become a major part of economic market of India. They are successfully engaged in gainful employment and contributing to the household and national economy. In rural India women's economic opportunities remain restricted by social, cultural, and religious barriers.

Women in S & T

"You can tell the condition of a nation by looking at the status of its women" –Pt. Jawaharlal Nehru.

Nehru was very much interested for upliftment of status of women in India, for the socio-economic development of the country. In India, the rapid expansion of S&T has taken place in post-independence era. This growth can be largely attributed to the Nehruvian vision that infused development planning in the country since the 1950s. The great importance was given to S&T for the growth of national economy after independence with Jawaharlal Nehru, the first Prime Minister of India, as the greatest propagator of science. It was under his leadership that the initial Five-Year Plans of the country provided a road map to circumvent the constraints imposed by tradition-bound Indian society. Initial Five-Year Plans did not recognize women as important actors in the development process of the country, but as subject of welfare. However, by the 1970s, with growing awareness, there was emergence of gender as an important social category, and its important needs to be taken into account in development planning. The Women's Decade in India began in 1975 with an official report of the Committee on the status of Women in India. The report of the Committee (1974), better known as Towards Equality Report, for the first time set clear guidelines on the aim of female education. There was also a shift in the approach from 'Welfare' to 'Development' of women with inclusion of Women and Development as a separate chapter in Sixth Five-Year Plan (1980-1985). Though the Fifth and Sixth Five-Year Plans talked of women's education, they did not stress the need for any planned programmes to ensure women's participation in S&T.

The National Policy for Empowerment of Women, 2001, adopted in the Ninth Five-Year Plan stated that the 'Application of Science and Technology is vital for advancement of women'. Concerns for women in science started to be addressed directly during the Tenth Five-Year Plan with the Indian National Science Academy (INSA) in 2004 constituting a Committee to examine issues related in science and suggest corrective measures on how best to encourage girls to take up science and provide opportunities to working women scientists. The Government of India (GOI) also constituted a Task Force for Women in 2005 recommended by the Prime Minister of India under the Department of Science and Technology (DST), Ministry of Science and Technology, Government of India. The National Task Force for women in science recommended steps to Government to ensure that the interests of women scientists are protected, and encouraged women to take up scientific careers. Since its constitution, The Task Force had meetings at Delhi in 2006. In the brain-storming meetings women scientists, college teachers, and P G students expressed their views. The recommendations of the Task Force were sent to the Planning Commission Steering Committee on Science and Technology. Some important initiatives were included: A website and a directory of women scientists are being collected, and a questionnaire on steps pertaining to reduction of stress on women scientists was also made. Most of the initiatives emphasized the need for social and institutional support if women are to do science.

The Department of Science and Technology (DST), New Delhi, has been making pioneering efforts in initiating and implementing programmes based on appropriate inputs for the welfare of women. The scheme 'Science and Technology for Women' in 1981 was a pioneering gender initiative of DST being implemented since the Sixth Five-Year Plan to promote research, development, and adaptation of technologies to enhance the overall social status of the women and augment their incomes through S&T, especially in rural areas. They have also focused on women through All India Coordinated Programmes (AICP), women technology parks, scholarship schemes and by constitution of national awards for national development through application of S&T to women. These initiatives enabled women to get newer opportunities for income generation, reduce drudgery and improve health and environment.

In India, women constitute a distinct group of minority in Science and Technology. Many highly qualified women drop out of the workforce, thus constituting a considerable depletion of natural resources in Science and technology. "Women Scientist Fellowship Scheme" being implemented by the DST since 2003 is specially focused on women scientist who would like to contribute to nation building through lab to land transfer and technology adaptation. The "Women Scientist Scheme" has been launched by the Department of Science and Technology for providing opportunities to women scientists and technologists between the age group of 30-50 years who desires to return mainstream science and work as bench-level scientists. Several

women scientists are working in the field of S&T and for its application to societal development with enhanced opportunities for income generation.

The Science, Technology and Innovation Policy (STI), 2013, announced by Government of India, states that the 'benefit of Science, Technology and Innovation (STI) should focus on faster, sustainable and inclusive development of the people.' This emphasis on inclusive growth is very much in line with the objectives of the 12th Five –Year Plan (2012-17) in the country for achieving faster, sustainable and inclusive growth. Inclusive growth has to ensure opportunities for all sections of the population with women empowerment.

Achievements of Women in S&T

The participation and recognition of women in science and technology has changed progressively during the past years. Women have made important contributions in all walks of life and made inroads into new fields like engineering and information technology. Several women in India with requisite qualifications and opportunities in S&T, have become successful entrepreneurs leading women empowerment to a significant extent. The field of biotechnology has revolutionized the industrial growth of the world. Kiran Mazumdar Shaw, is one of the top successful women entrepreneurs in India. She heads India's leading bio-pharmaceutical enterprise, Biocon. Started in 1978, Biocon became the first Indian company to manufacture and export enzymes to USA and Europe. She was awarded PADMASHRI (1989) and PADMA BHUSHAN (2005), by President of India for her pioneering efforts in biotechnology. She has been named among TIME magazine's 100 Most Influential People in the world. She has also been featured in Fierce Biotech's List of 'World's 25 Most Influential People in Biopharma' and is recognized among Forbes '100 Most Powerful Women' globally. U.S. based Chemical Heritage Foundation conferred her with the '2014 Othmer Gold Medal' and Germany based Kiel Institute for the World Economy awarded her '2014 Global Economy Prize' for business.

In India, Dr Indira Hinduja produced first scientifically documented test tube baby. In 1986, India's first test tube baby Harsha was born. Female ovum is fertilized with male sperm in a test tube, with suitable environmental conditions, and observed under microscope for more than three days. The fertilized egg is then put back into mother's womb and hence called test tube baby. Dr. Indira Hinduja rejected opportunities to settle abroad so that she can serve our country.

Women are storming Information and Technology field, and the number of women in computing and internet industries has registered a sharp rise in modern age of globalization. The IT landscape is full of women who are busy writing programmes, running network systems and delivering applications to clients on time.

Kalpna Chawla from Haryana was qualified from various applicants to earn herself a place in space shuttle Columbia for a 16 day out of the world experience. The NASA chief called her a "Terrific Astronaut".

Women have also accepted the challenges of the oceans and have participated in expeditions dealing with ocean research. Dr Aditi Pant is the first Indian woman to participate in the cruise to the icy continent, Antarctica. The expedition was for a period of 4 months and the participants had to explore this continent under rough weather conditions.

Shahnaz Husain is the mother of all herbal cosmetics in the world. Her creams and lotions have found their way into salons in different parts of the globe. Madhuri Mathur, made the life of ladies in kitchen easier by bringing out the idea of a kitchen machine that would blend, chop and grind that culminated into sumeet mixer.

Dr Yamuna Krishnan, a professor at the Bangalore based fundamental research organization, the National Center for Biological Sciences (NCBS), has been awarded the prestigious Shanti Swarup Bhatnagar Award (2013), a science award by the Council of Scientific and Industrial Research (CSIR), Government of India, for fundamental and applied research. She was awarded for her work with the structure and dynamics of nucleic acid.

Several women scientists are working in different fields of S&T with outstanding achievements for the welfare of society and nation. Dr Paramjit Khurana, Department of Molecular Biology, Delhi University, is well known for her researches focused on plant genomics. The strains of wheat, rice and mulberry she has developed are drought resistant and have higher stress, heat and UV radiation capacity. Dr Mitali Mukerji, Institute of Genomics and Integrative Biology, Delhi, is known for her researches on human genomics. Her research on human genomics has implications on personalized medicine. The variations in genomes will lead to identification of triggers for disease and its management.

Conclusion

Science and Technology brings economic growth and well-being to people and it is not the empowerment of women through science and technology, but also the enrichment of science and technology through women's participation. The participation of women in S&T could mean that science and technology is used more often for constructive purposes than for destructive purposes, because generally they are more involved in ethics than are men. It is necessary to recognize that the participation of women in science and technology is no longer simply an issue of gender equality: it is also an issue that should be considered in national economic development. With science and technology at the heart of economic development, women's participation in science and technology is therefore an essential part of economic development strategies. In order to arrive at a greater involvement of women in economic development through their participation in science and technology, systematic and coherent policies are required such that gender issues are brought into the mainstream at all levels, including education, employment and governance.

S&T is the key to the growth of any nation, as it improves the well-being of the population. S&T has improved the lives of women with scientific outlook and logical thinking ability which would greatly

influence the mindset of the society. Science and technology may act as an important tool for entrepreneurship and empowerment of women in rural as well as urban areas, leading to socio-economic development of the country. Empowering women would ultimately lead to empowering the nation. Women empowered through science and technology in India, are really creating a path towards an empowered India.

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