

Research Article

Women Empowerment through Science and Technology

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Abstract

Women can be empowered only if they are given education and made aware of their rights and hence they themselves prioritise their lives. Violence has to be completely eradicated from her life, then and only then can the dream of empowerment becomes a reality. Women have to be given due respect in a society to have actual empowerment. Women have always been suppressed, underestimated and valued less in the society and also within her family. Although efforts have been taken to improve the status of women, the constitutional dream of gender equality is miles away from becoming a reality. Even today, 'the mainstream remains very much a malestream'. The dominant tendency has always been to confine women and women's issues in the private domain. Women empowerment refers to increasing the spiritual, political, social or economic strength of women. It often involves the empowered developing confidence in their own capacities. An important factor in achieving these reforms will be a greater presence of women in decision-making bodies, be they scientific or political. The voice of women in governance is required to create the political will essential to bring about changes that will benefit all of society.

Keywords: Salary bias, Violence, Laws and Regulations, Work and Family.

Introduction

Women in general do not have a strong presence in science and technology. This is attributed to two broad issues: first, women's perception of their role and function in society, and second, society's expectation of their contribution. Women's involvement in science and technology encounters bias in regard to disciplines and academic or professional level of responsibility. Women are divided between two spheres: the management of the home and family, and the fulfilment of job responsibilities. Family commitments, either as the women's choice or as a result of cultural enforcement, have impaired women's capacity to meet their potential, and put them at a disadvantage in many science and technology-related jobs that are dynamic and competitive in nature.

The reality of women's lives remains invisible to men and women alike and this invisibility persists at all levels beginning with the family to the nation. Although geographically men and women share the same space, they live in different worlds. The mere fact that "Women hold up half the sky"- does not appear to give them a position of dignity and equality. True, that over the year's women have made great strides in many areas with notable progress in reducing some gender gaps. Yet, the afflicted world in which we live is characterized by deeply unequal sharing of the burden of adversities between women and men. Sprawling inequalities persist in their access to education, health care, physical and financial resources

and opportunities in the political, economic, social and cultural spheres.

Women Worldwide

Education is a basic human right and a reasonably good indicator of development. This is the basis of women's empowerment and has multiplier effects on the well-being of their families, communities and nations. Innovative use of technology, when built in with institutional arrangements and interventions can go a long way in creating enterprise opportunities for women at the grassroots level. With changing societal conditions, women are a great human resource and their role in science and technology is vital for its progress. If women have to be successful in science, we need to create support structures and positive attitude towards science as a career for them. Therefore, empowerment of women has been recognized as a central goal in the development process in India

To achieve a sustainable development in any country, each member of society has to be given equal opportunities, to unfold one's inner potential. Infact, 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 and development of a nation and healthy and harmonious growth of our society, would not be possible unless women are brought in to the

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main stream of national development. One of the ways by which people can give out their best and contribute significantly is through empowerment.

The deep and extensive roots of science and technology in all aspects of life have made this an overriding subject in the gender debate. Women's empowerment through science and technology has the potential to enable them to realize their potential and shape their life in accordance with their aspirations, and also to strengthen the advancement of science and wealth accumulation. However, realizing this potential is challenged with many variables. Empowerment is the core element of human development, and human development is a process of enlarging people's choices. Therefore women's empowerment is a process that involves changes over a period of time, and widens the choices available to women in fully realizing their potential. This is a broad process that involves every segment of society, and highlights the daunting task ahead in fully realizing gender equality.

Gender equality has been the subject of many international efforts, starting as early as 1946 with the United Nations Commission on the Status of Women. The culmination of these efforts resulted in the adoption of the Convention on the Elimination of All Forms of Discrimination against Women in 1979. Article 14 of the Convention articulates the importance of technology in achieving its objectives. The Convention's focus is on fulfilling human rights and social justice for women. Access to science and technology by women has been emphasized at many international conferences, in particular in the Beijing Declaration released at the Fourth World Conference on Women in 1995.

Women in Science and Technology

Science and technology have been an integral part of Indian civilization and culture. Women and men have been active in science from the inception of human civilization. One of the defining marks of humanity is the ability to affect and predict our environment. Science is the creation of structure. For our world and technology, the use of structure has been stepping stone to our progress. Women and men have researched and solved each emerging need. At a glance, women in general might look like one of the many housewives – simple, docile, unassuming and humble. But make no mistake, for behind this simple straight face is a razor sharp brain, and an uncanny ability to execute, to convert thought into action without much ado.

Women the world over want to see advancement in areas *they* define as crucial to their well-being. Although various ethnic groups are viewed as critical underserved population groups in different countries, women are the one population seen as a critical population worldwide. Women everywhere may believe they have more important problems to solve than gaining education in science and mathematics which ultimately fosters economic development. Yet, experts say women *must* become involved if they are to have input into the manner

in which science and technology are used and if societies are to benefit from the insights and knowledge that women possess.

Women are making progress in gaining equal status in the United States; the experts note that women have better incomes and more decision-making power than they had formerly. Further, because social change takes decades, patience could be a key virtue when considering issues of equality. Solution to the problems of inequality will not be found rapidly. An expert notes that perspective is needed on women's progress. Women have had the vote for approximately three generations in the United States, not a long period by historical standards. Yet significant change in women's roles has been achieved, partly because of developments in science and technology. Today, gender equity is closer than it has ever been in the United States, but further change may take several more generations to achieve.

Another expert says that men and women scientists would be expected to contribute equally on a daily basis, but individuals have different perspectives. There are even differences in overall perspective among women and between women and men. Sometimes international conferences on gender equity ignore the basic, fundamental needs of women. Instead, they focus on the glass ceiling and how to get women into management. The experts believe that the international community must pay more attention to women's basic needs, such as adequate food, shelter, medical care, safety, and education.

The argument runs that women have the obligation to see that science and technology are used in beneficial rather than in destructive ways. This is a key point, in which science and technology should be institutionalized. This would focus the role of science and technology in solving women's issues *by* women in science and technology within agencies that work to see these disciplines used in their own countries and internationally. The experts say that this could occur because women may be more interested in ethics than are men. Women becoming more involved in science and technology could mean that science and technology is used more often for constructive purposes than for destructive purposes.

Gender equality and women's empowerment are human rights that lie at the heart of development and the achievement of the Millennium Development Goals. Despite the progress that has been made, six out of ten of world's poorest people are still women and girls, less than 16 percent of the world's parliamentarians are women, two thirds of all children shut outside the school gates are girls and, both in times of armed conflict and behind closed doors at home, women are still systematically subjected to violence (UNDP, 2009).

Women's rights and issues have always been a subject of serious concern of academicians, intelligentsia and policy makers. From pastoral society to contemporary information and global society, the role of women has changed drastically. The role of a typical Grihani. (house wife) who catered to all the requirements of the household including the rearing and upbringing of children in various sub roles of daughter, daughter-in-law, wife,

mother, aunt etc. has been played quite efficiently. The continuity of changes in socio-economic and psycho-cultural aspects of human living has influenced the role of women. With the process of Industrialization, Modernization and Globalization showing its deep impact on the human society all over the world, the role and responsibilities of women has attained new definition and perspective. The women issues have received tremendous attention in the planning

India's well established academic institutions are generating about half a million engineers a year. US high tech companies are hiring more and more high tech professionals in India. Between 2001 and 2003, around 35,000 Indians emigres returned to the country to work in Bangalore (Indian National Association of Software). High tech entrepreneurship in India is growing as are Venture Capital Investments: Private equity funds in India went from US\$20 million in 1996 to 2 billion in 2006 (Ernst and Young). However, Indian women still do not have the same access to education and literacy but primary education in India is not universal. Overall, the literacy rate for women is 39 percent versus 64 percent for men (Women's Education in India, October 1998). With fewer than 2 million Internet connections in the entire country, very few women get access to technology (Business Week, 2001) and fewer still get an education in engineering (Women's Education in India). Women's representation in technical field is growing. For example, the percentage of women engineers graduating from IIT Bombay has grown from 1.8% in 1972 to 8% in 2005. In western and Eastern countries women are participating around 50% in Science and Engineering and 20-30% are towards perusing doctorates.

Women Empowerment

Women's empowerment is a process in which women gain greater share of control over resources material, human and intellectual like knowledge, information, ideas and financial resources like money and access to money and control over decision-making in the home, community, society, nation, and to gain power (Bisnath and Elson, 1999). According to the Country Report of Government of India, Empowerment means moving from a position of enforced powerlessness to one of power (Batliwala, 1994). According to Cambridge English Dictionary empowerment means to authorize. In the context of the people they have to be authorized to have control over their lives. When applied in the context of development the particular segment of population, the poor, the women, the vulnerable, the weak, the oppressed and the discriminated have to be empowered to have control over their lives to better their socio-economic and political conditions. Kabeer (2001) defines empowerment as the expansion in people's ability to make strategic life choices in a context where this ability was previously denied to them. For women in India, this suggests empowerment in several realms: personal, familial, economic and political. There are some basic questions that come to the mind when we talk of empowerment:

1. Can women, decide, with dignity and without any fear, their own goals and have the freedom and capability to act towards them?
2. Do they have access to means of production to ensure economic independence and physical security outside the house as a precondition to freedom of movement?
3. Do their opinions and desires count at the level of family, the society and the country?
4. How do we provide opportunities to enhance their capabilities?
5. Does she have the right to own and enjoy property?
6. Does she have freedom from the drudgeries of the laborious domestic chores and meaningless social restrictions?
7. Is she able to freely participate in the development and status building of the nation?
8. Does she have mastery over vocational, managerial and life-saving medicinal skills?

If answer to any of these questions is in the negative, it implies that women are not completely empowered. Thus, women's empowerment needs some basic ingredients which include fearlessness (implying absence of crimes against women), freedom from drudgery of laborious domestic chores, economic earning and productivity, ability to travel and control speed, authority to take decision, sharing power and property with men and a liberalizing education that can prepare grounds for the above (Batliwala, 1995).

Women can be empowered only if they are given education and made aware of their rights and hence they themselves prioritise their lives. Violence has to be completely eradicated from her life, then and only then can the dream of empowerment becomes a reality. Women have to be given due respect in a society to have actual empowerment. To empower women financially a lot of initiatives have been undertaken at national and state level like introduction of Self help Groups (SHG) a plethora of welfare measures but only spending money is not enough to financially empower women. Basic skills and training should be given for the proper utilization of the finances. As unskilled and semiliterate women are exploited everywhere. But the society having developed is still not safe for its female citizens. A woman's safety is not only her family's responsibility but the country as well.

The term Empowerment holds different meanings to different psyches and this divergence, this comprehension of facts against fiction, this way of interpretation that people of various sects, associations and understanding can perhaps answer this quintessential question. Women's empowerment in India is heavily dependent on many different variables that include geographical location (urban/rural), educational status, social status (caste and class), and age. Policies on women's empowerment exist at the national, state, and local (Panchayat) levels in many sectors, including health, education, economic opportunities, gender-based violence, and political participation. However, there are significant gaps between policy advancements and actual practice at the community level.

Woman has been suppressed under custom and law for which man was responsible and in the shaping of which she had no hand. Woman has as much right to shape her own destiny as man has to shape his. It is up to men to see that they enable them to realize their full status and play their part as equal of men-Mahatma Gandhi. Independent India for the past five decades has been trying to protect women from violence and discrimination and to strengthen their entitlements in the social and economic fields through scores of schemes, policies and programmes. In the institutional area, independent administrative departments, development corporations and commission for women have sprung up at the centre as well as in the states. Also women's movement and their network with the international community often gives forceful expression to women's upliftment and issues in legislature, executive and judiciary for reviewing the age old principles of patriarchal society. Yet, the status of women from all the sections of the society is mixed and not substantially altered. In the face of global competition traditional economic occupations of women have withered. In the new economic regime, the withdrawal of the activities of the state leaves the women in cold. Further gender blind legislation and laws are extending its coverage of shadow on women.

Surprisingly, the empowerment of women is one of the central issues in the process of development of countries all over the world, not just India. These issues of gender equality are an area of discussion in National and International Conferences, research studies, various forums and even establishing of special departments for women welfare. The imperative of gender partnership in matters of development has been widely recognized and institutional mechanisms and interventions have been consciously built into the development design.

In 1975, the first UN Conference of Women and Development was held at Mexico under the motto, Equality, Development and Peace. The need to integrate women into development was internationally proclaimed in the 1995 Beijing Conference. The Economic Survey (1999-2000) used an entire section on gender inequality. It began with a reminder of the commitment made in the ninth plan document of allocating 30 per cent of resources for women's development schemes through Women's Component Plans. According to Menon and Prabhu (2001), there was a strong plea for investing in women's equality on the ground that this made economic sense and spoke of the social rate of return on investment in women being greater than the corresponding rate for men.

According to Robeyns (2003), women's development can be attained by improving her status and bargaining power in the economy. Nussbaum (1995) argues that approaches and strategies for women empowerment could be possible by outlining the mechanisms and tools that will influence their empowerment and they are unable to realize their full identity and powers in all walks of life. The World Bank has suggested that empowerment of women should be a key aspect of all social development programs (World Bank, 2001). Since the 1980s the Government of India has shown increasing concern for

women's issues through a variety of legislation promoting the education and political participation of women (Collier, 1998). International organizations like the World Bank and United Nations have focused on women's issues especially the empowerment of poor women in rural areas. In the late 1980s and early 1990s, non-governmental organizations (NGOs) have also taken on an increased role in the area of women's empowerment (Sadik, 1988). NGOs, previously catering to women's health and educational needs, have moved beyond this traditional focus to addressing the underlying causes of deprivations through promoting the economic and social empowerment of women (McNamara, 2003).

Women development and empowerment has been one of the priority areas in the agenda of the Government. Various programmes have been initiated and are executed to achieve the objectives. However, all these efforts have so far remained sporadic attempts towards finding solutions to various situations. The time has come when it becomes necessary that a woman is viewed as one person and all the programmes whether it is in health sector or in education sector or in economic sector or are meant for providing protection from adverse situations is planned and executed in integrated and holistic manner. These programmes will need to be so focused that they ultimately enhance the dignity of women and also associate value to their socio-economic participation.

Women Security

Policies relating to women's rights have had a positive trajectory in the past few decades with the central government articulating many progressive measures to advance gender equality in social, economic, and political arenas. The Government of India (GOI) has two main bodies to advance gender equality: the Ministry of Women and Child Development and the National Commission for Women, which is an autonomous organization under the Ministry of Women and Child Development.

Both bodies work on national- and state-level legal and social policies to advance gender equality. The Ministry has widely implemented local-level micro-finance schemes to advance economic opportunities for rural women. The National Commission for Women has been instrumental in creating legislative changes, and has set up Complaint and Investigate Cells at the state level. The Grievance Cells receive complaints of gender-based violence and are mandated to investigate, provide referrals and counselling, and ultimately report on such cases.

Violence against women is partly a result of gender relations that assumes men to be superior to women. Given the subordinate status of women, much of gender violence is considered normal and enjoys social sanction. Manifestations of violence include physical aggression, such as blows of varying intensity, burns, attempted hanging, sexual abuse and rape, psychological violence through insults, humiliation, coercion, blackmail, economic or emotional threats, and control over speech and actions. In extreme, but not unknown cases, death is the result. (Adriana, 1996) These expressions of violence

take place in a man-woman relationship within the family, state and society. Usually, domestic aggression towards women and girls, due to various reasons remain hidden.

The traditional systems of control with its notion of 'what is right and proper for women' still reigns supreme and reinforces the use of violence as means to punish its defiant female offenders and their supporters. Hence it is of no surprise when National Crime Records Bureau (NCRB) predicted that the growth rate against crime women would be higher than the population growth rate by 2010.

Women economic opportunity, Social and Cultural Rights in India

India is one of the world's fastest growing economies, with women mainly from the middle class increasingly entering the workforce. Urban centers 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. However, the story of economic empowerment for women is not a singular narrative; rather it is located in a complex set of caste, class, religious, and ethnic identities.

In rural India, women's economic opportunities remain restricted by social, cultural, and religious barriers. Most notably inheritance laws embedded in Hindu and Shariat civil codes continue to marginalize women in the household and the larger community. Rural women, particularly of lower caste and class, have the lowest literacy rates, and therefore do not have the capacity to negotiate pay or contracts and most often engage in the unorganized sector, self employment, or in small scale industry. Self-help groups (SHGs) are a widely practiced model for social and economic mobility by NGOs and the government. SHGs provide women with the opportunity to manage loans and savings that can be used by members for varying needs. SHGs also are used to promote social change among the members and the community at large. Members of SHGs have used their experiences as leverage to enter other local institutions such as the Panchayat Khap.

The movement to assure women's economic, social, and cultural rights (ESCR) as basic human rights is just emerging in India. The movement aims to locate women's rights within the larger human rights framework, and by doing so moves away from looking at women's issues only within the framework of violence against women and reproductive rights. ESCR attempts to look at the broader issues facing women, namely poverty, housing, unemployment, education, water, food security, trade, etc

Women in India

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. Science and technology have been an integral part of Indian civilization and culture. Women and men have

been active in science from the inception of human civilization. One of the defining marks of humanity is the ability to affect and predict our environment. Science is the creation of structure. For our world and technology, the use of structure has been stepping stone to our progress. Women and men have researched and solved each emerging need. At a glance, women in general might look like one of the many housewives – simple, docile, unassuming and humble. But make no mistake, for behind this simple straight face is a razor sharp brain, and an uncanny ability to execute, to convert thought into action without much ado.

Since Independence, Indians have been promoting science and technology as one of the most important elements of national development. The Scientific Policy of 1958 and the Technology Policy Statement of 1983 enunciated the principles on which growth of science and technology in India has been based over the past several decades and inspires us till date. The major scientific revolutions of the last century have opened the doors to many remarkable technologies in the fields of health, agriculture, communication and energy, among many others. Science and Technology are powerful instruments in the tasks of national reconstruction, economic resurgence and maintenance of national security.

Employment in the Indian IT has grown by over a million between 2000 and 2005. The size of the Indian IT industry has reached \$48 billion in 2007 and represents 5% of the country's GDP. India's well established academic institutions are generating about half a million engineers a year. US high tech companies are hiring more and more high tech professionals in India. Between 2001 and 2003, around 35,000 Indians migrants returned to the country to work in Bangalore (Indian National Association of Software) High tech entrepreneurship in India is growing as are Venture Capital

Investments: Private equity funds in India went from US\$20 million in 1996 to 2 billion in 2006 (Ernst and Young). However, Indian women still do not have the same access to education and literacy but primary education in India is not universal. Overall, the literacy rate for women is 39 percent versus 64 percent for men (Women's Education in India, October 1998).

With fewer than 2 million Internet connections in the entire country, very few women get access to technology (Business Week, 2001) and fewer still get an education in engineering (Women's Education in India). Women's representation in technical field is growing. For example, the percentage of women engineers graduating from IIT Bombay has grown from 1.8% in 1972 to 8% in 2005.

Women's education is extremely important intrinsically as it is their human right and required for the flourishing of many of their capacities. Women work two-thirds of the world's working hours, produce half of the world's food, yet earn only 10 percent of the world's income and own less than 1 percent of the world's property. More than 850 million people— most of them women and children— suffer from chronic hunger or malnutrition. Women in the developing world bear a heavy burden of preventable illness. Each year, more than half a million women die

from the complications of pregnancy and childbirth.

Work and Family

The challenges of integrating work and family life are part of everyday reality for the majority of American working families. While the particulars may vary depending on income, occupation, or stage in life, these challenges cut across all socioeconomic levels and are felt directly by both women and men. As families contribute more hours to the paid labor force, problems have intensified, bringing broad recognition that steps are needed to adjust to the changed realities of today's families and work.

Employers, unions, professional associations and advocacy groups, government, and communities all have roles to play in integrating work and family life, but none of them can solve this problem acting alone. Each must recognize and reexamine the prevailing assumption that an "ideal worker" is one who can subordinate all other elements of life to the requirements of the job. Then all the players must engage in an ongoing dialogue over how to close the gap between today's work and family realities and the policies and practices that govern their interrelationships.

Work and family life have always been interdependent, but the increased employment of mothers, rising family hours of work, today's service intensive globalizing economy, and the trend toward long work hours for some and inadequate family income for others have rendered this interdependence both more visible and more problematic. The increased number of hours family members both individually and in total are contributing to the paid workforce means that both work and personal lives are not only under stress, but have changed in ways not anticipated by the assumptions, policies, and institutions that have previously shaped experiences in both work and family life.

Most workers today, regardless of gender, have family responsibilities, and most married workers, regardless of gender, have an employed spouse. But jobs are still designed as if workers have no family responsibilities.

The conditions leading to our current situation will not go away. Indeed, we believe the problems will continue to deepen as the population ages. Therefore, all of the institutions needed to create a successful result, one that will lead to coherent, coordinated, and systemic efforts to address the problems, have and will continue to have a strong incentive to be involved.

Gerstel and Clawson (2000) found that some union leaders still view work and family as primarily women's issues. In unions where few women are in positions of leadership, or the workforce and membership are predominantly male, such as in construction, child-care and other work-family benefits tend to get low priority. This may change as more women move into union leadership positions and/or as male union members begin to see work-family issues as important to them as they are to women.

Move More Women into Leadership Positions. As is true of corporations, a larger cadre of women leaders in

unions and professional associations is more likely to place issues of equal pay for equal work as well as the expansion of negotiated health care, paid leave, flexible hours, quality part-time work, and other family benefits higher on their agendas than men would.

Research shows that women in positions of leadership in corporations, unions, and government organizations give work and family issues a higher priority in decision-making. All these institutions therefore need to accelerate the pace of moving women into top-level positions.

Tapping into women's intellectual potential requires changes both at the individual level and that of society. Guiding these changes is a critical responsibility of governments and civil society organizations. Governments need to provide an appropriate policy environment which helps women to balance family and professional responsibilities: policies that recognize and harness women's intellectual abilities, and that reward excellence. Policies are also needed to ensure that women's education gives them the tools they need to be competitive in the job market. Cultural policies are required to focus on values in support of women's participation in science and technology, and to grant equal rights to women engaged in technological fields.

An important factor in achieving these reforms will be a greater presence of women in decision-making bodies, be they scientific or political. The voice of women in governance is required to create the political will essential to bring about changes that will benefit all of society.

Failure of Women career in Science and Technology

Education is a key factor in deciding the future career path of students, and educational institutions are also important in their success or otherwise in training individuals to make a living out of what they have learned. Societal and cultural factors are the key to defining which subject a woman might choose for her education. The existence of perceptions such as men's vs. women's academic disciplines skews the choice of women in early education.

Arriving at a higher rate of women's presence in science and technology fields requires a thorough understanding of the barriers they face at the time skilled women enter the job market. Among the factors that have restrained women's further involvement in science and technology, the following three could be the most important: (i) gender pay gap, (ii) culture and gender inequity, and (iii) lack of political will.

Political will from governments is essential for encouraging women's participation in science and technology. It can be assessed by use of the Gender Empowerment Measure (GEM), an important indicator that estimates women's empowerment through the number of seats occupied by women in the parliament or the number of female legislators, senior officials, professionals and technical workers; and the estimated ratio of female to male incomes. Political will could be demonstrated if governments improved their GEM.

To make the decision-making process more sensitive to the problems faced by women, the number of women on

decision-making and policy advisory bodies has to be increased. The implications of the absence of women at these top-level positions in the science and technology sphere are significant, and leads to the marginalization of women in the allocation of opportunities such as research funding and employment. The absence of women in top political and managerial positions in educational and research institutions eliminates the opportunity of hearing the voices of women in key decisions on the current and future orientation of science and technology.

Global employment trends indicate that there are more women in the labour force now than before, yet women have a higher unemployment rate than men. In 2003, more than 40 per cent of all people at work globally were women but the quality of employment by women is generally lower than men. Sixty per cent of the so called "working poor" – those earning less than the poverty baseline of a dollar a day - are women. New technologies can improve women's competitiveness in selected areas where intellectual competence supersedes physical strength. However, whether women are able to take advantage of these opportunities depends primarily on socio-economic factors.

Women have gained a fairly high level in education in quite a few countries: in some they are better educated compared to men, although the share varies widely by discipline. The question is, to what extent women have been able to transform the empowerment provided by education into employment opportunities. The environment of employment differs from that of education: there are different issues of concern when a woman enters into a professional position. Moving up the hierarchy is a particular challenge for women, as they have to compete with men. It is quite difficult to assess career opportunities in general, as career paths are rarely organized and documented, shortage of data makes any such assessment difficult. With this constraint, one of the few feasible comparisons seems to be that of career paths at universities.

We have almost of 40% girl students in all disciplines of Engineering. The woman faculty and Employee are also around 40% in the college. The leadership of women has to be achieved, even though we have few women in the leadership position.

It is amply documented that "women are lost from the academic pipeline at a greater rate than their male counterparts". A study shows that an equal number of female and male students enroll at colleges, but the number of women decreases at the upper hierarchy of the college (starting from Ph.D. students, to Assistant Professor, to Associate Professor, to full Professor). This trend demonstrates that the so-called "leaky pipeline" tends to lose much more women than men on their way to higher academic status and position in the university hierarchy.

The pattern of women's participation in science and technology has changed from exclusion to segregation in three major forms. The expression "vertical segregation" refers to high concentration of women at certain levels of the professional hierarchy, and is used to describe their

under or over-representation in that hierarchy. For example, women may constitute about half the undergraduates in some disciplines, but they represent a small fraction at the professor level.

Conclusion

Women should be encouraged to bring their vision and leadership, knowledge and skills, views and aspirations into the development agenda from the grassroots to international levels. Science and technology brings economic growth and well-being to people and it is not only the empowerment of women through science and technology, but also the enrichment of science and technology through women's participation. It is not the concern of one nation only, but there are many players and stakeholders in the aim to reach this millennium goal. We just hope that women become empowered at 100% and become equal to men so that both of them may work side by side for a better world of today.

It is necessary to recognize that the participation of women in science and technology is no longer simply an issue of gender equity: it is also an issue that should be considered in national economic development. Women are both consumers and producers, they can make a difference if they are involved and considered in economic development plans. 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. New technologies could assist in this endeavour if promoted. Information technology is empowering women by making education accessible, and raising women's skills.

There are, however, barriers preventing the full engagement of women in science and technology: the lack of interest among women to pursue engineering and technology-related disciplines at universities indicates cultural influences that often regard these fields as the preserve of men. Even those women who pursue higher qualifications in engineering and technology face discrimination: in many places where women are equally competent, the man is given precedence in employment opportunities as he is regarded as the bread-winner. Such discrimination may range from unfairness at the point of hiring, salary gaps and bias in promotion opportunities. The role of educational institutions is indispensable in promoting cultural change.

Government's role is crucial in bringing about these changes, through providing an adequate social infrastructure and policy environment which facilitate women's entry into the fields of science and technology. This could include measures to support the professional, personal and family needs of women through their education, career development and their employment. The

exact nature of policies and measures to achieve this aim will differ, depending on the cultural environment and the level of economic development.

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