

Committee: Special conference on the advancement of women

Issue: Promotion of women in science and technology

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Introduction

Rigorous women's rights movements around the world have augmented the opportunities of women being involved in scientific development. This has raised the status of women in science and technology within only a couple of decades. In spite of their increasing presence, taken overall, women do not hold leading positions in science and technology. This can be attributed to two major reasons. To begin with, women face an uphill battle against the prejudice of having to take on all the responsibilities of a household, which includes various chores, and at times the education of their children too. Secondly, the society doubts the academic or professional level of women because of the unconscious bias against the perspective of women in science. According to a study published in 2009 in the Journal Proceedings of the National Academy of Sciences, 70 percent of people across 34 countries tend to associate terms such as "astronomy" or "physics" with male rather than with female. This result clearly indicates that subconscious stereotypes suppress the employment of women in the fields of science and technology.

Many organizations such as WISE (Women into Science and Engineering) and AWIS (Association for Women in Science) have put enormous efforts to promote women in science and technology. However, the reality is that numerous barriers exist for women ,who try to take a role in science and technology. This conference will allow us to gain insight of the current situation and possible solutions of this issue.

Definition of Key-Terms

Gender studies

Gender studies courses place emphasis on gender identity and gendered representation as central categories of analysis. It includes a variety of fields such as women's studies, men's studies, and gay and lesbian studies.

Gender-mainstreaming

Gender-mainstreaming is the process of creating awareness of the ways gender affects health among health professionals, so that they may address gender issues wherever appropriate and thus make their work more effective.

Gender perspective

Gender perspective is an approach to sociological issues or ideas within the framework of gender.

Feminism

Feminism is a social movement that seeks equal rights for women. Its supporters are named 'feminists'.

Glass ceiling

A glass ceiling is a political term used to describe "the unseen, yet unbreakable barrier that keeps minorities and women from rising to the upper rungs of the corporate ladder, regardless of their qualifications or achievements.

Background Information

Historical overview

Most women were under-represented in terms of scientific research and engineering until the mid-20th century. They certainly did not have the chance to adopt scientific careers during the Renaissance (1400-1600), when the blossoming of science in Europe was at its peak. Colleges and scientific organizations had neglected the presence of women for a long while. Although most colleges in Western Europe did not even offer admission to women until the early 19th century, women's yearning for access to education in science and employment in science was radically accelerated due to numerous establishments of women's colleges around the world since the mid-1800s. These colleges offered extensive courses in sciences, including astronomy, botany, and chemistry. Some organizations began to accept female members around the beginning of 20th century, namely the "National Academy of Sciences" (U.S.) in 1925, the "Royal Society of London for the Promotion of Natural Knowledge" (UK) in 1945, and the "Académie des sciences"(France) in 1979> Thus, these acceptances paved the way for barriers to women in science to break down in official places.

Women's role in the society drastically changed during World War II (1939-1945). Since millions of men served in the war, women undertook a wide array of roles that were previously

addresses only to men, such as scientific researchers. For example, Grace Murray Hopper, an American mathematician, served as one of the first female computer programmers in the U.S. Navy at that time. Moreover, Rachel Carson who worked for the U.S. Bureau of Fisheries served as an aquatic biologist from 1940. Both of these female scientists had maintained their positions in the postwar years, and the notion that women are unfit in scientific fields began to lose its credibility.

Betty Friedan (women's rights movement activist) is a woman which must be mentioned, when considering the women's rights movements from 1960s to 1970s. Her book 'The Feminine Mystique' (1963) shocked the world by providing important insight into sex discrimination in working places and education. In her book, she pointed out that educational institutions were pushing women towards the role of housewives while discouraging them to pursue knowledge in various academic fields. According to her assertion, colleges were recommending female students to take courses that focused on family household skills instead of offering classes that were academically challenging. Friedan joined NOW (National Organization for Women) in 1966 with other women's rights activists in order to eliminate gender inequality. NOW's mission statement stated, *"We believe that a true partnership between the sexes demands a different concept of marriage, an equitable sharing of the responsibilities of home and children and of the economic burdens of their support. We believe that proper recognition should be given to the economic and social values of homemaking and child care."* Endless exertion of female rights movements activists like Betty Friedan finally brought up a successful result. In 1968, the U.S. Congress passed the Equal Pay Act which insisted that it is illegal to pay different rates of wage for women and men who did equal work; a problem faced by the women that were employed in the fields of science and technology.

There are a number of female scientists who won Nobel prizes in the 20th century. For instance, a British crystallographer Dorothy Crowfoot Hodgkin won the 1962 Nobel Prize for Chemistry, and American geneticist Barbara McClintock received the 1981 Nobel Prize for Physiology or Medicine. Undoubtedly, all these women and their achievements and breakthroughs constitute a clear indication of the fact that the status of women in the scientific and technological field has elevated. However, female scientists are still subtly neglected from male-dominant academies. For example, an influential study from 1997 Nature Publication by Wenneras and Wold demonstrates that it is more difficult for female scientists to get grants for their work. His study shows us that women should be 2.5 times more productive than men to be granted by Swedish Medical Research Council in 1995. Furthermore, the analysis of median annual salary for women scientists in the U.S.A. exemplifies the unfair treatment of female scientists. The survey states the median annual salary for women engineers and scientists was

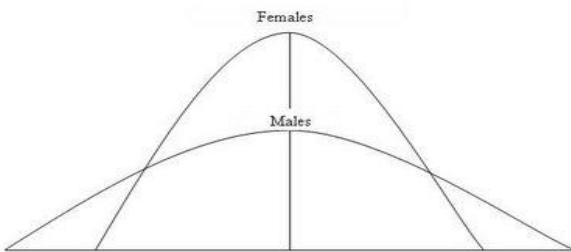
approximately 22 percent less than the median salary for men in 2001.

Potential causes of women's underrepresentation in math intensive fields of science

1. Discriminatory custom

Discriminatory custom is sometimes the source of meager hiring of women in scientific fields. For instance, a number of women in Muslim countries suffer from sexual discrimination at workplaces, which include not only science and engineering but also politics, accounting, journalism, etc. Nowhere in the Coran does it mention that women are forbidden to work. However, Muslim countries generally look upon women who are working outside boundaries of home as people who do not work hard and contribute enough for and to their families.

2. Gender stereotypes regarding math ability



Exaggerated stereotypes of the female ability in math-intensive fields suppress the hiring of women in technology-related jobs. In 2005, Lawrence Summers, former president of Harvard University, asserted that the problems women are facing could be partially due to innate differences. This created a large controversy among researchers. The Journal Science examined the mathematics scores from seven million students who were in grades two through eleven. A significant discrepancy in the average scores of boys and girls was not found in this survey. However, what the survey additionally found is that boys' scores are more variable than girls' scores like the graph above. Some researchers claim that this result is showing us that more men are likely to be enrolled in reputable universities or employed in competitive companies. On the other hand, others argue that the variability of scores has nothing to do with over-representation and under-representation of men and women respectively. Instead of variability of intelligence, they believe that the widely held prejudice regarding women's decision- making abilities and choices are the points which cause the meager participation of women in the fields of science and technology.

3. Women's preferences and choices

This is a often overlooked concept. As a matter of fact, a majority of women graduates tend to choose an industrial career rather than an academic career. The main reasons are the followings. Firstly, some women prefer to be involved with the household chores and take care of their children. Since it is a widely held belief that ought to be responsible for the housework, many women are under the impression that it is their main and/or only responsibility to do the domestic work. Secondly, some women even stated that they do not want to confront a discriminatory environment by having a technology-related occupation.

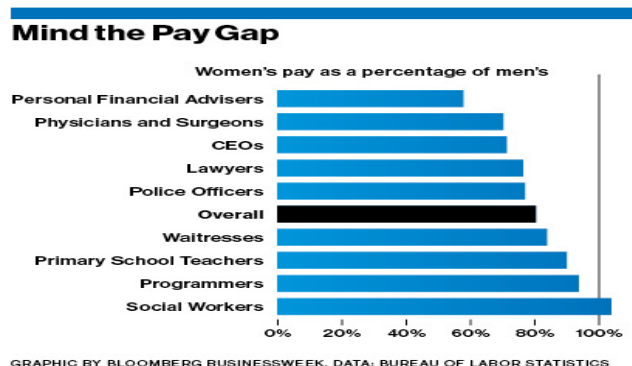
Problems faced only by women in the fields of science and technology

1.Restrictions on travelling

Travelling is an extremely rewarding learning experience because it exposes a person to different places that have cultural or historical significance. They can learn a lot of things by participating in big conferences in overseas and visiting science museums or universities. However, not all women around the world have this privilege to gain their insights in scientific fields. Husbands in Egypt and Bahrain can forbid their wives from leaving the country by filing an official complaint at the airport. In Saudi Arabia, women must have a written permission from their closest male relative to leave the country or travel on public transportation between different parts of the kingdom. Moreover, in Iraq, Libya, Jordan, Morocco, Oman, and Yemen, husbands can prevent from their wives travelling for any reason.

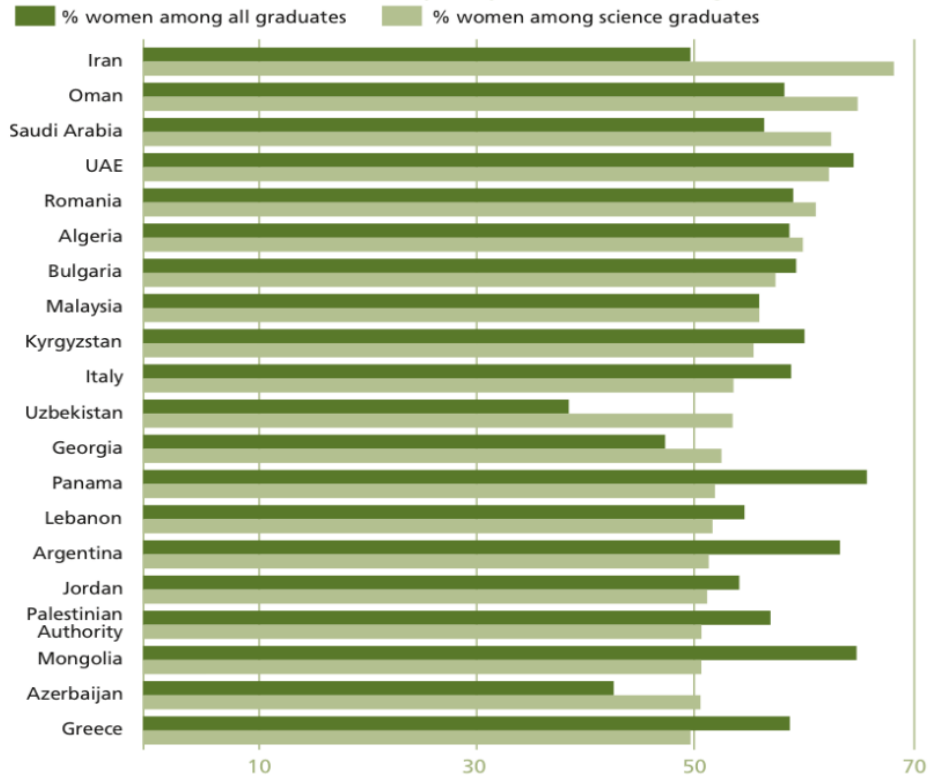
2.Relatively low wages

According to a survey by the Massachusetts Medical Society in 2000, 40 percent of female physicians said their wages were lower than those of male physicians. The data below shows us the pay gap between women and men.



Useful data

Where women earn the majority of science degrees

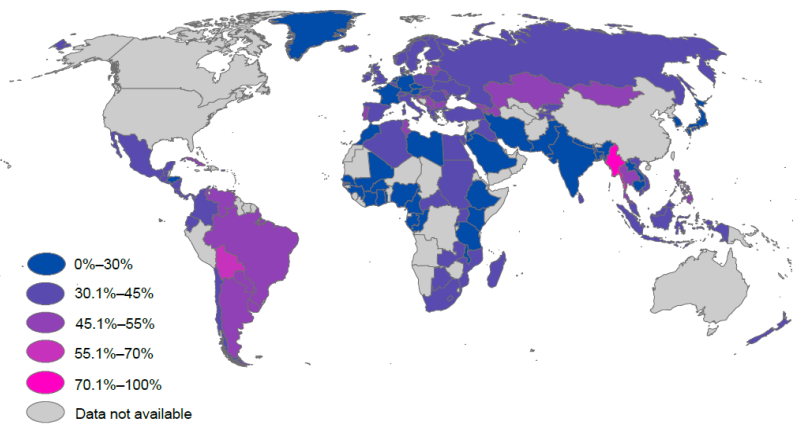


Source: UNESCO Data Center, 2010

These are the countries in which women earn 50 percent or more of the science degrees awarded.

FIGURE 1. THE GENDER GAP IN SCIENCE

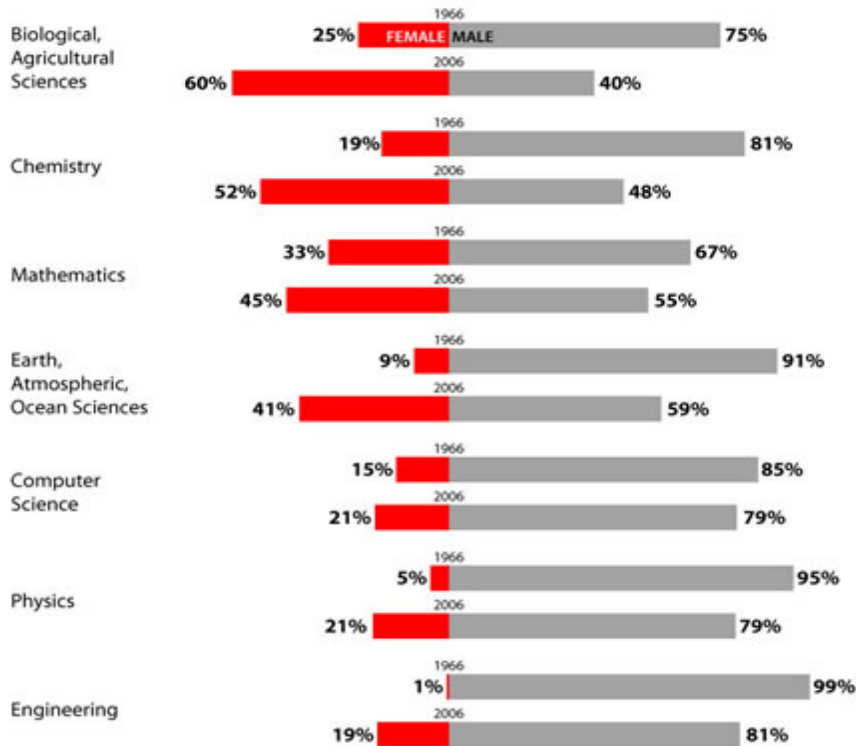
WOMEN AS A SHARE OF TOTAL RESEARCHERS, 2010 OR LATEST AVAILABLE YEAR



Note: Data in this map are based on HC, except for Congo and India (based on FTE).

Source: UNESCO Institute for Statistics, October 2012.

Bachelor's Degrees in Science, Mathematics, Engineering Fields Shares Awarded by Sex, 1996 to 2006 All US Institutions



Source: AAUW (Hill, Corbett and St. Rose: "Why So Few?")

Major Countries and Organizations Involved

Afghanistan

Due to a culture that bans women to appear in public, a lot of Afghanistan women barely have access to proper education. The literacy rate among young Afghanistan women between the age of 15 and 24 is only 18 percent. In 2008, there were 283 violent attacks in school which has killed 92 people, and injured 169 people. In spite of the obstacles these girls face, increase in primary school enrollment for girls shows us that they long for a wider education than ever before. Fazul Haque, UNICEF Chief of Education for Afghanistan said "The first challenge for girls' education in Afghanistan is cultural barriers", and emphasized that it is crucial for UNICEF education programs to support Afghan women.

Table I. Female vs Male Participation in the Public Sector, 2010

Position/Role	Men (% of Total)	Women (% of Total)
<i>Population</i>	51.2	48.8
<i>Judges</i>	95.3	4.7
<i>Prosecutors</i>	93.6	6.4
<i>Attorneys</i>	93.9	6.1
<i>Police</i>	99.5	0.5
<i>Army</i>	99.4	0.6
<i>Parliamentarians</i>	72.7	27.3
<i>School Teachers</i>	71.5	28.5
<i>University Teachers</i>	84.8	15.2
<i>Civil Servants</i>	81.5	18.5
<i>Agricultural Workers</i>	56.0	44.0

Source: [UNIFEM Factsheet 2010](#)

Iran

Iran, a country that has made substantial progress through education and training, has proclaimed that women will be excluded from a wide range of universal studies including nuclear physics, electrical engineering and mining engineering. According to the report, we find that 36 Iranian universities have banned women from 77 critical fields of study including engineering, education, and counseling. Iran's senior clerics endorse the ban since they believe that increased education for women has caused some serious social side effects which include declining birth and marriage rates. The letter that was sent to the UN special rapporteur in August, 2012 said *"It is part of the recent policy of the Islamic Republic, which tries to return women to the private domain inside the home as it cannot tolerate their passionate presence in the public arena. The aim is that women will give up their opposition and demands for their own rights."*

ILO (International Labor Organization)

ILO, an agency affiliated with the United Nations, is responsible for promoting and realizing standards and rudimental principles and rights at workplaces. Also, it is devoted to provide wider chances for women and men to decent income and employment. Claude Akpokavie, an official from the ILO Bureau for Workers' Activities, once stated *"Women tend to be overrepresented in the humanities and social sciences, and underrepresented in science and technology. Measures need to be put in place to redress this imbalance"* The following excerpt shows us some policies and programs in which this international organization has set up to achieve gender equality in terms of working fields.

ILO POLICIES AND PROGRAMMES TO PROMOTE EQUALITY IN EMPLOYMENT

Reflecting the global initiatives described above, ILO activities on gender issues have been stepped up over the past two decades. The focus has been placed on various key issues for women's work and careers, including:

- promoting the ratification and implementation of international labour standards of special relevance to women;
- gender-based policies and programmes for employers' organizations;
- gender equality in trade unions, including the increased incorporation of women workers' concerns in collective bargaining;
- women's presence in private-sector activities, including small businesses;
- women in management;
- increased equal opportunity for women in vocational training and technical education;
- greater harmony between work and family responsibilities; and
- social protection, especially for vulnerable groups of women.

These concerns are reflected in the ILO programmes and projects described below.

Timeline of Events

Date	Description of Event
1848	The first women's rights convention took place in Seneca Falls, New York.
1903	Marie Curie, first woman to win Nobel Prize in physics.
1925	National Academy of Sciences first accepted female member
1939-1945	The Second World War outburst
1961	Civil Rights Act establishes Equal Employment Opportunity Commission (EEOC) to inquire complaints and impose penalties upon sexual/racial discrimination.
1979	Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) adopted
1979	Académie des sciences first accepted a female member.
2009	President Obama signed the Lily Ledbetter Fair Pay Restoration Act. This allowed the victims of pay discrimination to file a complaint against their employer within 180 days from the first date of the first unfair paycheck.

Relevant UN Treaties, Resolutions, and Events

[Convention on the Elimination of All Forms of Discrimination against Women \(CEDAW\)](#)

The Convention on the Elimination of All Forms of Discrimination against Women (CEDAW), adopted in 1979 by the UN General Assembly, consists of 30 articles which advocate the eradication of sex discrimination in all forms.

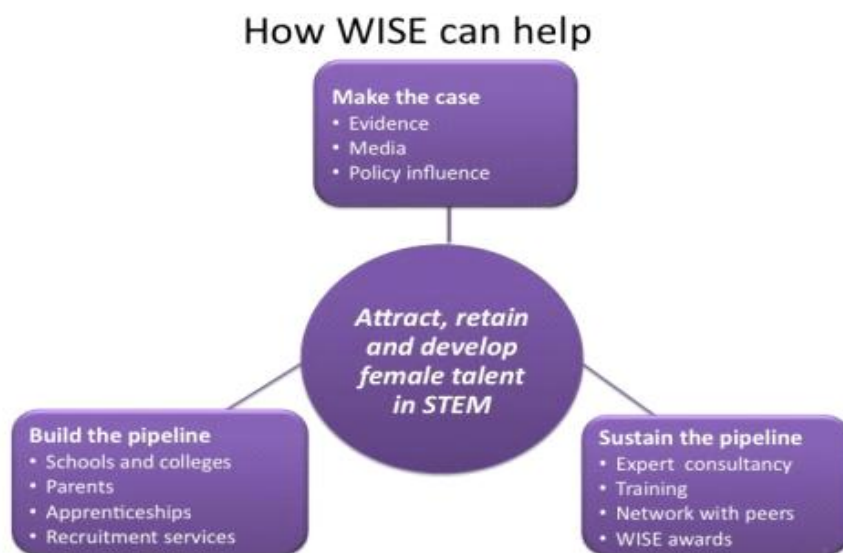
Major aims of this convention:

** Establish tribunals and other public institutions to ensure the effective protection of women against discrimination*

** Ensure elimination of all acts of discrimination against women by persons, organizations or enterprises*

Previous Attempts to solve the Issue

WISE (Women in Science and Engineering)



Source: <http://www.wisecampaign.org.uk/about-us>

'Women in Science and Engineering' is a non-profit organization that ensures women are offered equal opportunities in the fields of science and engineering. It places emphasis on the establishment of various programs that enable them to thrive at every stage of their careers, and focus on the advancement of the support for researches, and of the development of the fresh environment that promotes and motivates women entering scientific fields. WISE provides programs for students from middle school to professionals, including conference, academic preparation programs, internships, scholarships, internships etc.

Possible Solutions

Problem: Low wage and employment of women

Solution1: Creation of pay scales based on the job being done

A change in hiring and promotions policies is an effective way of eliminating gender discrimination. For example, when considering promotions within the company, managers should be looking at information that is based on candidate's qualifications, but not including the candidate's gender.

Solution2: Establishment of wage monitoring program

Wage monitoring programs must be established in order to make sure that the employees are fair treated from their workplaces. Trade union is a good example for this, and it can be funded and supported by nonprofit organizations or governments.

Besides dealing with the problems women face in the fields of science and technology, we must all understand that the promotion of women in these fields very much lies with our societies, which ought to understand that women and men have equal rights and can hold the same positions. Thus the greater problem, associated with society's perception of women and their possible role in various fields, such as the ones of science and technology can be addressed through various educational campaigns and advertisements, which will allow society to gradually accept gender equality. Furthermore, laws which for example deem a specific number of women scientists in firms necessary, could be implemented and regarded as a very important step in the promotion of women in this field.

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