

## **PROCEEDINGS**

**Expert Panel Meeting on Women and Gender Issues in Engineering, Science and Technology  
December 17-18, 2002  
UNESCO Headquarters  
7 Place de Fontenoy, 75352 PARIS 07 SP; TEL: + 33 1 456 84178**

### **DECEMBER 17, 2002**

#### **OPENING REMARKS**

##### **Dr. Tony Marjoram, Program Specialist, Engineering & Technology, UNESCO**

Dr. Tony Marjoram, Program Specialist, Engineering & Technology at UNESCO opened the meeting with comments about how UNESCO should become more involved in gender and STEM issues. He stated that UNESCO's focus on the issue has suffered due to changing priorities. UNESCO focuses on a broader "science and technology for poverty eradication". The "gender" aspect fits this subject area when one looks at science and engineering practices for sustainable development. He noted that calls for creating indicators to measure women's progress in science and engineering fields have been made for over twenty-five years, but to date little has been done to make it a reality.

Dr. Marjoram raised the topic of how to bring a renewed focus on the gender dimension in light of the recent renewal of the United States' participation in UNESCO. Member states approach UNESCO to set priorities for the work of the UN organization.

##### **Dr. Shirley Malcom, Director, Education & Human Resources, AAAS**

Dr. Shirley Malcom, Director, Education & Human Resources at the American Association for the Advancement of Science was the next speaker to give opening remarks. She provided participants with a historical overview of the United Nations' involvement of gender and STEM issues. Currently, the UN does not explicitly examine gender and STEM but rather looks at it indirectly in the context of communication, sustainable development, and reproductive health among other topics. In preparation for the World Conference to Review and Appraise the Achievement of the UN Decade for Women in Nairobi (1985), AAAS organized an expert panel meeting to review the progress of women in science and technology in 1983 at Mount Holyoke.

Dr. Malcom also discussed unsuccessful attempts to get science and technology listed as a platform for action at the Fourth World Conference on Women in Beijing in 1995. Since the Beijing conference, Dr. Malcom mentioned a shift in the argument for women's participation. In recent years it has taken on a more economic imperative. Women are half the human resources available, and their talents should be developed. At the same time, the arguments for women's participation for sustainable development and human capacity-building are still widely adopted. At the 1999 World Conference on Science in Budapest, paragraph 90 of the Framework for Action includes strong language calling for access of women and girls to the STEM education and employment, collection of gender disaggregated statistics, women in leadership positions, and the establishment of an international network of women scientists and engineers.

### **DECEMBER 18, 2002**

## SETTING THE AGENDA & EXPECTED OUTCOMES

### **Dr. Tony Marjoram, Program Specialist, Engineering & Technology, UNESCO**

Dr. Marjoram started the day reiterating some of the comments he made the previous afternoon. Then he suggested ways to use past world conferences as platforms for activities. Although, in his opinion, the 1999 World Conference on Science was unsuccessful for the most part in calling nations to action, its strong position on gender could be the focus for a meeting to be held at a Budapest +5 meeting. Also discussed were other important dates to focus efforts on such as Beijing +10, the US re-joining UNESCO, and the World Engineer's Convention (2004).

Dr. Malcom remarked that there has been talk of mainstreaming gender into science and technology issues but little emphasis on mainstreaming science and technology into gender issues. A publication by AAAS and the Global Alliance in preparation for Beijing +5 in 2000 tried to pull science and technology into the gender conversation. She talked about the Gender Advisory Board of UN Commission on Science and Technology for Development. After the Beijing conference UNCSTD took the recommendations to the Economic and Social Council of the UN and created three secretariats in Jakarta, Uganda, and Montevideo to put a regional emphasis on the issues. She urged the participants to consider more creative ways to integrate these issues.

Dr. Suzanne Brainard, Executive Director, Center for Workforce Development at University of Washington discussed the agenda for the day and introduced the panelists of the next session.

## PANELISTS

### **Mme Marianne Rodot, Vice President of the Association for the Women Engineers, France**

Mme Marianne Rodot, Vice President of the Association for the Women Engineers of France gave a brief presentation about the activities of her country and the European Union. As vice-president, she is responsible for international affairs. She discussed recent efforts by the European community to address gender issues for researchers. For example, the EU is compiling a directory of women researchers and establishing a network of organizations and researchers to lobby policymakers in Brussels. She noted that the EU has been more focused on research in academic institutions rather than looking at the state of women in industry.

Dr. Marjoram added that the OECD NESTI group has been collecting science and technology statistics with some sections disaggregated by gender. The indicators may be published sometime in 2003.

### **Mme. Gakou Salamata Fofana, President, Association of Female Engineers of Mali**

Mme. Gakou Salamata Fofana, President, Association of Female Engineers of Mali (AFIMA) began her presentation describing the activities of AFIMA in Mali. She said that the organization mobilized in response to the inactivity of the national government. AFIMA has regular meetings with decision-makers in the various ministries in order to sensitize them to the problems facing women in the technical professions. In June 2002, a new government took office and has given these issues more priority than in the past. AFIMA is preparing a report to brief the government on the organization's activities.

UNESCO has sponsored various activities of AFIMA. They have funded training workshops in Mali and abroad and the development of posters in the local languages to encourage girls' interest in STEM. With the assistance of UNESCO, AFIMA also held training camps for girls, ages 14-16. Two girls each from sixteen African nations attended.

Mme Gakou also discussed the Global Alliance African Women in Engineering and Science project funded

by the Engineering Information Foundation. AFIMA disseminated information on this project to government ministries, women engineers, and FEMSA. AFIMA invited these representatives to a meeting to view the web site and then generated a discussion about the issues. Over forty individuals attended.

Dr. Elleboudy asked how AFIMA was given access to provide training to the ministers. Gakou responded by saying that they spoke with the Prime Minister and convinced him to send letters to his ministers, asking for their compliance.

**Dr. Azza Elleboudy, Professor & Immediate Past Chair of Civil Engineering Department, Zagazig University Banha Branch, Egypt**

Dr. Elleboudy opened her remarks with a historical overview of women's advancement in education dating back in 1873 when Egyptian women were first granted access to primary education. Below is the timeline of progress.

- 1873: Primary education available to women
- 1921: Secondary education available to women
- 1923: Education became obligatory for both sexes
- 1945: First female engineering student
- 1960s: 15% of engineering students are women
- 2000: Women engineering students = 25%
- Women medical students = 45%
- Women science students = 47%
- Women pharmacology students = 56%
- Women dentistry students = 58%
- Women engineers in the workforce = 11%

Next, Dr. Elleboudy discussed the educational system in Egypt. Overall, it is an equitable system for boys and girls. There is not a gender gap in terms of academics or drop out rates. According to national test scores, girls outperform boys by receiving the highest marks in the last decade. These test scores are the competitive process by which students are selected into universities. Engineering is one of the most selective fields. According to Dr. Elleboudy, students do not typically considering dropping out of engineering once they secure a slot because of the inflexibility of the educational system. Students cannot switch majors, so to drop out of a program altogether means very bleak professional career options. Female engineering professors help advise, mentor, and encourage their women students .

While the educational system in Egypt has been successful in training women engineers, the main challenge to female engineers when they begin to enter the workforce. In the past the government was the largest employer of women engineers. In return for free education, university graduates were required to work in the public sector for two years. As the state-owned enterprises were privatized leading to a shrinking government sector, engineering positions for women became more difficult to obtain. The private sector and multinational corporations prefer to hire male engineers who are more likely to work long hours and can more easily be relocated. Women employees are considered more transitional because they will eventually have babies and prioritize family life over their career. The public sector employs 30% of the workforce.

In terms of women in leadership positions, the situation is not much better. Women make up 12% of the engineering faculty at universities. In the construction industry, no women serve on a board of directors. According to Dr Elleboudy, this situation occurs because members of the board are appointed by selection, not necessarily merit. The men on the boards have not appointed women to serve with them.

The National Council for Women, a governmental agency chaired by Suzanne Mubarek, the first lady of

Egypt, has worked to reduce discrimination of women in many areas since its establishment. Currently, it has other priorities than improving the situation of women engineers in Egypt.

### **Engr. (Mrs.) Ola Sulyman, Immediate Past President, Association of Professional Women Engineers of Nigeria (APWEN)**

Mrs. Ola Sulyman provided an overview of the challenges facing women engineers in Nigeria and described the activities of the Association of Professional Women Engineers of Nigeria (APWEN). She closed her presentation with recommendations to the Nigerian government and UNESCO. The UN conference in Beijing raised awareness of the inequities facing women generally. She noted in Nigeria women are still under-represented at all levels of government and political parties. In addition, no female engineers are present in policymaking positions.

APWEN was established twenty years ago as an independent organization and became a division of the Nigerian Society of Engineers. One of its objectives is to demystify science and instill confidence in girls. APWEN's membership is 300 women. It is unknown how many female engineers are in the country because that data is not collected.

Nigeria needs more engineers. International agencies have estimated that Nigeria needs 230,000 engineers to drive its economic growth. However, only eleven thousand engineers are currently registered with the Nigerian Society of Engineers. One easy way to increase the number of studying in engineering is to attract more girls into the profession. The government has yet to prioritize science and engineering as a vehicle for economic development.

The educational system in Nigeria is based on the 6-3-3-4 system. Female enrollments in primary and secondary levels are quite high but drop considerably at the tertiary level. Women comprise less than 10% of the students in engineering disciplines. Tracking of students in various disciplines occurs early in the educational system, not allowing students much flexibility to switch fields. Girls are not attracted into engineering and do not have the opportunity to study it at a later point.

The government is the major employer in Nigeria. Its workforce is 25% female. Like in Egypt, the private, industrial sector shows a strong preference for men. In academia, women make up less than 5% of the staff in science-related fields. Women rarely study beyond the master degree level. There is a difference in the quality of engineering jobs women are offered. Their positions are usually less challenging and have less opportunities – creating a glass ceiling and fewer women in leadership positions.

Mrs. Sulyman made several recommendations for the Nigerian government. It needs to prioritize science and technology policy as a means for economic growth and recognize the role women can play in increasing the number of engineers in the country. The establishment of scholarships are important in encouraging study. She encourages the government to use awards and other incentives for employers to hire women engineers in addition to mandating that a certain percentage of government contract be awarded to women. The government should also appoint qualified women into ministerial and policy-making positions. Recommended educational reforms include curriculum restructuring and the creation of female friendly classrooms. The training for engineers should be re-oriented to meet industry demands.

She also presented UNESCO with some recommendations. She felt that UNESCO should take a stronger role in encouraging less developed nations to prioritize science and technology policy for economic growth as well as the promotion of women in those fields. She also recommended that UNESCO sponsor activities such as posters, science clinics, and mentoring programs to encourage girls to take greater interest in STEM.

APWEN plans to disseminate the Global Alliance/EIF web site once the final version is posted to the site.

Information about this resource will be sent to engineers and government officials.

**Ms. Irene Muloni, Manager of Information Technology, Uganda Electricity Board**

*Increasing the Recruitment, Retention, & Advancement of Women in Science & Engineering Careers; What Strategies, Programs and Activities in Uganda (full paper available on the Global Alliance web site)*

Ms. Muloni discussed recruitment, retention, and advancement opportunities for women in the technology sector in Uganda. Her presentation began with a recounting of the status of women – the feminization of poverty and limited rights women enjoy. Women are rarely recognized for their scientific accomplishments.

The political situation in Uganda is quite positive to bring about change. The Constitution mandates equal opportunities for both men and women. The current president also supports science and technology for development. There are several policies that ensure women receive the same treatment as men in the workplace. The National Gender Policy and affirmative action plans create the policy environment for gender mainstreaming. There is also a gender weighting scheme at Makerere University that gives women extra points in the admissions process.

The affirmative action strategy has increased the number of women in government positions. Women have representation from every district in Parliament. Twenty-five percent of Cabinet members are women, and the vice president is female. According to Ms. Muloni, gender sensitivity has reached a critical mass and is an issue receiving much attention along with persons of disability. However, in order to address the increase of professional women in the workplace, the government and industry need to work more closely together.

Dr. Malcom observed that the message of promoting women's involvement in science and technology has to be approached from two perspectives. Gender inclusiveness has to be encouraged among individuals in technical fields while groups who focus on gender issues must be educated about why science and technology is a critical issue for them. Depending on the audience, it has to be "sold" in different ways. Scientists and engineers need to be involved in the formation of policy at all levels.

Dr. David Schindel, Director of the National Science Foundation's Europe office, contributed information about several fellowship programs through NSF. Gender equity has not been a factor in awarding fellowships as far as he knows. NSF has a program called "Research Network on Gender Studies" which is a North American and European initiative more focused on the social sciences.

**Mme Adrienne Yulu Mbembo, Cercle des femmes Ingénieurs du CONGO (Association of Women Engineers in CONGO)**

Mme Mbembo described the situation of women engineers in Congo. According to her, there are 450 female engineers in the country. The *Cercle des femmes Ingénieurs du Congo* organizes activities although their male counterparts do not show much support.

**Mme. Gakou Salamata Fofana, President, Association of Female Engineers of Mali & Country Director of Female Education in Mathematics and Science in Africa (FEMSA)**

Mme Gakou provided the participants with an overview of the FEMSA project in Africa. Of the twelve countries involved in the FEMSA program, three are Francophone nations. A major component of the FEMSA program was to determine the difficulties girls face in learning math and science at the primary and secondary levels. They conducted research at many schools such as rural, urban, all-girls, and technical schools. Questionnaires were sent out to parents, teachers, students, and members of the community. After they identified many of the challenges, workshops were held in communities to brainstorm potential solutions. FEMSA then generated action plans for each area. The implementation plan has been underway for three years. Recently, an evaluation was conducted to identify obstacles in implementation and make suggestions for program improvements.

Examples of activities undertaken by FEMSA include

- ◆ Production of a play
- ◆ Inter-school competition to encourage girls' interest in science and math
- ◆ Teacher training for gender sensitivity
- ◆ After school coaching in science and math
- ◆ Hands-on activities such as carpentry and soap-making
- ◆ Science days where girls conduct their own experiments
- ◆ Data collection to measure the impact of FEMSA activities

## **CONCLUDING REMARKS AND WRAP-UP**

### **Ms. Yolanda S. George, Deputy Director, Education & Human Resources, AAAS**

Ms. George summarized the major themes throughout the sessions of this meeting.

1. Access to equal employment
2. Equal opportunities
3. Advancement opportunities
4. Increasing the number of women in policymaking positions and boards
5. Data Collection - Despite the calls for collecting data of this sort, the question was raised whether it is fair to ask the same questions of developing nations as industrialized ones. Collecting such data is a way of informing their own development and building capacity within the nation. UNESCO and Women in Global Science and Technology (WIGSAT) have developed a toolkit for collecting gender indicators and may plan on running training workshops.
6. Follow-up summits to highlight women in STEM issues – Several upcoming conferences were listed where gender or science and technology issues could be added as a side event or a awareness-raising campaign. A more effective way of including gender issues at the more technical conferences may be to discuss it as a “human resources” issue. The strategy for encouraging gender and STEM as a US platform for action in re-joining UNESCO was mentioned again. Possible venues to implement this strategy include:
  - ◆ US re-joining UNESCO
  - ◆ Budapest +5
  - ◆ Beijing +10
  - ◆ World Engineer’s Convention (2004)
  - ◆ World Summit on the Information Society

### **Dr. Tony Marjoram, Program Specialist, Engineering & Technology, UNESCO**

Dr. Marjoram mentioned several activities that he would be working on in the near future. He would like to hold a meeting to develop a global code of conduct for engineering to establish a uniform ethics code for engineers around the world. He is also trying to promote the collection of gender disaggregated data. His strategy for promoting gender in STEM issues is to address them in a larger “globalization” context. “Globalization” is the current buzzword for many UN activities that may enable these topics to get more attention from a wider audience.