

# **Report of the**

## **TÜBA-AASSA Regional Workshop on**

### **“Women in Science & Technology”**

*29-30 May 2014, Izmir, TURKEY*

The TÜBA-AASSA Workshop on “*Women in Science and Technology*” took place on May 29<sup>th</sup> to 30<sup>th</sup>, 2014, at Ege University in Izmir, Turkey. The workshop was organized by the Turkish Academy of Sciences (TÜBA) and the Association of Academies and Societies of Sciences in Asia (AASSA). This was the third of a series of activities for the advancement of women in science that AASSA has organized. The previous workshops of “*Women in Science*” and “*Women in Science, Education and Research*” were held in 2012 in Baku, Azerbaijan and 2013 in New Delhi, India respectively.

This workshop was aimed to sum up the last two workshops and to draw concrete recommendations and action plans. The essences of the last two years efforts “to recognize and to discuss the status of women in science, and to search for methods to promote women scientists and engineers appropriate to AASSA member countries” were continued during this workshop.

The themes of the workshops were (1) to identify the problems of women scientists, (2) to explore government policies in promoting women scientists and the roles of the scientific community for advancement of women scientists, (3) to collate best practices in promoting the role of women, (4) to find out the proper ways to encourage girls to become professionals in Science and Technology and (5) to realize the summation/distillation of the New Delhi workshop.

In total 20 lectures were presented, of which 12 were from international speakers and 8 were from Turkey. The international speakers were from 9 countries, Armenia, Azerbaijan, Bangladesh, Korea, Malaysia, Nepal, Pakistan, the Philippines and Sri Lanka. The members of the ‘Special Committee on Women in Science and Engineering of AASSA’ actively participated in the meeting.

The workshop successfully identified the current situations and problems of women scientists, and addressed the methods to improve the situation. The recommendations and action plans of the New Delhi workshop were thoroughly reviewed and updated. We hope this will serve as the guidelines of future efforts for the advancement of women in science and engineering in AASSA countries and as well as in other countries in the world.

In the inaugural speech, Prof. Ahmet Cevat Acar, President of TÜBA, and the co-organizer of the workshop welcomed the participants and briefly presented the TÜBA and its activities, women in science figures in Turkey and emphasized women’s contribution to

S&T for development. Prof. Namık Kemal Aras, Vice President of AASSA and Vice President of TÜBA, welcomed the participants and gave a brief history of AASSA and explained how important is the proper utilization of women's capacity for science, regional development and competitiveness. Prof. Atilla Silkü, the Vice Rector of Ege University and Prof. Arzum Erdem Gürsan, Associate member of TÜBA also gave their inaugural remarks.

Prof. Doe Sun Na, the international co-organizer of the workshop, Vice President of the Korean Academy of Science and Technology (KAST) and Chair of Special Committee on Women in Science and Engineering of AASSA addressed the importance of the workshop and briefly summarized the achievements women scientists and challenges for the last 15 years in Korea. In 2002 Korean government enacted the 'Act for Fostering and supporting women in science and technology' and then WISSET was established to implement government policy. The status of women in Korea is very poor at the moment, few women are at the top scientific positions e.g. only 4.4 % of Korean Academy of Science and Technology members are women, and is slowly getting better. Also there is leaky pipeline phenomenon due to marriage and family commitments.

Prof. Semahat Demir emphasized the importance of participation of women for promoting the science and technology education and international mobility, presented data and programs to promote science technology, engineering and mathematics (STEM).

Prof. Khairul Anuar Bin Abdullah, Malaysia reported that the global attrition of under-representation of women scientist is progressively changing and aggressively moving up in all fields. The change was accelerated in Malaysia after the Cabinet approved the policy that at least 30% of women must be involved in decision making positions. The governmental policy to enhance women's opportunities to proceed to the top was extraordinary to improve women's status.

Aylin Guney, Turkey explained the challenges and prospects of women scholars in international relations and mentioned that women use different methodology in international relations compared to men.

Roida Rzayeva, Azerbaijan gave a philosophical perspective to the dilemma of women in science. She stated that the middle-aged white man symbolizes the ideal person of modernism, an opposition not-suitable to the scheme that is different to the other. Each other was pushed out to the subconscious or consciously oppressed, ignored and tried to be eliminated, whereas postmodernism has been recognizing each other.

Gunseli Naymansoy, Turkey reported how women engineers were struggling in men dominated world taking them as an example and also presented the examples of first Turkish women engineers dating back from 1950s and showed successful women engineers as role models.

Farida Habib Shah, Malaysia was not able to attend the meeting. However her slides were presented by Shamima K Choudhury and she conveyed the information on current status of women in S&T in leadership roles, importance of role models and mentors for career development of women scientists.

Safiye Ozvurmaz, Turkey presented a prospective study investigating the gender effect on student's perception of status of women in science.

The 2<sup>nd</sup> day meeting started with Naiyyum Choudhury, Bangladesh who gave a speech about the Bangladesh perspective for women in science and technology and achievements after the 2011 when national science and technology policy of Bangladesh was adopted and reported the areas of priority in science and technology for the Country's future.

Eun Hee Cho, Korea identified several problems originating from both cultural and cognitive roots interfering to raise female leaders in science and technology. She offered educating people to remove the gender stereotype and implementing affirmative action for hiring and promoting more women in workforce. She outlined a research grant program for female college and graduate students introduced by WISET as a successful model for supporting future women leaders in S&T.

Azra Khanum, Pakistan stated the various barriers faced by women scientist with reference to Pakistan such as politics, bias, attitudes, family-child responsibilities, bias at the entry and achievement at all stages of academic carrier. She also noted that according to UNESCO institute for statistics only 27 per cent of the world's total science researchers are women.

Hayrunnisa Bolay Belen, Turkey presented gender differences and similarities in cognitive performances, structural and functional brain activity regarding abilities in mathematics and science. She emphasized that the both gender employ different strategies and brain networks during creative performances though the outcome is similar. Understanding the mechanisms of gender based differences during innovative thinking, would increase the efficiency of S&T education particularly for girls.

Lourdez J Cruz, the Philippines reported the women's status in S&T in Philippines and noted that the country is in the 5<sup>th</sup> rank in global gender gap index. She showed female representation along the carrier path and noted that the highest women ratio was in the science academia of Philippines with 38 % women member in NAST PHL.

Nadira Karunaweera, Sri Lanka reported that there are a satisfactory number of females engaged in the tertiary-level education, except for more technically demanding fields and emphasized the contribution of professional courses enabling to by-pass traditional higher educational degree programs for the desired outcome.

Marine Nalbadyan, Armenia mentioned the ways to improve the work efficacy of Armenian women in science and noted that objective professional criteria should be applied for the hiring system depending only on researcher productivity, competence, capabilities and creativity regardless of gender.

Işıl Aksan Kurnaz, Turkey briefly summarized the women scientists in universities and science academy in Turkey, noted that the highest representation rate of female academicians and researchers in the globe is in Turkey (40 %). Low representation of women researchers at the top decision boards and their low representation in the national science academia (8%) have to be improved.

Anjana Singh, Nepal told that Nepali women receive less degree in engineering, mathematics and physical sciences, computer and information sciences compared to life sciences. Through figures from Nepal she confirmed global trend of the lower representation of women at the top positions of S&T.

Shamima K Choudhury, Bangladesh emphasized that women should become partners for introduction of modern scientific methods and particularly for sustainable agriculture in the rural areas of the developing countries. Low representation of women in science and engineering is the major hindrance to global capacity building in S&T. She also gave detailed recommendations to improve women's status in S&T starting from primary to higher educational levels and at the professional level as well.

Aftap Ahmad Chatta, Pakistan presented statistics related to scientific outcomes in the region, a need for scientific networking and addressed the major hurdles for promoting science and technology in the region as conflicts, language barriers and lack of centralized institutes.

The meeting ended with a general discussion session chaired by Professor Na and Professor Bolay. Professor Na made the closing remarks based on presentations and discussions of the workshop and mentioned that the participants basically confirmed the recommendations of the New Delhi Workshop. Some modifications were made to improve the New Delhi statement as follows:

## **Summary of Facts and Challenges**

### **I. General Observation**

1. Marriage, motherhood, and poverty have great impact on women's participation in science and engineering.
2. Leaky pipelines are mainly due to lack of family, government, and workplace support.

3. Women are less likely to be promoted to top leader positions (glass ceiling effect). Women in decision-making boards and other important committees as leaders, mentors and role models are much smaller than their counterpart males.
4. Much more women are on the temporary jobs compared to permanent ones.
5. Proportion of women in engineering is low and girls are reluctant to choose engineering as a career. This presents a big challenge to achieve a goal of 50% women in engineering.
6. Gender bias, mindset of male leaders, sociocultural effects for both men & women have great impact on cultivating women leadership.
7. Women are more self-critical for evaluating own abilities and success, which contributes to leaky pipeline in the science and engineering career.

## **II. Education of Girls**

1. No apparent neurobiological basis exists for math abilities and gender difference in science.
2. Education methods, laboratory tools, hands-on practical approaches could improve girls' learning and overcome the gender difference in science. There are deep, social, cultural and economical roots for the low representation of women in S&E: One end of the spectrum is the false belief that girls can not be succesful in science and maths , while the other end is the misperception that men and women are equal biologically.
3. Creativity and innovation performances are similar in both gender however strategies employed for a solution are different as well as the functional brain connectivity maps. Men and women seem to use different brain regions/networks and have different functional brain structure which are complementary to each other during innovative performance.
4. Increasing awareness and the teaching gender stereotype is useful for eliminating mindset and increasing the success rate of women in science courses.

## **Recommendations and Actions**

The participants confirmed the previous recommendations from the New Delhi Workshop in 2013. Some modifications were made to improve the statement. Several items were newly introduced.

### **I. General Statements**

1. Women in leadership position: It is essential to have women in leadership and decision making positions.
2. Encourage women scientists in self-actualization and self-realization of their potential.
3. Skill development and mentoring: Mechanism need to be evolved for skill development and mentoring at all levels of career including the students, entry-level scientists, scientists in mid-career, and senior level leadership positions.

4. Networking: The Networking of women in science including relevant researchers and others should be established nationally and internationally that can provide support, guidance, and opportunity for female scientists through mutual exchange of ideas and experience.
5. Data collection and analysis: It is essential to collect and analyze data of women in science and engineering emphasizing horizontal segregation during career development like influence of family and role models, and vertical segregation in careers like issues of glass ceiling, sticky floor, mentoring/tutoring etc., which would be necessary for policy decisions.
6. Family-friendly policies: Day care centers are essential. Good to have policies which allow for a break in work for family reasons but need to design policies which can obviate the need for a long break and/or minimize the length.
7. Flexibility of employment time and conditions: Flexible time schedule for work is necessary. Flexible funding for up to a year of family leave in project positions should be available and possibility of up to 2 years of leave for family reasons during a career should be considered. Such schemes already exist in some countries like India and Korea.
8. Public awareness of gender gap in science; It is urgent to raise awareness of gender discrimination in science, engineering and technology at multiple levels such as education, employment, advancement, recognition and income, which need serious attention and action for clearing hurdles for women as they pursue careers in science and engineering for full utilization of the labor force.
9. Gender similarities and gender differences: The society needs to be sensitized for “gender similarities” not “gender differences”.
10. Empower women scientists by balancing their lives at the personal, institutional, and academic levels, and revise the career descripton for women (*double career*), reimburse/ praise their family responsibilities.
11. Diversity is enhanced by women’s participation in S&E, which leads to effective development of S&E.
12. There should not be any salary gap for the same job based on the gender and the ratio of women in permanant positions should be increased.
13. The good practices for supporting women scientists should be collated and adopted to other countries also.
14. Science communication and science outreach programs: Scientists and engineers should put more effort for communicating with the public. The outreach programs can utilize the abilities of women scientists who have opted not to take up science as a career but want to be home makers. In countries like India and Korea this happens already. One might have country specific issues to take care of in this case.

## **II. Actions**

1. Set up database for women scientists, with a standardized format for sharing.
2. Collect and analyze the data necessary to design policy initiatives effective in meeting academic needs of women researchers

3. Organize workshops for women at different levels of career development. The workshops for training leadership roles and grant writing are needed especially for young female researchers.
4. Create a directory of women zonal/national/international women leadership, mentors and role models.
5. Develop proper networking mechanism for women scientists regionally and globally. Organize mentor/mentee workshops and planned visits on a regular basis.
6. Facilitate empowering women scientists throughout the career path
7. Create funds for travel grants, short term fellowships, and research grants for women at various levels.
8. Recommend nominations of women scientists for Committees, Academies, and Awards/Honors.
9. Provide more training programs for capacity building of young scholars, especially in the newly emerging sciences.
10. Provide supporting facilities and women-friendly environment that will enable more girls and women at each step of their professional career right up to the top management or professorial levels.

### **III. Recommendations for Education**

1. Educate parents and teachers about the “gender similarities” to break mindset.
2. Help capacity building for science and engineering education with equal opportunities for boys and girls.
3. Provide opportunities for research projects during studentship and in the early stages of their career.
4. Develop country specific outreach program for female students, teachers, and science professionals.
5. Create more awareness campaign through math and physics Olympiads, Science fairs etc.
6. Use new and emerging technologies for popularizing S&T among young children and young women.

### **IV. Recommendations for the Academies**

1. Establish Standing committee on women in science wherever needed.
2. Increase ratio of women in offices and fellowships
3. Recommend Gender Audit. Modality/norms should be set up. The above standing committee can recommend these to the government.
4. Emphasize the importance of school education in science in general, mathematics in particular. Since large numbers of women are involved in school education, this issue has a huge overlap with educational activities of all academies and should be taken into due consideration.
5. Organize international meetings of women academicians and scientists
6. Provide women faculty members opportunity to re-structure science and engineering courses.

## **V. Recommendations for Cooperation**

1. Networking between different academies of Asian/Oceanic countries: All the academies should develop a database of women scientists which will be shared to all the academies of involved countries.
2. Establish funds for women scientist exchange programs, at different levels.
3. Have a special session on women in science whenever one of the big conferences (IUPAP, IAP, AASSA etc.) is held in the Australasian region. Establish travel funds for women scientists' participation in these sessions.
4. Structured Mentorship programs should be developed involving senior scientists, both men and women, who are willing to contribute towards this program.
5. All Asian/Oceanic countries should exchange information resources about their activities related to women in science. They should establish exchange programs in such a way that scientists in one country can participate in these activities in other countries and the necessary travel funds should be established.

### **Report prepared by:**

Doe Sun Na (Korea)  
Hayrunnisa Bolay (Turkey)  
Arzum Erdem Gursan (Turkey)  
Eun Hee Cho (Korea)

### **Suggested Corrections by:**

Shamima K Choudhury (Bangladesh)  
Naiyuum Choudhury (Bangladesh)  
Anjana Singh (Nepal)

**Date:** June 9th, 2014

**Attachment:** Workshop Program





## 28 May 2014, Wednesday

Arrival of participants to Izmir

## 29 May 2014, Thursday

9.30-10.30

Registration

10.30-11.00

Opening Ceremony

**Arzum Erdem Gürsan** (TÜBA Associate Member)

**Namık Kemal Aras** (Vice President of AASSA)

**Ahmet Cevat Acar** (TÜBA President)

**Candeğer Yılmaz** (Rector of Ege University)

11.00- 11.25

**Chairs: Farida Habib Shah, Namık Aras**

**Doe Sun Na**

Women Scientists in Korea: Achievements and Challenges

11.25-11.50

**Semahat Demir**

Importance of Diversity to Promote the Science and Technology Education and Workforce Internationally

11.50-12.00

**Workshop group photo**

12.00-13.30

**LUNCH**

13.30-13.55

**Chairs: Naiyyum Choudhury, Semahat Demir**

**Khairul Anuar Bin Abdullah**

Women in Science and Technology in Malaysia: A case study

13.55-14.10

**Aylin Guney**

Women Scholars in the Field of International Relations : Challenges and Prospects Regarding the Turkish Case

14.10-14.25	<b>Roida Rzayeva</b> Postmodern: A Thematization of Woman
14.25-14.40	<b>Gunseli Naymansoy</b> Turkish Women in Engineering
14.40-15.00	<b>Coffee Break</b>
15.00-15.25	<b>Chairs: Khairul Anuar Bin Abdullah, Aylin Guney</b>
15.25-15.40	<b>Farida Habib Shah</b> Women in S&T in leadership roles- Current status
15.40-15.55	<b>Safiye Özurmaz</b> Are There Gender Differences in Students' Perceptions of Status of women in Science?
16.00-18.00	<b>Erdenebileg Tudev</b> The intervention study
18.00-18.30	<b>Visit the research centers in Ege University</b> Pharmaceutical Sciences Research Centre (FABAL) Natural History Research and Application Centre Ege University Science and Technology Centre (EBILTEM)
18.30-21.00	Bus transfer to the restaurant <b>WELCOME DINNER</b>

### 30 May 2014, Friday

9.45-10.10	<b>Chairs: Roida Rzayeva, Anjana Singh</b>
10.10-10.25	<b>Naiyyum Choudhury</b> Women in Science and Technology For Development- Bangladesh Perspective
10.25-10.40	<b>Eun Hee Cho</b> To Raise Female Leaders in Science and Engineering
10.40-11.00	<b>Azra Khanum</b> Various Barriers Faced by Women Scientists with Reference to Pakistan
11.00-11.25	<b>Coffee Break</b> <b>Chairs: Nadira Karunaweera, Gunseli Naymansoy</b>
11.25-11.40	<b>Hayrunnisa Bolay Belen</b> Is There Any Neurobiological Basis for Gender Gap in Science
11.40-11.55	<b>Vanny Narita</b> The Need to Develop Policies for Enhancement of Women's Role in Science, Technology, and Innovation in Indonesia
12.00-13.30	<b>Lourdes J Cruz</b> The Important Role of Filipino Women in Science, Technology and Inclusive Development
13.30-13.55	<b>LUNCH</b> <b>Chairs: Eun Hee Cho, Erdenebileg Tudev</b>

	<b>Nadira Karunaweera</b> Gender Influences in Education and Education-Related Employment in Sri Lanka
<b>13.55-14.10</b>	<b>Marine Nalbadyan</b> Mechanisms and ways to increase the efficiency of work of Armenian women in science
<b>14.10-14.25</b>	<b>Işıl Aksan Kurnaz</b> Turkish Women in Life Sciences
<b>14.25-14.45</b> <b>14.45-15.10</b>	<b>Coffee Break</b> <b>Chairs: Vanny Narita, Işıl Aksan Kurnaz</b>
	<b>Anjana Singh</b> Women in science and technology education in Nepal
<b>15.10-15.25</b>	<b>Shamima K Choudhury</b> Gender in Science – a global problem
<b>15.25-15.40</b>	<b>Aftab Ahmad Chattha</b> Research in Asia: Issues and Challenges
<b>15.45-16.45</b>	<b>Chairs: Doe Sun Na, Hayrunnisa Bolay Belen</b>
	<b>Final remarks on meeting report and discussion</b>
<b>16.45-17.00</b>	<b>Closing remarks</b>
<b>17.00</b>	Bus transfer to the museums
<b>17.00-18.15</b>	<b>Visit the museums in Ege University</b> Paper museum Ethnography museum
<b>18.30-21.00</b>	<b>DINNER</b>

<b>31 May 2014, Saturday</b>	
<b>9.00-18.30</b>	<b>Field trip to Ephesus for foreign speakers</b>