Understanding the gender implications of STI in the global context
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As the Gender Advisory Board, IFPRI and others have found, the effects on women of technology are not adequately understood or taken into account in policy or programming at the international level. There are many examples of technology in both the developed and developing worlds that fails to take into account women: Seatbelts are dangerous for pregnant women and their fetuses; airbags that have been designed for the 180 lb male, are just some examples.

In the developing world, it has become clear that women's productive activities are not supported by technology and resources to the same extent as those of men. While sex-disaggregated data on this is not regularly collected, we do have enough research that we can see some clear trends:

In its 2012 World Development Report on Gender Equality and Development, the World Bank notes that women's farms and enterprises have lower levels of access to resources such as technology, information, inputs, credit and training. This results in gender differences in productivity both on and off the farm:

1. We see the situation that female farmers show 20-30% lower productivity than males. This happens within as well as between households: the productivity of women farmers in Burkino Faso is 18% less than male members of the same household

2. Worldwide, businesses run by female entrepreneurs have lower levels of productivity than male-managed enterprises:

The value-added per worker is less:

By 34% in Europe/Central Asia

35% in Latin America

6-8% in sub-Saharan Africa

A study in rural Bangladesh, Ethiopia, Indonesia, and Sri Lanka found significant differences in profitability between female and male-owned businesses. In Bangladesh, the average output per worker was eight times - 800% - higher in firms operated by men, with the smallest differences in Indonesia at an output 6 percent lower for female-owned firms per worker.

Moving to other areas, we know that women and girls' daily activities are critical for the health and sustainability of households, yet, they too are poorly supported by technology:

For example, water-borne infectious diseases are holding back poverty reduction and economic growth in many of the world's poorest countries[i], with 19 per cent of the rural population in the developing world using unimproved sources of water in 2010.

Women and girls are particularly at risk, since they collect most of the water used household and farming activities such as food preparation, care of animals, crop irrigation, household hygiene, care of the sick, cleaning, washing and waste disposal[ii].

What's needed to improve the health of the rural poor and decrease water-borne disease and mortality? Improved sanitation, better water treatment, more efficient irrigation. Lack of proper and secure sanitation facilities bars girls from attending school regularly.

Inefficient, high-emission cookstoves and cooking facilities continue to affect the health of women and children globally. Approx 2.7 billion people worldwide rely on open fires and traditional stoves for cooking and heating. As well as contributing to climate change, this situation has enormous health implications. The number of people who die prematurely each year from the indoor use of biomass is just under 1.5 million – more than the total deaths from malaria and tuberculosis combined. Clean cooking facilities would prevent the majority of these deaths attributable to indoor air pollution[iii]. Other health implications of this form of energy include injuries and strains from walking long distances carrying firewood, as well as risks to security.

Girls and women are predominantly responsible for the provision of firewood and for cooking family meals, so that the effects of this inadequate technology support are gendered. Rates of respiratory illness are the same for girls and boys until age 5, when boys leave the house for school and other activities. From that point, rates of illness consistently increase for girls and women[iv], in the form of eye problems, cancer and asthma relating to cookstove emissions and indoor air pollution.

> *But we also know that this situation can be changed. Positive changes can occur when the causes for gender differences in productivity are addressed:*

FAO has estimated that equalizing access to productive resources for female farmers – fertilizers, extension, technology and credit – could increase agricultural output in developing countries by 2.5 – 4 % and result in 100 to 150 million fewer hungry people globally.

Data from the World Economic Forum and the Economist Intelligence Unit indicate that If women's paid employment rates were raised to the same level as men's, GDP would

rise 5% in the US, 9% in Japan, and 12% in the United Arab Emirates and a huge 34% in Egypt.

> *On the other side of the question, where are the women in S&T and how is this absence affecting the focus and approach of research and development? How does it affect the uptake of S&T by women?*

The percentage of female extension agents in sub-Saharan Africa in 18%. In West Africa it is 7-10%. What would be the difference if more women were trained in agricultural sciences to work with women farmers?

The National Assessments on Gender and STI project - studied the status of women in the knowledge society and STI sector of 6 countries and one region – Brazil, India, Indonesia, South Africa, South Korea, US and EU. It found that:

Numbers of women in the science, technology and innovation fields are alarmingly low in the world's leading economies, and are actually on the decline in many, including the United States.

Women remain severely under-represented in engineering, physics and computer science enrollments — less than 30% in most countries – while the numbers of women working in these fields are also declining.

Women have lower levels of access to the productive resources necessary to support active engagement in STI – property (land); finance; technology; and education.

The translation from women's proportion of S&E enrolments to S&E workforce sees a drop of 30% in most of the countries in the study.

For example, women continue to be underrepresented in fields such as energy, industry, construction and engineering. The share of female employees in the energy industry is estimated at only 20 percent, with most working in nontechnical areas.

> *The Elsevier Foundation, OWSD, and TWAS are working in two key initiatives to address these issues – National Assessments in Gender and STI , and GenderInSITE, Gender in Science, Innovation, Technology and Engineering - in the recognition that the gender dimensions S&T for development are little understood;*
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> that this deprives countries of women's creativity, abilities and vision for the betterment of societies;

and at the same time while women's contributions to sustainable socio-economic development are critical to poverty reduction and the MDGs – as food producers and providers, owners of micro and small-scale enterprises, healthcare providers, household managers, educators and natural resource managersv – the S&T needed to support these activities is not readily available to them.

1. The project **National Assessments in Gender and STI** is a joint initiative of OWSD and Women in Global Science and Technology (WISAT) which measures the participation of women in national STI sectors, using the Gender Equality-Knowledge Society indicator framework developed by WISAT. The GE&KS framework incorporates gender-sensitive data on key areas in the knowledge society (ICT, science, technology and innovation) with gender indicators of health, economic status and social status to assess the barriers and opportunities for women. The first phase of the Assessments, funded by the Elsevier Foundation, used the GE&KS framework to assess the situation of women in the 6 countries and one region described above.

As well as the findings I just mentioned, the study found that:

- Gender mainstreaming policy is insufficient to achieve results in itself, and requires strong implementation, including funding.
- Female parity in the science, technology and innovation fields is tied to multiple factors, with the most influential being higher economic status, larger roles in government and politics, access to economic, productive and technological resources, and a supportive policy environment. Findings also show that women gain ground in countries that have health and childcare, equal pay, & gender mainstreaming.
    - If women are not equal in society or the workforce, they are not present in substantive numbers in a national knowledge society. For example, South Korea's impressive achievements have been accomplished while leaving out women, demonstrating the lack of correlation between a country's GDP and gender equality.
- While important, access to education is not a solution in and of itself and neither is economic status. It's only one part of what should be a multi-dimensional policymaking approach. There is no simple solution.

In 2013, the Foundation is supporting the expansion of the study to three more countries in Latin America, while Sida will support national assessments in four countries in East Africa: Ethiopia, Kenya, Rwanda and Uganda.

2) GenderInSITE – Gender in science, innovation, technology and engineering

GenderInSITE **–** is a global initiative involving stakeholders from a range of different sectors to promote:

- the role of women IN science, technology and innovation
- how science, technology and innovation can be FOR women, or how can it serve women's lives and livelihoods at the grassroots level.

GenderInSITE was initiated to promote the awareness of decision makers at all levels that STI for development policy and programs will be more effective, equitable and sustainable when the gender lens is applied – when they reflect the vision, aims, concerns, perspective, knowledge and abilities of both women and men.

It was founded by OWSD, TWAS and the Gender Advisory Board of the UN Commission on Science and Technology for Development and has been joined by the Africa Centre for Technology Studies, the Chinese Academy of Sciences, the Elsevier Foundation, the UNESCO Chair on Women and S&T for Latin America and UNESCO. GenderInSITE is co-Chaired by Prof Fang Xin, of OWSD and the Chinese Academy of Sciences, and Dr. Shirley Malcom of the Gender Advisory Board and AAAS. We recently received a 5 year grant from the Swedish International Development Agency.

GenderInSITE will pursue its goals by promoting the use of gender assessment to:

- Demonstrate in key issues and sectors how gender analysis of SITE can lead to improved development.
- Highlight women's transformative role in development and how it can be supported using SITE;
- Highlight the contributions of women to SITE.
- Promote the advancement and leadership of women in SITE.

Focus Areas:

- Agriculture, food security and nutrition
- Water, sanitation and health
- Energy
- Infrastructure
- Climate change
- Biodiversity and environmental management
- The use of ICT to support these activities.

The initiative has just started its first year of operation, and will soon be reaching out to you for support and help in spreading the word.

On behalf of OWSD and its partnering groups, we look forward to working with you as we move this agenda forward.

[i] UNDP, 2006. Human Development Report 2006: Beyond scarcity: Power, poverty and the global water crisis. New York: United Nations Development Programme.

[ii] UN Women, 2012. *The Future Women Want: A Vision of Sustainable Development for All.* New York: UN Women.

[iii] International Energy Agency (IEA), 2011. World Energy Outlook 2011. Paris: International Energy Agency.

[iv] ENERGIA, n.d.. Fact Sheet on Energy, Gender and Sustainable Development. [online]. Available from: http://www.energia.org/knowledge-centre/fact-sheets/.

[v] UNCTAD, 2011. *Applying a Gender Lens to Science, Technology and Innovation*. Current Studies on Science, Technology and Innovation, No. 5 ed. Geneva: United Nations.