MAKING THE CASE FOR GENDER

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Many nations of the world have developed and initiated efforts individually to increase the participation of women in science and engineering as part of domestic policy strategies. In some cases this has been done in response to "rights- based arguments" in support of equal access and equal opportunity. Much of this focus has emerged from the over 30 years of attention given to the advancement of women as part of the Summits on Women held under the sponsorship of the United Nations. In other cases such a policy has been embraced to address issues of employment needs for a knowledge-based economy and to build workforce capacity. There has, for example, been a steady increase in the number of women enrolling and completing tertiary degrees in science and engineering, especially in countries that have focused on developing a knowledge-based economy. But there remains also wide variation among countries, from levels of women tertiary graduates in the range of 40 per cent in countries such as Portugal, to lows of under 20 per cent for Japan and the Netherlands. Whatever the drivers, the actions undertaken have usually encompassed the following:

- Equal access and opportunity for basic education
- Inclusion of science and mathematics curriculum and instruction as a component of basic education
- Access to appropriate secondary education, including rigorous curriculum in mathematics, science and technology.
- Recruitment of both female and male students with interest and ability to tertiary study in science, engineering, technology and mathematics, with financial support provided equitably to ensure their study to the highest levels.
- Provision of labor force skills and passage of equal opportunity legislation to ensure their smooth transition into the workforce.
- Development of a system of data collection, monitoring and enforcement to promote equal opportunity in employment as well as advancement within the various sectors of the economy.

But gender, science and technology and women's participation in science and engineering are global issues that require global strategies such as those that we propose in this document.

Approach

Increasing women's participation and retention among the community of researchers in all sectors will require additional strategies beyond those currently employed, strategies that can only emerge with research into the causes of losses and policies that respond to address these. Women must be enabled to support innovation and be given an opportunity

to rise to leadership positions in science and technology in all sectors—government, industry, education and civil society.

In addition there are countries among the L20 that have made special efforts to encourage and support science-based business development by women. This has included offering business "incubation" and assistance around issues such as patenting, obtaining venture capital and women-designated "set-asides." Such preferential "set asides" are often used to overcome the historic inequalities through support for the development of women-owned business as they transition from a pre-competitive to competitive status.

Some nations have moved beyond domestic policies focused on developing a talent pool for science, engineering and technology that includes men and women, to those policies aimed at achieving true gender mainstreaming. Mainstreaming a gender perspective, as outlined by the UN Economic and Social Council (ECOSOC), is "the process of assessing the implications for **women and men** (emphasis added) of any planned action, including legislation, policies or programmes, in any area and at all levels. It is a strategy for making the concerns and experiences of women as well as of men an integral part of the design, implementation, monitoring and evaluation of policies and programmes in all political, economic and societal spheres, so that women and men benefit equally, and inequality is not perpetuated."

For science and technology it means ensuring that gender is considered in establishing research priorities as well as in the design and execution of research and development projects across the board, but especially in areas such as health, agriculture, engineering and materials science, environment, energy and consumer technologies, for example. To achieve this mainstreaming, countries have put in place such policies as:

- Inclusion of women and men as members of advisory and review bodies, without tokenism.
- A "gender impact" audit among the directives given to committees of visitors and review groups for funding agencies and ministries.
- Incorporation of a "broader impacts" criterion for review of research proposals and extension of the concept of merit to ensure that both technical considerations and larger societal effects guide the country's research investment strategy.
- Specific efforts to ensure women's leadership and advancement at the highest levels of policy- and decision-making.

Not all nations have accepted these positions for gender inclusion in science, technology and engineering, despite evidence of the success of businesses that deploy diverse teams of professionals, or the positive effects on families and communities of investing in the education (including education in science and technology) of women as well as men. For some, where the traditions are those of separate education for men and women, the L20 notes effectiveness of strategies that have included building quality engineering schools and science programs for women, a tradition seen both in developing and developed countries alike.

Other countries have deep cultural traditions that require affirmative responses to overcome, including systems of incentives and disincentives (tax credits vs. fines and penalties), coupled with campaigns to promote women in science, engineering and technology as a positive social goal.

Old ideas die hard. Moving from women's exclusion to women's inclusion to incorporating a gender perspective into policy-making and decision-making in science, engineering and technology is an idea whose time has come. Achieving sustainable economic development compels it. The world science community is itself abandoning old traditions based on more informed perspectives of women's ability to perform in science and engineering at the highest levels. A recent report from the InterAcademy Council spells out the opportunities within the science academies of the world to support the idea of "women for science." The World Federation of Engineering Organizations is addressing women in engineering issues through its larger focus on capacity building.

At the meeting of the World Conference on Science held in Budapest in 1999, L20 countries agreed (with the acceptance of paragraph 90 of the report) on the need to join with civil society in efforts to "ensure the full participation of women and girls in all aspects of science and technology." This communiqué outlines an approach for implementing the agreed upon goals, thus living up to the vision articulated in the report.

Beyond the consideration of women and girls in science and technology and science and technology for women per se lies concern for the integrity of science. In the words, of Ismail Serageldin, Head of the Library of Alexandria, "discrimination of any kind is corrosive to the values of science."

The L20, working in concert with civil society, can achieve these ambitious goals around gender, science and technology. With strong consideration of gender as it interacts in science and technology for development, the world will have a real chance at actually meeting the UN's Millennium Development Goals (MDGs)!

Promoting Regional Cooperation

In preparation for the Beijing Women's Conference of 1995, a small UN agency, the UN Commission on S& T for Development, tasked a working group to articulate a set of transformative actions that could, if undertaken, move globally toward increasing women participation in science & technology and support science and technology in addressing women's needs. With support from the Dutch Foreign Ministry, the successor Gender Advisory Board undertook the work of monitoring the report approved by ECOSOC and setting in place structures for technical assistance to support its implementation.

Collectively the L20 plan and goals support the agreed upon transformative actions that emerged through ECOSOC. The wisdom of a regional approach is noted in both the agreements that have emerged from the Organization of American States as well as the studies, agreements and implementation mechanisms established by the European Union. Within the framework of the L20, countries commit to establishing national committees

and to collaborating in regional networks focused on gender, science and technology. Where such regional structures do not exist the L20 would support their development and maintenance for a minimum of 15 years. Within national committees, as envisioned in the ECOSOC-ratified document, men and women would examine the internal machinery to identify aspects of S&T, educational, employment and economic development policies to identify those that support and impede gender mainstreaming within the country. Working collaboratively with other national committees in the region under the auspices of a regional office there would be support for sharing of strategies and experiences appropriate for regional development. Support for leadership training, monitoring and development of a strong NGO community focused on gender, science and technology would complement this work.

Regional collaborations would support exchanges of women scientists and engineers; their involvement, training and research support within centers of excellence; development and testing of high quality, gender-sensitive curricular materials; networking for research collaboration; or any of many other possible other elements within a strategic plan for gender, science and technology developed for the region.

A number of important science organizations that also have regional structures would be invited as collaborators. These include regional structures of UNESCO and the International Council for Science (ICSU), as well as organizations such as the Academy of Sciences of the Developing World (TWAS), the organization for women scientists of developing world, TWOWS, and the Inter Academy Panel. All would participate in the development of regional strategic plans for gender, science and technology.

Regional research agendas and plans of existing institutes would be examined for their relevance to the needs of women and to assess whether there is differential impact on women and men in the formulation and implementation of their work.

Global Actions

Science is a global activity and the community of scientists is global. Unless we mount strategies to move women into that global conversation, they and their work will be marginalized. The L20 will lead a re-examination of the MDGs, and the science and technology choices to respond to these, considering where there may be differential impact on women and men and proposing strategies for assessment of these going forward.. Paragraph 90 of the report of the World Conference on Science recommends development of campaigns to urge girls' and women's participation and the establishment of a global network of women in science, engineering and technology. The L20 will lead by example, establishing a fund to encourage and support collaborative (multi-partner, cross-national) science and technology research that includes significant roles for women; supporting women's involvement in science and technology research centers of excellence; and ensuring access to information and communications technologies so vital to international networking and research.

Collectively the countries of the world have invented many organizations and structures to address shared needs as co-inhabitants of the planet. We have participated in establishment of the United Nations, agreed on the value of reducing greenhouse gas emissions, and established monetary structures for loans in support of major development projects. It is time for the L20 to institute a three per cent "set-aside" in all such loans to: finance efforts to build local capacity, that is, to develop the women and men engineers, scientists and other technical and craft personnel to support the long term maintenance and work on these projects; and support the research on and remediation for any differential impacts of these projects on women and men.

Following from the L20 meeting a task group will be established to develop timelines for moving forward on these actions as well as to develop carefully considered messages to communicate to world leaders the stakes involved in implementing (or failing to implement) this gender, science and technology agenda.