5. Academies to lead the way

– Academies must set an example for all of the world to see of welcoming women scientists and engineers to their ranks and treating them as full partners with men. –

National academies can play a valuable role in transferring S&T skills to women at the grassroots level, as described in Chapter 4; and they can be influential in other efforts—academic, governmental, industrial—aimed at achieving gender equity in S&T-related professions (Chapter 3). But in order for academies to truly help in the changing of corporate cultures and diversification of other workplaces, they must first put their own houses in order. Because academies are at the pinnacle of the S&T establishment, their own enlightened examples can inspire other organizations. Alternatively, if academies essentially adopt a policy of 'Do as we say, not as we do,' other entities could similarly take the issue less than seriously—with a consequent persistence or worsening of today's inequitable status quo.

National academies therefore each need to adopt policies and practices that create fair and inclusive working environments within their own domains and that influence individual academy members to practice inclusiveness at their home institutions. And through the workings of academies' far-reaching networks and collaborations, they may be effective in improving the representation of women not only throughout their countries but also in the international S&T community.

The present challenge for the academies, however, is sizeable. At the U.S. National Academy of Sciences (NAS), for example—an institution with more than 2,000 members as well as 340 foreign associates from 40 countries—women scientists have traditionally been a small fraction of the membership. With concerted efforts to increase the nomination pool, annual inductions of women have reached over 20 percent in the past few years, though many of these women are in the social sciences. Overall, the proportion of NAS women members is still under 7 percent, with the percentage among mathematicians, physicists, chemists, and engineers hovering around 2 to 3 percent.

In the United Kingdom, the Royal Society of London has seen a 10-percent increase in the number of women elected to membership in the

past five years. But because just 44 Fellows are elected each year, the presence of women overall—and especially in mathematics, physics, chemistry, and engineering—continues to remain low (at only 4.5 percent). Elsewhere in the world, the percentage of women academy members in the science and technology disciplines is similarly depressed—at an average of around 5 percent.

Within most academies, moreover, women members may not get to participate fully in meetings and committee work. And women members rarely find themselves in positions of power and leadership. Thus the InterAcademy Council Board, made up of the presidents of 15 prominent science academies, has no women members.

A December 2004 survey undertaken for this report showed wide variation in the range and strength of efforts by academies to address the underrepresentation of women among their membership. Most responses did show some awareness and concern about the problem, though they each tended to look elsewhere for direction. Many simply stated, in effect, that the academy is not actively doing anything but is interested to learn from others.

Yet among academies there are nevertheless some striking examples of gender balance worth emulating. The National Academy of Science and Technology of the Philippines (NAST), for instance, has had a woman president for two terms. Women have parity on the NAST Council, and women form almost one-third of the membership. Similarly, the science academies in India have a large number of women officers and pay strong attention to gender issues, as noted earlier in this report.

Several academies offered suggestions for action during the preparation of this report. All were considered by the Advisory Panel, and some have been incorporated into its recommendations. On the other hand, many of the proposed initiatives were small-scale and individualized, tending to focus on supporting just a few women, and were often based on the erroneous premise that women need help because they are inherently lacking in some way.

Stronger, more realistic, and more replicable efforts are required, especially those that go to the heart of the problem. Thus it is the Advisory Panel's belief that the most appropriate way for academies to address the underrepresentation of women members is to foster an inclusive institutional culture based on good management practice, as described in Chapter 2 and reflected in the discussion and recommendations below.

Commitment from the top

The first element of good management practice, simply because it affects all others, is commitment by those in the top echelons. In an academy, it is the president and council that must commit to including qualified women scientists throughout their organization, to appointing women to decision-making committees, and to introducing gender-equality principles into the academy's offices, programmes, and research institutes. In that spirit, the Advisory Panel recommends that the president and council of each academy sign a public commitment statement, a sample of which is shown in Box 6.1.

Put gender issues on the agenda

The single most important action an academy can take is to immediately put gender issues on its agenda. The president and council are thus asked to commit to the practice of inclusiveness at all levels of their organization and in all academy actions. Responsibility for gender issues may be assigned to a dedicated academy member (in small academies) but preferably to a standing diversity committee composed of women and men academy members. This committee, which helps formulate plans to remedy imbalances in gender representation within the organization, must report directly to the academy president and council.

Data monitoring

A primary responsibility for the diversity committee is the regular collection, analysis, and reporting of sex-disaggregated data. Such data are key elements in bringing gender issues to the fore and in measuring the success of programmes intended to improve the organization's gender balance. The Advisory Panel recommends that the committee report yearly to the academy's president, council, and membership, and that reports from the individual academies be aggregated and discussed at the IAP annual meeting. Within a few years time, the annual gender-issues reporting will become mainstream.

Widening the pool of nominations

Specific academy strategies must be employed to enlarge the pool of women who can be nominated for membership as well as for prizes, awards, and grants that the academy bestows. Raising the awareness of the membership of the need to diversify its ranks, and instigating more formal procedures such as mixed-gender search committees have been used with

some success. Other measures adopted by some organizations include a special election for women candidates only and the exemption of qualified women from the numerical upper limit set for the year.

One direct and creative way of increasing the nomination pool of women is by giving preference to the election of younger members. The reasoning here is that the traditional average age of election reflects the gender composition of science and engineering departments some 30 years ago. But with the definite progress that has been made since then, a younger cohort will have a much better gender balance. This reality has been incorporated into the policies of the National Academy of Sciences, India; the German Academy of Natural Scientists, Leopoldina; and the Royal Netherlands Academy of Arts and Sciences, each of which has introduced a 'young members' category. About one-third of Leopoldina's 'young academy' are women. In its first round of elections this past year, the Netherlands Academy selected 40 members of its new 'young academy.' Twenty of these members are in S&T-related fields, and 7 of the 20 are women.

Widening the pool by itself is only a first step; the people in that pool then need to be evaluated fairly. Awareness that women's accomplishments are judged more severely than men's, by women and men alike (Steinpreis et al., 1999), begins to reveal the additional obstacles that women have to surmount between being nominated and actually being elected.

Increasing women's participation and visibility

Academies can heighten the visibility of women scientists in general by expanding their involvement in academies' activities. Positive actions cited in responses to the Advisory Panel's survey include supporting women's inclusion in academy boards, panels, and committees (www.interacademycouncil.net). Also, women should be included in study programmes and professional meetings. Other positive actions cited were increasing women's presence on speaker platforms; ensuring that both women and men scientists and engineers are represented in academy publications and educational materials; and expanding women's opportunities to chair academy bodies and conference sessions.

In these ways, women become directly involved in setting research priorities and directions and in allocating funding. Such activities also offer exposure and self-development opportunities to women, and they raise awareness among men in their peer groups—along with that of the S&T

community in general—of women scientists' skills and talents. In addition to raising women's profiles, the full and equal involvement of women on these bodies serves to enhance their career development and helps them to cultivate leadership skills.

Sponsoring and evaluating research

In their roles as sponsors of research, reviewers of research proposals, and evaluators of research laboratories, academies have opportunities to show leadership on gender issues and ensure that good management practice is being followed. For example, when academies form panels to evaluate the performance of research institutes, they must include in their criteria the working conditions of women and other minority staff of the institute being evaluated. It is preferable, moreover, for such panels to be mixed-gender, receive diversity training prior to their visits, and include a member with expertise in diversity issues.

Academies must also be sensitive to the nature of the research itself. In some fields—life sciences, sociology, anthropology—the gender of the researcher may affect the choice of the research topic, how the research is carried out, the interpretation of its results, and the ways in which these results are applied. Academies sponsoring research and evaluating research proposals must therefore pay serious attention to the influence of the researcher's gender on the proposed work, as well as to the differential impacts of that research on women and men. By encouraging mixed-gender research teams and by including both women and men on evaluation panels, academies are helping to assure that results are as free as possible of gender bias. In this way, too, they are setting examples for other funding bodies to emulate.

Gender research and education

The issue of the underrepresentation of women in science and technology is not a women's problem per se but a problem for the whole S&T community, and, as such, for the academies. It warrants an objective analysis by the academies, carried out with the same degree of rigor that member scientists or engineers would apply to questions in their own fields. Moreover, the support of the academies in presenting this problem as a challenging intellectual endeavour will be invaluable to gender-equity issues' legitimacy and visibility. A prerequisite is that academies become more familiar with sociological research on cultural factors that influence women's participation in science and technology (for examples, Steinpreis et al., 1999; Etzkowitz et al., 2000).

Academies are urged not only to put the issue of women in science and technolgoy on their own research agendas but also to do so within a broader social context. They can do this, for example, by sponsoring studies, offering scholarships, inviting sociologists and anthropologists to give public lectures, and creating awards for researchers who have gained special insights into diversity matters or who have stimulated the general public's interest in this area.

This chapter has so far addressed what individual academies can do internally. But external forces also apply, both on an academy and by an academy, as briefly discussed below.

Advising and influencing government

Individual academies usually have considerable leverage within their own countries, with many of them providing independent advice to their governments on matters of scientific and technological importance. Thus, for example, academies may press for nondiscrimination legislation in countries where women and minorities lack such protection by the law.

Recommendations

- The Advisory Panel asks academies as employers to sign a statement formally committing themselves to good management practice. This will help ensure fair and transparent recruitment, employment, and promotion procedures in general, and in particular it will help expand the participation of women in academies' activities and lead to their increased membership.
- Each national academy is urged to establish an equality and diversity committee that advocates for the inclusion of women at the highest levels of science and engineering and that directly reports to the institution's governing body. The in-house committee proposes actions on diversity issues, and it regularly monitors and reports on these actions' results as benchmarks for further improvement.
- Academy leaders are encouraged to raise awareness among members regarding women's underrepresentation in the academy; strive to enlarge the nomination pool of women scientists and engineers; appoint women members to councils, boards, committees, and panels; and recruit women as speakers in the academy's lectures and symposia.
- When undertaking reviews of research institutes, academies are asked to stipulate that the working conditions and experiences of women staff be among the evaluation criteria.
- Academies are urged to become acquainted with research that examines sociocultural influences on women's participation in science and technology.
- In their interactions with governments, academies are asked to advocate for full inclusion of women in science and technology. They can urge the adoption of measures such as nondiscrimination legislation, a national office focused on women's issues in science and engineering, reform of textbooks and teaching materials, and a system for monitoring girls' and women's progress through the education/career pipeline.

They may look into specific cases of gender-based job discrimination and the legal recourses; or they may support infrastructure (such as the creation of an office focused on diversity issues in science and engineering) to help those who are discriminated against. Academies may also work with government and industries to develop and interpret data on girls' and women's progress, or lack thereof, through the education/career pipeline.

Contributions by the InterAcademy Council and InterAcademy Panel

The IAC and IAP are uniquely placed to help academies exchange information on good management practice and on innovative and effective programmes for improving women's representation in science and technology. Through their reports, meetings, and constant flow of global communications, the IAC and IAP can:

- Motivate women and men from the international S&T community in general and from member academies in particular to develop inclusive cultures,
- Ask each member academy to report annually on the status of women in its organization and on measures that are being taken to ensure its full inclusion of women,
- Engage social scientists to provide academic evaluations of issues and progress,
- Develop international partnerships to address the underrepresentation of women in science and technology and to secure funding for women-in-S&T programmes,
- Assist academies in consolidating their contacts and intellectual capabilities to advise numerous governments and international bodies on gender-equity issues.

The IAC and IAP can credibly undertake the above actions, however, only after putting their own houses in order. They need to develop a strategy, similar to the one outlined earlier for individual academies that involves:

- Commitment by the IAC and IAP co-chairs to equality and diversity;
- Placement of gender issues on the agenda of IAC and IAP study panel meetings;
- Monitoring of progress, based on the yearly (preferably standardized) collection, analysis, and reporting of sex-disaggregated statistics;
- Inclusion of women experts on study panels;
- Giving close attention to gender aspects of research supported and reports produced.

Academies acting on a global scale

In this planet's ever-more-interconnected 'global village,' progress in one country can readily inspire progress elsewhere as academies share information and experiences. The IAC and IAP can often function as facilitators. An excellent mechanism for such information sharing may be a dedicated website maintained by the IAP. At a minimum, the website would contain the *Women for Science* report, including references, resources, and supporting material.

The scope would be broadened, and duplication avoided, if the IAP website were developed in partnership with organizations already supporting women in science and technology through their own websites (for example, Women in Global Science and Technology at www.wigsat.org). Principally, the IAP website would bring the unique perspective of the academies to addressing gender issues. Links could provide access to resources, such as examples of successful programmes and good management practice, as well as to data on the education and employment of women in S&T jobs. In fact, the partnership could go further by creating a web portal providing a centralized venue for networking, and a search engine for resources and connecting users to relevant programmes. Individual academies on their respective web home pages will include a link to the IAP website or portal.

This will make IAC and IAP known as partners and even leaders in the existing global effort on behalf of women's inclusion in science and technology. One way to do so is by partnering with international bodies—such as the Academy of Sciences for the Developing World (TWAS), the Third World Organization for Women in Science (TWOWS), UN organizations such as UNESCO and UNCSTD Gender Advisory Board, and other nongovernmental organizations—that are effectively addressing gender issues and have implemented programmes for women in science and technology. Such organizations and the academies could be natural allies in coordinating a worldwide mobilization and in developing a strategy to establish gender equity throughout the global S&T community.

In particular, academies might want to collaborate with each other, as well as with other learned societies, to develop a set of indicators and benchmarks for assessing action plans for inclusive S&T practices. These measures should be based on the regular annual collection, analysis, review, and reporting of sex-disaggregated data. A standardized format (such as the European Union instrument, the UNCSTD Gender Advisory Board toolkit, or the WinSETS scoreboard as shown in Table 2.3) should be chosen. Academies that are planning or have already initiated interna-

tional efforts devoted to education and training programmes of various types need to consciously include gender-related issues in such initiatives. The IAC is thus urged to circulate this *Women for Science* report more widely than to academies alone. Higher-education institutions, public- and private-sector research laboratories, relevant nonprofit organizations, and others around the world may want to receive it and join in the action.

In much the same spirit, the IAC together with the IAP should make use of various means of communication, such as S&T-friendly radio and television programs, for increasing the public understanding of science, with particular focus on girls and women.

Recommendations

- The InterAcademy Panel is requested to establish a website for women in science that contains this report, supporting references, and links to other websites with resources for women scientists and engineers. The InterAcademy Panel may want to consider a multimedia approach for increasing the public understanding of science, with focus on girls and women.
- The InterAcademy Panel is encouraged to coordinate with other organizations—the Academy of Sciences for the Developing World (TWAS), the Third World Organization for Women in Science (TWOWS), and UN organizations such as UNESCO and UNCSTD Gender Advisory Board—on the acquisition and dissemination of sex-disaggregated data as well as the development of a global strategy to establish gender equity throughout the S&T community.
- Academies that have successful programmes for facilitating the entry and advancement of women in science and technology need to share their good management practice methods and develop partnerships with less-experienced counterparts elsewhere.
- The InterAcademy Council and the InterAcademy Panel are urged to develop and formally adopt statements of good management practice (aimed at the inclusion of women) and to pay attention to the gender implications of the studies they undertake and the reports they publish.
- The InterAcademy Panel is asked to feature at its general assemblies a report from each academy on its progress toward remedying the underrepresentation of women in science and technology. Furthermore the InterAcademy Panel needs to encourage each academy to maintain an ongoing advocacy position on gender-equity issues, particularly when meeting with high-level government and education officials.