SEPTEMBER 2008

gender & diversity
CGIAR

Successful Women, Successful Science

AMELIA GOH
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CGIAR Gender & Diversity Program

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Training Resources Group (TRG)

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working paper

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Photo by Mike Goldwater, 2007

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We are very grateful to the staff members of the Bellagio Study and Conference Center, especially Palacia Pilar and Nadia Gilordani, for their wonderful hospitality and amazing efficiency. In addition, our heartfelt appreciation goes to the CGIAR Secretariat for creative input into the beautiful poster exhibition, the artwork and conference materials, the Syngenta Foundation for Sustainable Agriculture for funding the photography series by Mike Goldwater that features the African women scientists in our pilot fellowship program, and the Swiss Agency for Development and Cooperation (SDC) for sponsoring the production of our short film, *Thema's Journey*, that premiered during the conference. Special thanks to our extraordinary facilitators from Training Resources Group (TRG) for co-designing this event and for the enjoyable yet results-oriented facilitation of the conference.

In Memory of Dee Hahn-Rollins 1940-2008



On February 16, 2008, Dee Hahn-Rollins, an inspirational facilitator, a gifted coach and trainer and a wonderfully warm-hearted and passionate woman, passed away following a recurrence of breast cancer. She was 67.

Dee joined the United States-based Training Resources Group (TRG) in 1988 and for 20 years shared her training, facilitating, development and coaching skills with a multitude of clients. She designed, organized and implemented highly experiential and innovative workshops and conferences and played a key part in building TRG's activities, as a staff member, owner, and leader.

Starting in 1998, she worked with the CGIAR Gender & Diversity Program on the design and delivery of its Women's Leadership and Management Series. These courses have empowered and strengthened hundreds of women scientists and professionals working in agriculture around the globe. Today, her legacy continues, as women are queuing for a chance to participate in the renowned courses.

Dee described the October 2007 G&D Bellagio Conference, *Successful Women – Successful Science*, as one of the most meaningful events of her consulting career. Already weakened by the effects of her illness but with great determination, she co-designed and co-facilitated this event with grace and sensitivity. In her own captivating style, she enchanted participants so much they hardly realized how hard they were working. We have no doubt that Dee's commitment to African development, to mentoring and empowering women, and to building connections among people enlightened this memorable event.

Anyone who had the pleasure to work with her recognized her mastery of her field and benefited from her warmth and humanness. Dee Hahn-Rollins was a woman of great skills, substance, and impeccable style. She has left an indelible imprint on our lives. We will miss her dearly and try to use the tools she has given us to live up to her expectations.

From Glass Ceiling to Leaking Pipeline

THE MYTHS AND REALITIES OF WOMEN IN SCIENCE

1

"Glass ceiling" was coined in the late 1970's to describe those invisible barriers that block the upward mobility of women in the workforce – namely organizational attitudes and prejudices that keep women from decision-making and leadership positions. Now, some 30 years later, there has been much progress for women in terms of employment opportunities, especially in business and education. However, this has not been the case in science, where the under-representation of women, especially at senior levels, remains quite evident. In fact, a term has been coined specifically to represent this reality of women dropping out of science instead of moving up the career ladder: "the leaking pipeline".

This is more than a clever use of words. Statistics reveal the existence of the leaking pipeline, and follow-up research has identified the factors contributing to the low representation of women in science. Traditionally, efforts to improve women's participation in science were more common in North America and Europe. However, in recent years, developing countries in Asia, Latin America and Africa have increasingly realized that balancing the gender equation in science is critical if we are to find answers to the pressing issues that affect global hunger and poverty.

In her 2002 speech entitled Rethinking the Rules to Promote Diversity, Dr. Rita Colwell, Director of the United States (USA) National Science Foundation from 1998 to 2004, called the leaky pipeline of women researchers "a disastrous investment strategy in economic terms alone." Putting this into the form of an equation, this can be interpreted as "Ignoring half the potential means getting half the results.

There is no shortage of literature, both academic and mass media, on the subject of the career advances women have made in recent decades. What remains is to separate the myth from the reality in terms of the current situation facing women who enter and wish to advance in science careers.

Myth 1

Women have less aptitude for science than men.

The Reality

There is no convincing evidence that women's representation in science is limited by innate ability.

Factors that might cause the paucity of women in science have always been and continue to be researched and debated widely. In 2005, when Dr. Lawrence Summers, then president of Harvard University, suggested that lack of innate ability was a con-

tributing factor to the fact that there were so few women in top science positions, it brought a major outcry from scientific communities across the world.

Substantive research data available today indicate that overall intelligence does not differ between men and women, and there is no convincing evidence that women's representation in science is limited by innate ability (Handelsman, *et al.*, 2005; US National Academies, 2006). In a study of gender similarities, researchers found that boys and girls have similar psychological traits and cognitive abilities and, further, recommended that science educators and researchers examine ways to increase awareness of the similarities in performance and ability to succeed rather than emphasize gender differences (Hyde and Linn, 2006). A study by Janet Hyde (2005) featured in *The Economist* (3 August 2006, online edition) shows that males and females of any age are equally good at computation and understanding of mathematical concepts and that men and women are equally good at navigating but using different styles. For example, women tend to rely on remembering landmarks, whereas men rely on their geometric skills to work out direction and distance.

The fact is that gender differences in cognitive and performance functions do not explain the paucity of women in science. Rather, it is the interplay of many individual, institutional, social and cultural factors.



Myth 2

Women today are as free as men to pursue and advance in the scientific careers of their choice.

The Reality

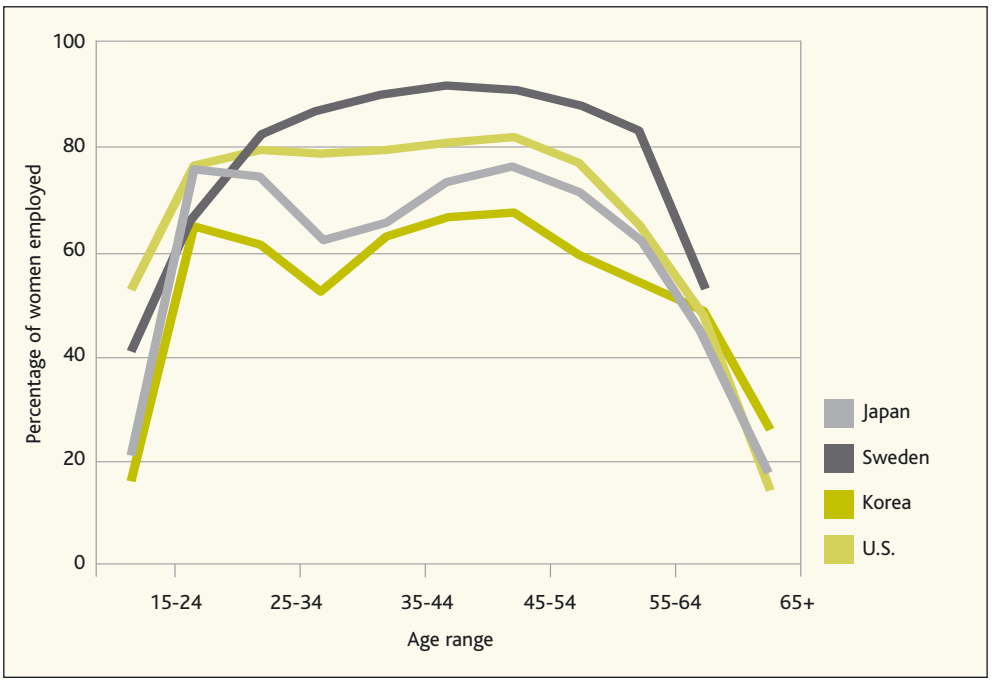
In most societies, women hold the main family responsibilities and are expected to combine career and family commitments, often putting the needs of their spouse's career ahead of theirs.

Although women have better access to education and employment in scientific fields today than ever before, the playing field is not a level one. As women increasingly enter and try to move up in traditionally male-dominated professions, they often face unfriendly organizational structures and policies that push them back. Even though women and men face many similar hurdles in science, women are more likely to falter because they lack role models, support systems to help them balance family and work, and professional networks that men can tap into more easily.

Women tend to fall behind in their scientific outputs during childbearing years and, therefore, have to try to catch up later in life – making it difficult for them to re-establish their careers, compete for funding and publish their work. This adds to the problem of succeeding in science and feeds into a negative cycle, since funding is still mainly awarded based on the number of papers published (Symonds, 2007). A study of 460 former National Science Foundation postdoctoral fellows found that women who had children during their postdoctoral years did not reach academic and leadership positions as high as other women and men (Healy, 1992). Even women who choose to sacrifice their family priorities or risk their prime childbearing years for the sake of their careers find it difficult to move up the career ladder. A US study

found that, whether married and single, women engineers had higher rates of unemployment than their male counterparts (Healy, 1992). Data from the International Labor Organization (ILO) featured in *Science* (March 2006) showed a clear dip in the employment of women scientists from ages 25-34, their main childbearing years, especially in Korea and Japan (Normile, 2006). See Figure 1 below.

FIGURE 1 Women's employment during childbearing years.



SOURCE: *Getting Women Scientists Back on the Career Track in Japan.* Science 3 March 2006: 1236

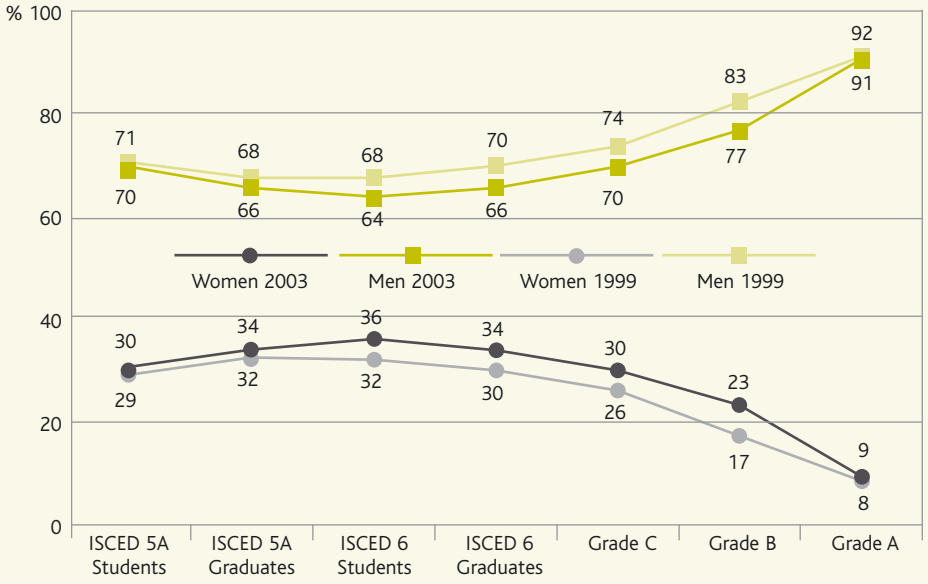
Women also find it difficult to succeed in their science careers due to institutional cultures that favor men, especially in academia. Recent research in the US found that university cultures still favor academics with stay-at-home spouses. It further found that fewer than half the wives of male faculty members in the sciences are employed full time, whereas 90 percent of the husbands of women faculty members have full time employment outside the home (US National Academies, 2006). A study of more than 160,000 students who received Ph.Ds between 1976 to 1999 and later achieved tenured faculty positions in US universities found that 70 percent of men were married with children compared to only 44 percent of women (Mason and Goulden, 2004). Traditional university cultures still give men better prospects of succeeding in science than women.

Due to their family responsibilities, women are also less mobile than men. This makes it harder for them to improve their positions or salaries by moving to other institutions or countries. In the case of dual career couples, women traditionally tend to treat their careers as second in priority to their partner's. A study of European female managers found that women are more likely than their male counterparts to have partners with professional careers (Scullion and Linehan, 2001). More than half of the study respondents stated that they had been able to progress to top positions only because their male spouses had agreed that their own careers were of secondary importance to them. In non-European societies, the likelihood that husbands will sacrifice their careers

for the sake of their wives is even lower, due to customary and cultural norms (Omar and Davidson, 2001). A 2004 survey by the Athena Project in the UK found that more women (32 percent) than men (4 percent) had taken career breaks in research, and a higher proportion of women (29 percent) than men (14 percent) reported difficulties in returning to work. For the women, the difficulties mainly centered on finding opportunities that offered flexibility to accommodate work and childcare, and dealing with negative attitudes of colleagues and managers. Not surprisingly, more women than men are moving away from increasingly time-demanding research jobs (Athena Project, 2006; UNESCO, 2007).

Poor work environments, career interruptions due to family and care-giving responsibilities and/or the move of a partner whose career takes precedence have caused women in the European Union to drop out of their science and engineering careers. Figure 2, published by the European Commission in *She Figures* (2006), shows that the percentage of women employed in science and engineering decrease as the salary grades increase, clearly illustrating the existence of a leaking pipeline.

FIGURE 2 Proportions of men and women in a typical academic career in science and engineering for EU-25, 1999-2003



DEFINITION OF GRADES:

A: The single highest grade/post at which research is normally conducted

B: Researchers working in positions not as senior as top position (A) but more senior than newly qualified PhD holders

C: The first grade/post into which a newly qualified PhD (ISCED6) graduate would normally be recruited

ISCED 5A: Tertiary programmes to provide sufficient qualifications to enter into advanced research programmes & professions with high skills requirements

ISCED 6: Tertiary programmes which lead to an advanced research qualification (PhD)

SET fields of education = 400 Science, maths and computing + 500 Engineering, manufacturing and construction
SET fields of science = Engineering and Technology + Natural Sciences

SOURCE: *SHE Figures 2006- Women and Science Statistics and Indicators*, European Commission Women and Science Unit

In the United Kingdom (UK), 50 percent of biology graduates are women and have been for the last 30 years, yet women hold only 9 percent of full professorships (Dewandre, 2002). In 2002, *The Guardian* highlighted a report by the UK Department of Trade and Industry which found that 50,000 female science, engineering and technology graduates were not working in their respective industries at any one time. In 2005, women made up just 11.6 percent of Japan's research and development (R&D) workforce – the lowest among the 30 Organization for Economic Co-operation and Development (OECD) countries (Normile, 2005). In Africa, although the numbers of women enrolling in agricultural sciences are slowly on the rise (Stads and Beintema, 2006), Table 1 illustrates that few women have reached positions of leadership in the workforce since the 1990s (Rathgeber, 2002; personal communication with fellows of the G&D Pilot Fellowship Program, 2007).

TABLE 1 Academic staff in science departments of 10 African universities by rank and gender,1993

COUNTRY	PROFESSORS		SENIOR LECTURERS		LECTURERS	
	Male	Female	Male	Female	Male	Female
Botswana	7	0	15	1	47	1
Ghana	73	1	136	17	294	40
Kenya	111	3	139	15	289	40
Lesotho	9	0	15	1	22	2
Malawi	24	1	45	7	64	13
Nigeria	134	6	169	25	174	38
Swaziland	6	1	18	0	42	11
Tanzania	56	2	101	3	137	10
Zambia	26	3	36	0	178	21
Zimbabwe	35	2	70	10	181	38

SOURCE: Rathgeber, 2002

Barriers to women's advancement in science

Factors affecting women's advancement in science can be grouped within four general categories.

- **Societal attitudes.** A society's attitude toward gender equality and the prevalence of gender stereotypes, especially regarding women's roles as wives, mothers, and primary caregivers affect whether girls and women are encouraged or discouraged when it comes to pursuing education and scientific careers. Women are often faced with the challenge of balancing work and family responsibilities, a challenge which affects men to a lesser extent.
- **Age differences.** In some societies, women often enter research careers at an older age than men, as they may be pressed by their families to postpone their careers until after their children are grown.
- **Lack of role models, mentors and networks.** Without a network of female peers and role models, many women find it hard to survive in a workplace characterized by discrimination and minority dynamics. The "old boys' network" hinders women's progress in male-dominated work areas.
- **Lack of leadership training and negotiations skills.** Academic prowess and scientific excellence are necessary but insufficient to advance women in their scientific careers. Even though men and women face many similar hurdles in science, women's lack of role models, support systems and professional networks, put them in a position that they need to concentrate on building strong leadership, carefully honed communications and people skills, plus savvy to handle difficult negotiations.

SOURCES: Summaries from OECD, 2007; CGIAR Gender & Diversity Program, 2007.



Myth 3

Women in science are recognized and rewarded in terms equal to their male counterparts with similar abilities.

The Reality

Women in science have to work harder than their male counterparts to prove themselves, sacrifice family priorities or face risky situations in order to be treated at par with their male colleagues.

A 1997 study of postdoctoral fellowships awarded by the Medical Research Council of Sweden found that women candidates had to be two and a half times more productive in terms of publications to achieve the same competency rating as men (Wold, 1997). More recent research shows that women are more likely to have their research published if the peer reviewers are unaware of their gender. For example, in 2001, reviewers of the journal *Behavioral Ecology* started using a double blind method to ensure that reviewers do not know the researchers' identities and vice versa. A study conducted of the gender of authors of papers accepted by *Behavioral Ecology* before and after it switched to double blind peer review found that, in the four years after the switch, the number of female authors who had their papers published increased by 8 percent, suggesting that gender biases had limited women's opportunities to publish (Budden, 2007). Other studies (WIRDEM-EC, 2008; MIT, 1999) found further evidence of the unfair treatment of women scientists and their difficulties in accessing equal opportunities in funding, information, lab space, promotions and participation in key networks and important committees.

In a wage survey of more than 7,000 UK scientists, Dr. Sara Connolly of the University of East Anglia established that the average pay gap between male and female academics working in science, engineering and technology was around £1,500 a year, and that men were likely to earn more than women within any given salary grade. Male professors, for example, earned over £4,000 a year more than female professors. Explicable differences (seniority, experience and age) amounted to 77 percent of the overall pay gap between the sexes. This still left a substantial 23 percent pay gap, which Dr. Connolly attributed to the possibility of discrimination. Her study was featured in the WIRDEM-EC 2008 Report, *Mapping the Maze – Getting More Women to the Top in Research*.

The 2006 report by the US National Academies, *Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering*, described women's under-representation in the sciences in the US as "deeply troubling and embarrassing." It cited research demonstrating that women were paid less, promoted more slowly, bypassed for honors and subjected to implicit gender bias from both their male and female colleagues. Specifically, the report presented the following conclusions.

- **Women are very likely to face discrimination in every field of science and engineering.** Research has identified considerable barriers that limit the appointment, retention and advancement of women faculty. As a result, throughout their careers, women have not received the opportunities and encouragement provided to men to develop their interests and abilities to the fullest. This accumulation of disadvantage becomes acute in more senior positions.

- **Most people – men and women – hold implicit gender biases.** An impressive body of controlled experimental studies and examination of decision-making processes in real life show that, on average, people are less likely to hire a woman than a man with identical qualifications, are less likely to ascribe credit to a woman than to a man for identical accomplishments and, when information is scarce, will far more often give the benefit of the doubt to a man than to a woman.
- **Academic organizational structures and rules contribute significantly to the under-use of women in academic science and engineering.** Structural constraints and expectations built into academic institutions assume that faculty members have substantial spousal support. The evidence demonstrates that anyone lacking the work and family support traditionally provided by a "wife" is at a serious disadvantage in academe.

Research conducted on the Financial Times Stock Exchange (FTSE) 100 companies in 2004 revealed that companies that appointed women to their boards had experienced consistently poorer performance in the five months preceding the appointment than those who appointed only men. This illustrates what is known as the "glass cliff" scenario. Women are breaking through the glass ceiling but are being promoted into risky, difficult jobs where the chances of failure are higher. This suggests that women standing on the glass cliff may be in danger of being held responsible for negative outcomes that were set well before they assumed their new roles. In other words, women may be at higher risk of being set up for failure (Ryan and Haslam, 2005).

Myth 4

There is no business case for balancing the gender equation.

The Reality

Half the insights equal half the results.

Bringing more women into scientific careers serves to do more than symbolically close a gender gap. A gender-balanced workforce has the benefit of a wider variety of experiences and views that can greatly benefit scientific research and development as well as society (IAC, 2004). Heterogeneous groups design more innovative solutions to problems than homogenous ones and bring a higher level of critical analysis to decisions (Handelsman, *et al.*, 2005). For example, women are known to be more pragmatic problem solvers, better networkers who operate well in teams and more socially aware than men.

Several studies have looked at the business case angle of ensuring that women have equal opportunities to provide their insights and bring their results. They have all come to similar conclusions.

- Catalyst, a US organization that aims to expand opportunities for women and business, found a positive correlation between the number of women in top executive positions and financial performance among *Fortune 500* companies between 1996 and 2000 (*The Economist*, 21 July 2005).
- The European Commission presented compelling evidence for including more women in senior R&D positions in its 2006 report, *Women in Science and*

Technology – the Business Perspective. The report found that diverse teams produce better results, and well managed gender mainstreaming policies in companies often improve overall economic performance. It also found that a workforce primarily of men clearly is not realizing its full potential, and that unequal opportunities "are not only a matter of injustice but primarily a matter of wasted talent." Further, it recommended that companies expose women to more challenging work experiences, address issues affecting work-life balance common to men and women, and implement internal company programs on mentoring, coaching and child care. The report cited several top companies, including Hewlett-Packard, Rolls Royce, Siemens, Schlumberger, Shell, Airbus, Total and Xerox, for their work in creating more staff diversity and a level playing field for women because they believe that employees with higher gender diversity produce better results.

- University of Melbourne Department of Zoology researcher Matthew Symonds conducted a study with colleagues from Australia and New Zealand that followed 168 biologists from British and Australian universities whose careers began in the early 1990s. He found that the men in the study published 40 percent more papers than women, but that the women's work was cited more often by other scientists than the men's work, a key indicator of quality (2007).
- Harvard Business Review reported in a 2007 article, *Women and the Labyrinth of Leadership*, that women's leadership style – characterized by innovating, building trust and empowering followers – is ideally suited to today's development challenges (Eagly and Carli, 2007).
- The World Bank Group announced six new commitments on gender equality in April 2008 with the president, Robert B. Zoellick, calling the empowerment of women "smart economics" and explaining that investments in women yield large social and economic returns.

The Guardian published an article by Vivienne Parry in 2002 that highlighted the need to include more women in science, stating, "Having only 50 percent of brainpower will result in only half the insights, half the results and half the solutions." A similar message appeared in a recently released European Commission report on women in science that said, "No quality without equality" (WIRDEM-EC, 2008). In expressing deep concern about the gender gap in science, the 2004 Inter-Academy Council report, *Women for Science*, stated, "Science and engineering – essential to the survival, development and prosperity of humankind – is being deprived of the vibrancy that would result from the inclusion of a wider range of abilities, experiences, viewpoints and working styles. Every man and woman should count."

The bottom line is that women bring unique skill sets, talents, perspectives, insights, personality traits, management, communication and cognitive styles to the table, field and laboratory, and their increased participation in science will lead to more productive teams, improved efficiency and better scientific outputs.

Essential role of women scientists in addressing Africa's agricultural challenges

Nowhere in the world are the challenges to agriculture more complex than in sub-

Saharan Africa, home to 16 of the 18 most undernourished countries in the world. Sub-Saharan Africa remains the only region where per capita food production continues to worsen year by year.

Adding to the complexity of the region's many challenges is that agricultural production patterns in traditional African systems are strongly influenced by gender. While women produce 60 to 80 percent of crops in sub-Saharan Africa (FAO, 1997), less than one in five of its agricultural scientists is female (Quisumbing, *et al.*, 1995; Stads and Beintema, 2006). The lack of gender balance among the scientists and leadership of African agriculture research institutes puts them in danger of missing the range of diverse perspectives necessary to develop appropriate technologies, leading to less optimal research results and impacts.

Women farmers in this region have more difficulties than men in gaining access to land, water, credit, wages, markets and services, yet the burden of ensuring household food security and income usually falls heavily on the women. In many instances, agricultural development projects have not taken adequate account of women's responsibilities, participation and priorities in their specific local conditions and, thus, hindering the achievement of program objectives or leading to negative effects on women and families (Dutta Das, 1995; World Bank, 2008). However, studies have shown that if resources were more equally accessible to African women and men farmers, women could bring significant increases to their countries' overall agricultural production (World Bank, 2001; Quisumbing and Meinzen-Dick, 2001; World Bank, 2008).

This indicates the importance of including highly qualified women in any equation for solving agricultural problems in sub-Saharan Africa. Women bring the broader perspective that research institutes require on the pressing issues faced by both men and women farmers. The agricultural science, technology and innovation capacity of Africa would be significantly strengthened through greater participation of its women.



Photo by Mike Goldwater, 2007

Successful Women Successful Science

ACCENTUATING THE POSITIVE

2

The CGIAR Gender & Diversity Program (G&D) is well aware of the numerous challenges, biases and stereotypes faced by women in science careers. Its own research has confirmed that talented women are dropping out of science instead of moving up the career ladder and that those who remain are less likely to attain leadership positions.

That is why G&D chose the theme Successful Women – Successful Science for a week-long conference it organized with the Rockefeller Foundation at its Study and Conference Centre in Bellagio, Italy, in October 2007. The purpose of the conference was to understand the landscape of the most pressing issues affecting women scientists with the goal of expanding and strengthening the capacity of African women scientists to contribute to Africa's Green Revolution and, at the same time, to strengthen women-in-science programs worldwide.

The participants, including leaders of the world's top programs addressing women-in-science issues (see Annex 1), spent their week together discussing a host of topics, all aimed at:

- generating a better understanding of proven success factors for enhancing the careers of women in science and, in turn, to coalesce and disseminate them to national and international research institutes worldwide, especially in Africa,
- identifying the most promising activities and funding mechanisms that could be applied to expand support for career development of women agricultural scientists,
- establishing ways to strengthen women-in-science programs worldwide through mutual learning and exchange of experience, with a focus on "what works".

By hosting this high-level conference, G&D was sending a message: This waste of scientific talent – this leaking pipeline – must be stopped. In Africa and other developing countries where agriculture holds the key to national growth and to better livelihoods for the world's poorest people, women's talents, skills and experience must be brought to the farms and agricultural research laboratories.

Participating programs

The participants were invited because the programs they head or are working in:

- address women's under-representation in science careers,
- implement cutting edge and innovative approaches,
- focus, at least in part, on agricultural sciences or needs of women scientists in Africa.

In addition, the participants came from a cross-section of geographic regions. They brought an awareness of women-in-science activities and needs in Latin America, North America and Asia as well as in Africa. African women role models in agricultural science and industry were also invited, as well as donors and dedicated supporters for initiatives to support women in science. Establishing such a broad-based group provided an opportunity to promote mutual learning and sharing of information across regions and between developed and developing countries.



Inspiration of successful stories

Recognizing that stories of success can be both inspirational and contagious, G&D prepared 11 case studies of successful programs and the women who lead them. The studies present personal stories of how women became involved in the issues of women in science and how they managed to achieve success. They are based on in-depth personal interviews with the subjects who offered honest reflections and recollections of the many trials they faced in reaching their current positions. Their stories served as the basis of discussions throughout the conference, providing insights into the types of initiatives that can truly serve to increase women's participation and contributions to science. The women were chosen according to three categories.

Participants whose organizations have put policies, strategies or programs in place to support women in science

- Alice Hogan – National Science Foundation ADVANCE Program
- Amelia Goh and Helga Recke – CGIAR Gender & Diversity Pilot Fellowship Program
- Jennifer Campbell – L'Oréal-UNESCO For Women in Science Program
- Nancy Hopkins – Massachusetts Institute of Technology Committee on Women Faculty
- Meredith Soule – USAID-USDA Norman E. Borlaug International Agricultural Science and Technology Fellows Program for Women in Science
- Shirley Malcom and Yolanda George – American Association for the Advancement of Science-Education and Human Resource Programs (AAAS-EHR)
- Tatiana Deane de Abreu Sá – Brazilian Agricultural Research Corporation (EMBRAPA)
- Vicki Wilde – CGIAR Gender & Diversity Program

Participants who are champions and role models for women in science

- Stella Williams – Obafemi-Awolowo University
- Thelma Paris – International Rice Research Institute

Participants representing women-in-science networking programs

- Kaiser Jamil – Third World Organization for Women in Science (TWOWS)

From discussions to recommendations

Building from the case studies, the outcomes of discussions at the conference and from a review of literature on the subject of women in science, this report aims to separate myth from reality in terms of the opportunities and the barriers women scientists face. Success factors distilled from the case studies and gender-based facts that bring key

issues into perspective have been factored into key recommendations on what needs to change to increase women's participation and advancement in science at both global level and institutional level, especially in Africa.



Photo by Mike Goldwater, 2007

3

They led the way

STORIES OF SUCCESS

Harvesting and sharing stories of success for inspiration and insight

11 case studies of outstanding women and outstanding programs for women in science

Numerous efforts have been made, especially in developed countries, to increase the participation of women in science and to address the barriers that prevent women from succeeding in science. Various innovative programs to repair the leaking pipeline of women scientists are also underway at national, regional and international levels worldwide with some measure of success. The CGIAR Gender and Diversity Program's Bellagio Conference, *Successful Women – Successful Science*, provided an opportunity to harvest the success factors from many of these programs, and to use them as the basis for developing new and innovative ideas to address Africa's compelling needs, in particular, and to identify and support the needs of women scientists in general.

The following eleven case studies were conducted to draw attention to some of the most powerful and successful programs that have been undertaken around the world to support women in science. Presenting a global array of dedicated women and letting them tell their stories of how they achieved their positive results presents a strong message to women who wish to enter science careers. It also provides more understanding of what will be needed to make sure that women avoid the leaking pipeline and have the support they need to take up positions of leadership.



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PROGRAM

Stella Williams
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UNIVERSITY





Jennifer Campbell

L'ORÉAL-UNESCO FOR WOMEN IN SCIENCE PROGRAM

IN 1998, THE L'ORÉAL GROUP, a worldwide leader in the cosmetics industry, joined with the United Nations Educational, Scientific and Cultural Organization (UNESCO) to create the For Women in Science Program. The program motto, "The world needs science ... science needs women", aptly fits one of its greatest champions, Jennifer Campbell, Director of Philanthropy for L'Oréal.

Ms. Campbell began her work in philanthropy overseeing corporate stewardship programs in the European headquarters of the Walt Disney Company, where she discovered that "giving back to communities" was the most rewarding part of her job. It was through her work Disney that she first partnered with UNESCO. As her career unfolded, Jennifer Campbell consistently responded when needed. Thus, when L'Oréal asked her to take over its program supporting women scientists, she accepted.

Beyond the brand

L'Oréal's For Women in Science Program was initially envisioned as an effort to launch the group's Helena Rubenstein brand. Rubenstein, considered a visionary in her field, had used extensive science in developing her cosmetics. However, after one year, the Director General of L'Oréal felt this was not the way to launch a cosmetics brand and, instead, moved the program under the umbrella of corporate philanthropy. To ensure it would make the kind of positive global impact that could change women's lives, L'Oréal stopped the program for a year in order to take stock, regroup and then re-launch.

The program, in partnership with UNESCO, set its course to promote women in scientific research by creating role models through "consecrating scientific excellence" with the L'Oréal-UNESCO Awards, the founding act of the program. Each year since its inception, five laureates have received these esteemed awards, one from each continent. Hailing from fields of material sciences and life sciences in alternating years, the laureates are chosen by an international jury of eminent members of the scientific community. Each laureate receives an award of US$100,000 and is expected to serve as a role model for younger women in the field of science around the world. Once the program was firmly established, the notion of promoting excellence in science to younger generations of women became the next focal point of the program.

In 2000, L'Oréal went on to create its International Fellowship Program for doctorate and post-doctorate women whose research projects had been accepted by laboratories outside their countries of origin. The criteria for awarding these fellowships were based upon "the candidate's scientific capability, the relevance and feasibility of the project proposed, and the young researcher's prospects of pursuing a scientific

career after finishing her thesis or doctorate." The vision was to create opportunities for young women scientists to broaden knowledge in their fields of research and to network and collaborate with colleagues at host institutions in other countries.

"In 2002, the first time I participated in the Awards Ceremony, we had the five laureates and the 15 international fellows on stage, interacting together," recalled Ms. Campbell. "I saw how important it was for these young fellows to meet the laureates. It was like plants being watered after being dry for so long. It gave these young women promise. It made me think to myself, 'Yeah, we got it right'."

Host institutions provide the young fellow with the opportunity to learn about new equipment, technology, methodologies and approaches to research, thereby broadening her knowledge base and skill sets. Each fellowship award offers a maximum of $40,000 over two years. This latitude in funding affords the young researcher an even greater opportunity to forge networks abroad and strengthen the possibility of pursuing a career in science.

Once the International Fellowship Program was underway, L'Oréal turned its attention to another group of women. In 2001, L'Oréal launched the National Fellowship Program, with awards created by L'Oréal subsidiaries offering support to young women working towards their Ph.D.s in science in their home countries. To date, there are nearly 30 National Fellowship Programs around the world, with plans to bring more than 50 more countries into the program before the end of 2008. Currently, the only African country participating in the National Fellowship program is South Africa.

Living its values – L'Oréal walks the talk

Jennifer Campbell became the Deputy Director of Philanthropy for L'Oréal just as the National Fellowship Program began to take wing. She was drawn to join L'Oréal and the For Women in Science Program for a number of reasons. "First," she said, "L'Oréal practices 'intelligent philanthropy', scanning the environment and constantly looking for ways to leverage its global networks to better serve women." L'Oréal recognizes it can utilize its global influence to do something right and important and that it can have an impact. Ms. Campbell emphasized that L'Oréal is not looking to do something "huge" but, instead, to do something "smart." For example, after training hairdressers for years, L'Oréal decided to introduce a module on HIV/AIDS prevention into its regular training curriculum and, thereby, educating through that forum. Campbell emphasized this small shift could pay huge dividends, "That's smart."

L'Oréal CEO, Jean-Paul Agon, recognized the potential dividends and has supported this program as part of his goal to make L'Oréal "more than a successful company." He said, "I want it to be a great place to work, a good citizen of the world, so it becomes one of the world's most admired and respected companies."

Ms. Campbell was also impressed with L'Oréal's own staff demographics. In the life sciences, 65 percent of L'Oréal's researchers are women, with women scientists comprising 55 percent of its researchers overall. There is clearly not only a high regard for the scientific research behind the business of L'Oréal, but the value of diversity is being lived out as well. Beyond the acknowledgement that this gender balance makes for good science, L'Oréal also believes it makes sense from a business perspective. L'Oréal found that laboratories with a balance of men and women

researchers are the most productive and creative. Not only does L'Oréal live its values, it also demonstrates the compelling business case for investing in women scientists.

First things first – sequence is important

It is a point of pride and marker of success for Ms. Campbell that L'Oréal has had the corporate wisdom to plan and implement sequentially, regardless of the cost. The For Women in Science Program is illustrative of this approach. L'Oréal first developed the idea of profiling women scientist role models by identifying and highlighting the laureates. Once that foundational aspect of the program was well established, L'Oréal went on to draw upon the expertise of its partnership with UNESCO to initiate the International Fellowship Program and, subsequently, the National Fellowship Program, each time reaching a different demographic of women in science. It is through this sequential planning and unfolding that the program has garnered so much success.

TOP 6 SUCCESS FACTORS

1. Intelligent philanthropy opens the door to progress and success
2. Enlightened leadership and living corporate values create an environment for possibility and success
3. Developing partnerships and utilizing those partnerships to their greatest potential – play on each others strengths
4. Creating role models for younger women scientists is key
5. Networking and training enable young women scientists to navigate more successfully
6. Effective widespread communication and messaging makes a huge positive difference

Visionary leadership and strength in partnering

Ms. Campbell believes the For Women in Science Program also enjoys success on a global scale because of its unique private sector-intergovernmental partnership with UNESCO. According to UNESCO's Director General, Kochiro Matsuura, "the L'Oréal-UNESCO partnership is exemplary because of the vision of science it aims to promote in order to safeguard the future of the planet. It is exemplary in the way it conceptualizes the role to be played in this formidable task by organizations such as ours."

L'Oréal Chairman, Sir Lindsay Owen-Jones, concurred and added, "Our partnership grows from day to day because it is based on strong convictions that the world needs science and science needs women, but women also need support, encouragement and recognition to lead successful scientific careers." With such full support from the top leadership of both organizations, the partnership can leverage the strengths that each bring to the table to fulfill its vision of promoting women in science around the world.

Communication is key

L'Oréal excels at marketing. Ms. Campbell noted that a large part of the success the program has experienced has come from L'Oréal's advertising and media campaign honoring the laureates and fellowship winners. The first billboard campaign it conducted in Paris provided a clear example of how vital communication is in the success of the program.

L'Oréal displayed the faces of the five laureates and their teams on 250 billboards throughout the city. The response from the global community was huge. E-mails came in from around the world say-



ing how inspirational the advertising campaign was, especially to young girls wanting to enter the field of science. This reaffirmed to Ms. Campbell that for the program to work, it needs to be visible. It needs to promote the image of successful women scientists who are being acknowledged, rewarded and valued for their contributions. When the President of Brazil said, "This year, we won the FIFA [International Federation of Association Football] World Cup and we have a L'Oréal Laureate from Brazil," Ms. Campbell knew L'Oréal was "doing well in getting the word out that women scientists are worthy of respect and admiration."

For its Fellowship Program, UNESCO had the academic ties to open doors and to identify promising, young women scientists at universities around the world. Once those fellows were chosen, L'Oréal ensured that the story of their success was told far and wide. The power of the partnership, coupled with the power of a compelling message, has worked to ensure that the For Women in Science Program reaches women globally.

Is the program working?

Each division of the For Women in Science Program has its own monitoring and evaluation structure. With the Laureate Awards, the goal is to highlight the best in science," according to Ms. Campbell and, therefore, "due diligence is done to ensure that the best candidates are honored with these prestigious awards and that the judges are renowned in their field of science and remain involved with the program over time." The program has now achieved so much acclaim that scientists approach L'Oréal to serve on the jury.

For Women in Science will mark its tenth year in 2008. This anniversary will mark the beginning of a process that will take a longitudinal look at past recipients to see how the L'Oréal International Fellowship made a difference in their careers and in their science. The program tries to remain in touch with past recipients to track impact informally. Of the 105 L'Oréal International Fellows to date, more than 70 are still involved in scientific research. Likewise, there are similar numbers for the L'Oréal National Fellowship Program. In fact, Ms. Campbell told of a L'Oréal National Fellow who, two years after receiving her National Fellowship, was awarded an International Fellowship by a different jury. All of this leads to the conclusion that the program is on the right track.

In order to have a more thorough and comprehensive impact assessment, L'Oréal has retained the London Benchmarking Group, an organization renowned for working with companies such as Procter & Gamble and Shell Oil. The London Benchmarking Group will look at the philanthropy program and establish metrics for benchmarking in two areas – financial resources and HR investment and impact. L'Oréal has begun a pilot in five countries to gather data and will be rolling the process for benchmarking to other countries in the coming year. Ms. Campbell acknowledged they are at the beginning of this process and that it will take several years to have enough quality data to make valid assessments on impact.

Impact beyond the award – networking and training

While receiving the Laureate Award or a National or International Fellowship is a powerful testimony to women doing extraordinary work in science, Ms. Campbell noted that there are ancillary benefits to the For Women in Science Program as well. As women enter the program, they become part of a network of powerful women scientists around the world upon whom they can call, share knowledge and work with in the service of better science. With the notoriety and prestige that being part of the program brings, they have more leverage to lobby for their science in their home institutions and countries. In short, it is empowering to be in the company of such women.

Additionally, L'Oréal has begun to offer training to help younger women scientists further their careers. L'Oréal organizes seminars on how to get research published, how to present science to a non-scientific audience and how to deliver an effective presentation. In the future, the program will be offering legal training on how to protect one's science and reap the benefits of hard work with full credit. In giving women scientists the tools of training and the resource of networking, the chances of their future success increase exponentially.

What does the future hold?

Ms. Campbell said she sees "a bright future for the For Women in Science Program." With L'Oréal's continued support, both financially and organizationally, the program can continue to expand and grow. Ms. Campbell envisions that the program can find ways to support even younger women in science, below the doctoral level and even possibly reaching into high schools. She acknowledged that any further work L'Oréal takes on will be rooted in L'Oréal activities and with the involvement of their local offices and subsidiaries. The challenge of that comes in the developing world where L'Oréal does not have as full a presence.

Ms. Campbell said she dreams "that L'Oréal will take that leap" and establish a greater presence in the developing world, especially in Africa, and thereby be able to support women scientists further, where it has the potential to do so much good. Finally, Ms. Campbell would like to see an internal recognition program established for the tremendous work of the women scientists who work for L'Oréal. Currently, the For Women in Science Program is external, but she believes there would be great benefit for a parallel program that is internally focused to ensure all women scientists have a chance to be recognized.

gender FACTS

In 1998, L'Oréal joined with UNESCO to create the "For Women in Science" program.

This unique partnership has a two-fold mandate:
- to consecrate excellence through the L'Oréal – UNESCO Laureate Awards, and
- to encourage talent through the International L'Oréal – UNESCO Fellowships supported by the UNESCO National Commissions.

Since its inception, there have been:
- 47 laureates from 24 countries;
- 105 international fellows from 62 countries; and
- over 215 national fellows from 38 countries.

From the continent of Africa, there have been:
- 9 laureates from Africa (1 each year the award has been given);
- 21 international fellow recipients from 14 different countries; and
- 5 national fellow recipients awarded by the South African UNESCO National Commission.

In thinking about the future, Ms. Campbell said, "A company with the reach L'Oréal has, and that is fully committed to something this important, can change society. And L'Oréal knows, society won't progress if you deny half the human capital on the planet – women. So far, L'Oréal has shown that one company, in partnership, can make a huge difference."

For more information on Jennifer Campbell and L'Oréal-UNESCO's "For Women in Science" Awards and Fellowships:

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Tatiana Deane de Abreu Sá

BRAZILIAN AGRICULTURAL RESEARCH CORPORATION

DR. TATIANA DEANE DE ABREU SÁ serves as Executive Director of the Brazilian Agricultural Research Corporation (EMBRAPA). Although the road to leadership of one of Brazil's premier research institutions was never easy, for Dr. de Abreu Sá, the road consistently led to possibilities for herself and her fellow Brazilian women scientists. She is only the third woman to serve as executive director in EMBRAPA's more than 30-year history.

For her, 1973 was a monumental time, heralding two significant births. That was the year that EMBRAPA was born and the year that her own daughter was born.

In the beginning ...

In the 1970's, very few scientists in Brazil had the requisite M.Sc. and Ph.D.s needed for the kind of research EMBRAPA was pursuing. Thus, EMBRAPA took advantage of opportunities offered by organizations such as the Inter-America Bank Fund to send promising research scientists to programs outside of Brazil. The participants were able to complete their studies and bring back the scientific expertise needed to build EMBRAPA's capacity.

Taking advantage of opportunities in spite of hardship

Dr. de Abreu Sá was offered the opportunity to study soil science and biometeorology at Utah State University in the United States, although when her time came, she already had a toddler son as well as her baby daughter. In recounting the challenges she faced in leveraging the opportunity to further her career in research, she recalled travel delays, arriving to the worst winter in Utah's history and finding she was too late to take courses for credit. Thus, she audited courses for one quarter while waiting to begin her credit coursework and, at the same time, weaned her six-month-old daughter and tended her two-year-old son. Although her husband accompanied her and was supportive, she found it a remarkably challenging situation.

"I thought to myself," she recalled, "if I fail in my studies abroad, if I fail in returning to EMBRAPA, it is not one failure in isolation … it would represent a failure for all young women from Brazil, or even from South America. I knew I could not do that. It made me realize how hard it is to be a woman in science."

This brush with the challenges of being a woman researcher deepened Dr. de Abreu Sá's commitment to tackle the issues of gender and diversity in tandem with her research career. "I had been thinking about the role of women in science since the

beginning." Those formative experiences created the possibility for her to break new ground with EMBRAPA.

Tackling gender organizationally

Since its birth in 1973, EMBRAPA has pursued a mission of providing feasible solutions for the sustainable development of Brazilian agribusiness through knowledge and technology generation and transfer. In aiming toward this goal, EMBRAPA has created more than 9,000 innovative technologies for Brazilian agriculture – innovations that have lowered production costs and increased Brazilian food production while concurrently protecting the environment and conserving natural resources. This impressive organizational track record earned EMBRAPA the role of coordinating and overseeing the National Agricultural Research System which includes most of the private and public bodies carrying out agricultural research in Brazil.

Today, EMBRAPA has presence in almost every state in Brazil. It consists of three service centers, 11 central divisions and 38 research centers, each set up to cover specific ecological conditions. EMBRAPA has more than 8,500 employees including more than 2,200 researchers, 45 percent of whom have master's degrees and 53 percent of whom have doctoral degrees. In addition, 27 percent are women, a percentage that EMBRAPA has worked to increase over time through concerted efforts in recruitment and retention and with the commitment of dedicated staff members such as Dr. de Abreu Sá.

Creating a convincing argument for change

Dr. de Abreu Sá and her colleagues always have presented compelling reasons for EMBRAPA to increase gender equity within its research staff. From a pragmatic point of view, EMBRAPA, as a governmental research institution, participates in the Gender Pro-Equity Program of the Brazilian Special Secretary for Women Policies. This program reflects the growing value given to developing gender equity in all arenas of public service. It works to promote equal opportunity for men and women in the public sector and awards seals to organizations that adopt concrete measures to promote equity and equality within their fields of action. For EMBRAPA, affiliating with the Gender Pro-Equity Program has meant integrating political wisdom with organizational wisdom and has served to create a win-win scenario by strengthening its organizational profile as well as the quality of its scientific outputs.

Furthermore, the inherent value of gender equity is particularly significant in scientific programs. Studies have found that women's sensitivity to certain research subjects encourages and enables them to engage in new and unique methods and, in turn, to create new and unique science. For example, according to Dr. de Abreu Sá, research on natural resource management shows women, more than men, excel at creating innovative methods of conservation and preservation. "These kinds of contributions," she said, "are particu-

TOP 3 SUCCESS FACTORS

1. Leveraging opportunities to promote an agenda for gender equity
2. Creating a compelling argument for organizational change
3. Reforming recruitment procedures and Human Resource policies to support recruiting and retaining women staff

larly critical in a country such as Brazil where the preservation of pristine vegetation in biomes such as the Amazon rainforest are prominent on both governmental and scientific agendas."

Enabling change organizationally

This compelling argument exemplifies EMBRAPA's efforts to attract, support and retain an increasing number of excellent women research scientists while several parallel activities have furthered their commitment. For example, Brazil's Ministry of Education, Ministry of Science and Technology, Special Secretary for Women Policies, and National Council for Science and Technology Development have jointly created and facilitated a Program for Women in Science that offers incentives for studies about inequities between women and men in Brazil, with an eye towards solutions. In addition, a proportional increase in the number of women university students who select scientific career paths has facilitated efforts to increase the number of women researchers. Thanks to these funded initiatives and the growing pool of talented female research science candidates, EMBRAPA has been able to look critically at its own recruitment practices.

Dr. de Abreu Sá is proud of the advancements in EMBRAPA's recruitment policies. "We are now sensitive to difference and consciously avoid discrimination. I have seen other institutions practice subliminal discrimination, so it is a real advance for us to be so aware," she said, adding that there was "an immediate and direct correlation between standardization of the recruitment process and increased hiring of female research staff." This standardization, she pointed out, was not set up specifically because of gender. "It was set up to reduce political influences on the process and, thus, ensure an equal opportunity for assessment of each candidate, irrespective of gender."

EMBRAPA's respect for gender equity and willingness to work to retain female staff is also reflected in its human resource (HR) policies. Through feedback and suggestions from the first wave of women scientists at EMBRAPA, HR policies were modified or amended to offer women the same opportunities and benefits as male counterparts. Results can be seen in the number of professional couples who have found opportunity at EMBRAPA, even if the wife is senior to the husband. The changes in these organizational policies and procedures have created fertile ground for women to view and pursue EMBRAPA as a viable career choice for their science, their research and their families.

gender FACTS

- In 1980, 12.4% of EMBRAPA researchers were women.
- In 2005, 27% of EMBRAPA researchers were women.
- In 38 research centers, 18% of higher administrative positions (directors general) are held by women, an increase attributable to EMBRAPA's vigorous recruitment process aimed at gender balance and equity.
- In Brazil, 32% of current scientific output is produced by women scientists.
- The increase in EMBRAPA's women researchers grew from both:
  - a proactive recruitment process that eliminates discrimination
  - an increase in the number of women entering university science programs.

What does the future hold?

In spite of the strides that EMBRAPA has made, Dr. de Abreu Sá acknowledges that hurdles remain. Although there has been increased hiring of women research scientists, the proportion of women in managerial positions is not equitable, especially at higher administrative levels. It took 19 years for EMBRAPA to choose its first woman executive director and, of the 27 executive directors since it was founded in 1973, only three have been women. There has never been a woman president.

However, Dr. de Abreu Sá sees a promising future because presidents and executive directors now will be chosen using the same equity-based recruitment process that has proven so beneficial in the recruitment of women research scientists and center directors. EMBRAPA has only now begun to look qualitatively at its performance in supporting gender and diversity. As part of the Gender Pro-Equity Program, EMBRAPA has developed its first-ever questionnaire for staff perceptions regarding the integration of gender equity. This first round of data will position EMBRAPA to continue strengthening its practices, policies and procedures that are aimed at incorporating gender equity into all levels of the organization.

Dr. de Abreu Sá dreams of seeing the issue of gender brought into not only the demographics of the organization but the very work EMBRAPA produces. She said she has hopes "to introduce gender and diversity issues at many levels. This includes raising awareness of the subject, exploring how we are dealing with instruments to consider this issue in evaluation and rewarding processes, and interacting with groups doing research on this issue within the country and abroad, including the CGIAR Gender & Diversity Program."

For more information on Dr. Tatiana Deane de Abreu Sá and her work with EMBRAPA and the work of Brazilian women scientists:

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YOLANDA GEORGE


SHIRLEY MALCOM

Yolanda George & Shirley Malcom

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE (AAAS)

DR. SHIRLEY MALCOM, head of the American Association for the Advancement of Science's (AAAS's) Directorate for Education and Human Resource (EHR) Programs, and Ms. Yolanda George, the program's Deputy Director, have known each other for more than 30 years. To hear them talk is to listen to two extraordinary professionals who are also good friends. In the course of conversation, memories are triggered, one finishes the other's sentences as stories are recounted.

These two women are a powerful team at AAAS, championing women in science and working collaboratively as a force for change through education. With a Ph.D. in Ecology from Penn State, and having served as a Program Officer at the National Science Foundation (NSF), Dr. Malcom brings expertise in both science and education to bear on vision and future direction of the Directorate. Likewise, Ms. George, with an M.Sc. in Biology and having authored numerous papers and educational manuals, is skilled at implementation for impact. These two women are a dynamic team in an organization renowned for leading the way with "cutting edge" science that always reflects the times.

AAAS - an organization on the cutting edge before there was a cutting edge

Dr. Malcom and Ms. George believe that one reason AAAS has given gender and, more specifically, women in science such a high priority is because the organization historically has responded to the times. Founded in 1848, AAAS's mission has always been "to advance science and serve society." Therefore, the evolution of AAAS has been intricately entwined with the development of American science, and, by association, the changing times of American society.

"Our practices fit our mission and that is one of the best parts of AAAS," said Ms. George. "The role of women in governance is a point of pride for us. Most scientific organizations are not characterized by women in leadership, but AAAS has always had that. In fact, a lot of our internal issues have been mainstreamed … you'll see regular stories on women in science on our Web site and in Science, the AAAS journal. We walk our talk."

From its inception, AAAS broke the mold. It was one of the first organizations to take a multi-disciplinary approach to scientific membership, with sections for each individual science linked under an organizational mandate. At the time, in the mid-nineteenth century, this was a novel approach, as most disciplines established their own societies, such as the American Chemical Society. However, AAAS's approach

was later embraced by the National Academy of Sciences (NAS) as an organizational model to emulate. AAAS is proud that its guiding principle supports valuing a diverse scientific community and believes this revolutionary approach has enriched the organization invaluably. Likewise, AAAS has historically taken a democratic approach to membership, allowing all who desire to join the opportunity to do so, irrespective of scientific credentials.

Again, keeping with times, in 1974, AAAS's Board of Directors issued a policy statement supporting equal opportunity employment and immediately put that statement into practice. By restructuring the organization's governance and staffing, AAAS ensured that women and minorities would be guaranteed representation in senior staff positions and on the Board of Directors. Since that time, the Board has been a voice for gender equality and diversity, consistently issuing policy statements supporting the role of women in science.

Another example of AAAS leading the global scientific community and being responsive to the issues of the day came in 1976, when it formed its Standing Committee on Scientific Freedom and Responsibility. The Committee's directive called for monitoring the infringements of scientific freedom around the world. Using a range of international frameworks, including the Universal Declaration of Human Rights, this committee became a mechanism and clearinghouse for persecuted scientists to be heard and supported. Over time, the Committee became a more active advocate on behalf of aggrieved scientists, sending fact-finding missions to countries where extreme acts of persecution were committed. Finally, the Committee was transformed into the Science and Human Rights Program and was one of the first human rights groups to use the Internet as a tool of advocacy in the support of scientists battling for their rights around the world.

AAAS had its first woman president, Mina Rees, in 1971, and has had 11 women presidents since then, including acclaimed anthropologist, Margaret Mead in 1975. AAAS ensures a focus on gender within the organization and also that the AAAS strategic agenda reflects how science relates to current issues facing not just the United States, but the world. It is this progressive approach to science and research that attracted both Dr. Malcom and Ms. George.

Organizational commitment and flexibility is critical to programmatic success

Dr. Malcom and Ms. George work collaboratively to oversee AAAS's Directorate for Education and Human Resource Programs (EHRP). The portfolio of the Directorate includes educational programs and activities for under-represented groups and for furthering public understanding of science and technology. It provides an ideal place for promoting and supporting the cause of women in science.

Dr. Malcom and Ms. George agree that AAAS's values and structure provide the organizational agility, flexibility and latitude to create programs that meet the Directorate's mandate and access needed resources. According to Ms. George, the "powers that be" have said, in essence, "figure out what needs to be done and then do it." With that mandate, the Directorate has created, facilitated and implemented many successful programs.

Cross-cultural conferences create hope

In 2007, AAAS co-sponsored the International Conference on Women Leaders in Science, Technology, and Engineering in Kuwait City, Kuwait. While it resembled the usual professional gathering of colleagues for presentations, dialogues and workshops on a range of scientific issues, this conference was different. At a time when tension between the Middle East and United States was high and mistrust abounded, the conference offered meeting opportunities for women scientists from the region as well as from Northern Africa and the US. It created a foundation for collaboration, connecting cultures as well as scientific interests.

"In addition to just meeting people and learning about the diversity in the region, there was a hopefulness that filled the room. It really was powerful," Dr. Malcom recalled. "You had a sense that many of the women came out of this conference with a new realization of some possibilities for the future, and they were going to go home and apply that in their work."

During the conference, the participants were able to articulate the challenges they face in seeking opportunities in science, engineering and technology, and highlight the notable progress that has been made around the world. The conference inspired hope that, in its aftermath, action would be followed by exchanges, collaboration in research and more, in order to invite the cross-cultural connection of both men and women in science and technology. As Dr. Farkhonda Hassan, a professor of geology at the American University in Cairo and a member of the Egyptian Parliament put it,

> "What galvanizes women scientists and technologists, and men of course, into action is nothing less than the humanization of science and the acceptance of social responsibility."

Collaboration with other organizations creates strategic direction

Dr. Malcom and Ms. George have created, refined and implemented a variety of programs through collaboration with other initiatives and organizations that have similar mandates. The National Science Foundation's ADVANCE Program is one such example (for more information on ADVANCE, see the case study featuring Dr. Alice Hogan).

The aim of ADVANCE is "to develop systemic approaches to increase the representation and advancement of women in academic science and engineering careers, thereby contributing to the development of a more diverse science and engineering workforce." Working with ADVANCE, AAAS identified the need to create training for university department heads to manage human resources and personnel issues. While most department heads are highly credentialed in their respective disciplines, few have the leadership or managerial skills to lead faculty effectively. By addressing this need, AAAS created the opportunity to educate and influence key university decision makers on the lack of women faculty in science and technology.

TOP 5 SUCCESS FACTORS

1. Keeping up with the times – being on the cutting edge
2. Organizational values and policy framework support gender initiatives
3. Connecting to donors through being visible and working collaboratively
4. Working with partners to identify strategic direction and programmatic emphasis
5. Using M&E tools to measure programmatic progress for widespread change – starting with making policy

Likewise, AAAS partnered effectively with the NSF on a three-year project – Women's International Scientific Cooperation (WISC). WISC aimed at increasing international scientific research opportunities for women scientists. The NSF provided US$1.4 million in grants for travel support to US scientists, thereby making it possible for them to visit research partners in 63 countries around the world. From 2001 to 2003, 226 women scientists in a range of disciplines benefited from the WISC project, both in research activities and career advancement.

Finally, AAAS convened a group of like-minded organizations, such as L'Oreal, and key actors in the field, such as Johanna Levelt Senger, an emeritus scientist at the National Institute of Standard and Technology, to review EHRP's portfolio of programs and to identify new strategic directions to pursue. As a result, leadership development surfaced as the key area upon which to focus and grow women scientists in the future. From this, EHRP has begun to develop leadership initiatives, including girls in science, women in science, and how best to prepare women to achieve higher-level science and research.

Being visible creates opportunity- funding through relationship building

Dr. Malcom and Ms. George believe the success of their programming is based on more than the fact that they get their ideas funded. Their success also comes from their credible and trustworthy reputations in the scientific/donor community. As Dr. Malcom puts it, "Someone has to know you and know you're not crazy." Therefore, to "stay in business" Dr. Malcom and Ms. George have to be active players. Dr. Malcom has served on the National Science Board and the policy- making body of the NSF. She is a trustee of the Carnegie Corporation of New York and served on the President's Committee of Advisors on Science and Technology during the Clinton administration. Dr. Malcom is out there networking, while concurrently sharing her expertise and experience.

"We live at the NSF," said Ms. George. "We review proposals when we do not feel like it, and we give presentations whenever asked. We are a 'soft money' operation. While we are happy to get US$1.7 million from AAAS, we do have to connect with the donor community." Dr. Malcom added, "You have to meet people, talk to them, have them see you present papers some place, hear you describing a project and getting results from your program … and even with all that, it is still hard."

Ms. George and Dr. Malcom feel that you get results by getting people's attention. Helping people develop programs and sitting on their committees and boards is key. "It's about the relationships you build," Dr. Malcom said. "If you serve with the president of a foundation, they know you when your proposal comes in."

Measuring progress – start with policy change

AAAS's programs for women in science have a monitoring and evaluation component built into each project from the start. There is tracking data for each one, and the statistics vary depending upon the stated results for each project. However, measuring the true impact of a complement of programs for women in science is a much more challenging proposition.

To make the kind of global impact needed to strengthen the presence of women in science, a range of inputs and variables is at play, with each being hard to quantify. Ms. George said, "You have to shift the climate, shift the legal basis, shift the mindset and actually perceive there are possibilities for change to happen." Dr. Malcom added, "We can not even cite causation in regard to development. What we can say is, having women present and able to participate is highly correlative to development – the more diverse companies have better outcomes. In fact, many places were able to achieve numerical gender balance in their workforce through social engineering, like in China; however, we see that once they relax or adopt capitalism, they go back to type and gender imbalance." Ms. George and Dr. Malcom cited instances of having singular impact on policy, a fact that can be the template for greater change. With policies in place, you create the field of possibility.

What does the future hold?

Both Ms. George and Dr. Malcom said they see the role they play within AAAS as holding promise. They envision continuing to advocate with NSF, advising the US Congress and federal agencies, and using their indirect but powerful influence in the service of women scientists around the world. However, there is still much more to do. They have identified a collection of issues that women scientists currently face that need addressing.

Work/life balance

Post-doctorate L'Oréal Fellows tell Dr. Malcom and Ms. George that the greatest challenge they face is finding balance between their career in science and their families. They say things like, "I didn't wear my wedding ring to the interview," to ensure they are perceived as credible and willing (for more information on the L'Oréal fellowships, see case study featuring Jennifer Campbell). Helping women deal with having and raising children is critical. This is often where women scientists give up their research for their families. There is the perception that it is impossible to be both a good mother and a good scientist. Ms. George and Dr. Malcom know that many women face this challenge, but the fact is we can figure out how to do both.

Mentoring

In conjunction with NSF, Ms. George and Dr. Malcom have discovered there are very few peer-reviewed articles on mentoring, while there is a plethora of dissertation literature. The goal of

gender FACTS

- The American Association for the Advancement of Science (AAAS) works with 262 affiliated societies and academies of science serving approximately 10 million people.
- In 1974, the AAAS Board of Directors created a policy statement on Equal Opportunity in Science and Engineering, stating: "complex social, economic, & political forces have combined in the past to discourage women, minority and handicapped [sic] persons from entering the sciences and engineering, and to deny those who do enter equal access to positions of respect and authority."
- As a result of this policy statement, AAAS transformed its own governance to achieve diversity among its senior staff & Board of Directors.
- In 2005, the AAAS Board released a statement reaffirming its commitment to women participating in science and engineering (S&E) and reiterating that while, historically, gender has predicted participation in S&E careers, there is no evidence – nor has there ever been – that gender predicts aptitude in science.

mentoring should be to "change the conversation" and think about work force mentoring and helping mentors develop skills to become deliberate and purposeful. Simply asking university departments or research labs if they have a plan to mentor could be a first step to making mentoring more meaningful. Many post-doctoral students have never written a grant, configured a budget, set up a lab or dealt with vendors. These are all aspects of working as a woman scientist that could be taught by an able mentor.

Leadership development

Succession planning is a big concern for Dr. Malcom and Ms. George. They believe the next generation of women scientists needs to be supported and intentionally grown in order to manage "what's coming at them." The passing along of knowledge, skills and lessons learned from the current cadre of successful women leaders will be key to enabling their future achievements.

There is also a need to create leadership development opportunities for mid-career and emerging women leaders who find themselves in a position of power for the first time. Many women do not see the challenges that leadership roles bring to their careers and, at mid-career, can be sideswiped by not being adequately equipped to do the job. Therefore, any leadership initiative would have to create two tracks for development – a track for newer post-doctoral scientists and one for mid-career scientists.

In order for this leadership initiative to take, Ms. George and Dr. Malcom agree that there will need to be cultivation of more male advocates. Currently, the encouragement of women leaders in science does not seem to be a priority on many male colleagues' agendas. Without male colleagues' support, influence and lobbying, the proposition becomes a much more daunting task.

As Dr. Malcom and Ms. George look forward, they see possibilities and positive outcomes on the horizon. With an organization such as AAAS, they have the autonomy and trust to address issues of gender and diversity they deem critical. With partner organizations and donors such as L'Oreal, the NSF and others, they have a network of collegial cooperation that can enable their programs to come to life. And, with one another, they have not only professional collaboration but personal support in a friendship that is visionary and that changes lives for the better.

For more information on Dr. Shirley Malcom and Ms. Yolanda George and the work of AAAS:

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HELGA RECKE


AMELIA GOH

Helga Recke & Amelia Goh

G&D PILOT FELLOWSHIP PROGRAM

TO HEAR DR. HELGA RECKE AND MS. AMELIA GOH tell the story, the CGIAR Gender & Diversity (G&D) Program's Pilot Fellowship Program to Enhance the Careers of Women Crop Scientists in East Africa sprang from a serendipitous encounter in London's Heathrow Airport.

G&D Program Leader, Vicki Wilde, was stuck with a long layover awaiting her flight home to Nairobi, Kenya and so was Dr. Peter Matlon, Managing Director of the Rockefeller Foundation's Africa Regional Program and Interim President for the Programs for a Green Revolution in Africa (ProGRA), a partnership project of the Rockefeller Foundation and the Bill & Melinda Gates Foundation. While waiting for their flight, Ms. Wilde and Dr. Matlon fell into conversation and, subsequently, conceived a program that would fast-track the careers of East African women in agricultural science by providing mentoring, training and professional development. And the rest, as they say, is history.

Recruiting an able team to steward the program... in the beginning

Ms. Wilde knew she could not manage and shepherd this program alone. She needed a strong team to help craft and refine the proposal, implement the process, monitor and evaluate along the way, and communicate lessons learned and best practices for future use.

She first called a long-trusted colleague, Dr. Helga Recke, to assist in getting the program off the ground. Dr. Recke, who had been working in an EU-funded program for the Kenya Agricultural Research Institute (KARI), helped Ms. Wilde draft the first proposal. Professor Julia Gitobu, a renowned Kenyan scientist and gender expert as well as a champion of the African Women Leaders in Agriculture and Environment (AWLAE) Program, helped review G&D's Mentoring Program material for cultural relevance and suitability for African mentees. In April 2005, the Rockefeller Foundation gave the green light for the program. Professor Gitobu was hired as the mentoring coordinator, turning out to be a huge asset and pivotal for the success of the program that unfolded. Although Professor Gitobu passed away in 2007, her contribution to the program in its early stages was crucial to its success and continues to be appreciated by all who are involved in the G&D Pilot Fellowship Program.

Dr. Recke recalls that, with the first call for fellowship applications in May 2005, there was an immense response. In the first round, from the more than 100 applicants, 11 G&D Fellows were selected. The competition was tough for good reason. The two-year G&D Fellowships offered a remarkable array of opportunities for professional devel-


JULIA GITOBU

opment, growth and mentoring plus they funded the G&D Fellows to present their research findings at two international conferences.

The Fellowship – a novel, efficient and holistic program

The G&D Pilot Fellowship Program was conceived as an opportunity for women crop scientists to strengthen their careers by developing their leadership as well as scientific skills. It was designed as a "proof of concept" with a narrow focus, concentrating only on women crop scientists working in the national agricultural research systems (NARS) of Kenya, Uganda and Tanzania with the hope of eventual expansion to a broader range of scientific fields in other parts of Africa. In addition to its Rockefeller Foundation sponsorship, it has additional funding from the Syngenta Foundation for Sustainable Agriculture.

The program is novel in that it provides both efficient and holistic approaches to repairing the "leaky pipeline" of women who enter scientific careers but then drop out because of various pressures they encounter either at home or in the workplace. It is efficient in that it taps into existing world-class resources for the career development of women in science, agriculture and development. It is holistic in that it supports professional growth in both scientific expertise and people management, thus facilitating the development of female crop science leaders and strengthening their respective institutions. This approach develops not only better and more widely known women scientists, but also better women leaders. Furthermore, the design of the program guarantees that G&D Fellows are supported throughout their two-year fellowships.

Between 2005 and 2008, each of the 22 selected G&D Fellows received a package aimed at increasing her skills, visibility and contributions to science, including:

- enhanced scientific expertise through a two-year mentoring relationship with a senior scientist in her field;
- funds to support presentation of her research at two international scientific conferences;
- development of team management and leadership skills through her participation in the CGIAR's women's leadership and negotiations training;
- improved access to knowledge and support via linkages to regional and global networks of women scientists and researchers; and
- opportunities to practice her newly acquired skills by mentoring junior women scientists in her institution or country during the second year of her fellowship, thus expanding the program benefits to at least 22 additional women scientists.


Photo by Mike Goldwater 2007

"It was a turning point in my life. The fellowship came at a time when I was feeling very low in my career and it energized me to continue as a lecturer and researcher. I feel that I have accomplished in the past two years what would have taken me ten years without the program."

WARIARA KARIUKI, FELLOW, KENYA

Dr. Recke and Ms. Goh maintain communications with all program participants. "We have had testimonials from G&D Fellows who were about to give up their careers in science," they said, "but, through mentoring and the leadership course, were encouraged to give it a fresh start. One fellow became a member of the university senate, while still others have applied for and secured jobs they never dreamed of before. These changes make us proud."

TOP 5 SUCCESS FACTORS

1. Having a powerful champion who has skills in enrolling others in the vision and keeping the team aligned, motivated and inspired while recruiting and trusting a team of colleagues to steward the program forward
2. Approaching the strengthening of women scientists' careers from a holistic perspective rather than simply scientific
3. Creating a network of mentoring championed by a committed and culturally sensitive Mentoring Coordinator that provides discernible positive change and impact
4. Complementing mentoring with training and networking possibilities to grow women scientists' leadership skills, visibility and knowledge base
5. Monitoring and evaluating consistently to ensure future programs meet women scientists' needs even more completely

Mentoring is key – paying back in kind for what you have been given

Mentoring is a cornerstone of the G&D Pilot Fellowship Program. Guided by the Mentoring Coordinator, the G&D Mentoring Program provides each G&D Fellow two or three choices of mentors – either men or women who are senior scientists in her field – and allows her to make the choice herself. Their two-year mentoring relationship is launched in a three-day Mentoring Orientation Workshop. The G&D Fellow identifies three goals she hopes to meet through mentoring, then she and her mentor agree on the terms and conditions of their work together. Coaching sessions by the trainers during the workshop further familiarize the mentoring pairs with the approach and goals. Mentors commit to meeting with their G&D Fellow at least once a month and, in turn, the G&D Fellow is expected to mentor a junior woman scientist throughout her second year in the program.


Photo by Mike Goldwater, 2007

The benefits to this approach are clear. G&D Fellowship recipients benefit directly from the devoted attention of a senior colleague and then practice their own mentoring skills as they pass along their wisdom and lessons learned to the next generation of women scientists.

Leadership training as a complement to mentoring

Leadership training is a key component of the G&D Pilot Fellowship Program. In year one, G&D Fellows attend the renowned seven-day CGIAR Women's Leadership Course. In year two, they attend the three-day CGIAR Women's Negotiation Skills Training Course. Both courses have been designed to develop skill sets specifically needed by women scientists in agriculture and both have a long history of positive and discernible impact for participants. During these workshops, as the G&D Fellows hone their leadership skills, they also have opportunities to network with other



Photo by Mike Goldwater, 2007

"I want to inspire African women to take the bold step of entrepreneurship and I want to be a shining example for them."

JOSEPHINE OKOT, FELLOW, UGANDA

course participants including women from the CGIAR, FAO, IFAD and more. In 2006, fellows from the USAID-sponsored Norman E. Borlaug International Science and Technology Fellows Program for Women in Science in Africa began to attend the training. This further expanded the networking opportunities for G&D Fellows because Borlaug Fellows are from throughout Africa (note: the Borlaug Fellowships are further explained in the case study featuring Dr. Meredith Soule).

Increasing visibility and professional networking

The G&D Pilot Fellowship Program provides opportunities to increase the international recognition of African women scientists and raise their visibility in the scientific community. Thus, G&D Fellows are funded to present their research in one international scientific conference each year. G&D Fellows' testimonials attest to the fact that conference participation provides crucial entrées to establish new and essential networks with world class researchers. Through networks formed during conferences, G&D Fellows have been invited to collaborate on international research projects that offer scientific development and career opportunities not possible within their national or institutional contexts. G&D Fellows are also electronically linked into G&D's global support network of women in agricultural science and have access to its extensive resource library. In addition, the fellows, their mentors and their junior mentees receive information on relevant agricultural science conferences, grants, other fellowships, jobs and informative publications on issues of gender and diversity via regular electronic newsletters.



Photo by Mike Goldwater, 2007

"It is so hard for us to break into the male dominated working areas, and gain the respect and recognition we deserve. Through this workshop (the women's leadership and management course) and through the information I receive from G&D, I've learned to network and be more assertive. I am better prepared for the struggle."

AGNES NYOMORA, FELLOW, TANZANIA



Photo by Mike Goldwater, 2007

"Through my relationship with my junior mentee, I realized that to be an effective mentor, I have to be a good role model – this will make it easier for her to have confidence in me. I also have to work hard and rise up to higher levels in my career – this will help my junior mentee to trust the skills I teach her. Although I have always had a talent for training people to be independent, my mentoring relationship has helped me to encourage my junior mentee to understand that she is 'responsible for her future', and should therefore never waste a single minute blaming anyone else for any aspect of failure in her life."

JOSEPHINE SONGA, FELLOW, KENYA

Recruiting an able team to steward the program ... to maintain progress

With the number of fellows, mentors and junior mentees more than doubling during year two of the pilot program, G&D needed help to keep the information flowing and to increase its staff capacity. It put out a call within the CGIAR system for the secondment of a communications officer position. Amelia Goh responded to that call. Ms. Goh, a researcher at the Molecular Genetics Laboratory at the WorldFish Center in Penang, Malaysia, was concerned about the problems associated with gender issues for women in science, especially in developing countries where women's representation in science is so greatly needed yet so scarce.

Although a scientist early in her career, Ms. Goh decided it also was important "to make a contribution to ensuring that the voices of fellow women scientists would be heard and their ideas valued." When chosen, she took on the critical role of ensuring that G&D Fellows could tap into the wealth of resources available to them, and helped them identify appropriate conference opportunities for presenting their research. Ms. Goh informs G&D Fellows, Mentors, Junior Mentees, Steering Committee members and donors about important steps along the way, keeping a great network buzzing. She also solicits feedback from G&D Fellows, not only on conference attendance and experiences within the mentoring program, but also impact stories. This provides G&D with the evidence needed when requesting support in expanding this promising approach.

Professor Gitobu, Ms. Goh and Dr. Recke, along with Ms. Wilde and Pauline Bomett, Office Manager of the G&D Program, worked collaboratively to oversee and implement the G&D Pilot Fellowship Program, assess and adjust as it unfolded, and harvest lessons learned and best practices for future replication. Their teamwork contributed greatly to the program's success.

Monitoring progress and evaluating for the future

Feedback is a crucial part of the monitoring process. The impact data gathered serves

to help retool and strengthen future iterations of the G&D Fellowship Program. Multiple mechanisms for monitoring and evaluating progress that are built into the framework of the G&D Fellows programs include:

- informal networking and review meetings with G&D Fellows, Mentors and Junior Mentees at least once a year in their own countries;
- anonymous evaluation of each training course;
- feedback questionnaires after conference attendance;
- yearly monitoring surveys of G&D Fellows, Mentors and Junior Mentees,
- annual impact stories from G&D Fellows and Junior Mentees in terms of their individual career goals; and
- comparative evaluation of the G&D Pilot Fellowship Program and the Norman E. Borlaug International Science and Technology Fellows Program for Women in Science in Africa, conducted by an external evaluation expert and funded by USAID.

These mechanisms function in a range of ways. For example, at the annual country meetings, G&D Fellows, Mentors and Junior Mentees offer insight, feedback and suggestions aimed at strengthening the program. Impact stories are gathered from G&D Fellows and Junior Mentees to articulate the effect the program is having on their personal and professional lives. These stories create a powerful testimony to positive change and the profound impact mentoring can have on women's lives. Finally, fellows complete a feedback form on their conference experiences that reflect the benefits they gain from their conference participation. The sum of all this data offers a holistic picture of success and provides a basis for further strengthening in the future.

gender FACTS

- In Africa, 60-80% of farming is done by women, but less than 20% of agricultural researchers are women.
- Africa's spending on research is second from the bottom among continents.
- Sub-Saharan Africa has the lowest researcher/population ratio among world regions, with 48 researchers per million inhabitants.
- When the CGIAR Gender & Diversity Program's Pilot Fellowship Program to Enhance the Careers of Women Crop Scientists in East Africa began in 2005, more than 100 women scientists from Kenya, Uganda and Tanzania applied for 11 G&D Fellowships.
- G&D Fellows and junior mentees experience numerous positive impacts in their career and their lives.

Why has this worked? Success factors of the G&D Pilot Fellowship Program

Dr. Recke and Ms. Goh are in complete agreement that Ms. Wilde is a lynchpin of programmatic success. Having a champion for your program who is gifted at enrolling others in the vision, leveraging every opportunity for funding and support, and using interpersonal skills to keep the team aligned, motivated and inspired is key. Yet Ms. Wilde and her team could not have achieved success without the good guidance and inspiring ideas the program's Steering Committee members contributed, notably Therese St. Peter from the Syngenta Foundation for Sustainable Agriculture and three senior women agricultural leaders from Kenya, Uganda and Tanzania, Professor Agnes Mwang'ombe, Dr. Fina Opio and Dr. Anna Temu. In addition, Dr. Peter Matlon and Dr. Joe DeVries of the Rockefeller Foundation provided constant encouragement and valuable support.



Photo by Mike Goldwater, 2007

"I strongly feel this mentoring program has a multiplier effect and its impacts are definitely changing lives and most specifically the lives of women..... the G&D Mentoring Program is a nurturing powerhouse!"

JENIPHER BISIKWA, FELLOW, UGANDA

The fact that the program is only for women has been as a success factor. Not having to compete with male colleagues who often are better resourced, connected and supported gave women G&D Fellows a level playing field upon which to grow and develop.

The very network of support and connection created by the G&D Fellows, their mentors and mentees also contributed to the success of the program. The G&D Mentoring Program, led by an inspiring and culturally sensitive Mentoring Coordinator, was seen as a tremendous success and a modality for G&D Fellows to strategize and put into practice the theories, concepts, and frameworks studied in the Mentoring Orientation Workshop, Leadership Course and Negotiations Training.

Lessons learned and ideas for the future

Looking toward the future, both Ms. Goh and Dr. Recke identified important enhancements that should further the success of the program beyond its initial accomplishments. Responses to some initial challenges were factored into the program between year one and two, while others have been factored into the lessons learned that represent the experience of the G&D Pilot Fellowship Program as a whole. They will help build a fellowship program that is more responsive and delivers greater impact.

Women's lives require tailored options

Increasing the flexibility of the program so it can be tailored to each recipient's specific need has been key to success. According to Dr. Recke, "In African culture, women usually take the role of caring for children, the elderly and sick relatives. Therefore, we know that women participating in the G&D Pilot Fellowship Program will most likely have other work and family commitments. For the next iteration, a completely new and greatly expanded program, we have created tailor-made options to cater to women's different stages of career and life." While the focus at B.Sc.level is on two years of intensive mentoring aimed to keep the younger women in their science careers, M.Sc.- and Ph.D.-level Fellows will be able to compete for advanced science training opportunities in fields of their choice at state-of-the-art research institutions worldwide.

The challenge of electronic connectivity

Many of the advantages of the G&D Pilot Fellowship Program come through electronic connectivity to the rest of the world. For example, discovering the range of available

resources and conferences to attend often requires consistent searching of the Web. Unfortunately, some G&D Fellows do not have ongoing access to the Internet or IT support and, therefore, struggle to reap the full benefit of the entire program. Future iterations of the program will reflect the importance of connectivity.

Opportunities to attend conferences

During the program's first year, only four of the 11 G&D Fellows actually presented at international conferences even though the fellowships would have fully funded attendance. It turned out that the G&D Fellows were simply too busy with work and the rest of their lives to ferret out opportunities in their fields, in addition to the problems that some had with electronic connectivity. Participation in international science conferences requires meticulous preparations from timely abstract and paper submissions and registrations to detailed travel logistics and in some cases, complicated visa-application procedures. Once Ms. Goh joined the team, that problem began to be solved. She serves as an information clearinghouse, ensuring that G&D Fellows receive updates, notices and, where possible, e-mails, alerting them to relevant conference opportunities. Additionally, she assists G&D Fellows with registration and logistical arrangements for their participation. In the future, this type of support will ensure that G&D Fellows can avail themselves of every possible opportunity.

Further enhancements to strengthen future programs to "support the women who support Africa"

The fact that women scientists of any age can apply for the program is a boon, according to Ms. Goh. "In Africa, women of all ages are at different stages of their academic and career progression. In the future, we hope to offer fellowships to women at B.Sc., M.Sc., and Ph.D. levels in an effort to nourish the pipeline of African women agricultural scientists from the start."

Dr. Recke and Ms. Goh agree that "in the future, the G&D Fellowship Program will work more collaboratively with African networks to reach as many promising women as possible and match them with suitable mentors." In addition, they will continue "to attend to and strengthen the pipeline of upcoming junior women scientists in Africa," they said, "and the next iteration of the G&D Fellowship Program will strive to have as broad a reach as possible, thereby growing the ever expanding network of African women scientists in agriculture."

For more information on Amelia Goh's and Helga Recke's work with the G&D Pilot Fellowship Program:

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Alice Hogan

NATIONAL SCIENCE FOUNDATION-ADVANCE

DR. ALICE HOGAN started her career at National Science Foundation (NSF) in the late 1980s, managing programs that supported collaborative research between the United States and China. In 1999, more than a decade after she joined NSF, she was asked to chair a new committee. "The committee was expected to rethink women's programs at NSF," she recalled, adding, "I had no idea how I was chosen." However, she readily accepted the role as Program Director of the National Science Foundation's ADVANCE program which, under her leadership, awarded more than 30 ADVANCE Institutional Transformation Grants totaling US$50 million to address the challenge.

"While we as a nation have made considerable progress in attracting women into most science and engineering fields, we still see fewer women at the full professor and academic leadership levels than we would expect, given the pool of women with doctorates," she said, describing a situation that is still being dealt with. "After investing in creating this pool of highly trained talent, we should see a high rate of return – productive, creative and respected teachers and researchers attracting more students into fields that might have seemed closed to them given the traditional profile of science and engineering faculty."

Birth of ADVANCE – adapting to legislative mandates and societal change

Starting in the 1980s, NSF funded grants to individual women totaling several million dollars for research and education activities, but it had not conducted any assessments to look at whether this approach also stimulated the type of institutional change that would support women's success. The program prior to ADVANCE, called Professional Opportunities for Women in Research and Education (POWRE), had supported women during various stages of their professional development. Although these grants were considered key to individual success, NSF leadership wanted to conduct a broader investigation into systemic and organizational barriers.

The legal environment in the United States also was changing, in light of US Supreme Court decisions that challenged restrictive eligibility practices. NSF's 1950 charter stated it was not just to ensure quality of science, but also to focus on who does science. This mandate was amplified in the 1980 Science and Engineering Equal Opportunities Act that expanded NSF's responsibilities to broaden participation in science and engineering.

At the time ADVANCE was created, Dr. Joe Bordogna, the Deputy Director of NSF, was head of the NSF Human Resources Task Force (HRTF), a small working group that reviewed NSF's efforts to broaden participation and formulate strategy. HRTF found that, in many fields, women were earning doctorates but were not attaining faculty positions. As a result, HRTF determined to seek a new direction for women's programs, focusing on structural, institutional issues.

Dr. Bordogna, his special assistant, Dr. Debbie Crawford, and a committee of both men and women had worked at senior management level to gain support for this new gender initiative. This required compiling and presenting data that showed the under-representation of women in science and illustrated that the roadblocks to women were institutional, since women clearly excelled in attaining Ph.D.s. This new focus identified constraints that impeded women's academic career advancement in science and engineering.

Dr. Hogan suspected that NSF's leadership had recognized that "determining a name for this new gender initiative was critical and that using the word "gender" might trigger negative reactions. So they decided on a non-threatening name – ADVANCE.

Growing pains

NSF set up a committee of ADVANCE advisors, with representatives from all NSF divisions, including math and physical sciences, biological sciences and engineering. Members brought their various perspectives on career stages and challenges specific to individual disciplines for consideration on approaches for ADVANCE to take.

A 1999 MIT report, A Study of the Status of Women Faculty in Science at MIT, that "blew the roof off the idea" that there were many women in science at MIT, proved to be an invaluable resource. The study reinforced the committee's thinking that it needed to: i) take the focus off individual women and put it on the conditions of the academic workplace and ii) pull together and present hard data that showed the under-representation and disadvantages women faced. All of this became critical in ADVANCE's emerging approach.

The committee looked at data from previous NSF programs to make recommendations about what could be done differently. Dr. Hogan attributes the committee's recommendations for the new program to three key factors: i) committee members represented a cross-section of all sciences, ii) sharing research from their different disciplines enriched their discussions, and iii) each member compiled data on the number of women in his or her field of science. One female committee member who trained as a social scientist and knew the literature regarding biases, stereotyping and the impact of small numbers, shared key research findings. This information," Dr. Hogan recalled, "permeated our cell walls."

The committee discovered that universities had higher enrolments of women than men in disciplines such as social sciences, biological sciences and chemistry and that most areas had increasing numbers of women in Ph.D. programs. But, in looking deeper at the women who were "in the pipeline", it found that, in every field, there were not enough minorities. This focused ADVANCE on the question of how to support women of color in academic science and engineering.

The committee's discussions and debates confirmed that the issues were structural and systemic, based in university policies and practices. The shift from an individual to an institutional focus would challenge the universities to think more systemically about how to build and sustain a more diverse academic workforce within science and engineering. Now all the committee had to do was convince NSF's leadership of its new approach.

Influencing the non-believers – highlighting research findings on bias and stereotyping

The committee's challenge and constant struggle became how to communicate its approach to non-believers. It sent the recommendations to the NSF Director, Deputy Director and Assistant Directors. That started a process of negotiating the focus of the program. Unlike most NSF programs, there was not a dedicated budget for ADVANCE. Rather, the funding came off the top of each directorate's budget – like a tax. The committee knew it must consider the unique needs of individual directorates because each field has different career trajectories. For example, some sciences have several postdoctoral research requirements, meaning people are often in their late 30s before they can enter an academic career.

The committee encountered some profound philosophical divides among senior management. Some thought women just needed money to do research, that there were not any other structural issues in academic life or unattractive characteristics in the system or organizational structure. Others recognized that the academic workplace had structural issues, such as the conflict between timing of tenure and childbearing. The findings of social science helped support the structural approach.

Academic workplaces pride themselves on being objective. They look at data. They look at previous scholarships, formulate a hypothesis and argue about it. The committee's goal was to influence the leaders and, eventually, others to respect data and scholarship. Committee members set out to dispel the common view that "one woman is good, two women are enough, so the issue of diversity is solved."

Most people believe the issues for women in academe have been solved because, for instance, now in the US, the undergraduate population is slightly more than 50 percent women. At the faculty level, women in fields such as engineering are highly visible because they are still relatively rare, but their male colleagues often think they have succeeded in diversifying the department because it has one woman. The committee at NSF understood that collecting the data was the clearest way to show that there are still relatively few women in academic science and engineering, and to challenge the perception of some male faculty that the issue is solved when they see more women.

Dr. Hogan described this negotiation with NSF leadership as "very intense." She reflected, "This is where I learned about gender being an issue that pushed buttons and that people often respond based on personal experience rather than data or objective evidence. I had not fully grasped or anticipated this. [It was] hard to find that middle ground."

NSF commits to ADVANCE-ing – shifting focus to institutional transformation

NSF approved the ADVANCE program in 2001. The program currently has three components and confers the following types of awards.

- **Institutional Transformation Awards** support innovative and comprehensive programs for institution-wide change, and identify and distribute "best practices" among its grantees.
- **Leadership Awards** support the efforts of individuals, small groups or organizations in developing national or discipline-specific leadership to enable the full participation and advancement of women in academic science and engineering careers.
- **Partnerships for Adaptation, Implementation and Dissemination Awards (PAID)** support the analysis, adaptation, dissemination and use of existing innovative materials and practices that have been demonstrated as effective in increasing representation and participation of women in academic science and engineering careers.

Dr. Hogan is proud of NSF's leadership and support of ADVANCE, especially the Institutional Transformation Award. Originally, NSF committed only five years to the program, but it is still going. As the former leader of ADVANCE, she admits that, initially, she underestimated the extent to which women in Ph.D. programs and their contributions were not recognized proportionally in the sciences. But now, receiving an ADVANCE grant brings great stature, both nationally and internationally. These awards are highly competitive and merit based. When an academic institution receives a grant, it is a stamp of approval from the NSF, which has great credibility and respect at colleges and universities. The program is helping to ensure a return on the nation's investment in women's education, a focus that takes it out of the fairness and equity arena.

ADVANCE does not impose a lot of restrictions on what the Institutional Transformation Awards can be used for, aside from standard US governmental requirements. Awardees are provided guidance in reporting progress on required indicators and evaluation results. Each university recipient appoints a principal investigator (PI) to lead the five-year, non-renewable grant program budget. Grantees are unhappy with the five-year, non-renewable clause, but ADVANCE has a flat budget.

The programs support the time grantees spend working on program activities, meaning PIs and staff are compensated for their time, whether through salary support, release time or research assistance. They are given release time so they do not have grant responsibilities on top of everything else they are doing. The grants include ways to compensate people for their time because, without compensation, the work may be devalued by others.

Grant personnel may be paid to take courses on gender or to do summer study, because often they are the people affected by the problem. For example, one group of faculty in the sciences met over a summer to read and participate in discussions regarding institutional practices that could adversely affect recruitment, retention and advancement of women. They then presented the information to search committees on the campus

so they could better recognize unintentional discriminatory practices in selection processes. This committee's time was partially supported by a stipend.

In addition to valuing (and therefore paying) for people's time, the program's focus on institutional processes, policies and practices, rather than on "fixing" the individual, is a hallmark of ADVANCE's efforts. It requires regular data reporting on the status of women and regular external evaluations to monitor and encourage institutional attention to the goals of the grant.

The start-up phase of these institutional grants often takes much longer than the recipients expect. Sometimes the women serving as PIs are faculty members not yet well connected within the larger university community. Therefore, it takes them time to establish networks and learn about current university practices and procedures. Often, their human resource departments do not have integrated data bases, making benchmarking at the beginning of the program challenging. To aid in this, best practices derived from the early recipients' experiences are distributed to new grantees to help shorten the start-up phase.

Since 2001, 27 institutional grants have been awarded and four smaller ones are currently in proof-of-concept status. Institutional grantees report annually on a set of indicators. This ensures that they collect data about the status of women on a regular basis that can be analysed by grant staff and presented to university leadership and NSF.

Early recipients

Two of the earliest ADVANCE Institutional Transformation Awards went to the University of Michigan (UM) and University of Wisconsin (UW). These recipients were well equipped to develop methods for incorporating data on the status of women at their individual institutions and for bringing social science into the discussion with other scientists.

University of Michigan

The UM model included giving core faculty opinion leaders a crash course in gender, so they could review the data and literature and come to a deeper understanding of how gender impacts everyday institutional processes, such as hiring practices.

Dr. Hogan commended Dr. Abigail Stewart, the PI at UM and a social psychologist with a background in gender research, for her astute approach to engaging allies. Her ability to engage colleagues in discussions of social science findings that were outside of their areas of research had a profound effect on program results. These colleagues, in turn, could pass on what they learned about evaluation biases and stereotyping. Dr. Hogan underlined that part of Dr. Stewart's success came from her understanding of the way academics work.

"You have to be respectful of how people do their work," she said. "You cannot force people to adopt new beliefs and practices unless you approach them by understanding their cultural norms and how they do their work. For example, people in academia look at data; they want to see the scholarship that informs the field. They need time to think about the data, to find the methodological

problems and, ultimately, to reach new understandings through their scientific process."

In questioning UM administrators, for example, Dr. Stewart asked why there were not more women in their applicant pool. She gave them articles about biases in recruitment, selection and retention, and pointed them to research findings and other scholarly papers that discussed biases in evaluation and peer-review processes. She and her staff helped administrators recruit faculty, meeting with candidates and providing advice and information about the university.

As part of the effort to engage senior faculty in this work, a UM math professor came up with the name Science and Technology Recruiting to Increase Diversity and Excellence, known as STRIDE. In addition, UM implemented sponsorship of a theater group that, although originally considered "a bit flaky", developed interactive classroom techniques and worked successfully with faculty and graduate students to develop more effective teaching methodologies. The techniques included mentoring sketches, tenure discussions and other typical short scenarios that were part of everyday life in the academic workplace. Deans invited faculty for dinner and performances and, after the performances, the actors facilitated discussions while staying in character.

Dr. Hogan invited them to perform at the annual Principal Investigators conference, noting that "the performances were measured, not over the top. All of this can open peoples' eyes. The message is to change the structure. You cannot change individuals, it takes a long time. But, by changing structures, you can begin to change assumptions." The original scientists and engineers who made up STRIDE were so interested and enthusiastic they did not want to stop working on the program. Analysis of UM science and engineering faculty data reveal overall significant progress in the representation of women over the course of the NSF-ADVANCE award period. See Figure 3.

University of Wisconsin

The UW-Madision Women in Science and Engineering Leadership Institute (WISELI) was another early grantee. As part of its cooperative agreement and with the help of the UW Office of Academic Planning and Analysis, WISELI collects and monitors major quantitative indicators of gender equity. Through its work, WISELI found that from 2002 through 2004, the percentage of women faculty in biological and physical sciences slowly increased, with the biggest increases at the assistant professor level in physical sciences (from 17 percent in 2002 to 24 percent in 2004), and at the associate level in the biological sciences (from 25 percent in 2002 to 30 percent in 2004). Since the grant's inception in 2002, women have increased as a percentage of new hires , particularly at the senior level. About 40 percent of new tenured hires in the biological and physical sciences are women, compared to 20 percent prior to the ADVANCE grant.

When WISELI data found that the percentage of women awarded prestigious campus awards (Vilas Associate, Hilldale, Romnes and Kellett) decreased between 2003 and

FIGURE 3 Recruitment trends at the University of Michigan science and engineering faculty.

FIGURE A Percent of Female Science and Engineering Faculty, AY2001 and AY2006

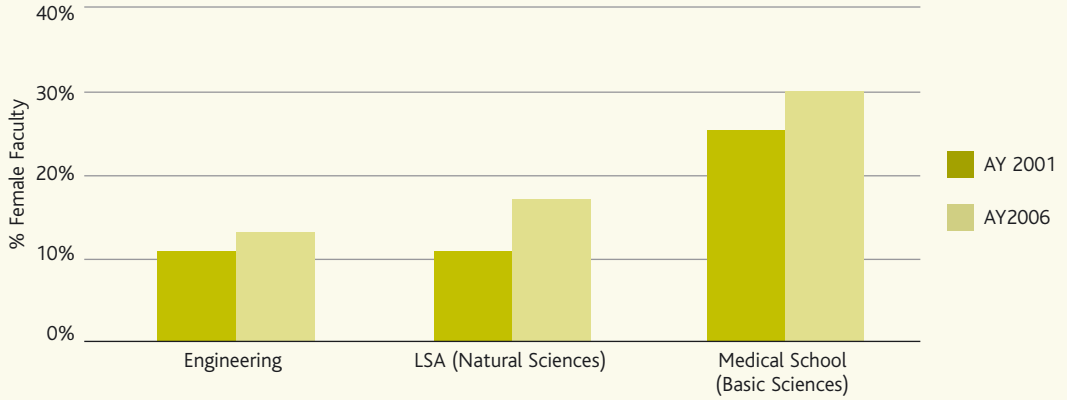


FIGURE B Number of Total New Hires and Percent Female in Science and Engineering, AY2001 - AY 2006

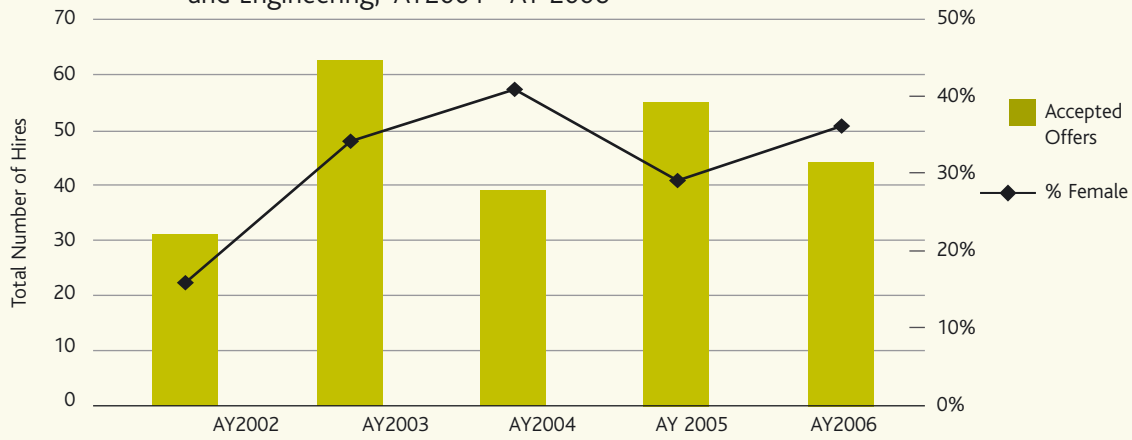
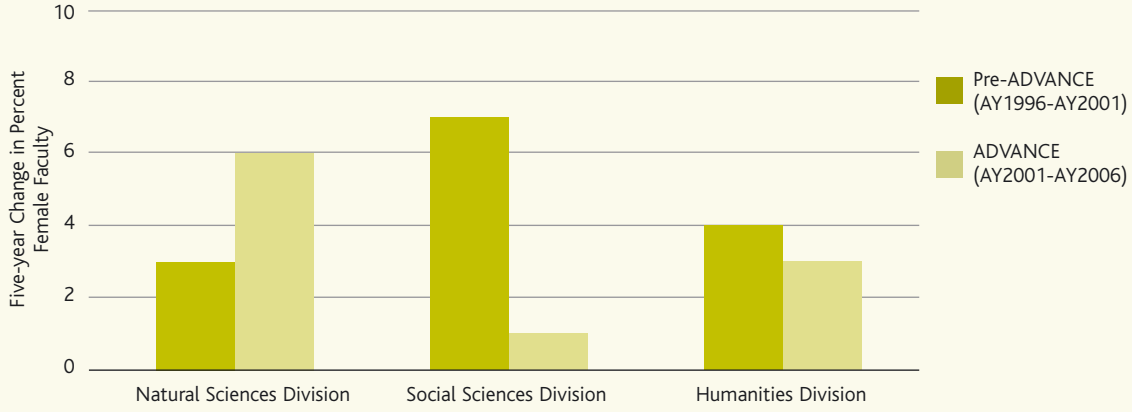


FIGURE C Gains in Percent Female Faculty Over Two 5-Year Periods Before and During ADVANCE in LSA by Division



RECRUITMENT

Analysis of UM science and engineering faculty data reveal overall significant progress in the representation of women over the course of the NSF ADVANCE award period. The percentage of the science and engineering faculty that are female increased overall from 15% in AY2001 to 19% in AY2006; see Figure A for percentages by College/School. These gains are due in large part to increased hiring of female faculty. In AY2002 16% of new faculty hires were female; in AY2006 that number had more than doubled to 34% (see Figure B). Looking at the proportion of men and women hired in each of the three colleges that employ the largest number of scientists and engineers at the University of Michigan from the two pre-ADVANCE years (AY2001 and AY2002) compared to the next four years (AY2003 – AY2006), we find a statistically significant increase in the proportion of women hired over this time period (chi square=10.54, p=.01). Moreover, while each of the three divisions in the College of Literature, Science, and the Arts (natural sciences, social sciences, and humanities) reported gains in percent female faculty over two five-year periods before and during the ADVANCE Project (1996-2001 and 2001-2006, respectively), the Division of Natural Sciences was the only division to report a larger percent increase during the latter five-year period (i.e., during ADVANCE) when compared to the earlier period (see Figure C).

TABLE 2 Grantee information about publications, presentations, and grant proposals*

GRANTEE	NUMBER OF PUBLICATIONS	NUMBER OF PRESENTATIONS	NUMBER OF GRANT PROPOSALS	AMOUNT REQUESTED IN GRANT PROPOSAL(S)
1	3	2	1	$75,000
2	7	0	1	$1,807,375
3	1	2	1	$50,000
4	1	1	2	$425,000 (total)
TOTALS	12	5	5	$2,307,425

* This table reflects the number of publications, presentations and proposals that the first four recipients of the LCRG directly attributed to the funding year from the grant. If all of the grant proposals were funded, the original investment of approximately $255,000 (for 6 awardees) would have a return rate of almost 1000%. Even if a fraction were funded, the pay-offs would be significant.

2005, it began working with the appropriate campus units to understand the processes at play. WISELI is also producing a documentary that looks at the institutional transformation outcomes of their ADVANCE project's five-year effort.

One critical WISELI initiative, supported by NSF-ADVANCE, was the creation of the Life Cycle Research Grant (LCRG) Program where research grants were made available to women faculty at critical junctures in their professional careers (e.g. between grants, a new baby, parent care responsibilities). These grants are meant to be flexible and women may apply for varying amounts and academic purposes. In an evaluation study of the LCRG Program conducted in 2004, recipients of the grants in 2003 and 2004 verbalized many pay-offs, both short- and long-term. These were described quantitatively, as in Table 2 above.

Many ADVANCE recipients decided initially to work on improving university policies for such things as maternity leave and flexible tenure clocks, only to discover that good policies were already on the books, but no one used them. Women often felt that asking for "special accommodations" was risky because it might imply they were "less committed" to work.

Academic science originated as a very male occupation, with expectations that the demands of science should take precedence over all else. The number of male scientists with partners who work less than full time or only in the home is very high compared to women in academe who have stay-at-home spouses. This puts women in a double bind – they must meet the expectations of the disciplines based on an "idealized" (male) worker, but they must also meet the expectations of family life.

At the University of Puerto Rico-Humacao, also a grant recipient, an external evaluation report found an increase of tenure promotions for women faculty after the ADVANCE intervention. It also revealed an increase in applications and support for external research funding. See Figures 4 and 5 on the following page.

TOP 7 SUCCESS FACTORS

1. Adapting to legislative mandates and societal change
2. Influencing non-believers by sharing research on bias and discrimination
3. Shifting the focus from individual to institutional transformation
4. Developing integrated systems for data collection, benchmarking, goal setting and measurement
5. Developing social networks and mentoring opportunities
6. Identifying and sharing best practices across programs
7. Achieving positive results and receiving public recognition

FIGURE 4 Percentage of faculty at University of Puerto Rico-Humacao serving as PIs and CoPIs in externally funded projects by department and gender-before and after ADVANCE 2000-01 vs. 2004-05

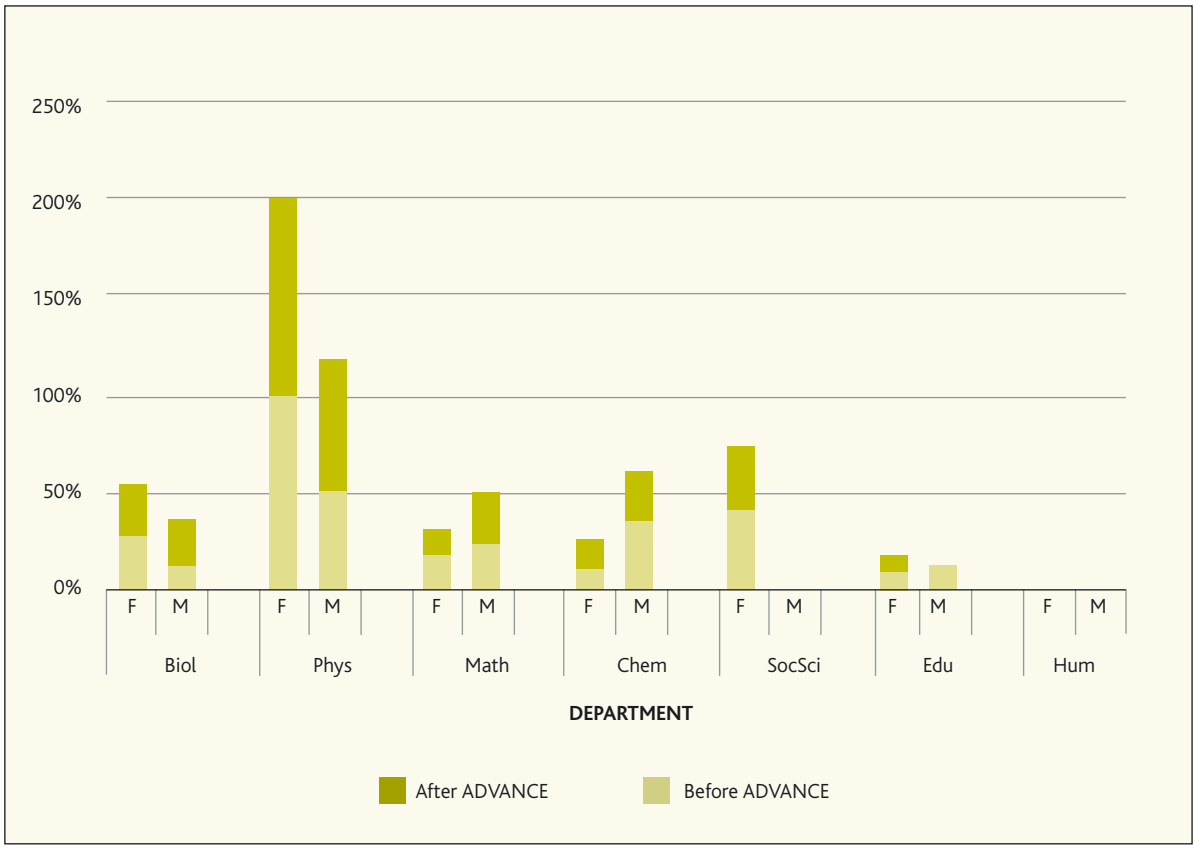
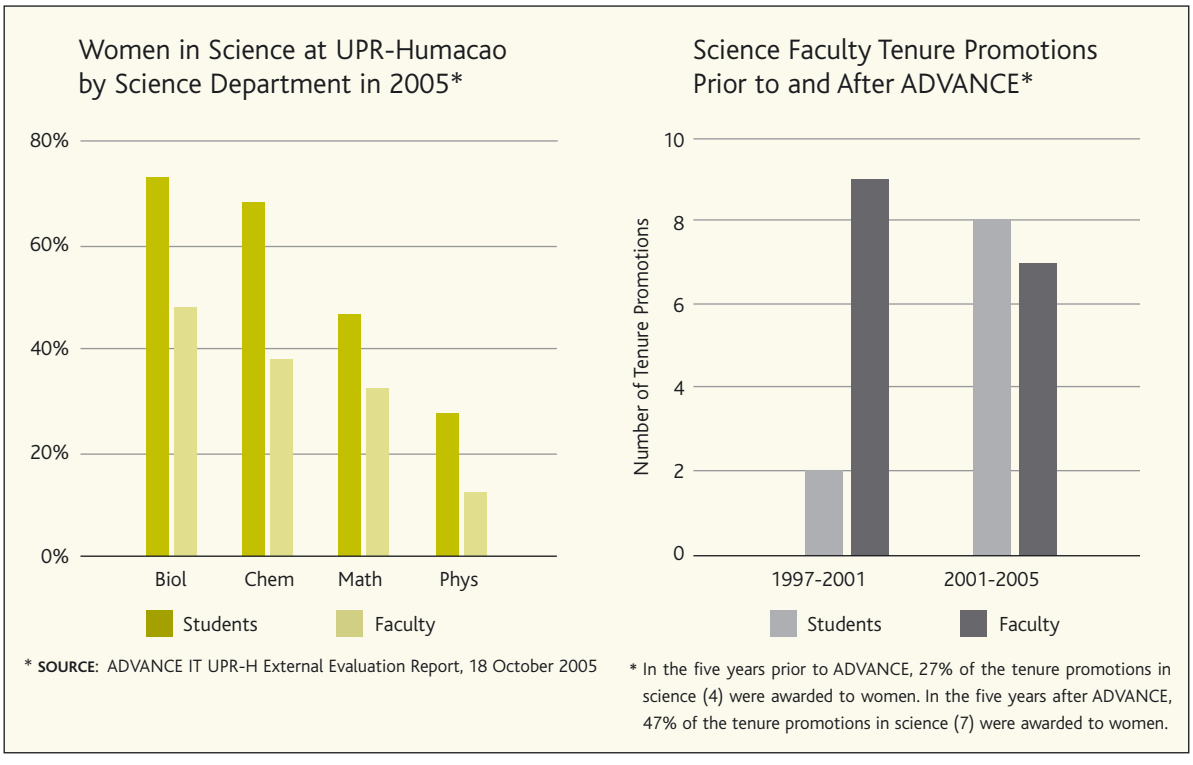


FIGURE 5 Proportions of women in science at the University of Puerto Rico-Humacao



* **SOURCE**: ADVANCE IT UPR-H External Evaluation Report, 18 October 2005

* In the five years prior to ADVANCE, 27% of the tenure promotions in science (4) were awarded to women. In the five years after ADVANCE, 47% of the tenure promotions in science (7) were awarded to women.

Creating social networks

Most ADVANCE programs build on two pillars: i) working on institutional processes and polices, and ii) creating networks and communities for women. Both are necessary because women, by virtue of their low representation in academic science, are usually outside the professional and social networks that provide informal and essential support and mentoring. One of ADVANCE's major impacts has been the increase in social networks of the hundreds, maybe thousands, of people involved in ADVANCE programs. The program offers women access to networking lunches, leadership training and to power through meetings with key administrators. For example, typical junior women arrive on campus, do not know anyone and are heads down, busy getting papers out. These women are drawn into ADVANCE networks, mentored and encouraged to develop social networks. ADVANCE also gives women small grants for their research, to get research samples, to retool in a particular technique and to visit other universities.

Commitment and accountability

Accountability for ADVANCE grantees includes annual reporting of data, third- year site visits that include external reviews, and on-going engagement with top leadership. Program staff members are encouraged to share insights, data, tools, successes and failures with their university leaders. Steady increases in the numbers of women hired and improvements in tenure and promotions help maintain support for the program. Although each ADVANCE program component has a different approach, each must have a formative and external evaluation.

These evaluations have raised several issues. "It turns out," said Dr. Hogan, "that it is difficult to measure impact. What are we evaluating: climate, numbers of hires, social capital? For example, if you believe social capital comes from strong networks that might be the largest impact. Bringing rigor to this networking process and to the leadership ranks raises awareness and learning."

The "chilly" climate within departments seems to remain the most difficult thing to change. Climate studies done at different times during the grant period have failed to show much improvement.

Universities have become more accountable over time. In the beginning, in order to ensure that the university administration would pay attention to the grant agreements and the work on their campuses, there were cost-sharing agreements. However, NSF's policy on cost sharing has changed, and as a result, the requirement for cost sharing (originally 20 percent) has been dropped. As universities have seen the benefits that attention to effective recruitment and retention bring overall, they have become more engaged.

In many places, department chairs are "now on board," said Dr. Hogan. They are raising questions about dual-career situations and they feel comfortable calling each other across departments, which strengthens underdeveloped networks within universities. As a grantor, Dr. Hogan says, "NSF is asking itself, what are we learning at the university level that can be applied nationally? Admittedly it is difficult to measure impact at that level. However, these cross-institutional experiences have raised further

questions. What is known now about what works for the majority population in academe? How do we engage the minority populations more effectively?"

Sustainability of ADVANCE program

Indicative of its commitment, NSF has committed about $100 million to ADVANCE and considers it a flagship program. It challenges the core academic culture, assumptions about evaluation, meritocracy and high standards. ADVANCE staff members keep directors and other constituencies involved, and the program has received positive press and public attention.

However, external site visitors often raise hard questions about the commitment that university administrators exhibit toward the program's goals. They sometimes complain about the monitoring and evaluation results. Unfortunately, often they do not complain directly to NSF's ADVANCE program director but instead to the next higher level of leadership. Despite these complaints, NSF leadership remains committed to the program's goal of institutional transformation.

This can always change when NSF leadership changes. Ultimately nothing is certain because of the way the funding is structured within NSF. Unlike many other programs, ADVANCE does not have a specified level of funding in the federal budget. It depends on the willingness of the NSF directorates to contribute. Until ADVANCE is a line item in the NSF budget, it is risky because the consensus that this is a good idea could fall apart. NSF has a tradition of not doing things forever.

The ADVANCE PAID Awards encourage sites to share best practices on how to address infrastructure constraints to women scientists' participation and advancement in academic science and engineering careers. Dr. Hogan suspects that "ADVANCE is the kind of program that will continually be challenged to justify its direction and budget. Much remains to be done to convince people of the waste of talent that is occurring because of this lack of full access to science and engineering academic careers for women."

Sharing best practices

Emerging Best Practices

Best Practices are outlined in the ADVANCE Institutional Transformation Program's Tool Kit #2.[1] These practices have emerged over the life of this program and are offered as examples of the change initiatives that have been instrumental in increasing visibility of the unexamined and institutional constraints hindering women's participation and representation. An analysis of the reports from the grantees suggests seven emerging best practices:

- public and transparent polices and procedures,
- committed leadership,
- diversity-inclusive recruiting,
- welcoming climate,
- stakeholder collaboration with other stakeholders,
- spirit of community,
- women feeling powerful.

1 http://www.advance.nmsu.edu/Documents/PDF/toolkit2.pdf

Dr. Hogan highlights stories that give voice to the experiences of three of these best practices – women feeling powerful, a welcoming climate and committed leadership.

Women feeling powerful results from women's leadership of ADVANCE programs. PIs report being seen as leaders, either in their professions or on their campuses. Often they are non-traditional or non-positional leaders; roughly half of the program leaders are not administrators. By being in command of this program, they become the "go to" person. They know about hiring practices and they make connections throughout the academic community. They see themselves as leaders, something they might not have often thought of themselves as being before. They are sought out for information, advice, and money. They can pay for people to attend meetings, provide stipends and give others an opportunity.

Dr. Hogan, who retired in 2007 (leaving the program in the capable hands of Laura Kramer and Jessie Dearo), said that some of her greatest moments as director came from seeing the growth of the ADVANCE community members as they gather for annual meetings. "When the PIs walk into the room, the energy is palpable and attendance increases each year. For me, the high is when individual women tell me, 'Without this program, I would have dropped out'. The program has helped grantees find validation and the ability to focus on the work they were committed to. At the same time, the program gave them cover. They could talk about it without others thinking they were just 'whining'. Now they are seen as people who brought in money from NSF and their male colleagues have seen they were getting better candidates in their recruitment pools."

Creating a more welcoming climate remains a conundrum. In academe, there is no bottom line in terms of departmental climate. It is often a toxic environment, it leaves women isolated, harasses them and does not do anything to help them get ahead. Women are often not part of informal department networks and are likely to be assigned low-value, high-time-commitment committee work. No one necessarily intends for this to happen. It is largely the result of unexamined assumptions, habits and traditions.

Developing committed leadership requires influencing leaders at different levels. ADVANCE's purpose and function, along with its financial resources, enable university departments to see the program as their best friend. This is important given the role that department chairs play in the lives of faculty – they can make or break a person's career. The next ADVANCE solicitation will require institutions to develop programs to train or support department chairs to be effective managers and leaders. Department chairs will be required to attend national workshops and receive training. As Dr. Hogan emphasizes, "It's really all about peer learning."

What's next?

Within NSF, there are several goals to forward the ADVANCE Institutional Transformation Initiative and others.

- Stabilize the ADVANCE budget, by integrating it as a line item in NSF's federal budget.

- Bring more accomplished women scientists to NSF to serve as ADVANCE advisors. Feature their science as well as their roles as leaders in broadening participation. Ask them what NSF could do in order to stimulate the thinking about these issues internally.
- Educate NSF staff on how gender bias can affect proposal reviews. For example, recommendation letters written for men are different from those written for women. Inculcate within NSF what has been learned in ADVANCE programs about biases. This means i) asking what needs to be done within the agency and what NSF is asking its grantees to do at their institutions and ii) providing a standard briefing and saying here is how we do this, here is what we know about evaluation biases.
- Continue to fund Institutional Transformation Start proposals, a pilot program to help small institutions with few resources plan, pull people together, collect data to make their case, and then develop a conceptual piece and evidence to request a larger grant from NSF ADVANCE.

ADVANCE has not been involved internationally, although it has done a small amount of work with the Science Foundation of Ireland, has communicated with government agencies in Europe and Asia, and some of the grantees have participated in international conferences. NSF does fund international partners, and could do work in Africa. Dr. Hogan surmises that women may not be as involved in international collaborations because of the other demands on their time and attention, such as family responsibilities.

A final question Dr. Hogan poses is "How do we support and harness the energy of women in leadership?" The tragic death of Dr. Denice Denton was a shock, especially to the women in the science community. Dr. Denton committed suicide in 2006. She had received the Presidential Young Investigator Award in Electrical Engineering from NSF in 1986. She rose to the level of Chancellor of the University of California – Santa Cruz. A press release from UC Santa Cruz on June 27, 2006 speaks to the tireless contribution Dr. Denton made to using "the power of her leadership position to raise the visibility of issues related to supporting and advancing women and girls in science-related careers both on and off the campus." Dr. Hogan ponders, "Did we fail her by not anticipating the isolation and pressure that women at the highest levels have to deal with?"

ADVANCE recently gave a grant to develop a think tank for university women leaders and provosts to help develop and organize support systems for women leaders. Organizations push people to take on leadership roles yet, when women move into these roles, to whom do they turn for advice and support? This grant, according to Dr. Hogan, is intended to support formation "of small groups of women leaders to discuss

gender FACTS

- Key institutional barriers to career advancement of women faculty
- Small numbers of women faculty in science and engineering "pipelines"
- Hostile or "chilly" organizational climate toward junior and senior women faculty
- Unconscious bias in recruitment and hiring practices
- Structural issue of balancing family and work goals with tenure track requirements
- Lack of sustained leadership to change initiatives

generic issues and to provide a setting where they can meet with others to talk through how to scope out an issue."

"Women," she added, "are recruited into troubled organizations and many have few people they can trust, unless they have formed their own personal support systems. Half of the Ivy League universities as well as other influential institutions are now run by women, including Princeton, Brown, Harvard, Drew, University of Pennsylvania and MIT. At other universities, there are women provosts and leaders of science departments. How can ADVANCE help design collaborative arrangements through which women can meet to talk and learn from each other in an environment of trust and confidentiality?"

NSF's business case for more women faculty in science

In summary, the business case for more women faculty in science is strong. More women have been earning Ph.D.s, but do not proportionately advance to senior academics levels. The return on the country's investment in their education is limited if these highly educated individuals do not have the chance to contribute to science and technology research and education. NSF's key business case includes:

- broader thought – diversity of thought often comes from diversity of experience and, in spite of worldwide competition for talent, women are routinely undervalued and underutilized at the Ph.D. level;
- broader participation – the NSF charter as a federal government institution mandates broadening participation in science and engineering;
- broader impact of research – NSF program officers have to recognize how increased participation can contribute to society and enhance education and, in turn, incorporate this into their funding decisions.

For more information on Dr. Alice Hogan's work with NSF-ADVANCE:

Alice Hogan
WEB SITE: http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5383
EMAIL: Alice.Hogan@asian-university.org



Nancy Hopkins

COMMITTEE ON WOMEN FACULTY, MASSACHUSETTS INSTITUTE OF TECHNOLOGY

IF IT HAD NOT BEEN for Dr. Nancy Hopkins' mother's strong belief in education as the key to upward mobility, excellent early education at a private school and a home environment that taught Dr. Hopkins science was a wonderful discipline that she could pursue, her life might be very different today.

"Fifty years ago, when I was a teenager," explained Dr. Hopkins who is now a Professor of Biology at the Massachusetts Institute of Technology (MIT), "it was assumed that girls wanted to learn very little science or math. But I liked science from the beginning."

"A mentor who tells you 'you can do it' is critical."

As a student at Radcliffe, at that time a women's liberal arts college in Massachusetts, and taking classes at Harvard, Dr. Hopkins pursued an undergraduate degree in biology. It was at Harvard that one of her professors, famous geneticist, Dr. James Watson who co-discovered the structure of the DNA molecule, took Dr. Hopkins as his mentee. That relationship changed her life.

Recognizing that she would excel, Dr. Watson encouraged her to become a scientist, helping her believe in herself. He encouraged her to attend graduate school and earn a Ph.D., something that was highly unusual for a woman to do at that time in the field of science. Dr. Hopkins believes that without Dr. Watson's guidance and support, she never would have thought to go on with her academic career.

Legal frameworks and social change converge to create possibility

In 1964, the United States Congress passed the Civil Rights Act, preventing employers from discriminating based on race, religion, color or national origin. In 1965, United States President Lyndon B. Johnson signed an executive order requiring employers to "take affirmative action" toward prospective minority candidates in all aspects of hiring and employment. At the same time, the women's liberation movement was making cultural inroads in the United States, ensuring that women had an equal right to choose their own destiny, whatever that might be.

It was against this changing social and legal backdrop that Dr. Hopkins found herself in the mid 1960's. She had married early, believing that she would eventually quit science to raise a family and follow her husband in his career. She knew that cutting edge molecular biology demanded long hours in the laboratory, and that her love of science would eventually come into direct conflict with her family situation. However,

when Dr. Hopkins divorced at age 30, she decided to put her career in science as her first priority. With a Ph.D. in molecular biology, her path was set.

With the Civil Rights Act, affirmative action and the women's movement all in full swing, universities across the United States were under pressure to hire women faculty. Both MIT and Harvard courted Dr. Hopkins to join. With the full support of her mentor, Dr. Watson, she took the position at MIT.

Science supposed to be merit-based

Dr. Hopkins discovered life at MIT was challenging and that, in spite of putting in 15-hour days in pursuit of her science, which she loved, her work was not easily noted or respected by her colleagues. She concluded that in order to have her work seen and heard, she had to be aggressive, a trait not inherent to her personality and sometimes viewed as abrasive in a woman. She saw that male colleagues who seemed "pushy and self-promoting" were successful, but they were behaving in ways contrary to her upbringing.

"Gradually," she said, "I came to see over many, many years that it was much more than a failure of my personality to be more aggressive and more like the male scientists with whom I worked. Women … no matter how great the science they achieved, were not treated equally with male scientists, were not respected in the same way for their achievements."

This struck Dr. Hopkins as ironic. Given that science is a merit-based discipline, it should be the one field where women have an equal opportunity for success. In theory, one's science should stand on its own merit, irrespective of the gender of who did or reported the work. However, Dr. Hopkins "came to see that was simply not true."

"I saw that essentially no woman was recognized equally to her scientific contributions – it was not my problem alone. It was a hard lesson to learn. It took 20 years for me to know with certainty that it was true, but finally I could not deny it any longer."

After conducting cancer research at MIT for 15 years, she decided to change fields. She believed that the problem of women not being recognized for their science was in part due to the nature of their chosen field, and the field of cancer seemed particularly difficult for women. Demoralized, she opted to change to the field of developmental biology where there were many more women scientists including Dr. Christiane Nuesslein-Volhard, a co-winner of the 1995 Nobel Prize in Medicine for her research on the genetic control of early embryonic development.

After a sabbatical in this setting, Dr. Hopkins returned to MIT enthused. However, when she informed her department that she was changing fields, she was told it was a "bad idea" and that she "would fail and be out of science altogether" if she did something so drastic. Nevertheless, Dr. Hopkins remained resolute and, contrary to the predictions of her colleagues, the change of fields was positive and successful.

In order to complete the change though, Dr. Hopkins required some minor support in the form of equipment and space, a rather small request relative to what male faculty members routinely asked for and received from the university. Dr. Hopkins knew she was asking for resources that were relatively small. By comparison, if her male coun-

terparts had requested the same, they would have been lauded as bold and daring. Yet, when Dr. Hopkins asked, she received a different reception altogether – silence. University representatives would not respond. Dr. Hopkins cites that as "the beginning of opening my eyes." She had never asked for anything before. When she asked for what she truly deserved and did not receive what she needed to do her work, she became resolved to fight.

At first, Dr. Hopkins decided to gather data which would demonstrate that she actually had less than her male colleagues. She found it comical to be measuring lab space in the dead of night, gathering figures that showed how small her space was relative to others. She hoped that upon confronting the reality of the disparity of space, MIT would be forthcoming with support. Instead, the colleague who assigned space in her building refused to even look at her figures.

As a result, Dr. Hopkins began to take her case higher and higher up the chain of authority in the School of Science, hoping to find someone with a sympathetic ear and a willingness to help. With each refusal of support, Dr. Hopkins began to realize that it was not a failing of her own personality to be aggressive, but, in fact, a form of discrimination against women that had not been recognized. Case-by-case, it always looked like a problem between individuals, but the truth was far more disturbing – it was gender discrimination.

Dr. Hopkins consulted a lawyer to ensure that she was reading the situation properly and pursuing an appropriate course of action. The lawyer advised her to go up to higher levels of MIT administration to seek help. By doing that, Dr. Hopkins received a little bit of help and resources for her research, but not enough to support her work fully. She finally resolved that this issue had to be brought to the attention of the President of MIT.

You are not alone

Dr. Hopkins carefully crafted a letter to MIT President Charles Vest that addressed the systemic gender discrimination in science at the university. Upon completion, she showed her letter to a male friend asking for feedback and input to strengthen it. Her friend advised her not send it, saying it would damage her career. Not dissuaded, she next decided to show the letter to a female professor whom she did not know well, but for whom she had immense respect because of her scientific accomplishments. Dr. Hopkins asked her to read the letter and offer any input that would make it more persuasive and less offensive. To Dr. Hopkins' great surprise, her esteemed colleague read the letter and said she, too, wanted to sign it and would accompany Dr. Hopkins to see President Vest.

"It was the most important personal moment in my career at MIT," said Dr. Hopkins. "For 20 years, you think these problems are yours alone, and then a distinguished woman scientist whom I had admired for years validated my experience. It changed my life," she said, citing this as the beginning of the change that unfolded at MIT.

TOP 6 SUCCESS FACTORS

1. Mentoring
2. Legislative frameworks and societal shifts to leverage for change
3. Data collection – the impact of stories and numbers
4. Maintaining a strong power base over time – developing coalitions and networks
5. Enlightened leadership with powerful allies
6. Power of the press

A single voice is hard to hear - power comes in numbers

Dr. Hopkins and her colleague decided to see if there were other women scientists at MIT who shared a similar perspective. The women realized that if they were going to inform one of the most prestigious universities in the United States that the institution was practicing gender discrimination, they needed power in numbers to make their case. They also knew they had the law on their side. In the United States, if an institution is sued for discrimination, it can lose all of its federal funding. Therefore, they knew that if a group of tenured female faculty spoke out collectively, MIT would have to listen.

It was 1994, and Dr. Hopkins' first shock was learning that the School of Science had 197 tenured male faculty and 15 tenured female faculty. Including two additional women in engineering with joint appointments in the School of Science, there were a total of 17 tenured women. Including untenured faculty, women comprised only 8 percent of the science faculty. Dr. Hopkins and her colleague contacted the other tenured women scientists one by one, and shared their stories. In the end, every woman except one expressed a similar experience and willingness to join any action they wanted to pursue. Of the 17 tenured women scientists, 16 agreed – they or their female colleagues had been discriminated against at MIT.

Your power base must stay strong under pressure

Dr. Hopkins became the organizer of the group of women scientists. She was willing to risk her career to correct the injustices she had experienced and seen levied against other women. She continued to run her lab and work on her own research, but began to devote large amounts of time to organizing and working with this coalition of women faculty. Dr. Hopkins realized that this group had to be strong under pressure because if even one woman left, they would lose the power they had to bring change. In order to strengthen the group, Dr. Hopkins spent time getting to know each of them and identifying areas of consensus.

She became a conduit for information, ensuring that everyone was consistently informed about all aspects of the case. Dr. Hopkins knew if the women did not trust her completely, if they believed she would misrepresent their position or use the group to promote her own agenda, that betrayal would be the end of their cause. Therefore, it took a lot of time, as everyone had to agree in full to every statement and every action. Dr. Hopkins made sure that every woman signed off on each memo sent to the administration so that whenever the dean or any other MIT administrator spoke to Dr. Hopkins, he was assured that he was actually speaking to all 16 women. Dr. Hopkins reflects that facilitating this group to action was the most rewarding professional experience she had at MIT.

The problem they encountered, however, was that the group members did not really know what to do to fix the problem, as most of them had never been part of academic administration. Nevertheless, they pooled their collective knowledge and plotted a path forward. During the course of two months, they wrote to Robert Birgeneau, Dean of the School of Science, articulating the problem and proposing a solution.

The group stated that there was unintentional but damaging discrimination and proposed establishing a committee to study and document the problem in order to create a plan that would address it effectively. The Dean commented, "When Dr. Hopkins came to see me with her own problems, I could not judge whether or not this was a singular incident. But when 16 out of 17 highly successful and tenured women faculty in all six departments of the School of Science say it is true, I know it is happening. I can not deny it." Dean Birgeneau supported the formation of the committee and the study of the issue.

Powerful allies and enlightened leadership are key

In the following weeks, Dean Birgeneau reported to Dr. Hopkins that several of the School of Science department heads, all male, were opposed to letting the women faculty have a committee to study this problem. However, when Dean Birgeneau consulted President Vest to clarify a path forward, he was told to go ahead and create the women's committee to study the issues. Had either the Dean or the President not supported the creation of this committee, the women's initiative would most likely have stopped there.

To address the department heads' opposition, Dean Birgeneau first formed a small committee with two department heads and two female faculty members, including Dr. Hopkins who was now viewed as "the ringleader" by all involved. This small committee wrote a charge to be given to a larger committee to address the concerns the women faculty had raised. This involvement in the writing of the charge calmed the department heads and cleared the way for the formation of a more formal committee.

In January 1995, the committee was finally convened to address the faculty's women's concerns. It consisted of six tenured women from the School of Science and three male faculty who were or had been part of the administration. This was a radical thing for the university to do at the time because it was empowering women outside the normal administrative channels. The Dean preferred that Dr. Hopkins not chair the committee as, by now, she was viewed as controversial. However, the women stood strong and insisted that no one but Dr. Hopkins could serve as their chair. The women knew they had the power of the law on their side, the power that came from respect for the women's considerable professional accomplishments, the power of backing from two key and influential allies in the President and the Dean, and the power of solidarity. They had begun to leverage change – collectively.

Data collection to create a compelling case for change – the impact of the stories and numbers

The committee took a two-fold approach to defining and addressing the issues. First, they interviewed women faculty and collected stories illustrative of gender bias and discrimination. These stories were some of the most persuasive data available. A pattern in discrimination surfaced, even though the women faculty worked in different departments and fields of science.

For example, a woman scientist told the committee: "There are six other male scientists in my field in my department. They got together recently and wrote a group grant

and omitted me. I was the only person in my field not included." Often, the woman to whom this happened assumed that there must be something wrong with her, with her research or with her competence that compelled her colleagues to exclude her. Because of these assumptions, she often did not tell others, as it was shameful.

Through the interviews, the committee learned this exact same scenario had happened to many women in different departments, even though there was ample evidence of these women successfully obtaining individual grant support. Furthermore, the committee discovered that a grant in the biological sciences had existed for 15-20 years with only 5-6 male faculty on it. No woman faculty had ever been included, in spite of the fact that women are quite dominant in this particular field of biology in the United States. This exclusion from group grants meant female faculty members had to raise their funding individually, which is more time consuming and isolating. The committee and, moreover, the men on the committee, began to realize how this type of exclusion would impact a scientist's career negatively.

These stories of marginalization and exclusion helped President Vest and Dean Bergineau fully understand the issues and their impact. To hear that these very distinguished women scientists had been treated this way by their male colleagues was very moving. It convinced them that there was a significant problem with potentially severe professional consequences.

The second thing the committee did was collect the numerical data that spoke to the issue. Do women have less space? Do women receive fewer awards for equal work? Do women make less money despite equal accomplishments? The numbers indeed confirmed what the women had come to understand after so many years but had been unable to speak to concretely in the absence of data. They did have less space. They were receiving fewer awards. They did make less money regardless of their accomplishments. They were not crazy and they were not alone. They were being discriminated against.

The data showed conclusively that although men and women started out equal, over time, because of exclusion in numerous small ways, two different professional groups evolved leading very different professional lives. More than half the women professors interviewed by the committee were not married and nine of the 15 tenured women faculty in the School of Science did not have children. Twenty years into their careers, these women were working harder and harder to achieve the same level of success as their male counterparts. Conversely, male faculty members had families, were running departments and were chairing key committees both inside and outside the university.

Of the women faculty in science who participated in the original study, 63 percent are members of the National Academy of Sciences, a rate higher than the MIT science faculty overall. And yet, these women were not starting biotech companies, as their male colleagues were. These women were not part of departmental or central MIT administrations. Many of them did not have a full family life to complement their professional achievements. With both the qualitative and quantitative data before them, the administration could no longer deny that gender discrimination was being practiced within MIT's School of Science.

Making a change for good

As a result of the committee's report, a two-phased attempt was undertaken to improve the status of women faculty in science at MIT. Initially, the Dean took steps to increase the number of women, both in faculty positions and in the administration. He saw the importance of getting women professors into the academic administration of their own departments and MIT administration overall. In collaboration with the department heads, he began a crusade to expand the number of women faculty within the School of Science and, in a very short period, made a significant difference. He actively recruited exceptional women scientists from around the country, increasing the percentage of women faculty from 8 percent to 13 percent. His efforts proved that, when you have a committed ally with some power, positive change can happen rapidly.

Never underestimate the power of the press

The second phase of response was the result of the committee's report being made public. In 1999, the women in science were delighted with the progress made by Dean Birgeneau's vigorous recruitment strategy and by his correction of measurable inequities. However, they were keenly aware that if he left the position of dean, all the ground gained by his good work could be lost, as the rest of MIT was unaware of the committee's study. Concurrently, the chair of MIT faculty, Dr. Lotte Bailyn from MIT's Sloan School of Management, learned of the study and asked to broaden the scope outside the School of Science.

Dr. Bailyn requested that a summary of the committee's work be written for publication in the Faculty Newsletter. Dr. Hopkins agreed to draft such a summary and Dr. Molly Potter and Dr. Bailyn agreed to edit it. These women knew that informing the larger MIT community would strengthen their position. The women asked the President and Dean to write comments to accompany the summary report as well to demonstrate that it was through collaboration with the MIT administration that positive change had occurred. It was key that this be seen as a collaborative initiative rather than adversarial.

The President wrote an immensely important and powerful comment for the Faculty Newsletter. He said that he had not fully understood the reality of this problem until he read the committee's report, but that now he did. To have the President of one of the top universities in the United States acknowledge that unintentional gender bias occurred and had impacted the lives of women scientists was overwhelming. When Dr. Hopkins read his words, she said she could never have imagined that a person in his position would come to understand this problem in her lifetime.

gender FACTS

- In 1994, there were 212 tenured faculty in the School of Science at MIT:
  - 197 were men
  - 15 were women. Women were 8% of the science faculty
- By 2000, there had been a sharp upturn in hiring that brought the faculty in MIT's School of Science to 13% women.
- In December 2004, Dr. Susan Hockfield became the first female president of MIT.
- In 2006, there were 276 faculty at MIT's School of Science:
  - 240 were men
  - 36 were women, making up 13% of the faculty

Not long after the President's statement, Dr. Hopkins was addressing a group of journalists visiting MIT when one asked her about being a woman scientist. Dr. Hopkins shared that the committee's report would soon be published and she added how amazing it was that someone in such a powerful position as the President of MIT had acknowledged and understood the problem of gender discrimination. Kate Zernicke, a reporter from the *Boston Globe*, also contacted Dr. Hopkins and, again, she shared her story and wonderment at how the committee's work was unfolding with the President's support and acknowledgement.

A few days later, Dr. Bailyn informed Dr. Hopkins that MIT had been alerted to Ms. Zernicke's upcoming story in the *Boston Globe* about the women faculty in the School of Science and their findings. Dr. Bailyn was quite upset, as the Faculty Newsletter with the summary of the committee's findings and comments from the President and Dean had not been published yet. Likewise, Dr. Hopkins worried that the women of her group would feel betrayed by her disclosures to the *Boston Globe*. It proved to be a tense and trying period.

The *Boston Globe* newspaper put the story of the MIT women in science on the front page. A few days later, the *New York Times* followed suit. This national coverage and notoriety clearly contributed to more permanent institutional changes, ensuring equity for women faculty and improve their professional lives. The response to the telling of this story was overwhelmingly positive.

President Vest of MIT received accolades from across the country – from women, from the press and from other academic institutions. He was applauded for his honesty and for moving MIT to address this problem, especially by using a data-driven approach. Many professional women wrote to say "thank you" and acknowledge that the experience of the women faculty of MIT was their experience too.

The Ford Foundation approached MIT saying it would like to help solve this problem for other institutions in the United States. The President was clear that while MIT had identified the problem, it had yet to create the solution. The Ford Foundation, however, felt that simply acknowledging the existence of the issue put MIT at the forefront of dealing with it. The President was encouraged to invite presidents of other research universities – Harvard, Michigan, Yale, Stanford, Penn, CalTech, Berkeley and Princeton – to come to MIT and make commitments to address this problem within their own institutions and share their experiences going forward.

They collectively agreed to sign a statement of commitment, crafted by the women faculty of their universities, to return to their campuses and study the problem too. This presidential consortium was critical because it meant the group could hold one another mutually accountable for fulfilling their shared commitment to their respective women's faculties, and they could share successful solutions in the future.

Having a network of women is key

For a year and a half, Dr. Hopkins' phone rang every day with calls from newspapers from the United States and around the world. To her surprise, her belief that the problems of MIT's women faculty were related to working in a male-dominated field at an elite school was quickly dispelled as women shared their challenges reflecting a more

widespread problem. Dr. Hopkins quickly realized that the findings of the committee were, in fact, a broader societal issue.

After 1999, Dr. Hopkins was invited to speak about the MIT report on women in science at many other universities. In her travels, she met women at every institution committed to the issue. Slowly, Dr. Hopkins began to see a national network of connectivity evolve that could leverage power at schools around the country. The core group of women who created the statement of commitment signed by their respective university presidents proved to be a powerful coalition. It was through this network of women professionals that, in the face of administrative turnover, pressure was applied to keep progress moving and stop any backsliding that might occur.

Institutionalizing change

As MIT became known as a leader on the issue of equality for women in science and other fields of academia, the pressure was increased to find more permanent solutions. To assure that goal, President Vest did several things. First, he established committees, in MIT's four other schools that were similar to the committee in the School of Science. These "gender equity" committees did studies on the status of women vs. men faculty in each school and wrote reports on their findings. Now permanent committees, they continue to monitor equity in salary and address any other related issues that might arise.

Next, the President created a high level position in his administration to address these issues and appointed Dr. Hopkins to fill that post. He established a committee called the Committee of Faculty Diversity and appointed Dr. Hopkins to co-chair with the Provost of MIT, the highest ranked academic officer in the university who has the power to make institutional change. The goal was to examine institutional processes, determine how they produced undesirable outcomes for women, and then determine how they could be modified to serve women as well as they served men. For example, a sub-committee of the Council, led by Dr. Bailyn, studied family leave policies and designed new ones, making it easier for young faculty with families and women with children to work and stay at MIT.

Dr. Hopkins also established a committee comprised of the chairs of the five gender-equity committees resident in each of MIT's schools, creating a network of senior women faculty to share information across the institution.

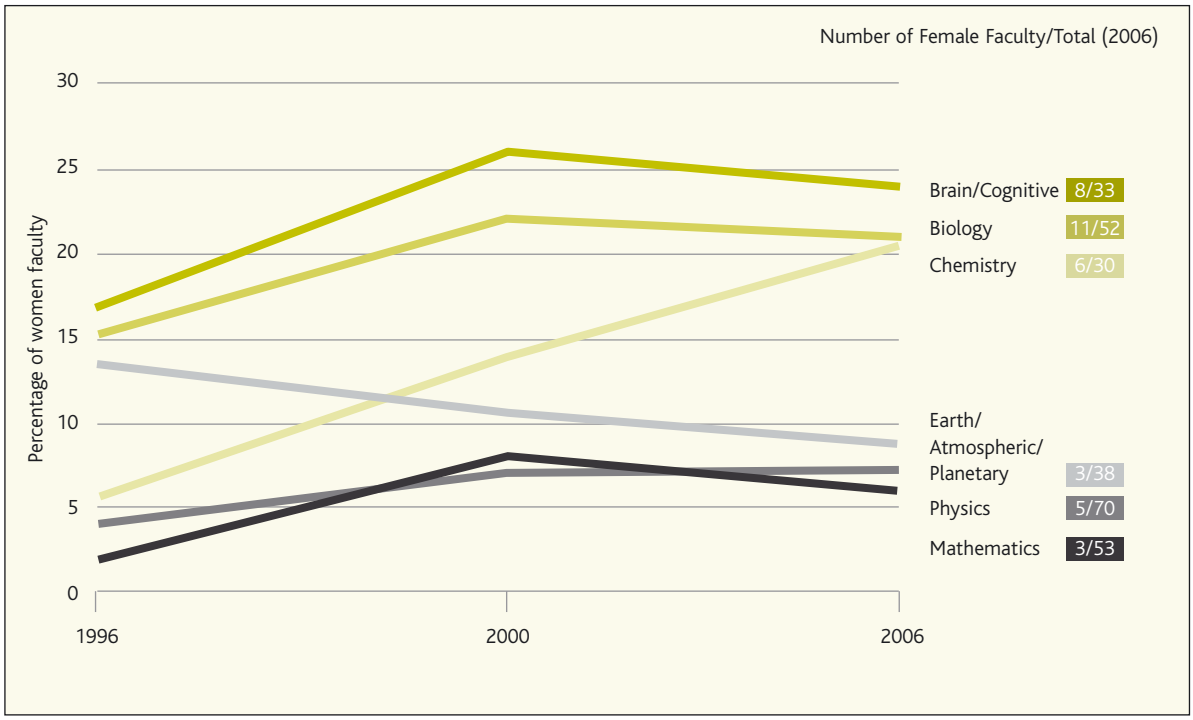
Looking forward

In 1994, none of the women faculty in the School of Science could have imagined that together they could make so much progress to improve the status of women in science at MIT. The committees the President established still exist and have been very effective in ensuring equity for women faculty, not only in terms of salary, but also in regard to resources, space and fair treatment by colleagues. In addition, many women are now asked to serve in the administration.

Dr. Hopkins' term as the Co-Chair of the Council for Faculty Diversity ended in 2006. In addition, Dr. Hopkins' administrative position was re-named Associate Provost to reflect more accurately the role this function serves in higher education administration. Her hope is that the post will receive commensurate resources in the future as

well. Finally, for the first time in its history, MIT has a woman president, Dr. Susan Hockfield. Many believe this never would have happened without the efforts of that courageous group of women led by Dr. Hopkins. Figure 6 shows the proportion of female faculty at MIT in various science departments in 2006.

FIGURE 6 Proportion of female science faculty at MIT (2006)



However, despite the progress, there is still a long way to go. The number of women faculty in science is still very small despite more than a decade of effort. In particular, when Dean Birgeneau left the School of Science to become President of the University of Toronto, the increase in the number of women faculty promptly stopped. It is clear that when a key ally with knowledge, skill and influence steps down, things can stop going forward and are even in danger of going backwards. At any university, hiring still depends upon the will of the dean and department heads. The moment pressure is eased and knowledge of how to achieve progress is lost, forward trends begin to revert.

Some may ask if the gender bias, the marginalization and exclusion of senior women faculty has changed at MIT? Do men now include women on group grants and in the creation of biotech companies? Dr. Hopkins is unsure, but believes the answer is that very little has changed in most fields, proving that this is the most challenging problem to fix above all. Although MIT now has a new president who has not chosen gender equity as an issue to promote within the institution, Dr. Hopkins believes MIT will never go back to the nearly invisible isolation women scientists experienced before 1994.

For more information on Dr. Nancy Hopkins and the Committee on Women Faculty at MIT:

Nancy Hopkins
WEB SITE: http://web.mit.edu/fnl/women/women.pdf
EMAIL: nhopkins@mit.edu



Kaiser Jamil

THIRD WORLD ORGANIZATION FOR WOMEN IN SCIENCE (TWOWS)

DR. KAISER JAMIL was present for the birth of the Third World Organization for Women in Science (TWOWS). Hers is a story of how an idea sparked an organization.

The notion of TWOWS was first discussed at the 1988 *Conference on the Role of Women in the Development of Science and Technology in the Third World*, convened by the Canadian International Development Agency (CIDA) and the Academy of Sciences for the Developing World (TWAS). The conference was attended by 218 preeminent women scientists from 63 developing countries, all of whom recommended that a study group be established to explore the possibility of creating an organization aimed solely at supporting women scientists.

"I think women scientists from developing countries are self-made women," said Dr. Jamil. "They have had to cross many hurdles and struggled hard to get where they are – family-wise, work-wise and culturally. That is what makes them unique and what makes TWOWS unique. We are an organization comprised of such women."

The importance of education, tenacity, and self-confidence

Dr. Jamil comes from a family in India where education was the family business. Both of her parents were educators; her father was a principal. As the eldest daughter of six children, her parents hoped she would become a medical doctor. However, Dr. Jamil saw it differently.

"There was terrific competition to become medical doctors," she said. Instead, she took her M.Sc. and Ph.D. in biological sciences and biochemistry, eventually becoming a biotechnologist. This field gave Dr. Jamil the latitude to do more social work, travel to different countries and network with like-minded people globally, working together for common interests in their respective disciplines.

As Dr. Jamil's career unfolded, she experienced challenges unlike those of her male counterparts. After receiving her Ph.D. in the early 1970's from Osmania University in Hyderabad, India, she started a family. As a mother, her priorities changed from research scientist to childcare provider, first and foremost. However, once her children were older, Dr. Jamil re-entered her career with vigor and focus. She contributed substantively to research at the Indian Institute of Chemical Technology (IICT) in Hyderabad, did post-doctoral work in Sydney, Australia and was a visiting scientist in France.

Once Dr. Jamil returned to science, other setbacks awaited her. In her work and as she traveled, Dr. Jamil found there were always more men in the research labs than women. Even when she became the head of her department and a senior researcher in her own organization, she was the only woman. Dr. Jamil jokes that for years, the director would address the scientists as "lady and gentlemen."

Being one of a handful of women scientists, Dr. Jamil began to see that she and her female colleagues were working ten times harder to prove themselves equal to their fellow male scientists. She tells how, initially, her male colleagues would snicker and make remarks about her and other women's work. However, she and her female counterparts tenaciously persisted and survived the jealousies. They not only succeeded, but eventually exceeded expectations by making important contributions to their respective bodies of research. Their competence and achievements could neither be questioned nor disparaged.

A need for connectivity – creating a network of support

Her personal encounter with gender discrimination led Dr. Jamil to realize the need for a network of women scientists to help one another, to share knowledge and information, and to leverage collective power for change on a much larger scale. "When you attend academic meetings and conferences," she observed, "you do not talk about the true hardships and sufferings that women and women scientists face everyday. What happened to your daughter? What happened to your sister? These are not the stories you hear. But, a connected global network of women scientists could provide the forum to have those conversations, to strategize about how to reach out and help one another and to create a platform to ensure global awareness in order to educate and empower women scientists to help themselves." Attending the *Conference on the Role of Women in the Development of Science and Technology in the Third World* provided the perfect opportunity to meet like-minded colleagues, initiate dialogue and take action on just such an idea.

TOP 5 SUCCESS FACTORS

1. Connectivity and creating a network of support
2. Developing a strong organizational constitution with clear objectives
3. Offering organizational membership at an individual level rather than as corporate membership in order to empower women rather than their institutions or academic departments
4. Addressing the professional needs of women scientists through various activities, such as:
   - fellowships
   - inventories and databases for networking
   - membership directories
   - publications
5. Having an organizational mechanism to craft winning proposals and access donor funding

The evolution of TWOWS – having a strong constitution

A study group was formed with an initial charge of examining the possible creation of an organization whose purpose would be to support women scientists in the developing world. The study group met in Trieste, Italy, in March 1989, establishing TWOWS and adopting its constitution.

The constitution articulates explicitly that TWOWS shall establish an international organization "which shall play an important role in increasing women's access to science and technology and in promoting greater participation of women scientists and technologists in the development process of their respective countries and in the international community."

It also states that the general aim of TWOWS shall be "the promotion of women in science and technology in the Third World with a view to strengthening their role in the development of their countries through directing their high level scientific activities to the improvement of the quality of life of the majority of their people. The Organization shall also promote the scientific and technological co-operation on both the regional and global levels giving due consideration to different existing cultural and socio-economic systems."

It is important to note that, even though TWOWS is gender-focused, it is a gender-free organization ensuring that both women and men, as well as institutions from both developed and developing countries are welcome to participate. There is no fee to join, although TWOWS asks for a voluntary contribution.

"TWOWS opened my eyes because without belonging to this organization, we would have a very narrow perspective," she said. "I might think, 'Only people in India are suffering.' But after traveling to other countries and seeing how much scientific outreach the world needs, I realized how much one person can do and not be limited to your own place. You can serve the world from anywhere if you work together."

With its mandate from the study group and its constitution, TWOWS became the first international forum to unite eminent women scientists from developing countries in promoting their representation in both technological and scientific leadership, while concurrently enhancing their role and participation in the development process. In short, it was the network and connectivity Dr. Jamil had longed for and now had helped create.

Individual membership and passion for the mandate fuels TWOWS' growth

Dr. Jamil assumed the presidency of TWOWS in 2005. She says, without hesitation, "TWOWS is the most wonderful organization I could ever think of. I have been a member of numerous service organizations, but this is the one that opened my eyes."

She noted that offering individual memberships as well as institutional or organizational memberships distinguishes TWOWS in a number of important ways. Individual women scientists who join TWOWS use the organization as a lifeline – a lifeline to tell their stories, to have their ideas heard and vetted by fellow women scientists, and to find funding for their initiatives in support of development. Dr. Jamil sees the individual members using their membership to educate themselves, educate their communities and to face the challenges of their professional lives.

Participation in TWOWS has increased markedly over the last two years. Dr. Jamil attributes this not only to the benefits individual membership offers, but also the passion women have for connecting to others and to their science. She reports that TWOWS tries to provide grants for as many members as possible to participate in international scientific conferences and to attend scientific meetings in the developed world. It is the women's passion for excellence, for learning and for connection that fuels the growth of TWOWS. The challenge becomes funding all the proposals that spring from such passion and commitment.

Crafting winning proposals for donor funding – a critical element to TWOWS' success

TWOWS' Donors

TWOWS facilitates proposal submissions from its members to its donors.

- African Academy of Sciences
- Canadian International Development Agency (CIDA)
- Carnegie Corporation of New York

- International Council for Science
- Kuwait Foundation for the Advancement of Sciences
- MacArthur Foundation
- Rockefeller Foundation
- MacFergus
- The Academy of Sciences for the Developing World (TWAS)
- Department for Research Cooperation (SAREC) of the Swedish International Development Cooperation Agency (SIDA)

Dr. Jamil admits that TWOWS has an ever-growing need for support from world bodies that share the organization's ideals. Currently the thrust of TWOWS' activities fall into four categories.

- **Postgraduate Training Fellowships for Women Scientists in Sub-Saharan Africa and Least Developed Countries (LDC) at Centres of Excellence in the South**

  The goal of this SIDA-funded program is to provide women students in sub-Saharan Africa or candidates from LDCs with post-graduate training in the service of acquiring a Ph.D. at a "center of excellence in the South" yet outside their own country. To date, these fellowships have helped more than 200 young women from a variety of scientific fields.

  This program was carefully evaluated by SIDA before its renewal and found to be outstanding. Applications are reviewed in a rigorous evaluation process to ensure the best candidates from a variety of places are accepted. Balancing equity and excellence has been a delicate process for TWOWS to master.

- **Inventory of Women Scientists and Organizations**

  TWOWS has created its own database of women scientists, technologists and organizations in the developing world engaged in the promotion of women in science and technology. This archive is available to national, regional and international organizations to use in the service of helping TWOWS meet its objectives of supporting women in science.

- **Directory of TWOWS Full Members**

  The directory profiles distinguished members and their work and is also available to all organizations concerned with the promotion of women in science and technology.

- **Women Leaders in the South**

  The TWOWS publication *"Science, Women and the Developing World"* emphasizes the international impact of women scientists in critical positions.

Beyond these ongoing activities, TWOWS members submit proposals and projects for which TWOWS leaders try to find funding from appropriate donors. This system of proposal generation and donor matching empowers individual members in their own and their community's development.

Dr. Jamil oversees the implementation of the organization's strategic plan and deployment of a clear methodology for refining proposals to send to donors. Proposals are vetted to ensure the outcomes are clearly articulated and demonstrate how they will

benefit society. Budgets are clarified to support requested funds. Completed proposals are approved by a group comprised of TWOWS leaders. Finally, donors are sought based upon the profile of the funding agency, the portfolio of projects that the donors are currently funding and the proposed outcomes of the project. So far, this process has served Dr. Jamil and TWOWS well. Each month, new members join in hopes of connecting both with other women scientists and potential donor funding.

TWOWS' governance – a system based on trust

Dr. Jamil currently has four vice presidents (VPs) and executive members (EMs) to oversee its four regions – Africa, Latin America, Asia and the Middle East. Most VPs and EMs have oversight for 15-20 countries each, with Africa having the most at 36. Keeping track of such an extensive network is a daunting proposition. The TWOWS reports try to reflect accurately the number of beneficiaries from each region's activities, but documentation often proves challenging.

Dr. Jamil related that most of the evidence she receives regarding TWOWS' impact comes from stories members tell when they attend the TWOWS general assembly or when they communicate directly with TWOWS leadership. Therefore, while Dr. Jamil and her colleagues are confident the organization has been of tremendous benefit to its members, there are no statistics at this point to serve as baseline data. Dr. Jamil believes that auditing is important and, in this regard, TWOWS follows procedures thoroughly and consistently. All TWOWS reports from its Trieste, Italy, headquarters follow international documentation procedures to ensure compliance with its by-laws and standing as a not-for-profit organization.

In addition, Dr. Jamil believes in TWOWS' "informal system for monitoring and evaluation," that is based on trust rather than systemic checks and balances. She relies on her VP and EM colleagues to inform her of how members are doing and to be her "finger on the pulse" of the organization overall. "This is a trust-based organization," she said, "and our people are honest and going in the right direction."

What does the future hold?

Looking toward the future, Dr. Jamil is working to access even more opportunities for donor funding to empower her membership. She receives proposals for supporting women's health, the environment and domestic situations to make women scientists more self-sufficient, many of which TWOWS cannot fund. She also believes there is much to be gained from creating an exchange program for professional growth between women scientists of developed and developing countries. In learning from one

gender FACTS

- The Third World Organization for Women in Science (TWOWS) is the largest organization for women in science in the world.
- TWOWS has 2,222 individual members and 29 institutional members representing 102 developing countries.
- More than 40% of TWOWS individual membership (929 members) hail from 36 African countries.
- Main activities of TWOWS include:
  - fellowships for young women scientists from sub-Saharan Africa & least developed countries for postgraduate training;
  - inventory of women scientists and organizations;
  - directory of TWOWS full members;
  - publication of profiles – Science, Women and the Developing World.

another's contexts, challenges and cultures, Dr. Jamil believes women scientists will return to their fields with new perspectives, new ideas and a new appreciation for their colleagues in other parts of the world.

During the past two years, TWOWS has made a special effort to encourage young women to join the organization. Some of these new members have become very active and there has been a new emphasis on the creation of national chapters to decentralize TWOWS' activities and extend its reach. Dr. Jamil's home country of India has led the way by creating a National Chapter that is now linked to the Indian Women Scientists Association. Furthermore, this chapter has sought to involve women entrepreneurs who possess not only valuable skills and experience but serve as role models in the business community. By creating opportunities for women scientists and successful women in other fields to meet and learn from one another, best practices can be shared and networking achieved. It is the add-on effect in the way TWOWS delivers these options for members to grow, to develop and to learn from one another that signals a bright future for the organization.

Dr. Jamil has many hopes for the future of TWOWS. "TWOWS must continue to ensure the understanding of the status and prospects of women in science and technology in the developing world in order to promote their achievements, enable them to leverage the educational opportunities available, and encourage collaboration and communication across the international scientific community as a whole," she said, adding, "it is our dream to strengthen the research efforts and training opportunities of as many young women scientists living and working in Third World countries as possible."

The Objectives of TWOWS

- Strengthen research efforts and training opportunities of young women scientists working and living in Third World countries.
- Survey and analyze the status and prospects of women in science and technology in the Third World.
- Promote the recognition of the scientific and technological achievements of women.
- Improve the access to educational and training opportunities for women in science and technology.
- Increase the scientific productivity and efficiency of women scientists in the Third World.
- Promote collaboration and communication among women scientists and technologists in the Third World and with the international scientific community as a whole.
- Promote participation in the decision-making processes, both at national and international levels.
- Encourage other international organizations to increase their activities concerned with promoting the role of women in science and technology in the Third World.

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Thelma Paris

INTERNATIONAL RICE RESEARCH INSTITUTE

TRADITIONALLY, ASIAN WOMEN, particularly in South Asia, have been assigned supportive roles relative to the men in their families. A range of social and civil society institutions in Asia such as religion, education, the law and marriage have served to reinforce these traditional roles, making leadership opportunities even more scarce for some.

Dr. Thelma Paris, an internationally recruited senior scientist at the International Rice Research Institute (IRRI) and socio-economic gender specialist sees this as especially true in the field of agricultural research and development (R&D) and accompanying extension sectors. "It takes guts for an Asian woman, unless she was raised abroad, to ask for a promotion, complain or request a change in benefits," she said, explaining, "I began as a junior research scientist who was very shy. Over time I thought, 'If I can make it, other women can too.' I genuinely want other women to grow and develop."

Overcoming unhelpful aspects of traditional roles – developing leadership capacity is the key

With 50 to 80 percent of the rice in Asia being produced by women farmers, Dr. Paris believes women researchers, research managers, extension leaders and other women professionals "must take the lead in order to have an impact on the field overall and influence policies that affect the sector." She also contends that the development of women's leadership skills is the key to paving the way for women in R&D as well as extension practitioners in the future. Throughout her career, Dr. Paris has pursued cultivation of leadership skills in women.

Mentoring – an opportunity for women scientists to pay it forward

Dr. Paris knows that women scientists in Asia often face multiple challenges to their success. Not only do they have to compete with male colleagues to have their work seen and acknowledged in both national and international fora but, if they are young, they also face the cultural stigma of youth as well. Younger colleagues are not always supported in presenting their work. Customarily, senior scientists are accorded that honor, which is seen as the respect one should pay an elder and more venerated colleague. Far too often, these scientists (who are often male) are the only participants from Asia traveling to international scientific venues to present their work. It is only when a mentor steps in to help a younger woman scientist that change begins to happen.

Dr. Paris considers Dr. Gelia Castillo, a distinguished rural sociologist, as one such mentor. She is the woman Dr. Paris credits with helping her voice be heard for the first

time on the international scientific stage. "She mentored me. She did not take credit for my work and she even recommended that I make a presentation at an international conference when I was a junior scientist. She opened doors for me and helped me open doors for myself. I became a trailblazer and decided it was my role to open opportunities for both younger staff and female staff. That is when I knew I wanted to be a mentor."

Finding a home where change is possible – IRRI's policies towards gender

In April, 1995, Dr. Paris, a nationally recruited staff member in the Social Sciences Division at IRRI, was promoted to Senior Associate Scientist and Coordinator of Gender in Rice Research. At that point, IRRI was one of the few CGIAR Centers with a clear policy on gender issues. It had an operating research program with a focus on gender, training in gender analysis and a commitment to gender balance among staff and trainees. Its gender policy, stated in the publication "IRRI Toward 2000 and Beyond" (1989), says, "Affirmative action will be taken in recruitment, in selection of candidates for training and in research design to address the roles of women in IRRI itself, in national rice programs, and as users and beneficiaries of rice technology."

At IRRI, policy translated to action. It was against this backdrop that Dr. Paris began to create opportunity after opportunity to mentor young women scientists and nurture their leadership capacities.

Leveraging opportunity

In 2000, Dr. Paris learned that the CGIAR Gender and Diversity Program (G&D) was looking for a venue to host its annual Women's Leadership Course. In previous years, attending the CGIAR's Women's Leadership Course would have cost more than her budget could spare, because funding would have come from funds allocated for collaborative research with her National Agricultural Research and Extension Systems (NARES) partners in India. Therefore, Dr. Paris recognized a double opportunity.

She suggested to senior leadership that the IRRI Center in Los Banos, Philippines, host the course. This would ensure that female staff at IRRI could attend and benefit at minimal cost, as well as encourage the participation of NARES partners from the region. Dr. Paris also volunteered to coordinate the hosting of the course, making sure that it went smoothly. The Center agreed and, with that, Dr. Paris and several of her colleagues and partners took part in the CGIAR's week-long course aimed at enhancing and strengthening the leadership skills of women. For Dr. Paris, this was just the beginning.

Building on a foundation to reach an Asian audience

After completing the Women's Leadership Course, Dr. Paris reflected that while the precepts offered were sound, their application in an Asian context for Asian women needed to be tailored and refined. Inspired, Dr. Paris thought, "How can the other women from the Asian National Agricultural Research and Extension Systems, particularly those coming from India and Bangladesh, benefit from the same kind of

course as we have had?" She felt it would be difficult for Asian women rice scientists to compete for international positions, despite their competency, if their leadership skills were not seriously strengthened.

"It is a tough climb," she said, "because one needs to do her job better than anyone else, deliver the goods, build a reputation, outperform others, and make her outputs visible through oral presentations and publications in order to build self-confidence. Thus, to go up the professional ladder, one needs to work harder just simply to be recognized. That is what it's like for Asian women scientists."

Dr. Paris sought to re-tool the Women's Leadership Course, expand it, enhance it and make it more suitable to an Asian audience. She envisioned adding new features such as modules on Asian culture and inspirational talks from successful women leaders, mainstreaming gender in research, improving communication skills using multimedia, organizing field trips to rural areas to interact with women's groups, developing and presenting action plans and – most importantly – mentoring. With that as her target, the next step was for IRRI to buy into her vision and sponsor it.

Making the dream a reality – courage and strategy

Initially, the former head of the IRRI Training Center was skeptical about offering a leadership course focused solely on Asian women. Since the Center's mandate is only to deliver technical training courses, he did not see why a course addressing Asian women's leadership skills should be funded by IRRI, especially as a recent IRRI assessment had not cited it as an explicit learning need. However, Dr. Paris was resolute and knew that if they had positive evaluations, she could make a compelling case for future funding.

She decided to take a risk – to develop a curriculum and pilot the course on her own. She did this by involving the Filipina alumnae of the CGIAR Gender & Diversity Program's Women's Leadership Course, scraping together funding to meet a tight budget and inviting local resource persons from both within and outside of IRRI. Her risk-taking paid off.

The first running of the Asian Women's Leadership Course received outstanding evaluations, positive enough to convince the head of the IRRI Training Center not only to allocate funds for future delivery of the course, but to require women in IRRI's outreach office to attend. Thus, the training course involved participants engaged in management, research and extension. He admitted that he was initially hesitant to support the course because he never expected such an overwhelmingly positive response. Since 2002, 125 women scientists from the Philippines, Thailand, Vietnam, Indonesia, South Korea, Mongolia, India, Sri Lanka, China, Nepal, Bangladesh, Cambodia, Laos PDR and Papua New Guinea have taken the course, giving it consistently high ratings in evaluations. In fact, in 2005, the Asian Women's Leadership Course received the highest rating among all the courses given by IRRI.

TOP 6 SUCCESS FACTORS

1. Overcoming traditional impediments through the development of leadership capacity
2. Mentoring and looking for ways to pay it forward
3. Leveraging opportunities
4. Having courage and being strategic
5. Finding allies in management
6. Using data to create compelling business cases for change

Word of mouth is the best press

Over time, more and more people heard about the course. Dr. Paris' supervisor, a Bangladeshi, invited participants for a welcome reception in his home. Upon hearing the accolades for the curriculum and delivery from the female Bangladeshi participants, he began to promote the course, showing appreciation for Dr. Paris' good work. Likewise, as other donors heard about the course and the good results being achieved, they began to provide scholarships to more and more Asian women. For example, the Australian Centre for International Agricultural Research (ACIAR) provided scholarships for female participants from NARES over the course of five years based solely on positive evaluations and recommendations from those alumnae who had completed the course. In fact, Dr. Paris and her colleagues had to limit the number of participants in order to ensure diversity in country representation and a manageable-sized training cohort. In short, the course was a huge success.

Demonstrating impact by assessing behavioral change

The Asian Women's Leadership Course has been offered since 2002. Dr. Paris and her colleagues recently conducted a survey of alumnae to assess beneficial changes resulting from the course and the impact those changes have made on their professional lives. Dr. Paris reports that initial data indicate alumnae of the course are more confident in communicating their opinions, have increased their ability to give oral presentations, feel a greater sense of self-confidence and assertiveness on the job, have strengthened their potential to lead work teams and task forces, have promoted the further mentoring of other women and have grown their own emotional intelligence as seen through appropriate expressions of empathy and self awareness. These reported changes have culminated in many women experiencing notable professional growth and development.

Stories of success – how mentoring begets mentoring and support begets support

Dr. Paris finds it deeply rewarding that women who participated in the Asian Women's Leadership Course at IRRI have been promoted and have gone on to occupy influential positions within their respective institutions. One such woman, Ms. Truong Thi Ngoc Chi, earned a B.S. from Cantho University in Vietnam, an M.Sc. in Entomology from Hyderabad University in India, and secured a position in the entomology section of the Cuu Long Delta Rice Research Institute (CLRRI) in 1982 as an associate scientist. Her first exposure to the social sciences came in 1992 when she presented a paper on gender concerns in rice farming at a workshop in Chiang Mai, Thailand. Because Ms. Chi lacked social science training, Dr. Paris began to mentor her, eventually helping her secure a scholarship at the University of the Philippines, Los Banos, to work on a master's in sociology.

Two years ago, Ms. Chi was promoted and given more responsibilities as the Head of the Social and Economics Department at CLRRI. Dr. Paris and Ms. Chi have continued their mentoring relationship by working together to publish papers in refereed journals. Ms. Chi has taken the Asian Women's Leadership Course as well.

In turn, Ms. Chi has begun to mentor colleagues of her own. Recently, she recommended that an agronomist from her research team, Ms. Tran Thi Ngoc Mai, pursue her M.Sc. in Rural Development in Central Luzon State University (CLSU) in the Philippines. With Dr. Paris' support, Ms. Mai received a scholarship for study and, in 2006, received an award from the university for the outstanding thesis, "Impacts of row seeder technology on rice farming in An Giang Province in the Mekong Delta, Southern Vietnam", on which Dr. Paris had supported and guided her. In the acknowledgement section of her thesis, Ms. Chi wrote of her gratitude to Dr. Paris, and said she plans to continue working with Dr. Paris on gender issues in the future. Under Dr. Paris' tutelage, Ms. Chi is now much sought after as a resource person on social science and gender issues in South Vietnam and now, Ms. Mai is eager to work in collaborative research.

Make your supervisor your ally

Dr. Paris has noted that along with ongoing mentoring, the support of women scientists' immediate supervisors is key to their success. Dr. Paris relates how Dr. Duong Vin Chin from CLRRI, Vietnam, the supervisor of Ms. Chi and Ms. Mai, has expressed his gratitude for her mentoring of his colleagues, which has resulted in an increase in performance. For a long time, their Institute did not have social scientists. Dr. Chin was proud to be building a team of female social scientists with strong backgrounds who could work with both male and female farmers. He realized that building the capacities of these researchers contributed significantly not only to their research, but to their work with poor farming communities and women in particular. Dr. Chin gave full support not only to his colleagues on their participation in the Asian Women's Leadership Course, but to their ongoing mentoring upon their return.

Dr. Paris points out that often it is the immediate supervisors who have to vouch, speak for, or recommend potential women leaders, often putting their own reputations at risk when doing so, especially if the woman is younger or unpublished. Dr. Paris has been fortunate that her own supervisor has repeatedly demonstrated his support by endorsing her for promotions and offering her leadership opportunities in highly visible international projects. Just recently, Dr. Paris was asked to take on the role of coordinator in the management of a huge grant from an international funding agency to facilitate the international and national collaboration of a number of

gender FACTS

- 50%-80% of rice production in Asia is done by women.
- In 2002, IRRI introduced the 2-week Leadership Course for Asian Women in Agriculture R&D and Extension.
- Objectives of the Leadership Course are for women leaders to:
  - understand the concept of leadership in general and leadership relevant to Asian women in particular;
  - learn strategies for developing both work-related and personality skills as prerequisites to becoming a leader;
  - develop the basic leadership skills for application in their work & personal lives;
  - develop a work plan integrating gender concerns in the R&D and extension environment.
- 105 women scientists from the Philippines, Thailand, Vietnam, Indonesia, South Korea, Mongolia, India, Sri Lanka, China, Nepal, Bangladesh, Cambodia, Laos PDR and Papua New Guinea have attended this course since its inception.

predominantly male stakeholders. She knows that this is an exceptional opportunity to model a higher level leadership role that requires delivering the expected outputs on time and with the highest quality. Dr. Paris believes that all women scientists must take advantage of these visible opportunities to lead, in order to serve as role models for younger women colleagues and establish precedents for the future.

What does the future hold?

Dr. Paris said she has been fortunate to work with women scientists, women development workers, women affiliated with non-governmental organizations (NGOs) and rural women farmers. This is due to IRRI's structure, gender-friendly policies, and interdisciplinary and participatory approaches to problem-oriented programming. She now is in an advantageous position – the social scientist on numerous programs – to suggest that female scientists join the teams. "I'm proud to say I am having a 'trickle-across' effect and paving the way for other women in science to advance professionally," she said.

In 2007, Ms. Vicki Wilde, Director of the CGIAR Gender & Diversity Program and Dr. Paris were requested by IRRI Management to make presentations at the Board of Trustees meeting held in Laos. Based on these presentations, the Board recommended that IRRI continue to serve as a premier institute in providing the Asian Women's Leadership Course while also working to enhance the technical knowledge and skills of grassroots women engaged in rice production and processing in Asia.

Dr. Paris reported that there is a keen interest from other networks to organize a similar leadership course for Asian women in agriculture. She sits on the Board of Directors of one such network, Women Organizing Change in Natural Resource Management (WOCAN), and will facilitate its organization of just such a course. Moreover, her former supervisor, Dr. Mahabub Hossain, who left IRRI to assume a director position of a top NGO in Bangladesh, has recently sought Dr. Paris' help organizing a similar training for the staff in Dhaka as well as in the field. In addition, the Swedish-based International Foundation for Science (IFS) has committed to support participants for the next three years and ACIAR will continue to support its participants every year. Last year, representatives from both funding agencies were present during the presentation of the action plans by the sponsored participants.

IRRI's new strategic plan spells out how, during the next nine years, IRRI proposes to bring the best rice technologies to all parts of the world, including East and sub-Saharan Africa, where demand is increasing. With this goal in mind, Dr. Paris envisions the possibility of cross-over strategies for training women leaders engaged in rice science in order to empower them to make changes in their own institutes and to help grassroots women in both Asia and Africa.

For more information on Dr. Thelma Paris and her work with Asian women scientists:

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Meredith Soule

USAID-USDA BORLAUG FELLOWSHIP PROGRAM

DR. MEREDITH SOULE, an agricultural economist who advises the United States Agency for International Development (USAID) on agricultural research issues, serves as manager of the Norman E. Borlaug International Science and Technology Fellows Program for Women in Science in Africa (WIS). Under her leadership, the Borlaug WIS Program, which is funded by USAID and administered by the Foreign Agricultural Service (FAS) of the United States Department for Agriculture (USDA), has awarded 28 fellowships to African women agricultural scientists and entrepreneurs since its launch in 2005, with plans to bring the total to 49 by 2009.

In addition, Dr. Soule oversees USAID's investment in the work of the Consultative Group on International Agriculture Research (CGIAR) and its 15 Centers involved in agricultural research. She works with the CGIAR's decision-making bodies and helps develop US positions on strategies and recommendations for the Centers' future directions. She also follows the scientific work of the Centers and helps ensure their financial stability. Of the core, unrestricted funds that USAID provides to the centers, 8 percent is earmarked for collaborating with US universities and institutions engaged in agricultural research. In addition, Dr. Soule works on issues concerning agricultural research in Africa, such as USAID's support to the Forum for Agricultural Research in Africa (FARA) and other sub-regional organizations.

It was Dr. Soule who engaged the CGIAR's Gender & Diversity Program (G&D) to provide Borlaug WIS fellows with mentoring orientation, leadership training and networking opportunities. She saw this as an opportunity to link the Borlaug WIS fellows with other African women scientists, including those participating in the G&D Pilot Fellowship Program to Enhance the Careers of Women Crop Scientists in East Africa funded by the Rockefeller Foundation and Syngenta Foundation for Sustainable Agriculture.

Setting a direction – having a vision – securing a "place at the table"

Dr. Soule says that her work builds on the vision and work of Ms. Emmy Simmons, a USAID senior leader who played a key role in creating the Borlaug WIS Fellowships. Ms. Simmons served as a USAID Foreign Service Officer for 25 years before receiving a political appointment as the Assistant Administrator (AA) to USAID's Global Economic Growth, Agriculture and Trade Bureau (EGAT), one of USAID's largest

bureaus. As an agricultural economist, she knew the importance of improving agricultural production, especially in developing countries. She was especially sensitive to the role women played in food security, noting that according to USAID, "Approximately one-third of the rural households in sub-Saharan Africa are headed by women and 90 percent of rice cultivation in Southeast Asia is done by women."

Early in her role as AA, Ms. Simmons collaborated with USDA in recognizing Norman E. Borlaug, who was awarded the 1970 Nobel Peace Prize for developing high-yield, disease-resistant wheat varieties. In 2003, USDA, USAID and the US State Department created the Norman E. Borlaug Fellows Program in recognition of his contribution to agriculture.

Ms. Simmons decided to complement the program by authorizing additional funds to be set aside for a Borlaug Fellows Program for Women in Science. Prior to her decision, Ms. Simmons held meetings in which she listened to different perspectives on how to translate her vision into a program and where to place its emphasis. One of her office directors resisted the idea, especially since the funds would be re-allocated from her program's budget. USDA also wanted the new funds for its larger Borlaug program. Ms. Simmons prevailed, largely because of her designated status, political will and, most of all, because of her conviction that more women were needed in agricultural research. She also believed women's access to information and opportunity was compromised by existing barriers, both organizationally and politically. It was Ms. Simmons' position that, "Women make up half the population and they have a sensibility to issues and problems." She added, "I found the idea that I was being asked to justify the 'business case' for my support inexplicable. It was so obvious, yet I had a hard time explaining my decision to the dissenters."

Ms. Simmons understood how the bureaucracy worked. She knew how money was allocated as well as where and at what level decisions were made. This knowledge enabled her to act. Following the re-allocation of funds, the next step was crucial: to assign the responsibility of implementing the program. She assigned that role to Dr. Rob Bertram and Dr. Soule. Ms. Simmons envisioned an innovative program, set a direction and increased the opportunity for women scientists and entrepreneurs to have a "place at the table."

Challenges in getting started

Setting a goal of strengthening the science, technology and innovation capacity of Africa through greater participation of its women, the Borlaug WIS Fellowships aligned itself with the Initiative to End Hunger in Africa (IEHA), a Presidential Initiative managed by USAID's Africa Bureau. Although the funds were secured in 2004, implementation did not begin until 2005.

"Early on", Dr. Soule recalled, "challenges in implementing the WIS program ranged from which countries to solicit for proposals to issues concerning women scientists' pregnancies."

"In the first year, when we solicited candidates from West Africa, we received proposals from strong candidates from Ghana and Nigeria because of their relatively strong

educational systems. But applicants from Mali and Niger were harder to identify because of the added constraint that candidates needed to speak English."

Dr. Soule began sending success stories to USAID missions (country offices) to stimulate interest in the program and increase support. As word of the program spread, staff in USAID's missions began to assist in searching for and recruiting applicants from their countries and regions.

Application is open to women scientists, researchers and agricultural entrepreneurs from IEHA countries including Ghana, Kenya, Mali, Mozambique, Nigeria, Uganda, Zambia, Niger and Malawi. USDA works with FARA, under the leadership of Executive Director Dr. Monty Jones, to consolidate applications and help screen candidates. Once USDA makes a short list of candidates, it conducts interviews and site visits to select fellows, identifies mentors and arranges the fellows' stays with US universities.

After early difficulties with visa applications and security issues, USDA/FAS and USAID learned from the experience. For example, all USAID funded trainees are now entered in the TraiNet system, a US security system that requires a background check on applicants in their country of origin. Because this takes time, it can slow down and even disqualify a woman if the required paperwork is not submitted by a certain deadline. In addition, a woman will be denied a visa if she is pregnant and close to giving birth. In this case, the applicant can be shifted to a later group but, if the program ends or is projected to end at a future date, that option will not be possible. Also, women sometimes drop out after being selected due to personal or family reasons.

There has been outside support for the USAID strategy. Ehsan Mosood of the Science and Development Network said he saw USAID's WIS strategy as "Helping women at all levels. Women scientists will be encouraged to link their research to innovation. Women farmers will be provided with opportunities for education, training and better access to agricultural information."

Modeling leadership – having an innovative mindset

Taking a page from Ms. Simmons' leadership, Dr. Soule, in her role as agricultural research advisor, continues to make the challenge of women's participation in agricultural research and development in Africa more visible, and to seek solutions that will benefit not just the women, but also their institutions, and will promote the goals of increasing African agricultural productivity.

"It has been noted around the world that women are consistently less well represented in the sciences than men." said Dr. Soule. "This disparity means that neither women nor the scientific institutions are reaching their full potential."

TOP 8 SUCCESS FACTORS

1. Committed senior leaders using their authority to create new programs
2. Working collaboratively with other agencies/partners
3. Mentoring and leadership development
4. Building and sustaining networks - Looking for linkages with other organizations
5. Having an innovative mindset
6. Measuring impact and hearing the voices of recipients
7. Continuing to ask hard/ critical questions relating to programs
8. Using best practices to stimulate forward thinking and research

In Africa, this dilemma is now being addressed by her Borlaug WIS Fellowship Program and by the G&D Pilot Fellowship Program to Enhance the Careers of Women Crop Scientists in East Africa. "Both are designed to boost the scientific and leadership skills of African women scientists. The ultimate objective is to address food security and agricultural growth needs of African countries more fully, by increasing the skills and participation of talented women scientists in the agricultural research and development process."

In addition, in 2006, Dr. Soule organized a USAID Conference – Women in Agricultural Science: Meeting the Challenge. Her initial idea for the conference was to bring people together who had an interest in women in science and perhaps form a global alliance of partners to fund women in science programs. That idea fell by the wayside when other interested donors were not able to attend, but the conference participants were energized by the ideas and decided to develop a similar session for the Annual General Meeting of the CGIAR, which was held in Washington, D.C. in 2006. That presentation, sponsored by Vicki Wilde, Leader, CGIAR Gender & Diversity Program, caught the attention of a representative of the Bill & Melinda Gates Foundation who attended the conference. Discussions led to a proposal and eventual funding from the Bill & Melinda Gates Foundation for G&D's African Women in Agricultural Research and Development Program (AWARD).

Dr. Soule continued in her efforts to seek synergies and leverage funds, including a project in cooperation with the private sector that will provide USAID funds for four to six months of training for African women in biotechnology. African women scientists who are AWARD Fellows will be eligible to apply for these research attachments.

Voices of the fellows

"Weaving together and empowering the Borlaug WIS Fellows," said Dr. Soule, "is based on key strategies involving research innovation, mentoring, leadership training and networking." The following paragraphs presenting the voices of the fellows "are a testimony to the value they place on their experiences in the program and its impact on their research and professional development."



Adeola Adenugba,

CHIEF OF PRODUCTIVITY, NATIONAL PRODUCTIVITY CENTER, LAGOS, NIGERIA.

"From my stay at the University of Florida, USA and through the relationship with my mentor, I have gained important exposure in my area of research [dairy sector]. My attendance at various seminars also provided an impact on my personal and professional life. Seminar topics that I found useful were: Gender Analysis Training, Financing Small Farm Projects, Leadership Skills in Agriculture, and Impact of African Agriculture. These seminars and training opportunities have enabled me to acquire knowledge and skills and, in turn, have enhanced my job performance."



Nome Sakane,

RESEARCH ASSISTANT (AGRONOMY), AFRICA RICE CENTER, SAHEL, SENEGAL.

"The CGIAR Women's Leadership and Management Course reinforced my hope for the future. I left the course feeling more confident and empowered. By sharing with other women, I realized that I am not alone in my situation. The most important impact I gained from this fellowship was the networking. For example, I met with three graduate program coordinators of different departments at the University of Florida and we discussed the possibility of pursuing my PhD in their departments. I also received excellent exposure to new scientific techniques by working closely with my mentor on a new Global Information Systems (GIS) software package."



Morufat Oloruntoyin Balogun,

FORMERLY SENIOR RESEARCH FELLOW (PLANT BREEDING), INSTITUTE OF AGRICULTURAL RESEARCH, NIGERIA.

"Through this fellowship program, I have fostered an excellent, highly productive relationship with my mentor. This relationship really taught me how differences in opinion can be a rare opportunity for improvement. I have come to realize that networking with experts world-wide is critical for sustainable research and global impact. I was also overwhelmed by how the CGIAR Women's Leadership and Management Course helped me to know myself – my weaknesses and my strengths, when I should ask for help and when I should be independent. This was done without making me feel inadequate."



Flora Christine Nelson-Quartey,

RESEARCH SCIENTIST (FOOD SCIENCE AND TECHNOLOGY), CSIR CROPS RESEARCH INSTITUTE, KUMASI, GHANA.

'The interaction I had with my mentor enabled me to handle almost all the equipment in the Post Harvest Laboratory with very minimal supervision. The network opportunities offered by the CGIAR's G&D Program have given me a broad perspective on issues relating to gender in the global context."



Fatou Diop,

RESEARCHER (PLANT BREEDING), INSTITUTE OF AGRICULTURAL RESEARCH, SENEGAL.

"Through the fellowship program, I had the opportunity to attend lectures in virology, visit an experimental field and a plant clinic, and learn how to detect begomovirus presence using Polymerase Chain Reaction (PCR) and the Enzyme Linked Immuno Sorbent Assay (ELISA) test. I also learned different methods to inoculate tomato with the yellow leaf curl pathogen. I now use these new scientific techniques in my work. At the CGIAR's Women's Leadership and Management course, I learned how to resolve conflicts effectively in my institution, gained leadership skills, and learned how to organize a dynamic research team.

Ruth Mbabazi-Tugume,
MINISTRY OF AGRICULTURE, UGANDA.

"I attended a workshop to support fisheries quality assurance. During this workshop, we shared experience about the fisheries sector. The opportunity you granted me to share experience and acquire more knowledge on food safety and quality issues has helped me greatly in analyzing issues in relation to [the] Ugandan situation."

According to Dr. Soule, Borlaug WIS fellows' voices all have similar refrains. "They appreciate exposure to different perspectives, the exchange of information and techniques, the deepening of their self-awareness and their leadership capacities, and the building of confidence to continue their professional growth." In addition, she said, they also tell of sharing the new skills they have learned with their colleagues. "Their experiences strongly suggest some emerging best practices and a vision of a future where women play a greater and sustained role in agriculture world-wide."

Emerging best practices and future direction

As the Borlaug WIS program begins its third year of operation, the stories of the fellows' experiences and their impact are striking. The experiences prompt important research questions:

- How does the impact of the WIS fellowship compare or contrast with the G&D Pilot Fellowship Program?
- How can the limited funds be reconciled with the expressed concerns of some of the fellows about extending the length of their mentoring experience with US scientists?
- What other innovations need to be considered?
- Is the fellowship program more about how to influence institutions or individuals?
- Are women a better investment because they are more likely to go back to their countries and work instead of staying in the US illegally?
- How can the impact of gender that is being discovered in this program be integrated with the larger Borlaug Fellowship Program?
- How can this fellowship approach be converted into a larger effort that can attract other partnerships?
- How can the program be made sustainable? What criteria should be used to determine when its utility has diminished?

The Norman E. Borlaug International Science and Technology Fellows Program for WIS offers its fellows:

- a 4-6 week training and collaborative research opportunity in international agricultural science at a U.S. university;
- a mentoring experience with staff from the US university who coordinates the Fellow's training;
- participation in the Women's Leadership and Management Course, organized by the CGIAR Gender & Diversity program (G&D);
- networking services, including an electronic newsletter and fellows' updates from G&D;
- opportunity to apply for a small grant for research or travel to present research at an international meeting.

gender FACTS

- One third of all rural households in sub-Saharan Africa are headed by women.
- Women farmers receive only 1 percent of total financial credits to agriculture.
- African women's workdays may be 50 percent longer than men's, and their work is closely integrated with household production systems.
- In Kenya, giving women farmers the same level of agricultural inputs and education as men could increase yields obtained by women by more than 20 percent.
- In Tanzania, reducing time burdens of women could increase household cash incomes for smallholder coffee and banana growers by 10 percent, labor productivity by 15 percent, and capital productivity by 44 percent.
- In Zambia, if women enjoyed the same overall degree of capital investment in agricultural inputs, including land, as their male counterparts, output could increase by up to 15 percent.

Under Dr. Soule's leadership, several initiatives have begun to respond to these questions. USAID is funding an impact evaluation in order to assess the impact of the Borlaug WIS Fellowship and the G&D Pilot Fellowship Program. One element of the evaluation will compare the experiences of the women in the two fellowships, particularly the different approaches to mentoring. Another initiative seeks to identify funding sources for further professional development and research efforts for women fellows. Dr. Soule has initiated a grant program in 2008 that offers stipends of approximately US$5,000 to US$10,000 for fellows to attend a conference or a meeting to present a research paper, or will provide small research grants.

How best to spend limited funds is always a key question. Although the management of this interagency collaboration has been clearly delineated, consultation and compromise are still required. USDA has the responsibility of bringing together the fellows and the US university hosts. There is limited money, thus there are trade-offs. Some of the women fellows have expressed a desire to stay longer in the US, which would mean fewer women could participate. However, other fellows have reported not wanting a longer fellowship because they would not want to be away from their families for a longer period of time. USAID funds the program but USDA has authority to spend the money with consultation. Compromise is the key. A collective decision was made to continue with the current fellowship timeframe allowing more women can participate even though it goes against some of the women's desire to stay longer.

With central funding for the Borlaug WIS program ending in 2008, Dr. Soule is reaching out to USAID missions to encourage them to use their own resources to fund fellowships for women scientists. She also has designed a program for women agricultural entrepreneurs and is encouraging USDA to incorporate lessons learned from the women's program in its other Borlaug programs that are open to both men and women. "It is about helping create partnerships and connections."

For more information on Dr. Meredith Soule and the Norman E. Borlaug International Fellowship Program for Women in Science in Africa:

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Vicki Wilde

CGIAR GENDER & DIVERSITY PROGRAM

WHILE VICKI WILDE'S career path has had many twists and turns, she always kept her focus: empowering women. She first worked on international development issues while serving as a fellow to the United States Congressional Caucus on Women's Issues. "It was the Reagan years and we lost every cause we worked on. But I learned an important lesson: to succeed, we have to listen to all sides." Over the next several years she spent ever more time listening to women and men farmers throughout Asia and Africa.

Working on behalf of various agencies of the United Nations, Ms. Wilde used participatory methods to explore food security and agricultural or forestry development issues at the village level. "Everywhere, without exception, I learned that understanding the differing roles and resources of women and men was essential to finding the most feasible and sustainable way forward." She also spent a few years exploring gender issues in war zones, including Burundi, South Sudan and northern Ethiopia. "My work in emergency situations taught me that "ignoring gender issues not only hinders development, it costs lives." As a result of her years on the ground, Ms. Wilde became a well-known trainer and writer, advocating more attention to gender and diversity issues in agricultural research and development.

In July 1999, she assumed her current role, as Program Leader of the Gender & Diversity Program (G&D) for the Consultative Group of International Agricultural Research (CGIAR). Her work with the CGIAR has meant advocating for gender and diversity in-house. "The CGIAR is a science organization. I didn't want the G&D program to be seen as 'fluff'," she said. "I wanted to get away from the jargon and rhetoric usually associated with gender and diversity issues, and focus on facts. For example, we do staffing research; we put facts in front of senior managers. I want senior leadership to see us as useful."

The CGIAR mobilizes science to support agriculture

The CGIAR is the world's largest public goods investment mobilizing science for the benefit of poor farming communities worldwide. It supports 15 international agricultural research Centers in their efforts to mobilize agricultural science to reduce poverty, foster human well-being, promote agricultural growth and protect the environment.

"Working with diversity is an organizational imperative in the CGIAR," explained Ms. Wilde. The 15 Centers employ more than 8000 staff from more than 100 countries. Under Ms. Wilde's leadership, "the G&D Program works to leverage that staff diversity. People join the CGIAR to make a difference, to find solutions to the problems of hunger and poverty, and G&D is there to support them."

TOP 10 SUCCESS FACTORS

1. Building trust with key leaders, investors and partners to drive change throughout the entire organization.
2. Integrating gender and diversity with organizational change and staff development.
3. Investing in a critical mass of change agents.
4. Using research to set priorities – basing the work on data and avoiding short term fads and jargon.
5. Tackling the hard issues.
6. Monitoring tenaciously – setting up mechanisms to assess progress on a regular basis, sharing both good news and bad and following up wherever needed.
7. Using multi-directional communication and constant feedback.
8. Reaching out and networking – reaching beyond organizational borders to others.
9. Innovating – experimenting fearlessly with new tools that make diversity work fun, accessible and meaningful.
10. Celebrating small wins as well as big ones.

Prior to Ms. Wilde's arrival, the CGIAR had a fledgling gender program that focused primarily on internationally recruited women who comprised about 12 percent of CGIAR staff. Each Center chose a woman to serve as the "focal point" to the gender program. "I was a bit alarmed to learn how sensitive the diversity issues were," Ms. Wilde said. "Nationally recruited staff – those from the countries where the Centers were located – were largely neglected by CGIAR programs. One of my first decisions was to open up our focal point system to include nationally recruited staff, both men and women. I strongly believed that we had to work with our diversity in an inclusive way. My decision was very controversial at the time, but has since become the norm."

Diversity is a fundamental driver of business results – not a buzzword

In the early years, gaining credibility and support from both the leadership and staff for G&D's mission was tough. Staff members needed to be convinced that their concerns were going to receive more than an airing – that policies and practices would actually change. CGIAR leaders needed to be assured that the program was not out to embarrass them and, instead, would help them improve organizational performance. Initially, a few Directors General (DGs) were supportive allies while others were openly adversarial and still others "sat on the fence," cautiously waiting to see what the program would offer. In other words, would the program move beyond diversity buzzwords and offer new polices and practices based on credible data?

For example, in 1999, the program started with 22 appointed women as focal points. Now, 200 focal points – both men and women, from science and administration backgrounds – volunteer. "This is credible data that illustrate the level of increased support," she said, describing the focal points as "a community of change agents in every Center. They are the advocates for the services and research that G&D offers to help drive the CGIAR's business results."

Accountability, visibility and flexibility

Ms. Wilde is accountable to the Centers' Directors General (DGs) and to the Director of the CGIAR Secretariat at the World Bank. Each year, at the annual DG meeting, she reports on the progress and results of the yearly G&D work plan. She also makes the case for continued support alongside other CGIAR programs. "They see us as a good investment. Also, the CGIAR receives global recognition for its G&D program which serves as an added incentive to support the program."

Ms. Wilde holds an "open event" at the CGIAR annual meeting, inviting donors, Center staff and partners to learn about G&D's

research results and services. She has the authority to raise additional funds for the G&D program – what she calls a "hunting license." At these events, potential investors learn about the G&D program and afterwards, many become active supporters and donors.

External investors' interest in the program is not always about money. Some provide expertise, advice and serve on the Steering Committees of G&D's programs. This contributes to G&D's mission of collaborating across institutions. It engages a critical mass of individuals and institutions in considering how to attract and leverage global staff diversity more systematically.

The CGIAR leadership's early and sustained support has helped the program offer "world class services" beyond its own institutions. At the same time, it comes full circle by helping develop a diverse population of scientists for the Centers to draw upon in the future.

The lack of micro-management by the CGIAR is one reason G&D is able to innovate, experiment and excel. It allows G&D's staff the flexibility to think and act on new opportunities. G&D is trusted, held accountable and evaluated annually for results. Ms. Wilde says, "The DGs trust me and I trust them. For example, they know that I am happy to announce publicly where Centers are excelling, but when I talk about bad practices, I do not name Centers. We give visibility and celebrate small wins. Too often, especially in many gender programs, the focus is on what's wrong. I like to turn this around, focusing on how to make more successes happen more often and in more places. I'm after nothing less than a positive epidemic."

Leveraging global diversity for global impact

The G&D Program sees research as its modality and essential to its success. When G&D puts forth a new service, it has sound data to support the innovation.

The underlying goal is to provide senior managers with useful and results-oriented approaches to the challenges their organizations are facing. G&D has created data bases, tracked trends, and conducted organizational assessments and impact studies to provide facts for senior managers' consideration. It also has developed a series of working papers and tools for addressing a wide range of issues confronting the Centers such as learning to working with diversity in collaboration, designing HIV and AIDS policies for the workplace or ensuring diversity-positive recruitment, and comparative perspectives of CGIAR's male and female scientists.

Ms. Wilde based G&D's strategy on the five stages of innovation presented by Everett Rogers in his book Diffusion of Innovation "I recognized his ideas as central to the type of strategy that could bring the required changes to the CGIAR's practices," she said. These stages include:

1) developing and sharing knowledge about innovation,
2) persuading others of the value of the innovation,
3) gaining commitment to adopt the innovation,
4) implementing the innovation—new policies and practices,
5) confirming/ measuring level of acceptance and results.

The first two stages were addressed early in G&D's strategy through increased research, data sharing and involvement of staff and leaders. The breakthrough for the third stage was sparked when Ms. Wilde had a brainstorm while shopping for books online. She decided to organize an e-conference designed to let the DGs "shop" for what they wanted from G&D.

"We listed 12 different services G&D could offer, outlining the costs and benefits for each. These 12 shopping items included such services as organizational diversity diagnosis, helping with spouse employment, and training to strengthen global science teams' abilities to leverage their diversity. It was a whole menu of services. By putting the DGs into the driver's seat, letting them select on the basis of their Center's particular needs and priorities, we re-positioned the work of G&D. We became a positive partner. I re-wrote my work plan based on their priorities so that G&D would be directly responsive. This approach has built our credibility and contributed to good working relationships."

The fourth and fifth stages for adopting innovations were equally demanding and are still ongoing for the G&D Program. Ms. Wilde admits implementing and measuring for results is a tougher challenge. In 2003, G&D conducted benchmarking research, providing every Center with a detailed report on the gender and diversity of its staff and how each Center compared to other Centers. Next, in 2004, G&D facilitated a detailed goal-setting exercise. This exercise helped each Center develop its own one-, three- and five-year goals for policy, practice and staffing, which then went to the Center's governing board for approval. Relevant indicators were integrated into the overall performance management system that determines the percentage of World Bank funding received by each Center, thus institutionalizing G&D goals and tying them to financial rewards. "People respond to financial rewards," Ms. Wilde says, "it's pragmatic."

The Centers' goals are monitored annually, necessary adjustments are made, and progress and success are celebrated. Ms. Wilde conducts an orientation to introduce new members of the CGIAR Center boards to the G&D Program and its performance measures. She emphasizes the

gender FACTS

- G&D is hosted by the World Agroforestry Centre in Nairobi, Kenya and is tasked to work with 15 agriculture research centers worldwide.
- **G&D's motto:** We cannot achieve on the outside what we do not practice on the inside.
- **G&D's business case:** When staff diversity is sought, respected and enhanced, organizations have a greater ability to:
  - Respond to changing workforce demographics, including greater participation by women and members of other historically under-represented social groups;
  - Strengthen collaborative modes of work by accentuating interdependence, partnerships and alliances;
  - Build innovation, creativity and problem solving through supporting multi-cultural, multi-disciplinary teams;
  - Advance social justice and equality - a core value of CGIAR Centers;
  - Improve retention of highly qualified staff by offering progressive and satisfying work experiences;
  - Excel in performance and reputation by modeling the workplace of the future; and
  - Tap into new knowledge networks giving broader access to clients, beneficiaries and investors.
- Example impacts 1999-2003:
  - Management staff from developing countries increased from 36% to 45%
  - Internationally-recruited women from developing countries increased from 33% to 40%
  - Scientists from developing countries increased from 47% to 58%
  - Female scientists increased from 15% to 20%

best practice of integrating G&D goals and strategy at the organizational level, both at the senior management level as well as at the board level. All of these organizational innovations send the message of the importance of gender and diversity in a Center's performance.

In 2008, G&D will follow-up on the benchmarking research done in 2003. This survey will provide valuable data about the level of adoption and effectiveness of gender and diversity policies, practices and staffing goals in the Centers. The G&D program predicts leaders will see more innovation, creativity and effective problem-solving through the increase in their staff diversity.

Providing a menu of key services

The four key services G&D offers are its: Mentoring Program, Women's Leadership Series (WLS), Inclusive Workplace e-Resource Center, and Dignity Advisors Training. G&D also offers customized services to individual Centers. The 200 focal points advocate for these services and other policies and practices to be implemented in their respective Centers. Focal points attend an annual workshop to share best practices and network across the Centers.

In the whole menu of services, the WLS is the only one solely for women. Centers nominate their women scientists and professionals, and finance their participation. Other services, including mentoring, dignity training for the prevention of harassment and discrimination, the high performance global team course, and a seminar on working with diversity in times of change, represent 80 percent of the G&D program and are for both men and women.

Mentoring

The CGIAR Mentoring Program is a cornerstone service of the G&D Program. After researching best practices of other mentoring programs, G&D added a strong focus on cross-cultural and cross-gender communications. It is goal oriented – every "mentee" sets three goals to be achieved through one year of mentoring. Mentors commit to meeting with their mentees for a minimum of one hour a month. Originally, the Mentoring Program was developed to ensure that junior women scientists were supported in their careers. One of the focuses was on women from cultures that discourage assertiveness or career advancement and who have relatively few role models. Many of these women scientists were quietly falling between the cracks, remaining invisible, not moving up the career ladder or dropping out. The demand grew for this key service and now mentees include both men and women, from science and administration – it serves everyone but also meets its original goal of reaching out to young women scientists.

Women's Leadership Series

The WLS includes a highly successful Women's Leadership and Management Course, a Negotiation Skills for Women Course and an Advanced Women's Leadership Course. "We have consciously and carefully built the series over the years. It is designed to build a cadre of women with leadership skills that will make them and the CGIAR more successful. It also sends a powerful message to the world that women

really matter to this organization," said Ms. Wilde who organizes a networking event for alumnae of the courses during the annual CGIAR meetings and sends out monthly e-newsletters. Each course within the series is a "world class offering."

"It is important to continue the women's leadership series for as long as women are a minority of the CGIAR's leadership positions," Ms. Wilde said. "During the Women's Leadership Course, for one week at least, women experience what being a majority feels like. They discuss issues and experiment with new behaviors they would never try if men were in the room." In 2006, G&D commissioned an impact study of its Women's Leadership Series. The report, Inspiring Transformation,[2] documents lessons learned during the 10 years the program has been offered.

Inclusive Workplace e-Resource Center

One of G&D's innovations was the 2005 launch of the Inclusive Workplace e-Resource Center, a dynamic interactive section of the G&D Web site. It was designed to help the Centers move forward with policy reforms. It features an animated graph of G&D's core values (inclusion, dignity, opportunity, well-being), each linked to relevant model policies, best practices, and tips and tools. It includes guidelines for diversity-positive recruitment, flexible workplace policies, accommodating spouses and partners, and preventing harassment and discrimination. Since the launch, the Web site has received 12,000 visitors a month. The guidelines are presented in a way that Centers can adapt or adopt them for their own policy manuals. G&D specifically makes them accessible to everyone and, thus, many other international and national organizations are tapping in and taking advantage of them. In the near future, the Inclusive Workplace e-Resource Center will expand to include updated guidelines on HIV and AIDS in the workplace, family friendly practices, work/life balance and diversity competencies, among others.

Dignity Advisors Training

In 2007, G&D launched a new program for the development and training of G&D Dignity Advisors. This is an effort to prevent the abuse of power, discrimination and sexual harassment. The goal is to train all 15 Centers and embed dignity and respect into Centers' organizational cultures. "The CGIAR Centers are no worse than other organizations," Ms. Wilde said, "but we want to be better."

"Any time you mix women and men from 100 different nationalities, there is the risk of bringing historical-cultural inequities into our workplace – one ethnic group traditionally abusing another, men traditionally dominating women, whites traditionally dominating blacks. These behaviors have no place within our global organizations. This is part of risk management. G&D works on these issues through a multi-cultural lens and we focus on prevention."

Ms. Wilde considers the Dignity Advisors Training as one of the "non-negotiables" of G&D's program. The second non-negotiable is ensuring that the work place does not discriminate on the basis of HIV status. "The CGIAR has progressed well on this tough topic," she said, reporting that "most Centers have action plans and provide insurance coverage and access to treatment. Several have active programs for education and prevention."

2 http://www.genderdiversity.cgiar.org/publications/WorkingPaper47.pdf

Reflections and future transformations

Ms. Wilde feels proud that staff members at all levels are included in most G&D services and events. In addition, nearly all recruitment activities in the CGIAR give specific attention to ensuring that women and developing country nationals are represented in the pool of applicants. "These two actions are now well embedded in the CGIAR culture," she said, "far ahead of where we started. In the early days, when I sent out announcements for the women's leadership courses, I would receive a whole slew of hostile and angry replies – some of the worst came from men in leadership positions. It was not pleasant. But I stuck to my vision and let them know that I would stop having women's leadership courses when I saw more women in positions of leadership! No one argues about the women's leadership course anymore. We have built up a fairly large cadre of female alumnae, all reporting back on the experience to their supervisors. The courses have an excellent reputation and strong support from most CGIAR leaders, male and female."

G&D's decision to extend its world-class services, including mentoring, women's leadership, inclusive workplace policies, outside of the CGIAR has been especially successful. Now African women scientists who work in national agricultural research systems can take advantage of these services through fellowships (for more information on the fellowship opportunities, see case study featuring Amelia Goh and Helga Recke of the G&D Pilot Fellowship Program and Meredith Soule of the Borlaug Fellowship Program) .

"We don't want to play catch up, we want to lead," Ms. Wilde declared. "We want to show that the CGIAR is a great place for women scientists to work. We want the CGIAR to become the science organization that others benchmark themselves against. We know that these women scientists can provide crucial insight and scientific results that will help the CGIAR achieve its meaningful and compelling mandate to help reduce poverty in developing countries."

For more information on Vicki Wilde's work with the CGIAR Gender & Diversity Program:

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Stella Williams

OBAFEMI AWOLOWO UNIVERSITY

DR. STELLA WILLIAMS, a member of the faculty at Obafemi Awolowo University (OAU) in Ile-Ife, Nigeria, believes that "to make a scientist, a child must know this is her calling and build upon that. In Africa, this means that parents need to be aware they are a critical cog in that wheel. If the parents are not encouraging or if they disparage – even if the teacher is trying to channel that child's innate gifts – it is difficult. And this is not just true for Nigeria, but for the whole of the African continent. The parents are key."

The best gift a child can have – a brain

From an early age, Dr. Williams' mother conveyed to her and her sisters that they had been given a gift that would serve them well all their lives – a brain. Furthermore, her mother taught Dr. Williams that the development and nurturing of her brain was her responsibility, a responsibility Dr. Williams did not take lightly. Shuttling back and forth between schools in Nigeria and Sierra Leone, her mother's home country, Dr. Williams cultivated a love of science. She ended up at the Prince of Wales School in Freetown, the only high school willing to accept girls interested in science. At 17, Dr. Williams gained admission to the University of Sierra Leone, Mt. Aureol, Freetown, and began to work diligently on a degree in zoology.

It was during her university years in Freetown that she began to show signs of leadership in a traditionally male world. In 1968, Dr. Williams led a student government delegation from Sierra Leone back to her grandfather's home country of Nigeria, the country that Dr. Williams felt was "the home of her heart." At that time, it was unheard of in Nigeria for a woman to lead a delegation if there were male delegates in the group. When queried by the *Lagos Daily Times* journalist Olusegun Osoba (a former governor of Ogun State) about why she was chosen to lead when there were male candidates available, Dr. Williams declared, "because Sierra Leone is a modern country where men and women are equal in ability and personality." The next morning, Dr. Williams' picture was on the front page of the paper, her foot on a table striking a pose that was both confident and authoritative.

A young man who bought the paper that day was taken with the image of the striking young woman who dared to lead like a man. He sought her out and, eventually, became her husband. "He remains a feminist at heart till this day," she said. "He is my friend with whom I share observations, argue about academic issues and brainstorm ideas and opinions. He believes in my dreams and supports my plans and strategies for the education of the 'girl child', especially in the sciences." Dr. Williams and her husband have two daughters and a son. Their girls are both university graduates with master's degrees.

A cadre of women who believe – mentoring makes a difference

Dr. Williams credits not just her mother with being a strong positive influence in her development as a scientist, but also a cadre of women with significant roles in her growth who saw her potential and encouraged her to study science and pursue her passion. "With their encouragement and belief in me," she said, "I genuinely believed nothing could stop me." With these women as role models, Dr. Williams recognized the power of the teaching profession. She believed that the best way to honor her mentors and show appreciation for all they had given her was if she, too, became a teacher who encouraged young girls to pursue science as a career.

Finding an institution where she could fly – the role of enlightened leadership

After completing a M.Sc. in Ecology and Zoology at the University of Connecticut and a Ph.D. in Fisheries and Aquaculture Economics at Auburn University, Alabama, USA, Dr. Williams returned to Nigeria ready to "fight the fight for girl children – for the sciences." In September 1983, Dr. Williams joined the staff of the Department of Agricultural Economics of OAU. At that time, there were only a few tenured female academic staff on some of the faculties and none had risen to the rank of professor. However, there were leaders at the highest levels who understood how important female faculty would be for the growth of the institution over time. "After all," Dr. Williams commented, "when you educate a woman, you are educating a nation."

"The leadership of this university has been very significant in making change happen," she said, recalling the late Vice Chancellor, Professor Hezekiah Oluwasanmi, whom she called "a blessed memory." A graduate of Georgia Tech University, USA, in agricultural economics, he always claimed that there was not anything a man could do that a woman could not do as well, supporting Dr. Williams' theory that he was "a feminist at heart." Women faculty and their male counterparts were treated equally, encouraged to present papers and attend conferences in their disciplines, and received support in pursuing Ph.D.s. Professor Oluwasanmi also ensured that female staff had needed resources and housing, which was of great help to Dr. Williams in the early stages of her academic career when she commuted three hours between her teaching at OAU and Lagos, where her husband was stationed.

Other Vice Chancellors also have worked to remediate the gender inequity at the university and to implement the Carnegie Foundation's mandate that OAU reach a staffing level of 30 percent female faculty. Senior colleagues in the highest administration of the university have created an environment where professors such as Dr. Williams can not only educate classes of young Nigerians, they concurrently can mentor scores of young women who long for vocations in the sciences.

Networking to make a difference

At the beginning of Dr. Williams' career at OAU, she felt a need to connect with other female staff members. She began building a network of support with her women colleagues, forming the Soroptomist International Club (SI) of Ile-Ife and was chosen the founding president. Not unlike Rotary International, which was all male at that

time, Soroptomist was an all-female organization. The primary mandate of SI is to empower women and children in the communities where there are SI clubs. The majority of the Ile-Ife chapter's membership came from the university community and, therefore, felt the need to advocate for women's and girls' education. Dr. Williams ensured that an emphasis was placed on empowering girls in the area of science and science-related studies.

Dr. Williams also connected with colleagues in the faculty of sociology at OAU. A Women's Study Group was established and, over time, became the Center for Gender and Social Policy Studies of OAU. Through the work of the Center, the university obtained funding from the Carnegie Foundation of New York and established the Carnegie Gender Equity Project. The major goal of this project was to enhance female enrollment, retention, employment and decision making and, in the end, to achieve gender equity in every aspect of the university. The project offered scholarship and fellowship awards to female undergraduate and post-graduate students, as well as female staff members, enabling them to complete their studies and improve their performance. The Center has awarded scholarships and fellowships to 600 undergraduates and 90 postgraduates.

Checking the data – monitoring and evaluation on gender equity

As Phase 1 of the Carnegie Foundation project drew to a close, OAU began to collect baseline data concerning enrollment and graduation of female students. Now, OAU has established a computerized database and, for the first time, data can be disaggregated efficiently by gender, discipline and tenure. "This will be of great benefit," said Dr. Williams, "because OAU needs to look at the number of females dropping out and examine services available to try to mitigate attrition."

"If African countries are to join the league of developed nations, we must improve on science education. This will be heavily dependent on us women being good motivators to our children, especially the talented ones."

Currently, OAU offers a "role model" program to spur female students on through empowerment. Dr. Williams cites anecdotal evidence that the Carnegie project and the Center's strategy have had a positive impact on her faculty. For example, OAU has hired a female biotechnologist who is the first female professor on the faculty as well as the head of the Department of Animal Science. Serving as a role model, this professor has mentored a female student who is currently employed as her junior fellow and who is registered to take her Ph.D. in the same department. Dr. Williams has two other female staff members in her own department, both of whom have registered to take their Ph.D.s. All of this evidence points to the Center's and the Carnegie Foundation's success in the area of gender equity.

TOP 6 SUCCESS FACTORS

1. Parental encouragement and motivation
2. Enlightened leadership creates a context for change
3. Mentoring – role models make a difference
4. Networking – the power of a network of women
5. Creating alliances to navigate cultural contexts
6. Information sharing to promote the growth of other women scientists

A strategy for equity - how does OAU make it work?

Dr. Williams offers a range of reasons why OAU has been successful in increasing both its female student population and faculty. For example, the university is now working on including issues of gender equity in the university's overall policy handbook. Likewise, the Center's strategy to create awareness and a development process around gender equity involves identifying focal points in all departments, administrative offices and units who have the responsibility of mainstreaming gender across the entire campus. In collaboration with Center staff, these focal points help raise gender awareness of both university staff and faculty on how equity can be brought into their respective programs. Dr. Williams is a member of the Center's focal group for the faculty of agriculture and has worked to ensure that gender mainstreaming is present in her own department and programming.

Furthermore, Dr. Williams and other colleagues from the Center for Gender and Social Policy Studies, as well as the Directorate of Student Affairs, work with new students from orientation onwards. As Dr. Williams put it, "We befriend these young people. If they have any problems, they can talk to us. We offer them a safe place to discuss their problems." Dr. Williams also works to ensure that the various science departments provide extra tutorials for both male and female students. She believes these measures have contributed to reducing the drop-out rate significantly.

gender FACTS

- In 1983, there was not a single female tenured professor at Obafemi Awolowo University (OAU) in Ile-Ife, Osun State, Nigeria.
- Between 1985 and 2005, OAU saw an increase of 10% in the population of female professors in the 14 faculties and Research Institute.
- From 2003 to 2007, there was a dramatic increase in female department heads at OAU. By 2007, each of the 14 faculties at the university had one or more female department heads.
- The Faculty of Agriculture has 3 female department heads. The overall agriculture faculty has a 50/50 ratio in terms of the university's gender policy implementation.
- Dr. Stella Williams was the first female Vice Dean in the Faculty of Agriculture at OAU.
- In August 2007, OAU appointed Professor F. Togonu-Bichersteth, a psychologist by training/ profession, as its second female Deputy Vice Chancellor (Academic).
- OAU has a gender policy aiming to increase the number of women studying science to 30%. Currently, the percentage of women studying science fluctuates between 7-10% at OAU as well as at other Nigerian universities.

Impact of the cultural context and the importance of allies

When asked what it will take to keep change moving forward for African women scientists, Dr. Williams said, "Because of our culture and our tradition, change has always had to come from the top down. You have to defer to your elders and allow them to do things, to be your voice."

Dr. Williams learned this lesson early, as a young female faculty member in her first year on campus. At that time, Dr. Williams met an older and venerated university librarian whom she identified as a potential key ally – to be her eyes, ears and voice until she had gained enough age and credibility to stand on her own. Through her friendship with this senior colleague, Dr. Williams navigated political waters deftly and began to have indirect influence in creating change.

Dr. Williams' ability to create alliances still serves her well in promoting an agenda of change for women scientists. Each Friday after classes, Dr. Williams goes to the Staff Club where she mingles with colleagues and, as she expresses it, "I put my feet up. We talk about current events, but in the process, we are preparing the ground for the things we want to change in the system." Dr. Williams describes the Staff Club as a place with an atmosphere of relaxation, but also a forum where a lot of lobbying takes place, "because, in order to facilitate change, you have to be able to lobby with the best of them." To that end, Dr. Williams excels. Her vision of promoting and sustaining women scientists at OAU flourishes through her conscious networking and, she said, "I don't feel intimidated if I have to look for someone to help me. In fact, it's the smart thing to do."

The sky is only the beginning

Dr. Williams knows that Nigeria still struggles. In general, the Nigerian government has not invested in its educational system as it optimally might. For example, when the MacArthur Foundation, which funds Nigerian federal educational institutions, requested that the government match 10 percent of the funding, the government invested less than 5 percent. As a result, most institutions lost the majority of their MacArthur Foundation funding. In the scramble to fill that gap, scientists turned to donors such as the British Overseas Foundations (Commonwealth, DFID), the Fulbright Foundation, the Ford Foundation, the Bill & Melinda Gates Foundation and the Carnegie Foundation to fund their research. According to Dr. Williams, without these donors, there would have been no research at all in Nigeria between 1985 and the present.

In the summer of 2007, when nominations for candidates to fill ministerial posts went out, state leaders from Nigeria nominated an overwhelming number of men rather than qualified women. Of 39 ministerial posts, only six are held by women. In response to this disparity, Dr. Williams created the "50/50" group. Inaugurated July 30, 2007, the 50/50 group will now lobby to see a 50/50 representation of women appointees to ministry positions, and will partner with other 50/50 groups globally that are advocating for similar equitable representation in their own countries. It is through her example of leadership in the face of adversity that Dr. Williams serves as a role model and mentor to other young women.

As a mentor, one of Dr. Williams's primary roles is to act as a conduit of information for her numerous female mentees. Many of them need help finding funding for their post-graduate work, and Dr. Williams often connects them with scholarship opportunities through the Commonwealth Scholarship, the Fulbright Program, the Academy of Sciences for the Developing World (TWAS)/UNESCO and other sources. Seeing the lack of available information as a key bottleneck to many young women scientists' professional growth, Dr. Williams shares as much information as she can. She disseminates key papers widely, uses e-mail listserves to forward helpful data, and follows up to ensure that the right information gets to the right people.

Today, Dr. Williams reports, there is not a ministry in Nigeria or Sierra Leone where some woman does not come up and say, "Hello, Dr. Williams!" because she was taught by Dr. Williams at some point in her career. These women are the new face of

science in Nigeria and Sierra Leone. They are now teachers, professors and political advocates in their own rights. They are Dr. Williams' legacy and the accomplishment of which she is proudest. "If we, as women, stop playing on our beauty and start using our brains, I'm telling you the sky is only the beginning and definitely not the limit of where we can reach."

For more information on Dr. Stella Williams and her work with women scientists at Obafemi Awolowo University:

Stella Williams
WEB SITE: http://www.oauife.edu.ng/faculties/agric/index.htm
EMAIL: swilliam@oauife.edu.ng or stellaluwilliams@yahoo.com



Photo by Mike Goldwater, 2007

Looking ahead

BUILDING ON SUCCESS

4

As participants studied, discussed and debated the opportunities and constraints for women scientists during the Successful Women – Successful Science Conference, they also kept an eye to the kinds of recommendations they could offer when the remarkable gathering came to an end. These participants, all representing programs dealing with issues confronting women in science, not only wanted to raise awareness of the crucial role to be played by women in science, especially in agricultural science, they also recognized the importance of combining their experiences and their ideas to provide realistic recommendations to international science organizations – with the ultimate goal of encouraging more women to remain and advance in scientific careers. The following summarizes their recommendations for science organizations in general, as well as for the CGIAR and for Africa, in particular.

What global science organizations can do differently

1. **Recognize that women are not on the same playing field as men and do something about it.**

   The first step is to recognize that something is not right and has to change. Organizations need to realize and acknowledge that women scientists face a barrage of challenges in their careers that are not often faced by men. Organizations need to appreciate the talents and insights women bring to the table and find innovative ways to recruit, retain and promote qualified women in a transparent and fair manner.

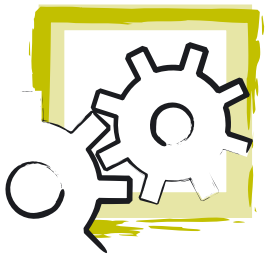
2. **Identify and empower groups of women and men champions and build a critical mass of pathfinders, visionary leaders, change agents and risk takers.**

   Strong leadership is needed to create more gender equity in science and research organizations. According to the participants' experiences, success often depends on having a leader who recognizes the need and is willing to take the risk to champion the cause of including more women in science and advancing them to leadership positions. A shift in the political will of organizations is crucial, and no real shift will occur without the dedicated and persistent efforts of leaders influencing other leaders.

3. **Collect, monitor and use data on women's participation in science and conduct more research on gender issues.**

   Currently, data on women's participation and advancement in science is scarce, especially in developing countries. Reliable data is necessary to make compelling arguments for organizational change. More gender disaggregated

data and research into complex gender issues in science, especially in agricultural science, are needed to raise awareness, support decision making and priority setting, and encourage funding allocations by governments and organizations.



4. Practice mentoring and build capacity for scientific and leadership skills.

Mentoring and coaching from senior women and men role models in science are proven avenues for helping promising women scientists focus on their careers goals and overcome barriers to their advancement in science. Support and guidance from women and men who have years of experience can help young women scientists find "short cuts" that allow them to move forward faster in their careers. In addition, it is essential to create opportunities for women to sharpen their scientific and technical skills if they are to take positions in the forefront of science. At the same time, both hard and soft skills must be developed. A woman scientist may have the impressive technical savvy yet not succeed in her career due to lack of leadership and management skills. Developing leadership skills to navigate organizational gender issues, leverage team talents, manage conflict and use influence appropriately is of key importance to help women scientists excel in their careers. Knowledge sharing is also a powerful tool to ensure that women are kept informed of opportunities to advance or receive support in their careers.

5. Build networks, partnerships and alliances, practice cultural intelligence and adaptability.

Navigating organizational politics and dynamics that do not favor women requires formation of strong networks and alliances in order to build a critical mass of both women and men who are aware of gender issues and advocate long-term change. The influence of champions supported by data showing that investments in women yield large social and economic returns will be the key to forming alliances with meaningful impact. Understanding the cultural contexts of the organizational environment and adapting change strategies accordingly helps form partnerships and alliances. The question of "what's in it for *them*?" (i.e. the parties entering into the partnership or alliance) in terms of risks, rewards and benefits also need to be addressed.

6. Put in place policies, mandates, incentives and performance indicators, monitor and evaluate to ensure accountability, and establish long-term interventions and strategies.

Effective organizational change requires policy support, clear mandates, incentives and a monitoring and evaluation system based on performance indicators. Gender issues, both within organizations and in the work they deliver must not be marginalized. Sufficient time, effort and financial commitments must be put forward and honored. Monitoring and fine- tuning mechanisms must be put in place to ensure effectiveness, relevance and compliance with policies. Success must be recognized and rewarded. External pressure from donors and stakeholders is also a strong driving factor in an organization's performance and can be tapped into to ensure effective change.

7. **Increase visibility, improve communications and remember to celebrate.**
Raising the awareness of international science communities and the public of the need to balance the gender equation requires increasing the visibility of women leaders in science who can serve as role models and inspire girls and younger women to enter agricultural science careers. Celebration of success in programs that empower women scientists must be broadly publicized to build and maintain momentum for raising the profiles of women scientists, increasing public and private sector interest, and demonstrating that investments in developing women scientists pay off.

8. **Commit more resources and funding.**
Increasing availability of resources and funding is central to promoting women's participation in science. Donors are starting to pay more attention to the importance of gender mainstreaming across projects as well as within the institutions of their grantees, but more investments are needed for innovative programs and grants related to empowering women in science, especially in developing countries. No progress or long-term change can be made without solid investments to close the gender gap in science.

What the CGIAR can do differently

The CGIAR is in a great position to leverage its agricultural research to increase the number of women on its teams and to create more impact for women farmers on the ground. It has more than 8,000 scientists, experts and staff actively working to mobilize agricultural science to benefit the poor in more than 100 countries throughout the world. Balancing the gender equation within its Centers and across the work it delivers in collaboration with partners would give the CGIAR a comparative advantage in its output, but would require:

- increasing the representation of women agricultural scientists at all levels in the CGIAR and partner institutions, by implementing policies to attract, retain and advance women scientists systemwide,
- increasing collection, monitoring, and analysis of gender disaggregated data in agriculture for decision making and priority setting for CGIAR and partners,
- improving understanding of complex and inter-disciplinary gender issues, risks, and opportunities in agriculture and increasing capacity and expertise to develop and promote gender responsive agricultural innovations across all projects,
- integrating gender-related indicators in CGIAR performance evaluation and reward systems (system-wide and leadership),
- increasing the number of agricultural education and training opportunities within the CGIAR to build the capacity of women and men scientists to conduct agricultural R&D that is pro-poor and gender responsive.

What African agricultural research organizations and networks can do differently

In sub-Saharan Africa where poverty and malnutrition rates are the highest in the world, agricultural challenges are extremely complex and strongly influenced by

gender. The majority of farm labor is done by women smallholders, yet they do not receive benefits proportionate to their efforts. Their needs and challenges are usually not taken into consideration when it comes to project development and implementation. Women, who hold the potential to drive the future of African agricultural development, need to be big part of the solution to agricultural challenges. This requires empowering African women in agricultural policy making, R&D, agribusiness and extension. Women in these fields form the crucial link that will help agricultural innovations become more relevant and effective for rural women who form the majority of smallholder farmers in this region.

Key recommendations to empower African women in agriculture research and development include:

- **Ensure sound funding:** Encourage donors and African governments to commit to long-term investments aimed at enhancing the careers of women agricultural scientists and professionals and to establish projects related to creating gender-responsive agricultural technologies.
- **Form strong coalitions:** Build formal alliances between organizations and networks to raise awareness of the need to fix the leaky pipeline of African women scientists.
- **Nurture the talent pool:** Establish a system of incentives, mandates, and accountability mechanisms for recruitment, retention and advancement of African women in agricultural science. The publicly available G&D indicators for inclusive workplaces[3] can guide National Agricultural Research Systems (NARS) and the private sector in Africa in developing policies and sound indicators for the inclusion and retention of women staff.
- **Empower African women agricultural entrepreneurs:** Provide support systems, such as training, access to information, financial support and credit lines for African women agricultural entrepreneurs.
- **Close the information gap and develop champions:** Increase efforts to collect data on women's participation in science and the impact they bring to agricultural projects. In each sub-Saharan African country, change agents and champions for women in science must be identified, empowered and developed.

3 G&D Inclusive Workplace e-Resource Center: http://www.genderdiversity.cgiar.org/inclusiveworkplace/index.htm

African Women in Agricultural Research and Development (AWARD) Program

THE NEXT STEP

5

Bellagio lessons have practical application: the AWARD Program

The CGIAR Gender & Diversity Program and the Bill & Melinda Gates Foundation launch the African Women in Agricultural Research and Development (AWARD) Program

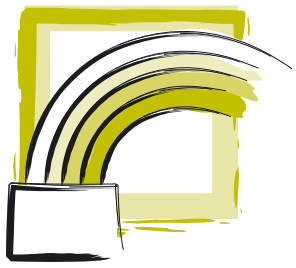
One month after the Bellagio Conference, the Bill & Melinda Gates Foundation announced that it would fund the AWARD Program by providing US$13 million to support fast tracking the careers of at least 360 African women who work in agricultural research. AWARD was launched at the CGIAR Annual General Meeting in Beijing, China, in December 2007.

The African Women in Agricultural Research and Development (AWARD) Program

In 2007, building on the success of its pilot fellowship program for women crop scientists in East Africa, G&D developed a proposal for a larger program to fast track the careers of African women in agricultural research. The proposal for the African Women in Agricultural Research and Development (AWARD) Program sets out the specific objectives of:

- 25 percent increase in African women with B.Sc. degrees participating as members of research teams in at least 20 agricultural institutions in sub-Saharan Africa;
- 50 percent increase in African women with M.Sc. degrees managing research teams and producing improved farm technologies at these institutions;
- 50 percent increase in African women Ph.D.s serving in influential leadership roles and as role models and mentors to younger women;
- significant increase in the number of African girls and young women inspired to pursue careers in agricultural research and development; and
- significant increase in the number of men and women aware of the importance of women's voices and contributions to agriculture in Africa.

In order to achieve these objectives, AWARD fellows will have the benefits of the same success factors elaborated at the Bellagio Conference. The heart of AWARD is its series of competitive two-year fellowships designed to fast-track the careers of African women



in agricultural R&D. High-performing scientists will be selected for fellowships at three critical career junctures – upon completion of their B.Sc., M.Sc. or Ph.D. degrees.

Key features of the AWARD Fellowships are as below:

- **Mentor and pass it on:** Each AWARD fellow will be matched with a senior scientist for one to two years. This formal mentoring process will build the fellows' science and leadership capacity and at the same time allow them to tap into their mentor's networks. In their second fellowship years, M.Sc.- and Ph.D.-level fellows will pass on their knowledge by mentoring junior women scientists in their institutions, which will also provide personal leadership experience.

- **Build science capacity:** Apart from increasing science skills through mentoring, AWARD will offer competitive research placements at the CGIAR Centers and other research institutions of excellence to M.Sc.- and Ph.D.-level fellows. AWARD fellows also will receive support to attend science conferences and join professional associations, as well as access to electronic science libraries and short courses in science writing or proposal writing. In addition, all fellows will enjoy the benefits of international networking through G&D's Global Database of Women Scientists and Professionals.

- **Build leadership capacity:** AWARD is explicitly designed to empower African women in agricultural R&D to serve as champions of rural women and to increase their visibility. Through its specially tailored leadership training courses, AWARD fellows will learn to navigate organizational gender issues, better manage teams, resolve conflicts and increase their visibility. Fellows will be able to put their leadership skills to practice by serving as role models to inspire girls and younger women to enter into careers in agricultural science.

AWARD is also geared toward long-term success through building partnerships, building the capacity for conducting world class training in Africa and closing the information gap.

Key features of the AWARD Fellowships are as below:

- **Partnership and collaboration.** AWARD's activities will be delivered in collaboration with African agricultural networks, African national agricultural research systems (NARS), the CGIAR Centers, the Network of African Women Leaders in Agriculture and the Environment (AWLAE-Net), selected African universities and other development partners.

- **Leveraging existing training capacities in Africa and creating more.** AWARD includes training of trainers in order to increase the pool of Africans specialized in delivery of courses in mentoring, leadership, and science and proposal writing.

- **Working with men and women.** While the AWARD fellowships will be offered to African women, both men and women who serve as mentors to AWARD fellows will attend AWARD training courses.

- **Providing the data.** AWARD is striving to close the information gap on women in science by benchmarking women's participation in agricultural sciences in at

least 150 agencies in 20 sub- Saharan African countries and conducting rigorous monitoring, evaluation and impact assessment throughout the duration of the program.

AWARD will be initially offered in nine sub-Saharan African countries and will be open to applicants working in a range of agricultural sciences.

AWARD FELLOWSHIP DISCIPLINES		AWARD FELLOWSHIP COUNTRIES *
Agricultural economics	Entomology	Ethiopia, Ghana, Kenya, Malawi, Mozambique, Nigeria, Tanzania, Uganda, Zambia
Agroforestry	Extension education	
Agronomy	Food sciences and nutrition	
Animal and livestock sciences	Molecular biology (plant/animal breeding)	
Aquatic resources and fisheries		
Biodiversity conservation	Natural resources management	
Crop sciences (including horticulture)	Soil sciences	**Initial list of countries subject to change over time.*
Ecology	Water & irrigation management	

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Annex A

Participants of the Bellagio Conference - Successful Women, Successful Science

22-27 October 2007, Bellagio Study & Conference Center, Italy

Organized by the CGIAR Gender & Diversity Program



FRONT ROW, FROM LEFT: Nancy Hopkins (USA); Mayra De La Torre (Mexico); Alsacia Atanasio (Mozambique); Kaiser Jamil (India); Njabulo Nduli (South Africa); Jane Ininda (Kenya); Yvonne Pinto (UK); Manju Sharma (India), Yolanda George (USA) Thelma Paris (the Philippines); Meredith Soule (USA)

BACK ROW, FROM LEFT: Fionna Douglas (Australia); Therese St Peter (USA); Laura Guyer-Miller (USA); Stella Williams (Nigeria); Dennis Garrity (USA); Vicki Wilde (USA); Nienke Beintema (Netherlands); Alice Hogan (USA); Maria Dutarte (Finland); Josephine Okot (Uganda); Dee Hahn-Rollins (USA); Amelia Goh (Malaysia).

Biographies of Participants

Alice Hogan

Alice Hogan is currently Chief Administrative Officer of the Asian University for Women Support Foundation based in the USA. She was the founding Program Director of the US National Science Foundation (NSF) ADVANCE Program. ADVANCE was designed to address the under-representation of women in academic science and engineering, particularly at the senior ranks. Alice chaired NSF committees charged with design and implementation of the ADVANCE Program. Prior to working with the ADVANCE Program, she was a senior program manager with NSF's Division of International Programs with responsibility for strategic planning, oversight, and management of bilateral science and engineering programs in the Asia-Pacific region. She worked at the White House Office of Science and Technology Policy, and was responsible for coordinating science and technology efforts under Vice Presidential Commissions with Egypt and Ukraine, and for advising on science and technology programs with China and with the Organization for Economic Co-operation and Development (OECD). Prior to joining NSF in 1986, she worked in the National Oceanic and Atmospheric Administration in a variety of professional positions involving international operations, policy and research, including the development of the first cooperative projects between NOAA and China in 1979. Alice is a graduate of Cornell University and the University of Michigan. She retired from federal service in June 2007, but remains engaged with ADVANCE awardees in an advisory role.

Alsacia Atanásio

Alsacia Atanásio is currently Executive Director of the National Research Fund of the Ministry of Science & Technology of Mozambique. She served as Executive Secretary of the Technical Council for Agricultural Research from January 2003 to December 2005. She participated in key meetings with regional agricultural research entities including SADC, the NEPAD Secretariat and FARA, and worked to support the institutional reform process as well as improve collaboration and coordination between the Agricultural Research Institute of Mozambique and the referred entities. She was Head of Advisory & Cooperation Office of the Agricultural Research Institute of Mozambique (IIAM) from January to Mid April 2006. Alsacia has published numerous papers in veterinary science and medicine, and is also a member of the Mozambican Veterinary Association and World Association for the Advancement of Veterinary Parasitology. She has been President of the Scientific and Deontological Council of the Mozambican Veterinary Association since 2000 and has worked with the International Assessment of Agricultural Science and Technology for Development (IAASTD) in an advisory and expert role since December 2004. Alsacia obtained her PhD in Veterinary Science in 2000, from the Medical University of Southern Africa (MEDUNSA). Her PhD research focused on "Helminths, Protozoa, Heartwater, and the Effect of Gastro-intestinal Nematodes on the Productivity of Goats of the Family Sector in Mozambique".

Amelia Goh

Amelia Goh is currently Communications Officer -Women in Science for the CGIAR Gender & Diversity Program based in Nairobi, Kenya. Her interest to work on gender and diversity issues and especially with women scientists stems from a desire for improvement in women's participation in science, especially in developing countries. She focuses on communications, but also plays an important role in the implementation of G&D's Fellowship Program for Women Crop Scientists in East Africa. She has supported various G&D women in science initiatives, most notably in the development of a proposal to fast track the careers of African Women in Agricultural Research & Development (AWARD), which was successfully funded by the Bill & Melinda Gates Foundation amounting to US$13 million over four years for its first phase. Amelia completed her Bachelor's degree in applied science majoring in molecular genetics with a minor in management studies at the University Science Malaysia in 2003. Upon graduating, she worked at a charitable hospital as a junior embryologist at the In Vitro Fertilization and Assisted Reproduction Technology Facility. Prior to joining the CGIAR Gender & Diversity Program, she was a genetics researcher at the WorldFish Center in Penang, Malaysia, working on the population structure of coral reef fish using microsatellite DNA markers to promote trans-boundary fisheries management in the South China Sea.

Dennis Garrity

Dennis Garrity is Director General of the World Agroforestry Centre (ICRAF) based in Nairobi, Kenya, whose vision is to alleviate poverty through advancing the science underlying a massive increase in the cultivation of trees in smallholder farming systems. He is an ex-officio member on the Centre's Board of Trustees, a member of the Board of the Forum on Agricultural Research in Africa (FARA) and the Board of the UN Millennium Development Goals Technical Support Centre. He also chairs the CGIAR Centers' Committee on sub-Saharan Africa and a committee on the Millennium Development Goals. From 1992 to 2002, Dennis served as Regional Coordinator of the ICRAF Southeast Asia Programme, based in Bogor, Indonesia. From 1992 to 2002, he worked as agronomist/crop ecologist and head of the Agro-ecology Unit at the International Rice Research Institute in the Philippines. As the Director General of the World Agroforestry Center, Dennis also provides oversight to the CGIAR Gender & Diversity Program (G&D) on behalf of the Alliance of CGIAR Centers and serves as G&D's representative to the CGIAR Center Directors Committee. Dennis has a Bachelor's degree in agriculture from Ohio State University, a Master's degree in agronomy from the University of the Philippines at Los Baños, and a PhD in crop physiology from the University of Nebraska.

Fionna Douglas

Fionna Douglas is currently Strategic Alignment Adviser & Communications Team Leader of the CGIAR Secretariat based at the World Bank in Washington, DC, USA. Fionna was educated as a lawyer. She has worked in the media as a documentary film maker and journalist, and in public affairs in non-governmental and governmental sectors. Prior to joining the Consultative Group on International Agricultural Research (CGIAR), Fionna was Director of Public Affairs for Australia's Agency for International Development (AusAID).

Helga Recke

For the past three years, Helga has served as Senior Advisor on Women in Science for the Gender & Diversity Program (G&D) of the Consultative Group on International Agricultural Research (CGIAR), specifically working to secure funding and implement fellowship programs to fast track the careers of African women agricultural scientists. Helga played a key role in developing the African Women in Agricultural Research and Development (AWARD) Fellowship Program proposal which was successfully funded by the Bill & Melinda Gates Foundation amounting to US$13 million over four years for its first phase. Helga obtained her Master's degree in horticulture at Hannover University and her PhD in soil science/plant nutrition at Giessen University, both in Germany. She worked on fertilizer recommendations for farmers based on soil tests with Kali & Salz AG in Germany for three years before joining Suedzucker AG, the largest European sugar producer, where she eventually became a senior advisor to the chief executive on agricultural policy during the GATT negotiations, representing Germany's interests in a group of policy experts of the European Committee of Sugar Producers in Brussels. For more than 10 years, she coordinated EU-funded Research Support Programs at the Kenya Agricultural Research Institute concentrating on gender-responsive research approaches and income-generating technologies, particularly focusing on rural women. In 2004, she was named Consultant of the Year by the British Consultants and Construction Bureau (BCCB).

Jane Ininda

Jane Ininda is currently Program Officer for Crop Improvement & Farmer Variety Adoption with the Alliance for a Green Revolution in Africa (AGRA). As a plant breeder by training, she works with a network of over 150 plant breeders in national agricultural research systems in Eastern and Southern Africa. Her goal is to develop a new generation of crop varieties that will increase on-farm productivity, and thus increase the food security for rural households in Africa. Before joining AGRA, Jane was Maize Research Coordinator with the Kenya Agricultural Research Institute (2003-2007); and Head of Plant Genetics and Physiology at the National Agricultural Research Centre-Muguga South (1997-2007). She has over 20 years experience in African crop improvement and plant breeding. She was a fellow of the Pilot Fellowship Program to Enhance the Careers of Women Crop Scientists in East Africa, implemented by the CGIAR Gender & Diversity Program (G&D). She is also currently serving as a Steering Committee Member of the African Women in Agricultural Research and Development (AWARD) Program implemented by G&D. Jane Ininda holds a PhD in Plant Breeding from Iowa State University, USA and an MSc in the same subject from the University of Nairobi, Kenya.

Josephine Okot

Josephine Okot is Founder and Managing Director of Victoria Seeds Ltd, a full line seed company based in Kampala, Uganda. It became operational in January 2004 for the purpose of delivering quality seed to smallholder farmers who are producing more than 90 percent of agricultural output in Uganda. Through her leadership, Victoria

Seeds Ltd has grown into a dependable seed house exporting seeds for vegetable, cereal, legume and oil crops to the regional market. Josephine has extensive experience in agribusiness and the seed sector and has a leadership role in the harmonization of seed policies and laws in Eastern Africa. She has served as Chairperson of Uganda Seed Trade Association and on the board of directors of key institutions and industry associations such as the Uganda Investment Authority, the African Seed Trade Association and the Kampala Industrial and Business Park. She is presently serving as Co-Chair of the FARA Management Committee, overseeing the Implementation of the Sub-Saharan Challenge Programme in the Lake Kivu Region. She holds an advanced degree in International Business from Washington International University and recently participated in a Finance Management Course for Smaller Businesses at the Harvard Business School. In August 2007, Josephine was awarded the prestigious YARA Prize at the Oslo Conference for a Green Revolution in Africa.

Kaiser Jamil

Kaiser Jamil, an internationally renowned biotechnologist from India, is President of the Third World Organization for Women in Science (TWOWS). She received both her undergraduate, Master's and PhD degrees from Osmania University in Hyderabad, India, in biological sciences and biochemistry. Her career began in the 1970s at the Indian Institute of Chemical Technology in Hyderabad, where she focused her research on toxicology and the emerging field of biotechnology. She subsequently traveled to Australia, France and Japan where she served as a post-doctoral fellow and visiting professor. She is presently working as Research Director of the Indo American Cancer Institute and Research Centre, Hyderabad, and works part time in Mahavir Hospital and Research Centre conducting research on breast cancer, genetic toxicology and leukemia. She also directs the School of Bio-Technology and Bio-Informatics at Mahatma Gandhi National Institute of Research and Social Action in Hyderabad, where she directs post-graduate fellows seeking doctorate degrees in biological sciences and biochemistry. She hopes to concentrate her time seeking additional external funding for TWOWS to expand the organization's activities. Her goal is to raise the profile of social sciences and economics within the organization without compromising its traditional strength in the natural sciences, and to make the TWOWS agenda more visible on the global stage.

Manju Sharma

Manju Sharma is the President and Executive Director of the Indian Institute of Advanced Research, Gandhinagar, Gujarat, India. She is co-chair of the InterAcademy Council's Advisory Panel on Women for Science. She is also former Secretary to the Government of India for the Department of Biotechnology. With the responsibility for boosting the development of biotechnology in India, she set up many new research institutes and spread the educational network for biotechnology all over the country. She has initiated major programs for the inclusion of women in science and technology. Manju Sharma has received honorary doctorates from many universities in India,

as well as many national and international awards. She was the first female President of India's National Academy of Sciences. She is a member of the Board of Governors of the United Nations University's Institute for Advanced Studies, a member of the Advisory Panel on Agricultural Biotechnology of USAID, and a Fellow of the Third World Academy of Sciences.

Maria Dutarte

Maria Dutarte is currently working with the Global Fund in Geneva, Switzerland. Prior to that, she worked for the International Foundation for Science (IFS) in Stockholm, Sweden and coordinated the IFS programme of support for young social scientists in developing countries in the domain of sustainable natural resource management. The IFS programme consists of individual research grants as well as capacity enhancing activities. Having closely worked with researchers from Africa, Asia and Latin America, she has developed a keen interest in the situation of women scientists and wishes to promote scientific research as a viable career choice for young women in developing countries. Maria holds a masters degree in International and Comparative Education from Stockholm University and has previously worked in university administration and management of European and worldwide student exchange programmes. She has also completed traineeships at development NGOs and agencies for higher education. Maria has an international background and was brought up in Finland and Japan.

Mayra De La Torre

Mayra De La Torre is currently a full professor in the Department of Food Sciences of the Centro de Investigacion en Alimentacion y Desarrollo A.C. in Sonora, Mexico, and is also collaborating as Principal Special in Biotechnology with the Organization of the American States (OAS) at the Department of Science and Technology. She is widely published and has also been awarded several patents for her innovative research. She has written 24 research and development (R&D) technology reports which have helped transfer technologies to small Mexican biotechnology enterprises and to one international company enabling them to produce about ten different products using her process technologies. In 1988, she received the National Award of Science and Fine Arts in the technology category (the highest prize the Mexican government awards to Mexican scientists). She is the first woman and the youngest ever scientist to be awarded this honor. Mayra has supervised more than 30 bioengineering students from throughout Latin America. In 2003, she received the Third World Academy of Sciences (TWAS) award for her scientific and technological achievements in engineering sciences and in 2004 she was awarded the Intercienca Award in Life Sciences. She is a member of several national councils related to science and technology policies and is member of the executive committee of the Third World Organization of Women Scientists (TWOWS) for Latin America and the Caribbean. She is also director of the recently formed Latin American Women in Science Network. Mayra was born in Mexico City and received her undergraduate, Master's and PhD degrees from the Instituto Politecnico Nacional (Mexico), majoring in bioengineering.

Meredith Soule

Meredith Soule is a Research Adviser in the United States Agency for International Development's (USAID) Office of Environment and Science Policy. She oversees USAID's investment in the Consultative Group on International Research (CGIAR), and supports USAID programs on agricultural research, principally in Africa. Before joining USAID, Meredith worked as a research agricultural economist at the World Agroforestry Centre (ICRAF) in Kenya and at the Economic Research Service of the U.S. Department of Agriculture (USDA). Meredith has a keen interest in addressing the hurdles women scientists face in school and in the workplace. She helped develop the Norman E. Borlaug International Agricultural Science and Technology Fellows Program for Women in Science. Meredith was instrumental in negotiating the partnership with G&D for provision of leadership training and networking for all African women Borlaug fellows. She is also currently serving as a Steering Committee Member of the African Women in Agricultural Research and Development (AWARD) Program implemented by the CGIAR Gender & Diversity Program. Meredith earned her PhD in Agricultural and Resource Economics from the University of California at Berkeley, USA, and her MSc in Agricultural Economics from the University of Illinois at Urbana-Champaign, USA.

Nancy Hopkins

Nancy Hopkins is the Amgen, Inc. Professor of Biology at the Massachusetts Institute of Technology MIT). She is well known as a scientist for her innovative use of large-scale forward genetic screens in research designed to identify the genetic basis of developmental processes in zebrafish. Her research is also linked to cancer studies (see: http://web.mit.edu/biology/www/facultyareas/facresearch/hopkins.shtml). She is a member of the National Academy of Sciences, the Institute of Medicine of the National Academy of Sciences, and a fellow of the American Academy of Arts and Science. Outside the biological research community, Nancy is probably best known as the architect of the 1999 Study on the Status of Women Faculty in Science at MIT. The study was pivotal for inspiring change at MIT and many other institutions for women's participation in science. She has since taken a part-time position with the school's higher administration to work on achieving gender equity and greater faculty diversity within MIT. She continues to lead efforts to realize institutional change for women in science at MIT and she plays a pivotal role catalyzing initiatives to improve the training, employment, retention and recognition of women in the sciences on a national scale.

Nienke Beintema

Nienke Beintema is head of the Agricultural Science & Technology Indicators (ASTI) initiative, an initiative jointly led by the International Food Policy Research Institute (IFPRI) and the International Service for National Agricultural Research (ISNAR). The ASTI initiative involves collaborative alliances with a large number of national and regional research and development (R&D) agencies, as well as international institutions. The initiative compiles, processes, and makes available internationally

comparable data on institutional developments and investments in agricultural R&D worldwide and analyzes and reports on these trends in the form of occasional policy digests for research policy formulation and priority-setting purposes. Nienke has co-published several key reports on African agricultural research (see:http://ifpri.org/srstaff/BeintemN.asp). Before joining IFPRI as a research analyst in 1995, Nienke worked at ISNAR in The Hague. She is a citizen of the Netherlands and received a Master's degree in economics from the University of Groningen, the Netherlands.

Njabulo Nduli

Njabulo Nduli is Counselor of Agriculture Affairs for the South African Embassy in Rome, Italy. Prior to that, she served as Deputy Director-General for Production & Resource Management in the South Africa Department of Agriculture. Her technical background is complemented by a number of national and international leadership and development programs she has attended, including the Leadership for Environment and Development (LEAD) International and the Presidential Special Leadership Programme (PSLDP) for senior managers in the Public Service in South Africa. She served as the Chairperson of the Forum for Agriculture Research in Africa (FARA) from 2005 to 2007. She is a board member of the International Fund for Agriculture Development (IFAD) representing the Republic of South Africa and a board member of the Agriculture Research Council in South Africa. Njabulo holds a Bachelor's degree in chemistry and botany from the University of Dar-es-Salaam, Tanzania, a Master's degree in agricultural sciences from the University of Wales, United Kingdom, and an Advanced Project Management Programme certificate from the University of South Africa.

Stella Williams

Stella Williams is Professor of Agricultural Economics at Obafemi-Awolowo University, Ile-Ife, Nigeria. Stella is an experienced and internationally respected educator, activist and social scientist. She has been an advocate for 'girl-child' education in science in 1969 and has continued that active engagement in Africa to the present. As a fisheries economist with expertise in agricultural development and policy, she serves as Vice Chair of the Board of Trustees of the WorldFish Center. Stella has been involved in major global initiatives on fisheries and poverty reduction in Africa. She uses this platform to promote gender issues in agricultural development and for accelerating agricultural developmental growth for poor African farming families. Stella has advocated bold fisheries and aquaculture policy initiatives for the poor at the highest levels of policy making, and influenced African Heads of State within the NEPAD Fish for All initiative of the WorldFish Center. She is also currently serving as a Steering Committee Member of the African Women in Agricultural Research and Development (AWARD) Program implemented by the CGIAR Gender & Diversity Program. Stella holds a PhD in Fisheries and Allied Aquaculture from Auburn University, Auburn, Alabama, USA. She earned her MSc in Ecology from University of Connecticut at Stoors, Connecticut, USA after her Bachelor's degree from Fourah Bay College (Dunelm), Mt. Aureol, Freetown, Sierra Leone followed by a Diploma in Education from the same university.

Thelma Paris

Thelma Paris is currently Senior Scientist at the Social Sciences Division of the International Rice Research Institute (IRRI). In her 30 years at IRRI, her research has focused on human nutrition in relation to agricultural production; gender issues in rice-based farming; the impact of male labor out-migration on livelihoods, rice productivity and gender roles; impact of technologies on rural women; socio-economics in farming systems research; and participatory research in germplasm improvement and crop resource management. She also initiated training courses at IRRI such as the Leadership Course for Asian Women in Agriculture R & D and Extension and a course on Participatory Approaches in Research and Extension. She works with biology scientists and is the socio-economist of several special funded projects conducted in collaboration with the National Research and Extension Systems (NARES) in India, Bangladesh, Vietnam, Thailand, Indonesia, Philippines, and South Korea. She is a recipient of many local and international awards, including the CGIAR's Chairman's Excellence in Science Award for Outstanding Local Professional. Thelma obtained both her Bachelor's and Master's degree in agricultural economics at the University of the Philippines at Los Banos, Laguna and her PhD in social ecology at the University of Western Sydney, New South Wales, Australia.

Therese St Peter

Therese St Peter is Head of North America Partnerships and Programs, at the Syngenta Foundation for Sustainable Agriculture, based in North Carolina, United States. In her work, she blends international development expertise with the private sector experience in product development, law, public relations, marketing and regulatory compliance. She has directed food safety issues management in North America, Latin America and the Asian-Pacific arena; and aided non-profit rural livelihood program development in semi-arid rural areas of Africa. She is a US national speaker on public health and environmental issues and in dealing with the public on risk communications. Her multifaceted background includes marketing, product advocacy, communications, issues management, regulatory science, grant making, project management and product liability defense. She is a former board member of the California Agriculture Leadership Foundation and the Coalition for Urban and Rural Environmental Stewardship.

Yolanda Scott George

Yolanda Scott George is Deputy Director and Program Director, Education and Human Resources Programs, American Association for the Advancement of Science (AAAS). She has served as Director of Development, Association of Science-Technology Centers, Washington, DC; Director, Professional Development Program, University of California, Berkeley, CA; and as a research biologist at Lawrence Livermore Laboratory, Livermore, California involved in cell cycle studies. She conducts evaluations, project and program reviews, and evaluation workshops for both the National Institutes of Health (NIH) and National Science Foundation (NSF), and reviews SMT proposals for private foundation and public agencies, including the Sloan Founda-

tion, the Carnegie Corporation of New York, the Ford Foundation and the European Commission. Over the last 25 years, she has raised more than US$70 million for a variety of SMT education initiatives for colleges and universities, associations and community-based groups. She currently serves as principal investigator (PI) or co-PI on NSF grants related to developing evaluation capacity of PIs, project directors and evaluators for the Alliance for Graduate Education and the Professoriate (AGEP). She serves on the board of various organizations and programs working on gender equity issues, and has authored or co-authored more than 50 papers, pamphlets, and hands-on science manuals. Yolanda received her Bachelor's degree from Xavier University of Louisiana and her Master's from Atlanta University in Georgia.

Yvonne Pinto

Yvonne Pinto is currently Program Officer in the Agricultural Development Team of the Bill and Melinda Gates Foundation with close links to the Alliance for a Green Revolution in Africa (AGRA), based in Seattle, USA. She has undertaken research in rice, pigeonpea and forage legume systems within the International Rice Research Institute, International Crops Research Institute for the Semi Arid Tropics and the International Livestock Research Institute. She has focused on the molecular biology of virus diseases in African crops especially African rice and undertaken research funded by the UK Department for International Development and the European Union at the Sainsbury Laboratory and the John Innes Centre (UK). More recently, she has spent 8 years with the Gatsby Charitable Foundation managing the African development programs in 9 countries in Africa in the fields of Agriculture, Enterprise, Microfinance and Education. She has been involved in creating intermediaries such as the Kilimo Trust and the African Agricultural Capital Company in East Africa. She has worked closely with various international development partners especially related to upstream research for development. Yvonne was born and raised in East Africa. She obtained her BSc in Agriculture and Botany from the University of Reading and MSc and PhD from the University of London's Imperial College at Wye.

Vicki Wilde

Vicki Wilde is the Leader of the African Women in Agricultural Research and Development (AWARD) Program and CGIAR Gender & Diversity Program (G&D). She plays a leading role in conceptualizing and delivering the AWARD program. She is well-known internationally for her expertise in gender and diversity issues in agricultural development, natural resource management, emergency food aid and organizational change programs. For the CGIAR, Vicki is responsible for gender and diversity results within the 15 CGIAR Centers worldwide, delivering a renowned women's leadership series, a multicultural mentoring program, diversity-positive recruitment services, model policies for an inclusive workplace, and more. She was also Leader of the G&D Pilot Fellowship Program to Enhance the Careers of Women Crop Scientists in East Africa.

Before joining the CGIAR in 1999, Vicki spent a dozen years working with local communities in Asia and Africa on behalf of the United Nations Food and Agriculture Organization (FAO), World Food Programme (WFP) and International Fund for Agricultural Development (IFAD). She is active in a number of gender-related panels

and committees, including the American Association for the Advancement of Science (AAAS) task force to study the Under-representation of Women in Agricultural Sciences. Vicki Wilde holds a Master of Arts in Psychology, specialising in Environmental Psychology from the City University of New York, USA and a Bachelor of Arts in Social Ecology from the University of California, Irvine, USA.

Conference Facilitators:

Dee Hahn-Rollins (1940-2008)

Dee Hahn-Rollins was a senior organizational development consultant with more than 25 years of experience working with Training Resources Group (TRG). She specialized in designing and conducting state-of-the-art, high impact management and leadership development programs, executive coaching and multi-lateral conferences and organizational interventions. Dee had extensive experience working with senior managers in numerous US and international organizations, and has earned a reputation as a highly effective executive coach, facilitator and organizational consultant. For ten years she was TRG's project manager of the Women's Leadership and Management Course for the Consultative Group on International Agricultural Research (CGIAR) Gender & Diversity Program. Two years ago, she co-designed and facilitated with colleagues an Advanced Women's Leadership Course for alumnae of the basic course. Her clients included the U.S. State Department, the United Nations Development Program, Heifer International, the International Fund for Agricultural Development (IFAD), Wilkes University in Pennsylvania and the World Bank. Dee passed away on 16th February 2008 and is very dearly missed.

Laura Guyer-Miller

Laura Guyer-Miller is a management consultant with Training Resources Group (TRG) with more than 20 years of experience providing training and training management services in cross-cultural environments. She specializes in the design of leadership development programs and all aspects of organizational development and training and does leadership coaching at all levels of international organizations. After nine years in academia running English-as-second-language programs at the University of Portland and Butler University, Laura returned to training and organizational development where she has worked with public, private and non-profit clients in the United States and throughout the world. She has co-designed and conducted the CGIAR's Advanced Women's Leadership Course. She also has co-facilitated the Gender & Diversity Program's basic Women's Leadership and Management Course. She excels at coaching leaders in organizations as varied as the United Nations Population Fund (UNFPA); the World Bank; the U.S. Department of Commerce; and United States Agency for International Development (USAID), both in the field and at headquarters in Washington, D.C.



Photo by Mike Goldwater, 2007

CGIAR

The Consultative Group on International Agricultural Research (CGIAR) supports 15 international agricultural research Centers located around the globe in their efforts to mobilize agricultural science to reduce poverty, foster human well-being, promote agricultural growth and protect the environment. The CGIAR is a strategic alliance of countries, international and regional organizations, and private foundations working with national agricultural research systems, civil society organizations and the private sector to build the scientific foundations of equitable and sustainable development. The results of the work generated by the CGIAR are global public goods and freely available to all. CGIAR members contributed approximately US$450 million in 2005, the single-largest public goods investment in mobilizing science for the benefit of poor farming communities worldwide. For more information about the CGIAR, see: www.cgiar.org

GENDER AND DIVERSITY PROGRAM

Working with diversity is more than a social skill in the CGIAR – it is an organizational imperative. With scientists and professionals coming from more than 100 countries, the Gender and Diversity Program (G&D) works to leverage that staff diversity for global impact. The G&D Program always keeps its focus on the overriding mission of the CGIAR – fighting hunger and poverty through scientific advancements in agriculture, forestry, fisheries, policy and environment. Quite simply, the CGIAR cannot succeed in its mission without leveraging the richness that staff diversity brings in terms of new ideas, new ways of doing things and new abilities to find solutions. People join the CGIAR to make a difference and G&D is there to support them.

G&D's strategy affirms diversity as a critical performance factor. It is premised on three key objectives that guide G&D's work.

- Strengthen the ability of CGIAR Centers to attract, develop and retain world class staff from diverse backgrounds and regions, with particular emphasis on women in management and science.
- Consolidate and institutionalize policies and practices to incorporate fully the values of inclusion, dignity, wellbeing and opportunity into the management systems of the CGIAR Centers.
- Integrate gender and diversity practices into the core work of the CGIAR through closer collaboration with research teams and management as well as the CGIAR's System Office and other global initiatives.

G&D is the CGIAR's system wide program tasked with delivering gender and diversity results within the 15 Centers. Just as the CGIAR shares its scientific results freely, G&D makes its products and services widely available to all via its Web site. By putting focus on performance and accountability, G&D ensures that gender and diversity issues receive more than lip service and are, indeed, fully integrated into activities, policies and programs and produce tangible results. G&D's services include diversity-positive recruitment, international teamwork, cross-cultural communications and advancement for women. G&D helps position the CGIAR Centers as employers of first choice.

G&D maintains continuous consultation and communication with all key bodies of the CGIAR. It is hosted by the World Agroforestry Center (ICRAF) in Nairobi, Kenya. G&D's Program Director is Vicki Wilde (v.wilde@cgiar.org) whose office is based in Rome, Italy.

CGIAR CENTERS

Africa Rice Centre (WARDA), BENIN
Bioversity International, ITALY
Center for International Forestry Research (CIFOR), INDONESIA
Centro Internacional de Agricultura Tropical (CIAT), COLOMBIA
Centro Internacional de Mejoramiento de Maíz y Trigo (CIMMYT), MÉXICO
Centro Internacional de la Papa (CIP), PERU
International Center for Agricultural Research in the Dry Areas (ICARDA), SYRIA
International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), INDIA
International Food Policy Research Institute (IFPRI), USA
International Institute of Tropical Agriculture (IITA), NIGERIA
International Livestock Research Institute (ILRI), KENYA
International Rice Research Institute (IRRI), PHILIPPINES
International Water Management Institute (IWMI), SRI LANKA
World Agroforestry Centre (ICRAF), KENYA
WorldFish Center, MALAYSIA

We cannot achieve on the outside what we do not practice on the inside