

WOMEN'S PARTICIPATION IN AGRICULTURAL RESEARCH AND HIGHER EDUCATION

KEY TRENDS IN SUB-SAHARAN AFRICA

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Key Results

- Total capacity of professional agricultural staff employed at the research and higher education agencies included in this study increased by 20 percent between 2000/01 and 2007/08. The female share of the pool of professional staff increased by 8 percent per year on average—four times higher than comparable growth in the share of male staff.
- Given these high growth rates, the overall proportion of female professional agricultural and higher education staff increased from 18 percent in 2000/01 to 24 percent in 2007/08. On a national basis, female staffing levels were particularly low in Ethiopia, Togo, Niger, and Burkina Faso, whereas in Botswana, Mozambique, and South Africa levels were high.
- Of concern, about two-thirds of the total (that is, female and male) capacity increase involved staff holding only BSc degrees. This trend indicates a decline in the overall quality of agricultural research and higher education staff in some Sub-Saharan African countries. Notably, overall numbers of MSc-qualified male staff declined between 2000/01 and 2007/08.
- In most cases, the shares of women enrolled in advanced agricultural education were higher than the shares of professional women employed at research and higher education agencies. A large proportion of the female students concerned (83 percent) were enrolled in BSc-level studies.
- The growing shares of professional women employed in agriculture and female students enrolled in agricultural sciences indicate that the gender gap in African agricultural sciences may well be narrowing, especially in southern Africa. This trend is not reflected, however, in a number of West African countries and Ethiopia.
- Only 14 percent of the management positions were held by women, which is considerably lower than the overall share of female professional staff employed in agriculture (24 percent).
- Unsurprisingly, the pool of female staff is much younger and remains less qualified, on average, than the pool of male staff.
- The prevalence of female professional staff is comparatively higher in fields related to life and social sciences and comparatively lower in fields involving engineering and other areas traditionally considered “hard sciences.”

Introduction and Rationale¹

Female farmers play a vital role in African agriculture, accounting for 60 to 80 percent of the agricultural workforce. However, agricultural research and higher education are disproportionately led by men. There is an urgent need for a greater representation of women in the field of agricultural science and technology (S&T) in Sub-Saharan Africa. Female scientists, professors, and senior managers offer different insights and perspectives to help research institutes to more fully address the unique and pressing challenges of both female and male farmers in the region.

Gender-disaggregated data on S&T capacity are scarce, often lack sufficient detail, and focus more generally on S&T

rather than on agriculture specifically. Data are not always comparable due to different methodologies and coverage. The Agricultural Science and Technology Indicators (ASTI) initiative and the CGIAR Gender & Diversity (G&D) Program partnered together to address this information gap. This brief summarizes the key results from their benchmarking survey of 125 agricultural research and higher education agencies in 15 Sub-Saharan African countries.^{2,3}

² The survey was also conducted to provide baseline data in order to monitor and evaluate the African Women in Agricultural Research and Development (AWARD) project, which is managed by the G&D program. AWARD offers fellowships to build female capacity in science, mentoring, and leadership among high-performing African scientists.

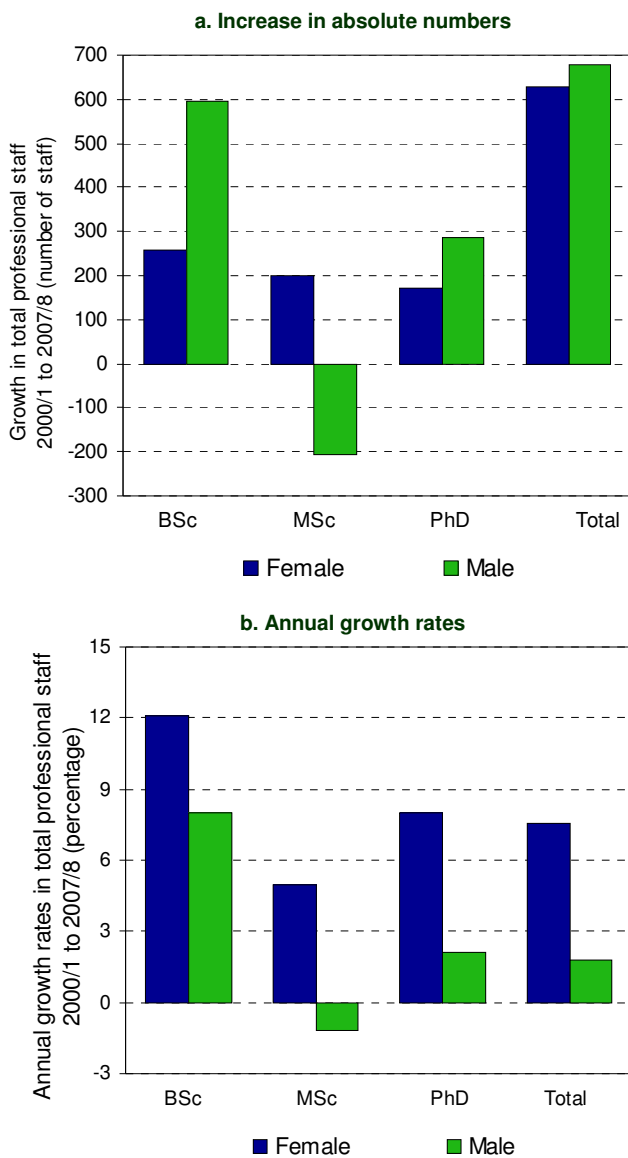
³ Countries included in the survey are Botswana, Burkina Faso, Burundi, Ethiopia, Ghana, Kenya, Malawi, Mozambique, Niger, Nigeria, Senegal, South Africa, Togo, Uganda, and Zambia. Four other countries (Mali, Mauritania, Rwanda, and Tanzania) were included in the survey, but the resulting data were insufficient to enable their inclusion in the analysis.

¹ This brief summarizes the synthesis report, *Female Participation in African Agricultural Research and Higher Education: New Insights* and a series of country fact sheets. See the Agricultural Science and Technology Indicators (ASTI) website at www.asti.cgiar.org/gender-capacity.

Increased Female Participation in Agricultural Research and Higher Education in Africa

Overall, for a 14-country sample for which data were available (excluding Mozambique), the total number of professional staff in agricultural research and higher education increased by 20 percent, from about 6,600 in 2000/01, to 7,900 in 2007/08 (Figure 1a). Nigeria and Ethiopia accounted for the vast majority of this increase, and women made up almost half of the additional 1,300 staff members (in headcounts). Furthermore, the number of female professional staff increased in all 14 countries, even though total staff numbers actually declined in some (Burkina Faso, Kenya, Niger, Togo, and Zambia). The pool of female professional staff more than doubled in Botswana, Nigeria, Senegal, and Zambia.

Figure 1. Overall growth in the pool of professional staff by gender, 2000/01–2007/08 (14 countries)



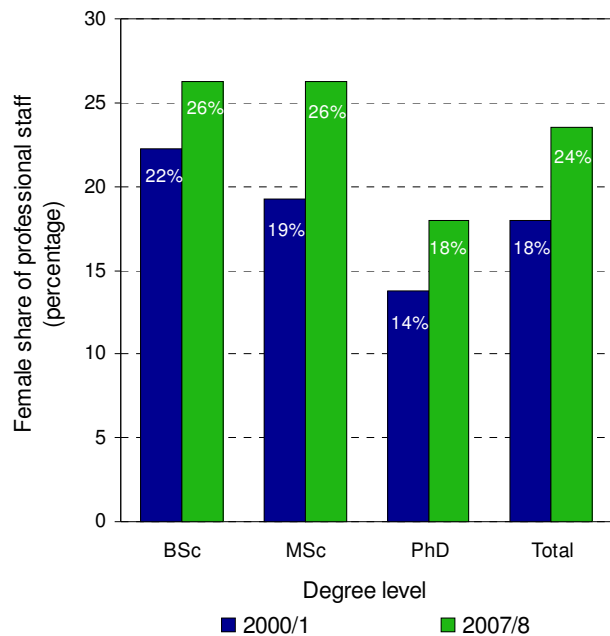
Source: Calculated by authors based on survey responses.
Note: Excludes Mozambique due to lack of available data for 2000/01.

Almost half of the increase in professional staff consisted of male BSc-trained staff. On the other hand, the number of men with MSc degrees declined by more than 200 and affected almost all the sample countries. Unfortunately no details were available to explain these declines, but they may have resulted, at least in part, from staff attaining PhD degrees or leaving their agencies in recent years. The increase in total numbers of female professional staff was more equally distributed across the three degree-levels, although it was slightly higher in the BSc category.

The female population in the overall pool of professional agricultural research and higher education staff increased by 8 percent per year between 2000/01 and 2007/08 (Figure 1b). This rate was four times higher than the rate for the male population (2 percent). The annual growth rates also reflect a relatively higher increase in professional staff with BSc levels compared with the other two degree categories.

As a result, the share of female professional staff in agricultural research and higher education increased from 18 percent in 2000/01 to 24 percent in 2007/08 (Figure 2). This increase occurred across all degree categories, although it was slightly higher for MSc-qualified staff, mostly due to declining numbers of male professional staff in this category.

Figure 2. Female shares in professional staff by degree, 2000/01–2007/08 (14 countries)



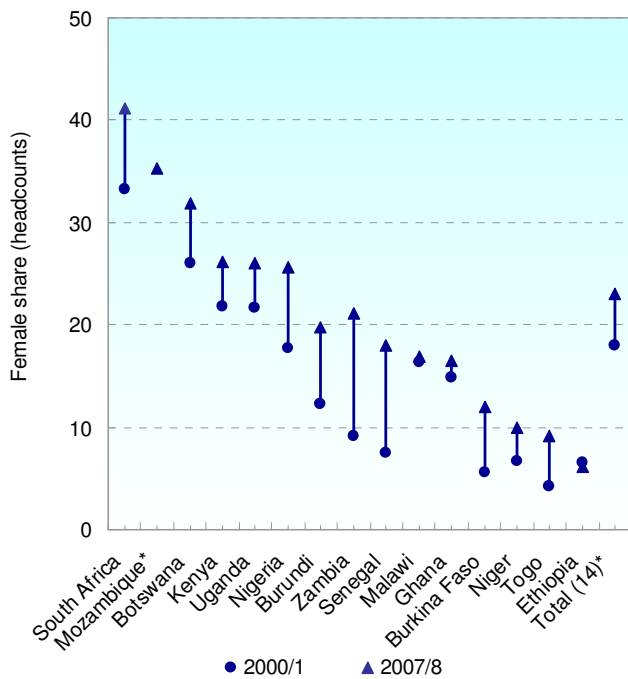
Source: Calculated by authors based on survey responses.
Note: Excludes Mozambique due to lack of available data for 2000/01.

Growth in Women's Participation by Country

Female participation in agricultural research and higher education is particularly low in Ethiopia and a number of Francophone countries (Togo, Niger, and Burkina Faso), but it is much higher in southern African countries (South Africa, Mozambique, and Botswana).

From 2000/01 to 2007/08, shares of female professional staff increased substantially in some countries, such as Senegal and Zambia (Figure 3). Shares of female professional staff also rose significantly in three of the four largest countries: by 8 percent in Nigeria and South Africa and by 4 percent in Kenya. The result in South Africa is particularly striking given that the 2000/01 share of female professional staff was already the highest of the 27 countries for which data were available. In Ethiopia, despite the large increase in numbers of female professional staff during 2001–08, the share of female staff actually declined by 1 percent.

FIGURE 3. Growth in shares of female professional staff, 2000/01 and 2007/08

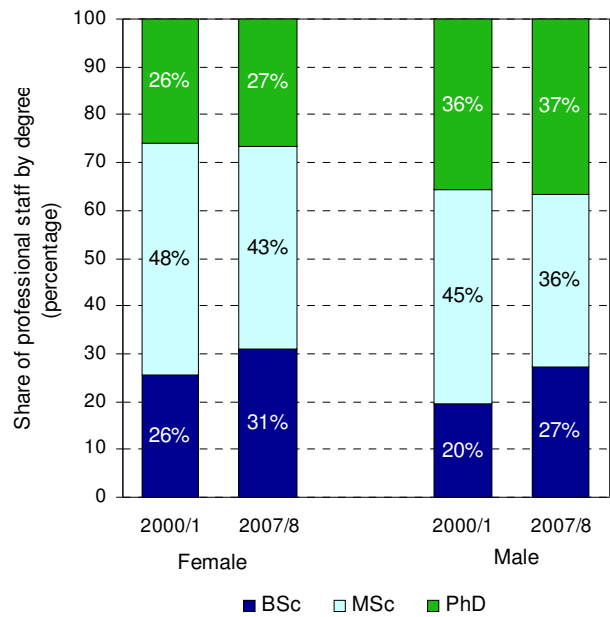


Source: Calculated by authors based on survey responses.

Degree-Level Distribution of Professional Staff by Gender

Female professional staff members were found to be consistently less educated than their male counterparts (Figure 4). In 2007/08, on average, fewer women than men held PhD degrees (27 compared with 37 percent), but more women held MSc degrees (43 versus 36 percent). The high influx of BSc-qualified staff has increased the female share in this category from 26 to 31 percent, and the male share from 20 to 27 percent. Interestingly, the relative shares of female and male staff with PhD degrees remained fairly stable over the seven-year period.

FIGURE 4. Gender-disaggregated shares of professional staff by degree level, 2000/01–2007/08



Source: Calculated by authors based on survey responses.

Although capacity increased between 2000/01 and 2007/08 in terms of numbers of professional staff, overall, staff qualification levels deteriorated in terms of degree level. This trend is worrisome given existing capacity constraints in agricultural research and higher education in many African countries. A number of organizations and publications have expressed concern over this issue. For example, an assessment of the national agricultural research and extension systems in Africa, conducted by the Forum for Agricultural Research in Africa (FARA), found that many agencies experience staff shortages (so that many positions remain vacant). Some countries are also struggling with the challenge of an aging pool of research staff. The number of universities and faculties in agricultural sciences has grown substantially during the past three decades. Besides staff shortages, many suffer from insufficient funding, declining student enrollments, outdated curricula, and a disproportionate focus on undergraduate studies.

Tertiary Agricultural Education: Student Enrollments and Graduations

Based on a sample of 28 of the 36 higher education agencies that participated in the ASTI–AWARD survey, 34 percent of the total number of students enrolled in 2007 were female (Figure 5a). This average share was reasonably stable for all three degree levels, ranging from 32 to 35 percent.

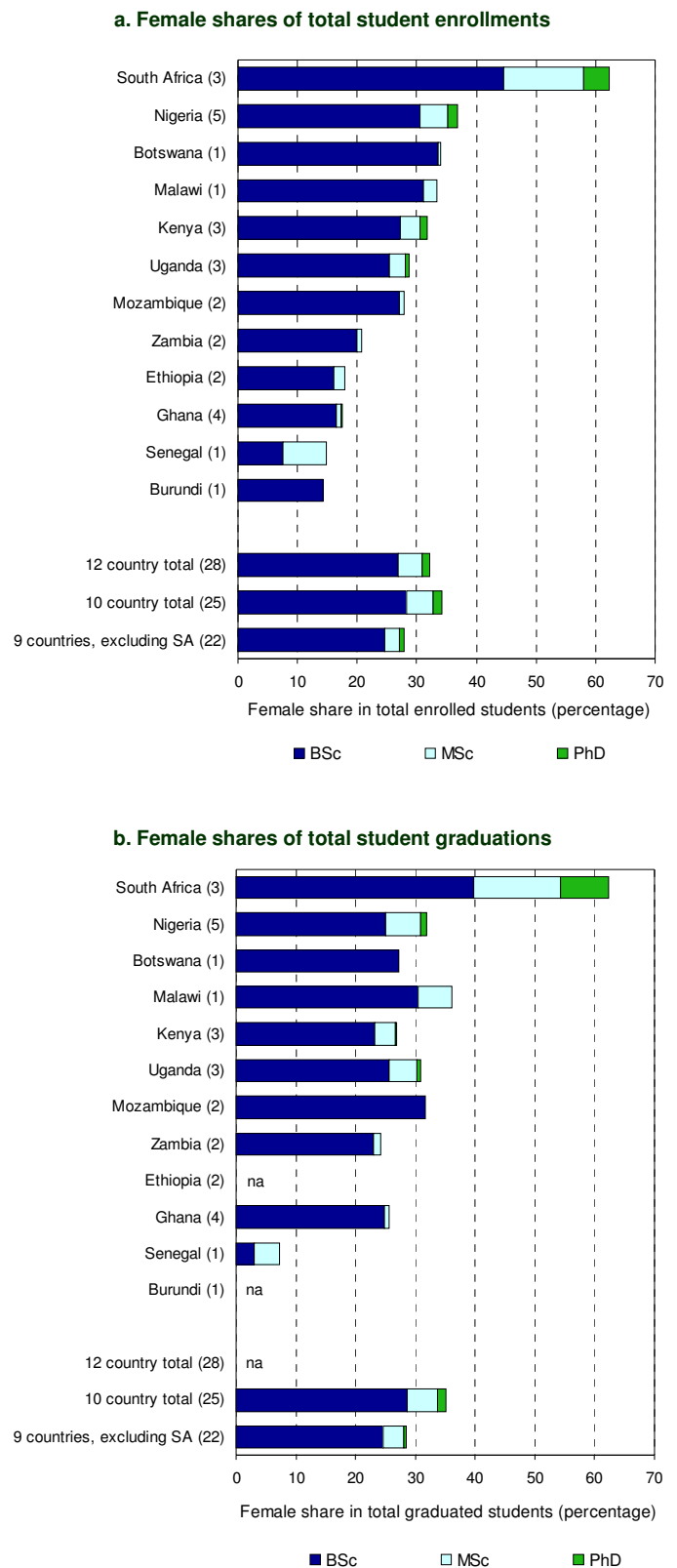
Most of these female students were enrolled in BSc studies (83 percent), whereas only 13 and 4 percent of female students were enrolled in MSc and PhD studies, respectively. The distribution was similar for male students, reflecting that many faculties and schools still lack or only have nascent PhD programs.

Unsurprisingly, comparatively more women were enrolled in agricultural science in South Africa, where 62 percent of all students were female. It should be noted, however, that enrollment data were only available for three of the six major South African faculties. In contrast, women accounted for less than 20 percent of the student populations in agricultural science in Burundi, Ethiopia, Ghana, and Senegal.

In a 25-agency sample in 2007 (excluding Burundi and Ethiopia), the average shares of female students enrolled in and graduating from tertiary studies in agricultural science were roughly equal (35 compared with 34 percent). A slightly higher share of female students graduated with MSc and PhD degrees (16 and 5 percent of the female totals, respectively); compared to the enrollment numbers (Figure 5b). This trend is also evident in the shares of female students in the total population of graduates. Of the MSc and PhD students that graduated at these 25 higher education agencies in 2007, 39 and 40 percent, respectively, were female. This means that women once enrolled are more likely to complete the program.

The female shares differ considerably across the 10 sample countries and are strongly influenced by the female shares in South Africa. The three South African higher education agencies in the sample accounted for about one-third of the female students enrolled in the 25-agency sample. If these agencies were excluded, the share of female students in the population that graduated with MSc and PhD degrees in 2007 would fall to 30 and 19 percent, respectively.

FIGURE 5. Share of female students enrolled in and graduating from tertiary agricultural education, 2007



Source: Calculated by authors based on survey responses.

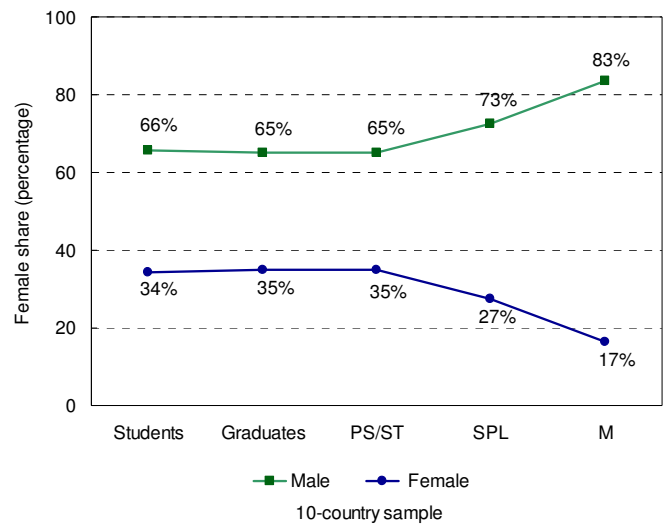
Shifts in the Gender Gap with Career Advancement

Although the proportion of both women and men in the total student population (in both enrollment and graduation) is higher than comparable shares at later stages of the career path, the shares of women are consistently lower than the shares of men. More simply put, on average, the proportion of women disproportionately decline with career advancement (Figure 6).

Age Structure of Female Professional Staff

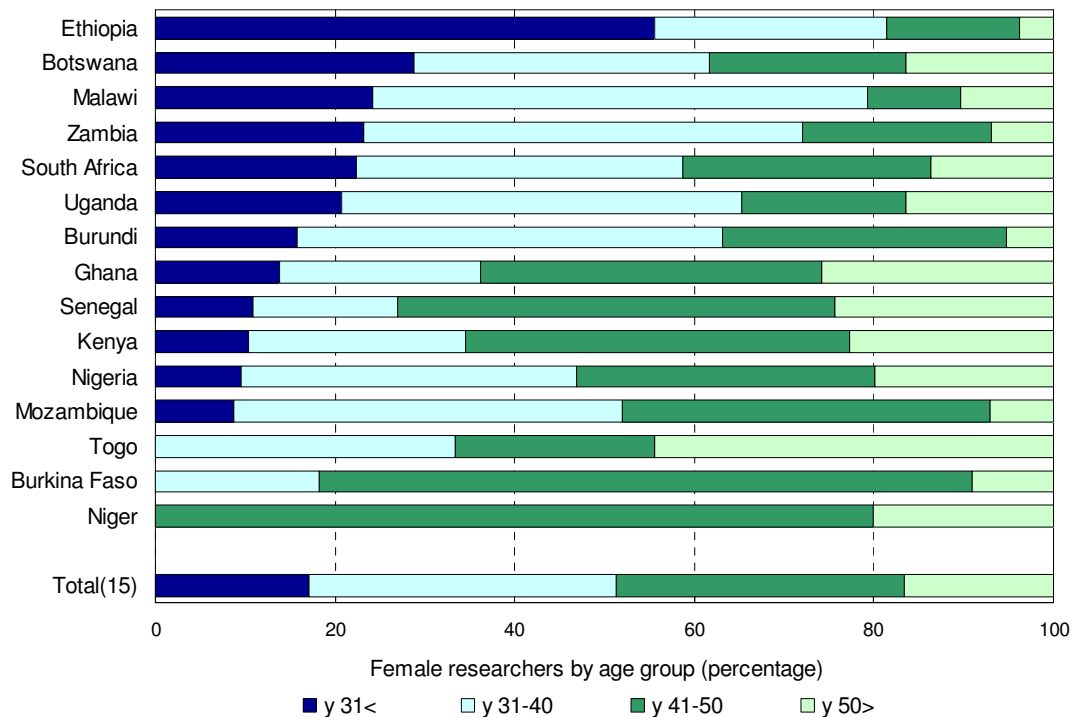
On average in 2007/08, the majority of professional women employed in agricultural research and higher education in Sub-Saharan Africa were between 31 and 50 years old (Figure 7). Fewer than 20 percent of the female professional staff in a 15-country sample were younger than 31 years. Wide variations were reported across countries, however. More than half of the female staff in Ethiopia were younger than 31 years, in part due to the significant increase in overall number of professional staff between 2000 and 2007. Botswana, Malawi, and Zambia also had relatively young pools of female professional staff. Agencies in Burkina Faso and Togo, however, employed no female professional staff younger than 31 years, and those in Niger employed no professional female staff younger than 41 years. In Togo, 44 percent of the female professional staff were 51 years or older (representing 4 of 9 women).

FIGURE 6. Gender-disaggregated shares of tertiary students and professional staff in agricultural sciences, 2007/08



Source: Calculated by authors based on survey responses.
 Note: Burkina Faso, Burundi, Ethiopia, Niger, and Togo were excluded because data on student enrollments and graduations were either unavailable or incomplete. PS/TS indicates professional and technical support staff; SPL includes scientists, (assistant) professors, and (senior) lecturers not in management positions; and M indicates management and includes directors, deans, and department heads. When including all 15 countries, the female share in management positions is lower at 14 percent.

FIGURE 7. Distribution of female professional staff by age group, 2007/08



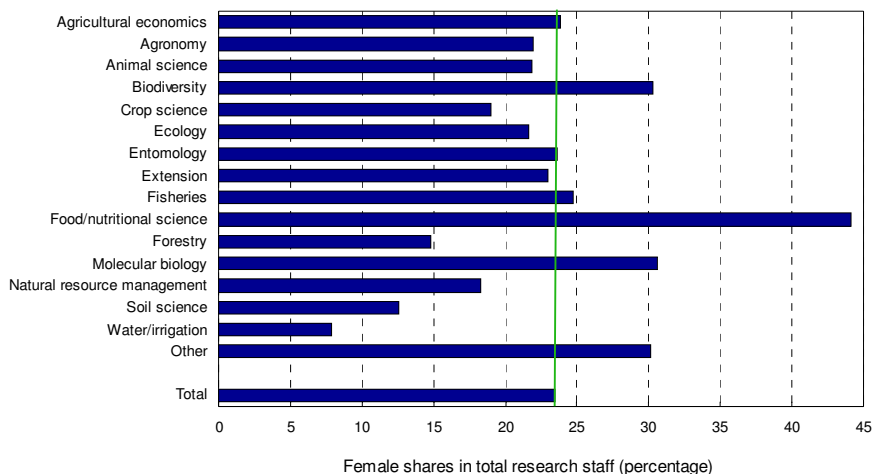
Source: Calculated by authors based on survey responses.

Discipline Mix of Female Agricultural Staff

Evidence shows that the level of women’s participation in S&T is higher in areas such as biology and other life and social sciences (the so-called “soft sciences”). Their participation in areas like physics and engineering (deemed “hard sciences”), however, is much lower. The distinction is less clear within agricultural science itself. Some fields clearly fall under the category of engineering, while others can clearly be defined as life or social sciences (Figure 8).

Unsurprisingly, the proportion of women employed in food and nutritional science was considerably higher, at 44 percent, than the share of women employed in other fields of agriculture. Relatively more women were trained in biodiversity (30 percent), molecular biology (31 percent), and agricultural economics (24 percent). In contrast, shares of professional women were particularly low in disciplines related to engineering, such as water and irrigation (8 percent), forestry (15 percent), and soil science (13 percent).

FIGURE 8. Distribution of female professional staff by discipline mix, 2007/08



Source: Calculated by authors based on survey responses.

Note: The green bar indicates the average share of women participating across all fields of agricultural science (24 percent).

About ASTI

The Agricultural Science and Technology Indicators (ASTI) initiative compiles, analyzes, and publishes data on institutional developments, investments, and human resources in agricultural R&D in low- and middle-income countries. The ASTI initiative is managed by the International Food Policy Research Institute (IFPRI) and involves collaborative alliances with many national and regional R&D agencies, as well as international institutions. The initiative, which is funded by the Bill & Melinda Gates Foundation with additional support from IFPRI, is widely recognized as the most authoritative source of information on the support for and structure of agricultural R&D worldwide. To learn more about the ASTI initiative visit www.asti.cgiar.org.

About AWARD

African Women in African Agricultural Research and Development (AWARD), funded through a grant from the Bill & Melinda Gates Foundation and the United States Agency for International Development, is a project by the Gender and Diversity (G&D) program of the Consultative Group on International Agricultural Research (CGIAR). Competitive two-year fellowships focusing on building capacity in science, mentoring, and leadership are offered to high-performing female African scientists at one of three critical career junctures: completion of a BSc, MSc, or PhD degree. To learn more about the CGIAR G&D program visit fellowupdate.wordpress.com.



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