III. HUMAN RESOURCE DEFINITIONS AND PROCEDURES

PROFESSIONAL RESEARCH STAFF
Professional research staff are counted as all individuals employed in a formal research position within an organization and holding at least a BSc degree or equivalent (that is, at least three, but usually four, years of full-time university training). This includes long-term consultants and contractual research staff, as well as managers (for example, directors, deputy directors and heads of research program). Only staff on-post should be reported (that is, excluding any staff away on long-term unpaid leave and positions approved but not filled).

TECHNICAL AND OTHER SUPPORT STAFF
ASTI identifies three levels of support staff:

- **Technical support staff.** Those who directly support the design and conduct of agricultural research activities but do not hold a formal research position are classified as technical support staff. These employees have at least a secondary education level (i.e., high-school or middle-school) plus additional technical training. Some technical support positions may require a university degree. Examples of these are laboratory and field technicians and station managers.

- **Administrative support staff.** Personnel who carry out secretarial and administrative tasks and have at least a secondary education plus additional professional training are classified as administrative support staff. Examples are accountants, computer personnel, personnel managers, and secretaries.

- **Other support staff.** Included in this category are various remaining staff positions not classified in any of the above categories. Examples are drivers, laborers, and guards.
CHALLENGE: Professional research staff versus support staff holding a university degree
In some countries, an expanding pool of support staff (technicians, research assistants, and laboratory assistants) have obtained bachelor’s, master’s and even occasionally, doctorate degrees, but do not hold an official researcher position. This may be because at least a master’s degree is required for scientific posts, for example, as at the Senegalese Agricultural Research Institute (ISRA). Or promotion opportunities may be limited due to a fixed number of approved scientific positions combined with an increasing access to degree training for junior staff, for example, as at Uganda’s National Agricultural Research Organisation (NARO). In contrast to the situation in Uganda and Senegal, technical support staff at Tanzania’s Directorate of Research and Development (DRD) are promoted to the researcher level upon obtaining their bachelor’s degree.
ASTI accounts for such differences by collecting technician data by degree level. This also recognizes that technical staff with a bachelor’s degree are a component of the future pool of agricultural scientists.

TIME SPENT ON RESEARCH VERSUS OTHER ACTIVITIES
ASTI calculates its human resource and financial data in full-time equivalents (or “FTEs”). Its method takes into account the proportion of time that researchers spend on R&D versus other activities. University employees, for example, spend the bulk of their time on activities other than research, such as teaching, administration, and student supervision. These hours are excluded from ASTI calculations of human resources invested in agricultural R&D. Thus, four faculty members estimated to spend 25 percent of their time on research would individually represent 0.25 FTE and collectively be counted as 1.0 FTE.

DEGREE QUALIFICATIONS
ASTI collects time-series data on university qualifications of professional research and technical support staff by degree (PhD, MSc, and BSc). If the degree-level equivalent is unclear, the following scale is applied:

- **Research doctoral degrees (e.g., PhD, DSc)**. Equivalent to more than six years of full-time university education, including a doctoral thesis.
- **Master’s degrees (e.g., MSc, MEd, MPhil)**. Equivalent to five to six years of full-time university education.
- **Bachelor degrees (e.g., BSc, BVM, BPhil)**. Equivalent to at least three (but usually four) years of full-time university education. This category also includes staff with honors degrees.
EXPATRIATE RESEARCH STAFF

Many African agricultural research systems were staffed by expatriates in the 1960s. After independence, most countries made great strides in nationalizing their research capacity. The share of expatriate workers in African agricultural R&D gradually declined and is now negligible in most places. There are countries, however, where expatriates still play a key role in national agricultural research. As expatriates are paid by their mother institutes, expatriate salaries do not show up on the payroll of national agricultural research institutes. Nonetheless, it is important to capture the number of expatriate researchers (in FTEs) active in a country to get a complete picture of agricultural R&D investment and capacity.

ASTI defines an expatriate researcher as a person sent by a development cooperation or international agency to carry out long-term research (one year or more) at an agricultural research agency in a developing country. ASTI estimates the average cost of an expatriate researcher based on salaries and benefits of outposted CGIAR staff. This assumes that that most expatriate researchers from North America, Europe, and Australia receive similar salaries and benefits.

CHALLENGE: Degree levels in non-anglophone countries

ASTI collects data on the number of researchers with PhD, MSc, and BSc degrees. However, universities in many countries offer a much larger variety of academic degrees. Classifying these degrees into the simple PhD-MSc-BSc system is not always easy. Although France has harmonized its academic degree system with those of other European countries, the university systems in many former French colonies in Africa are still based on the old French system. Some small differences remain across francophone African countries, but as a general rule, degrees from francophone universities correspond to the following PhD-MSc-BSc equivalents:

- PhD = Doctorat
- MSc = Doctorat de médecine vétérinaire, DESS, DEA, master, maîtrise, ingénieur
- BSc = Licence

Degree systems in Spanish- and Portuguese-speaking countries are similar to those in the anglophone world.

CHALLENGE: Foreign researchers working abroad independently

The expatriate category excludes foreign researchers working independently at another institute within the region; for example, a Ugandan researcher taking up employment at a research institute in a neighboring country. Furthermore, the salaries and benefits earned by outposted researchers differ, depending on the expatriate’s country of origin and the place of employment. For example, the case of a North Korean researcher working at the Guinean Agricultural Research Institute (IRAG) is quite different from a CGIAR researcher working in Africa. Adjustments have to be made to accurately calculate the average cost of these expatriate researchers. It is therefore important to collect information on the country of origin of foreign researchers working abroad.
GENDER
Professional research staff and technician data by degree are classified by gender. The breakdown of research staff by gender is one of ASTI’s least ambiguous indicators and therefore requires no further explanation.

COMMODITY AND THEMATIC FOCUS OF PROFESSIONAL RESEARCH STAFF
ASTI collects detailed information on the number of researchers working in specific commodities (about 40) and thematic areas (about 20). These include more than twenty field and horticultural crops, five livestock items, pastures and forages, forestry, marine fisheries, inland fisheries, agricultural engineering, off-farm postharvest R&D, natural resources, and socioeconomics. Nonetheless, it is not always possible to associate all researchers with one of the commodity-specific categories. For example, a soil scientist working as part of a wheat research program would fall under the wheat commodity category, but if the soil scientist was not part of a commodity program, the researcher would be recorded in the natural resources category.

In addition, ASTI requests a list of the agency’s formal research programs, along with a breakdown of the number of FTEs of professional research staff assigned to each.

DEMOGRAPHIC STRUCTURE OF PROFESSIONAL RESEARCH STAFF
Age is an increasingly important indicator because many research agencies, especially in Sub-Saharan Africa, have an aging pool of scientists with many staff set to retire in the coming years. ASTI is therefore collect data on the number of professional staff by age group (“30 years and younger,” “31–40 years,” “41–50 years,” “51–60 years,” “61 years and older”), by degree.

STUDENT ENROLLMENTS AND GRADUATES
ASTI recently expanded its data coverage to include the number of students enrolled in and graduated from institutions of agricultural higher education. This provides an indication of the future pool of agricultural scientists and professionals in developing countries.