I. OVERVIEW

CURRENT INDICATORS AND DATA AVAILABILITY BY REGION

National survey rounds have been rather ad hoc in the past, focusing on one region at a time depending on the availability of funds. As a result, most regional data collection has been limited to updating datasets. ASTI uses a various indicators to measure agricultural research investment and capacity. Table 1 summarizes these, as well as the regions and time periods covered up to 2012.

Table 1. ASTI indicators and geographical and time coverage per December 2011

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<thead>
<tr>
<th>Indicator</th>
<th>Regions and years covered</th>
<th>Details</th>
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<tbody>
<tr>
<td>Professional female research staff</td>
<td>- SSA: 2000/01 and 2008&lt;br&gt;- SA: 2002/03 and 2009&lt;br&gt;- SEAP: 2002/03&lt;br&gt;- LAC: 2006&lt;br&gt;- WANA: 2001/03</td>
<td>- By degree level (PhD, MSc, and BSc)&lt;br&gt;- Numbers (not by degree level) for 14 countries in SSA (1991) and 16 countries in LAC (1996)&lt;br&gt;- Government, nonprofit, and higher education</td>
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<td>Professional research staff by age group</td>
<td>- SSA: 2007/08&lt;br&gt;- SA: 2009</td>
<td>- For 15 SSA countries only; conducted as part of a special study for the African Women for Agricultural Research (AWARD) scholarship program</td>
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<td>Thematic research focus</td>
<td>- SSA: 2000/1 and 2008&lt;br&gt;- SA: 2002/03 and 2009&lt;br&gt;- SEAP: 2002/03&lt;br&gt;- LAC: 1996&lt;br&gt;- WANA: 2001/03</td>
<td>- Includes ± 4 themes related to crops, ± 5 to livestock, and ± 7 other&lt;br&gt;- List is currently being adjusted to capture emerging thematic areas such as climate change, bioenergy, and biotechnology&lt;br&gt;- Government, nonprofit, higher education, and private sector</td>
</tr>
<tr>
<td>Indicator</td>
<td>Regions and years covered</td>
<td>Details</td>
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- SEAP: 1981/91–2002/03  
- WANA: 1991/96–2001/03 | - By salaries, operational costs, and capital costs  
- Government and nonprofit |
- SEAP: 1996–2002/03  
- WANA: 2001/03 | - Government, (multilateral and bilateral) donors, producers and marketing boards, public and private enterprises, own income, other  
- Sources differ by region and by country  
- For some countries multiple years are available  
- Government and nonprofit |
| Technical support staff   | - SSA: 2001–08  
- SA: 1996–2009 | - By degree level (PhD, MSc, BSc, other/without diploma)  
- By gender |
- SEAP: 1991/96–2002/03  
- WANA: 1996–2001/03 | - By technical, administrative, and other support  
- Government, nonprofit, and higher education |

Source: ASTI datasets.
Notes: LAC = Latin America and the Caribbean, SA = South Asia, SEAP = Southeast Asia and the Pacific, SSA = Sub-Saharan Africa, WANA = West Asia and North Africa. Country coverage from 2001 to 2010 includes 34 countries in Sub-Saharan Africa, 5 countries in South Asia, 6 countries in Southeast Asia and the Pacific, 15 countries in Latin America and the Caribbean, and 6 countries in West Asia and North Africa. Yearly coverage applies for most, but not all, countries. 
“/” between years means that timeseries data is available for the first or second year.

**CHALLENGE: Boundaries of ASTI datasets**

ASTI has chosen to limit itself to agricultural R&D rather than expanding to include indicators on the multiple dimensions of the agricultural innovation process. It is, however, piloting an agricultural innovation system framework for use as an analytical tool at the sector and commodity level. Appropriate national-level measures for agricultural innovation remain difficult to develop. Even the role of agricultural R&D warrants further study, especially with regard to the contribution of R&D to agricultural innovation performance. There is no clear consensus as to how such research can best be done. Analysis on these issues, though important, is not ASTI’s core business.

ASTI focuses on measuring inputs into agricultural R&D, rather than outputs or outcomes. It recognizes, however, that the latter are key supplementary indicators for assessing agricultural R&D performance. R&D outputs are notoriously difficult to measure at the national level and over time, in addition to being hard to compare internationally. ASTI currently plans to initiate analysis on agricultural R&D outputs using a case-study approach.

**IMPLEMENTATION OF NATIONAL SURVEY ROUNDS**

ASTI conducts national survey rounds in close collaboration with “focal points,” most of which are located in national agricultural research institutes. In some cases, the national focal point is a consultant or agency other than the national agricultural research institute itself. In a few instances, it is a regional organization, which may be responsible for multiple countries. At the start of each national survey round a complete list is compiled of all agencies involved in agricultural research and development (R&D). Each agency is approached to participate. Three survey forms are used: one for government and nonprofit agencies, one for institutions of higher education, and one for the private sector. Each type
of form has different sets of questions. Those for government and nonprofit agencies are the most detailed. In general, the forms have four sections:

- **Institutional details.** This section requests basic information such as address, affiliation, and organizational structure.

- **Human resource information.** Questions here relate to the number of researchers and technicians employed, degree levels, the proportion of time that various staff spend on research, the age distribution of research staff, the number of women researchers, and support staff by various categories.

- **Financial information.** This section requests details on research expenditures by cost category and sources of funding.

- **Research focus.** The survey forms request details on the commodities, themes and program focus of the research conducted.

Time-series data are collected for three main indicators: “research investments,” “research funding sources,” and “research staff totals.” The remaining indicators are collected for particular benchmark years for use in cross-country comparisons. Additional qualitative information is gathered during country visits through in-depth meetings with various agencies. These provide a fuller picture of developments in agricultural R&D than could be generated with quantitative data alone.

**CHALLENGE: Declining survey responsiveness**

During the most recent survey round in Sub-Saharan Africa, ASTI experienced more difficulty in obtaining survey responses than in previous rounds. This appeared to be due to an increasing number of agencies involved in agricultural R&D, many of which are institutions of higher education whose mandates are not primarily research. Furthermore, there seemed to be an increasing demand on agencies to provide quantitative information, often paired with poor data management and a lack of monitoring and evaluation (M&E) systems.
THE OECD FRASCATI MANUAL AS BASIS

ASTI collects and processes its datasets using standard procedures and definitions developed by the Organisation for Economic Co-operation and Development (OECD) and the United Nations Educational, Science, and Cultural Organization (UNESCO). These are described in the *Frascati Manual: Proposed Standard Practice for Surveys on Research and Experimental Development*. The manual was originally published in 1963 as a handbook for science and technology studies in OECD countries. It has since become the global standard for both national and international organizations and has been revised numerous times. The manual, along with other publications in “the Frascati Family,”¹ is a key tool for understanding the role of science and technology in economic development.

CHALLENGE: Suitability of the Frascati Manual for use in developing countries

The procedures and definitions in the *Frascati Manual* were developed by and for industrialized countries. They are therefore not always directly applicable to R&D statistics in the developing world. While ASTI’s methodology is largely based on procedures in the *Frascati Manual*, it has made some adjustments to align its data collection activities better with the nature of its subject-matter: measuring agricultural R&D indicators in developing countries.