

ASTI IN RETROSPECT 02

The Prevalence of Volatility in Funding Trends



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This year marks the 20th anniversary of the inception of ASTI. During this time, governments, donors, and international organizations have used ASTI's evidence to guide agricultural research investment and policy decisions, to assess areas of underinvestment, to identify capacity gaps and training needs, and to demonstrate the returns to agricultural research investment. This series of notes marks this important milestone by focusing—and updating—on some of the key advancements and insights ASTI data have enabled in the past 20 years. This note focuses on the prevalence of volatility in long-term funding (and hence spending) trends, largely stemming from high levels of donor dependence.

KEY ADVANCEMENT

With the establishment of ASTI, and especially with consistent funding support from the Bill & Melinda Gates Foundation for the past 11 years, more regular data collection was made possible for Africa south of the Sahara (SSA) and South Asia. This enabled the construction of long-term time-series data on national agricultural research investment and human resource capacity in these two regions. Moreover, in order to assess investment fluctuations across countries, ASTI developed a measure of national-level spending volatility over time (Figure 1).¹

RESULTING INSIGHTS

Long-term spending data, which reflect funding levels, revealed that agricultural research funding was indeed volatile, and often highly so, in many countries of SSA. Such fluctuations significantly impede the ability of agricultural research entities to plan and budget appropriately; to attract, maintain, and motivate well-qualified researchers; and to carry out research effectively. Average volatility in SSA, at 0.20, is much higher than in other developing regions. The average value for both Latin America and the Caribbean and the Asia–Pacific is 0.13. Although volatility is driven by a variety of factors, data reveal that in SSA it has largely been caused by the short-term, project-oriented nature of donor and development bank funding (see overleaf for details).²

1. ASTI's spending volatility ratios by region, 2016



Africa south of the Sahara
0.20



Latin America and the Caribbean
0.13



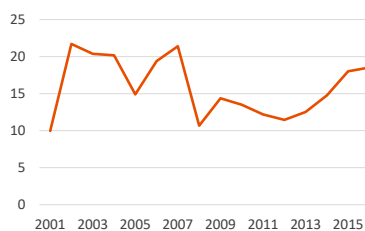
Asia-Pacific
0.13

Note: Data are based on a sample of 66 developing countries of the Asia–Pacific, Latin America and the Caribbean, and Africa south of the Sahara.

In deepening its analysis of agricultural research investment in Africa south of the Sahara, ASTI data brought to light the grave situation arising from the prevalence of volatility in funding trends in many of the region's countries, most notably based on high levels of dependence on donor contributions. In addition to highlighting the need for increased funding, this evidence added weight to the argument that more stable levels of funding are needed for African agricultural research so that shorter-term gains can be built on over time, rather than being eroded, and strategic, long-term plans can be executed successfully to achieve the desired outcomes.

2. Examples of fluctuating spending trends, 2000–2016

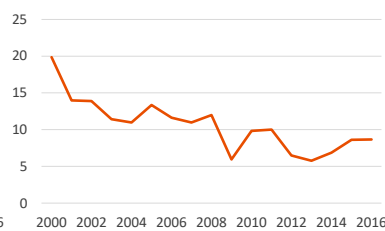
MAURITANIA



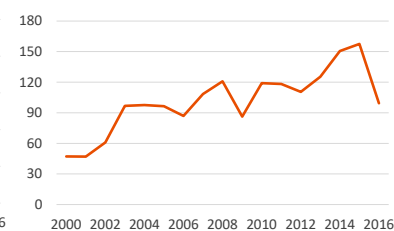
TANZANIA



TOGO



UGANDA



Note: Data are presented in million purchasing power parity (PPP)³ dollars at 2011 constant prices (that is, adjusted for inflation and differences in purchasing power).

CONTEXT

Despite well-documented evidence that the payoffs to agricultural research are considerable, many countries continue to underinvest (see Note 04 in this series on *Underinvestment in Agricultural Research*). The process of investing in research and reaping subsequent rewards, such as new technologies or crop varieties, involves an inherent—and usually substantial—time lag. In the interim, sufficient sustained and stable financial resources are needed. A challenge arises because these long-term agricultural research cycles rarely coincide with changing political agendas, short-term election cycles, or shifts in budget priorities and allocations. Furthermore, governments have limited public resources and face complex decisionmaking processes when it comes to allocating resources across sectors.

Funding for agricultural research is far from stable, so yearly fluctuations in funding—and hence in spending—are common in many countries. This is especially the case in a large number of SSA countries (Figure 2). Low levels of sustained government funding

mean that their agricultural research systems are often dependent on donor and development bank funding, which is generally short term and ad hoc, resulting in major funding fluctuations.

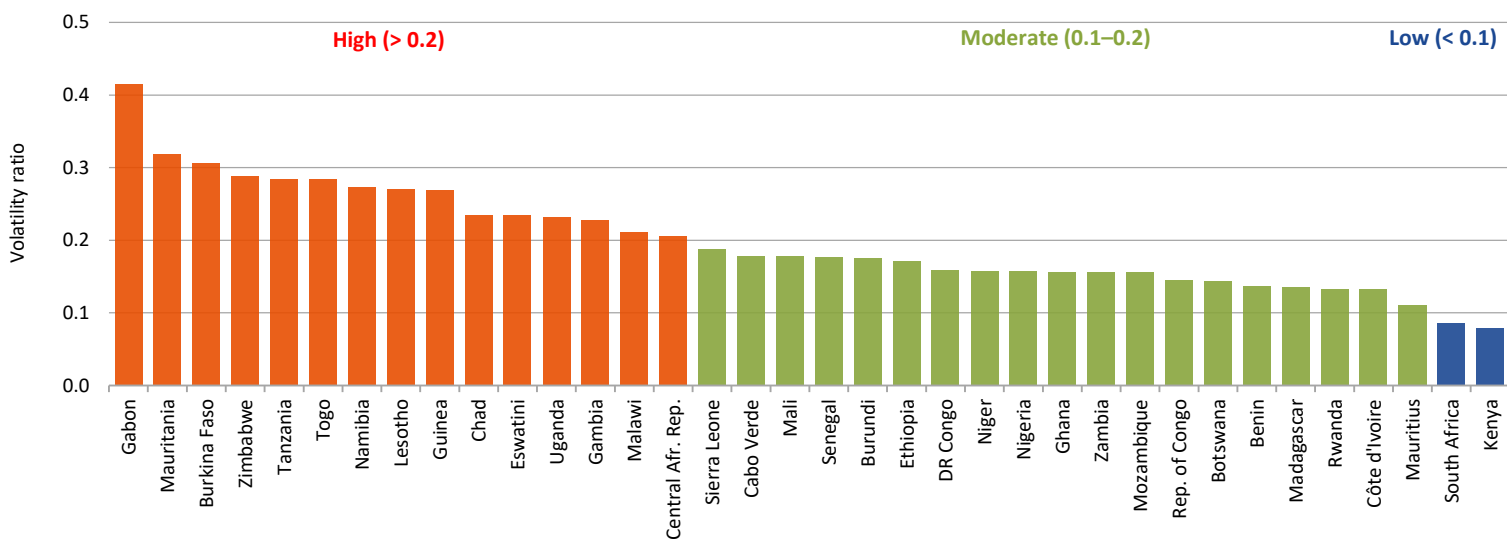
ASTI’s volatility measure quantifies shifts in agricultural research spending levels. It is a useful tool for assessing funding volatility across countries and regions, and providing insight into the drivers of funding shocks.

FINDINGS

ASTI calculated funding volatility ratios for 36 SSA countries based on complete time-series data for 2000–2016 (and in some cases for a shorter period). Countries with few changes in yearly spending levels or with steady (positive or negative) growth—such as Kenya and South Africa—rank relatively low. In contrast, countries with erratic fluctuations in year-to-year spending levels rank high (Figure 3).

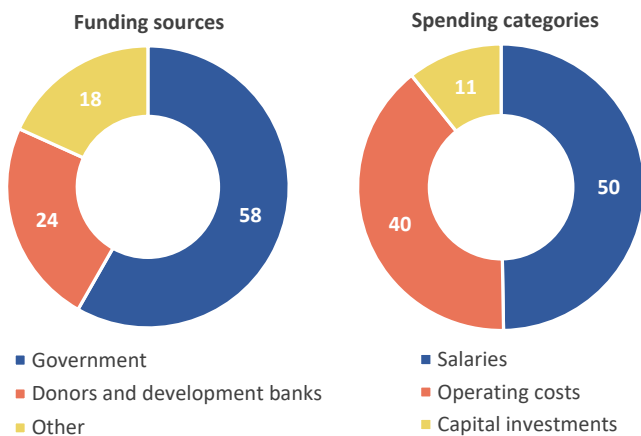
During 2009–2016, on average, the national governments of SSA countries provided 58 percent of all funding to their principal

3. Volatility ratios for countries of Africa south of the Sahara, 2016



Note: A value of 0 indicates “no volatility,” whereas values above 0.20 indicate relatively high volatility.

4. Shares of funding sources and spending categories for Africa south of the Sahara, 2009–2016 average (%)



Notes: Data are for each country’s main government agricultural research department(s) or institute(s). “Other” includes the sale of goods and services, commodity levies, contributions from producer organization, and miscellaneous sources. Data exclude Nigeria, South Africa, and a number of the smaller countries.

government agricultural research institute(s). Funding from donors and development banks constituted 24 percent of the total (Figure 4). In many countries, the national government funds salary-related expenses, but little else. Operating costs and capital investments require additional donor and development bank funding. This dependency on donor funding is particularly high among the francophone countries of West Africa (Figure 5). And although many governments are committed to funding agricultural research in principle, the amounts disbursed are habitually lower than—and in many cases only a fraction of—budgeted allocations.

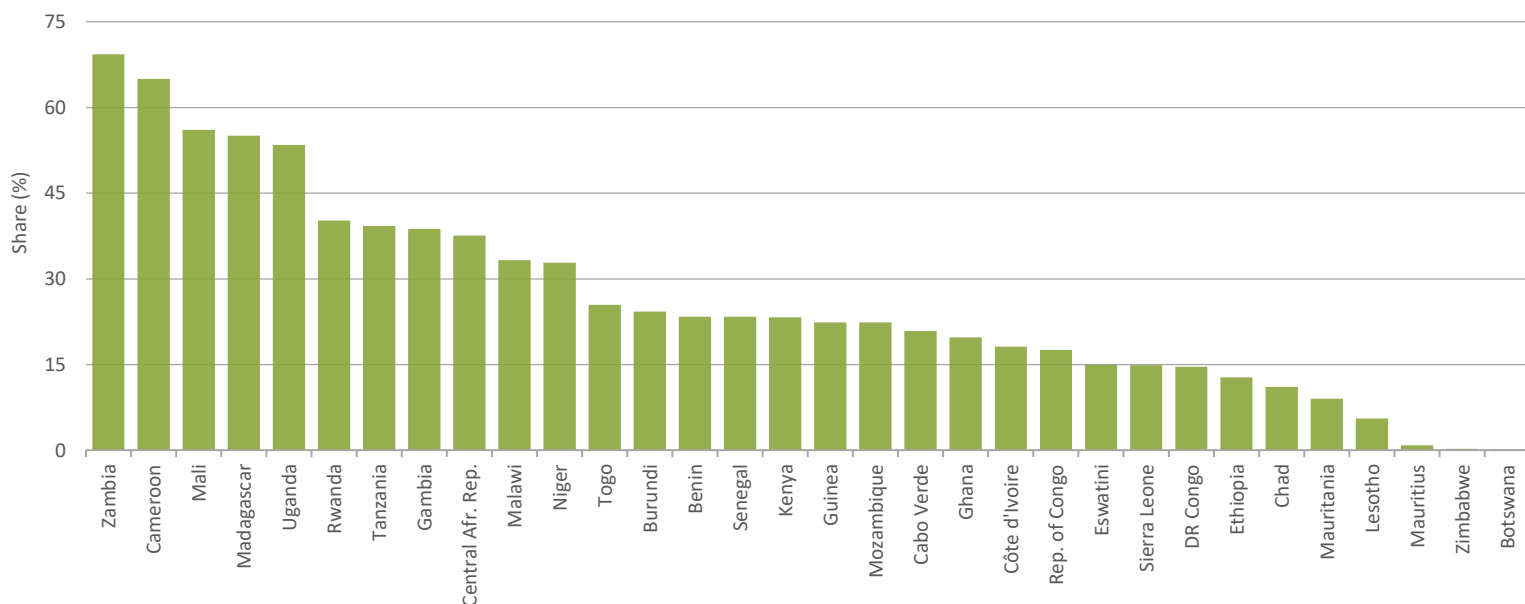
Among a large number of bilateral and multilateral donors, development banks, and private foundations that have funded agricultural research activities in SSA, the World Bank has been a major contributor. Support originally took the form of country-level projects financed through loans and supplemented by grants. As of the mid-2000s, the World Bank shifted away from its national approach and introduced a regional model based around commodity-specific productivity programs. More recently, however, the second phase of the productivity programs was halted.

IMPACT

Unsurprisingly, severe fluctuations in yearly agricultural research funding significantly complicate and compromise long-term budget, staffing, and strategic planning decisions, all of which affect the continuity and outcomes of research programs. Large fluctuations in yearly investment levels hinder the advancement of technical change and the long-term development of new varieties and technologies. In addition, valuable advances made at one point in time can subsequently be eroded, and planning decisions and priorities derailed.

In addition, too much of the critical decisionmaking about research priorities appears to have been devolved to donors. As a result, the research agendas of many agricultural research agencies across SSA—particularly in smaller, low-income countries—have either be skewed toward short-term goals that are not necessarily aligned with national and (sub)regional priorities, or to commodities of comparatively limited economic importance. A new framework is therefore needed whereby governments establish strategic priorities that donors can contribute to.

5. Share of total funding derived from donors, 2009–2016 average (%)



Note: Data are for each country’s main government agricultural research department(s) or institute(s).

2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020

KEY MARKERS OF ASTI'S EVOLUTION

- ✓ ASTI was established as a CGIAR public good in early 2001, led by IFPRI and the former International Service for International Agricultural Research.
- ✓ In those earlier years, ASTI undertook the somewhat daunting task of developing key indicators and statistical methods in alignment with international standards; initiating data-collection activities on an ad hoc, project-driven basis; and forging fledgling relationships with potential national partners. And with the creation of its website, ASTI became one of the CGIAR's first sources of open-access data.
- ✓ With consistent funding from the Bill & Melinda Gates Foundation and numerous other supporters, ASTI matured to become a more holistic program, focusing not only on data collection, but also on building its partners' capacity, expanding its analysis and outreach activities, developing a suite of innovative online data tools, and contributing to influential global and regional initiatives and reports.
- ✓ Supplementary funding facilitated the expansion of geographic coverage, the initiation of more in-depth studies, and greater focus on increasing the capacity of ASTI's extensive network of national partners.

AUTHOR'S REFLECTIONS ON 20 YEARS

Twenty years ago—with email still relatively rare and Internet access very limited in developing countries—the only way to get information was to send (and resend) letters, faxes, and telexes, and to visit (and revisit) research institutes in person. Then came the fastidious work of manually entering the data into computer files. Thankfully, much has changed. Greater Internet access paved the way for ASTI to make its data freely available online, becoming one of the CGIAR's first open-access data sources. Technological advancements not only allowed collecting, processing, and sharing data to be done effectively, but also facilitated the development of creative solutions for accessing, presenting, and analyzing data. Fruitful partnerships became possible across national, regional, and international boundaries. Importantly, sustainable funding from the Bill & Melinda Gates Foundation and numerous other donors facilitated the expansion and capacity building of ASTI's network, collaboration with partners to undertake more in-depth analyses of the data's implications, and greater outreach to disseminate the resulting findings.

RELEVANT RESOURCES

- ASTI. 2019. ASTI database. International Food Policy Research Institute, Washington, DC.
- Beintema, N., and G. Stads. 2017. *"A Comprehensive Overview of Investments and Human Resource Capacity in African Agricultural Research."* ASTI Synthesis Report. Washington, DC: International Food Policy Research Institute.
- Beintema, N., A. Nin Pratt, and G. Stads. 2020. *Key Trends in Global Agricultural Research Investment. ASTI Program Note.* Washington, DC: International Food Policy Research Institute (forthcoming).
- Stads, G., and N. Beintema. 2015. *"Agricultural R&D Expenditure in Africa: An Analysis of Growth and Volatility."* *The European Journal of Development Research* 26: 391–406.
- Stads, G. 2016. *"Investment in Agricultural Research and Development: An account of Two-speed Growth, Underinvestment, and Volatility."* Chapter 4 in *Agricultural Research in Africa: Investing in Future Harvests*, J. Lynam, N. Beintema, J. Roseboom, and O. Badiane, ed. Washington, DC: International Food Policy Research Institute.

DATA NOTES

1. ASTI's measure of funding volatility is calculated by applying the standard deviation formula to average yearly logarithmic growth of agricultural research spending over time (for more information, see Stads and Beintema 2015).
2. The underlying data presented in this note can be downloaded, by country and available year, via the Regional Benchmarking Tools, Data Tool, and Country Pages available at ASTI's website.
3. Note that all dollar values are based on 2011 PPP exchange rates, which reflect the purchasing power of currencies more effectively than do standard exchange rates because they compare the prices of a broader range of local, as opposed to internationally traded, goods and services. ASTI collects all its financial time-series data in local currency units and converts these into constant prices using official World Bank GDP deflators. Currently, ASTI expresses its financial data in 2011 prices.

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Nienke Beintema is the former head of ASTI. This series of notes has been prepared as an ASTI output and has not been peer reviewed; any opinions are those of the author and do not necessarily reflect the policies or opinions of IFPRI. The author acknowledges the Bill & Melinda Gates Foundation and the CGIAR Research Program on Policies, Institutions, and Markets for their generous support of ASTI and, in particular, this series of notes. She also thanks Gert-Jan Stads, who initially developed the volatility index, and Mary Jane Banks, who provided editorial and graphic design support in the preparation of this series.

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