

GUINEA

RECENT DEVELOPMENTS IN AGRICULTURAL RESEARCH

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LONG-TERM INVESTMENT AND CAPACITY TRENDS IN AGRICULTURAL R&D

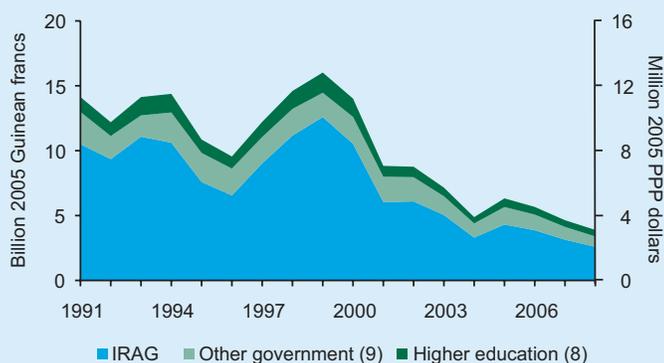
Since the early 1980s, Guinea's agricultural research and development (R&D) has been marked by contracting expenditures, whereas its human resource capacity has remained more or less unchanged. In 2008, the country employed 229 full-time equivalent (FTE) agricultural researchers, and public agricultural R&D expenditures totaled 3.9 billion Guinean francs or 3.2 million PPP dollars (both in constant 2005 prices), which is well below the levels recorded in the 1980s (Figures 1 and 2; Table 1). Unless otherwise stated, all prices in this note are based on purchasing power parity (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.¹

The Guinean Agricultural Research Institute (IRAG), the country's most important agricultural research agency, accounted for approximately two-thirds of all agricultural researchers and public expenditures in 2008. Since its foundation in 1989, IRAG has depended heavily on donor contributions to finance its research, mainly through five large projects funded by the French government and the World Bank (see the section

Key Trends Since 2000

- Agricultural research and development (R&D) expenditures in Guinea have fallen gradually as a result of reduced donor support and cuts in government funding.
- Overall R&D capacity remained stable from 2000 to 2008, averaging around 220 full-time equivalent (FTE) researchers.
- The Guinean Institute for Agricultural Research (IRAG) is the country's main agricultural R&D agency, employing two-thirds of the country's agricultural research staff and accounting for two-thirds of its national agricultural R&D expenditures.
- From 2000 to 2008, IRAG was largely dependent on funding from the Government of France and the World Bank.
- Agricultural R&D in Guinea faces an uncertain future because donor support has been largely suspended due to the current political situation.

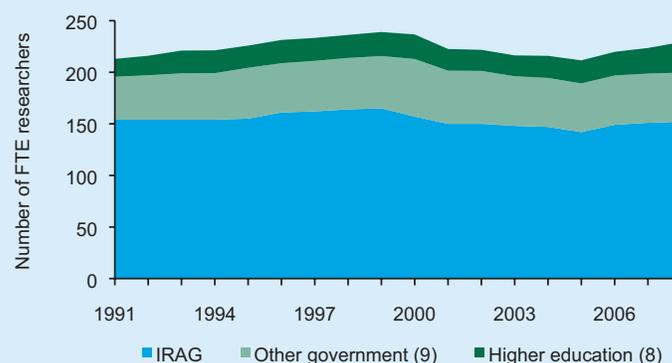
Figure 1—Agricultural R&D spending adjusted for inflation, 1991–2008



Sources: Calculated by authors from IFPRI–IRAG 2009 and Stads and Bévogui 2003.

Notes: Figures in parentheses indicate the number of agencies in each category. Total agency sample includes one government agency, which discontinued its research activities in 2003. For more information on coverage and estimation procedures, see the Guinea country page on ASTI's website at www.asti.cgiar.org/guinea.

Figure 2—Agricultural research staff in full-time equivalents, 1991–2008



Sources: Calculated by authors from IFPRI–IRAG 2009 and Stads and Bévogui 2003.

Notes: Figures in parentheses indicate the number of agencies in each category. Total agency sample includes one government agency, which discontinued its research activities in 2003. Data include French and North Korean expatriate research staff employed at IRAG.

Table 1—Overview of agricultural R&D spending and research staff levels, 2008

Type of agency	Total spending			Total staffing	
	Guinean francs	PPP dollars	Shares	Number	Shares
	(million 2005 prices)		(%)	(FTEs)	(%)
IRAG	2,591.4	2.1	67	152.0	66
Other government (8)	797.9	0.7	21	47.7	21
Higher education (8)	501.9	0.4	13	29.6	13
Total (17)	3,891.2	3.2	100	229.2	100

Source: Compiled by authors from IFPRI-IRAG 2009.

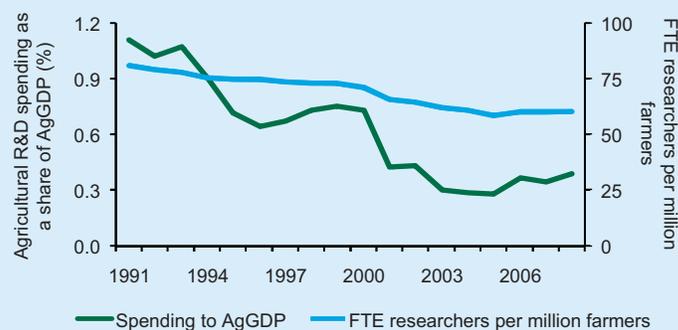
Notes: Figures in parentheses indicate the number of agencies in each category. Data include French and North Korean expatriate research staff employed at IRAG.

on Funding Sources on page 4). IRAG's financing has followed a highly erratic pattern. A sharp fall in expenditure followed the completion of each of the above-mentioned projects, severely influencing IRAG's ability to maintain its day-to-day operations. In particular, the end of the World Bank-funded National Agricultural Services Project (NASP) in 2000 greatly affected IRAG's overall spending capacity. Contrary to the trend in yearly expenditures, research staffing levels remained comparatively stable, hovering around the 150 FTE mark throughout 1991–2008. In 2008, IRAG employed 152 FTE researchers (including five French and four North Korean expatriates).

Nine other Guinean government agencies are involved in national agricultural R&D activities. Together, these agencies employed 48 FTEs in 2008, accounting for one-fifth of Guinea's agricultural research staff. The main agencies in this group are the National Research Center on Fisheries and Marine Resources (CNSHB) and the Institut Pasteur de Guinée (IPG). In 2008, CNSHB's research staff totaled 17 FTEs, and IPG's totaled 13. Corresponding figures for the remaining agencies in this category did not exceed 5 FTE researchers.

The higher education category includes six units under the Valéry Giscard d'Estaing Institute for Agronomical and Veterinary

Figure 3—Intensity of agricultural research spending and capacity, 1991–2008



Sources: Calculated by authors from IFPRI-IRAG 2009, Stads and Béavogui 2003, FAO 2009, and World Bank 2009.

Sciences in Faranah (ISAVF), and two under the Gamal Abdel Nasser University of Conakry (UC). ISAVF and UC reported a moderate increase in capacity in recent years. In 2008, the higher education sector accounted for 13 percent of Guinea's R&D capacity compared with 8 percent at the beginning of the 1990s. No private companies were found to be involved in agricultural R&D, so subsequent analyses in this country note exclude the private sector.

In 2008, Guinea's total public agricultural R&D spending as a percentage of output (AgGDP)—a common, internationally comparable indicator of a country's agricultural R&D—was \$0.39 for every \$100 of AgGDP, which is a far lower ratio compared with those recorded in the 1990s (Figure 3). This decrease in public spending was matched by a gradual decline in research capacity—that is, the number of agricultural FTEs per million farmers—from 81 in 1991 to 60 in 2008.

INSTITUTIONAL STRUCTURE AND POLICY ENVIRONMENT

The institutional structure of Guinea's agricultural research has changed little since 2000. IRAG continues to dominate, even though the role of the higher education sector has strengthened somewhat over time. IRAG's ambition is to triple its research capacity by 2015, but this will only be achieved if the institute obtains sustainable funding from the national government. Given the current political crisis, this seems highly unlikely. In 2009, extensive reorganization under the National Research and Development Program (NRDP), led to significant downsizing of IRAG's research from 33 to 15 programs. As of 2008, the regional center of Foulaya in Lower Guinea carried out five programs (focusing on biodiversity, farm systems, food technology, fruit, and rice); the regional center of Bareng in Middle Guinea ran four programs (animal husbandry, fonio, market gardening, and soil); the regional center of Bordo in Upper Guinea also ran four programs (focusing on cereals, cotton, groundnuts, and root crops); and the regional center of Sérédou in Guinée Forestière operated two programs (focusing on forestry and perennials). NRDP, which runs until 2015, also aims to stimulate scientific cooperation, encouraging IRAG to collaborate with in-country partners (universities), regional partners (centers in

ASTI Website Interaction

-  More details on institutional developments in agricultural research on Guinea are available in the 2003 country brief at asti.cgiar.org/pdf/guinea_CB12.pdf.
-  Underlying datasets can be downloaded using ASTI's data tool at www.asti.cgiar.org/data.
-  This brief presents aggregated data; additional graphs with more detailed data are available at asti.cgiar.org/guinea/datatrends.

www.asti.cgiar.org/guinea

neighboring countries), and international agencies (members of the Consultative Group for International Agricultural Research [CGIAR], as well as the French Institut de Recherche pour le Développement [IRD] and the Center for International Cooperation in Agricultural Research [CIRAD]).

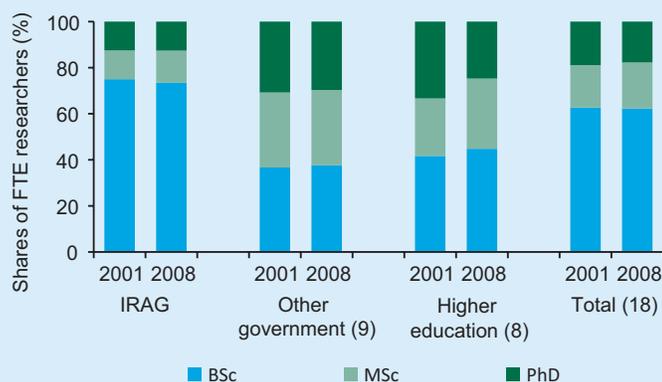
RESEARCH STAFF QUALIFICATIONS AND TRAINING

In 2008, 38 percent of Guinea's agricultural research staff were trained to the postgraduate level, and 18 percent held PhD degrees (Figure 4). Consistent with regional gender trends, PhD-qualified women are underrepresented. In 2008, of all the PhD-qualified agricultural researchers, only 0.2 FTEs were female, compared with 34.3 male FTEs. It should be noted that the overall share of scientists with PhD degrees at IRAG was lower than the corresponding ratio in the other public and higher education agencies. Guinea's low percentage of PhD-qualified researchers can be attributed, on the one hand, to the country's lack of agricultural development and, on the other, to its having been isolated until the mid-1980s. The majority of Guinea's most senior researchers, both at IRAG and elsewhere, completed their studies in the former communist countries of Eastern and Central Europe. Guinean universities do not currently offer PhD-level courses in agricultural and veterinary sciences.

During the 1990s, IRAG's average human resource capacity showed some improvement, but this development halted at the turn of the millennium. The number of PhD-qualified staff employed by IRAG totaled 18 in 2008, but by late 2009, about 30 of IRAG's junior researchers were studying abroad on scholarships financed by France's Aid and Cooperation Fund (FAC). Indeed, FAC grants provided for the training of one PhD student in Montpellier, another in Cameroon, and several MSc-level students in Moroccan, Senegalese, Guinean, or French universities. The first fully qualified researchers are expected to return to Guinea in 2010.

In contrast to many national agricultural research agencies of other African countries, IRAG recognized in time that a large number of its research staff were approaching retirement age.

Figure 4—Researcher qualifications by institutional category, 2001 and 2008



Source: Calculated by authors from IFPRI-IRAG 2009.

Notes: Figures in parentheses indicate the number of agencies in each category. Data exclude expatriate staff employed at IRAG. 2001 data include one government agency that discontinued its research activities in 2003.

ASTI Website Interaction

-  A list of the government and higher education agencies included in this brief is available at asti.cgiar.org/guinea/agencies.
-  Detailed definitions of PPPs, FTEs, and other methodologies employed by ASTI are available at asti.cgiar.org/methodology.
-  The data in this brief are predominantly derived from surveys. Some data are from secondary sources or were estimated. More information on data coverage is available at asti.cgiar.org/guinea/datacoverage.
-  More relevant resources on agricultural R&D in Guinea are available at asti.cgiar.org/guinea.

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Consequently, the recruitment and training of young researchers was given high priority in allocating French project funding through FAC-2 and the Priority Solidarity Fund (PSF). Under these two projects, 11 new researchers were recruited, and 25 junior staff received training. This has yet to solve the problem, however. As it launches a new phase, IRAG's capacity-building efforts continue to focus on its younger researchers. Having developed a new training policy, IRAG now seeks to expand its cooperation program with international centers. Those who wish to participate, including traveling abroad to complete their studies, must sign a contract confirming their commitment to IRAG for at least 10 years. This provision should enable IRAG to avoid the trap, experienced by agencies in other countries, of building human resource capacity only to see it once again eroded as newly qualified staff promptly accept lucrative opportunities elsewhere.

INVESTMENT TRENDS

Expenditures

Since the allocation of research budgets across salaries, operating costs, and capital expenses affects the efficiency of agricultural R&D, detailed cost category data were collected from the government agencies as part of this study. In 2000–08, IRAG spent half of its budget on operating costs, 32 percent on salaries (excluding those for the French and North Korean researchers), and 17 percent on capital expenses (Figure 5). Strong fluctuations marked this entire period, with contractions largely coinciding with the completion of projects financed by the World Bank or France. Expressed in current Guinean francs, IRAG's total expenditures for 2008 were 25 percent lower than

comparable expenses for 2000. However, given the country's high inflation rate during that period, when expressed in real terms, 2008 expenses represented no more than about a quarter of those recorded in 2000. The reason for the particularly low expenditures in 2004 (1 million 2005 PPP dollars) is that in that year the institute received no funding from the French government. Although France resumed its support in 2005 through PSF, overall expenditures declined from 2005 onward, again as a result of high inflation. In addition to the training opportunities discussed above, French funding through FAC and PSF also enabled IRAG to equip four of its regional centers with geographic information systems (GIS) and to develop some of the theme-based research programs (for example, the program on perennial crops).

Three other government agencies involved in agricultural research for which detailed data were available reported similar cost category shares to those of IRAG.

Funding Sources

Agricultural R&D in Guinea derives funding from a variety of sources, including the national government, World Bank loans, foreign donors, and the sale of goods and services. Government support only covers researchers' salaries and a share of operating costs. Funding for research programs must be generated from other sources. As previously mentioned, IRAG's funding during the 1990s and 2000s was highly dependent on five large projects funded by the French government and the World Bank: France's FAC-1 project (1989–93), the World Bank's Agricultural Services Project ASP-1 (1990–94), France's FAC-2 project (1998–2002), the World Bank's NASP (1996–2000), and France's PSF (2003–08). Regional research centers provided additional funding administered through various networks (Figure 6). No further funding has been forthcoming from France since PSF's conclusion in 2008, but the country's current political climate is a disincentive for donors to invest in Guinea. As a result, IRAG and the other Guinean agencies are finding it increasingly difficult to raise research funding.

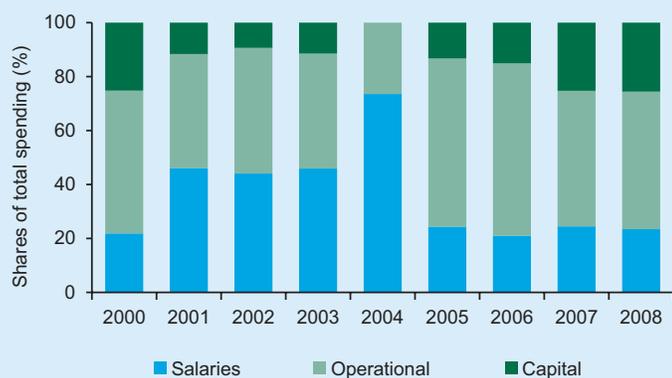
Additional foreign partners that provided funding to IRAG during 2000–08 included the Japan International Research

Center for Agricultural Sciences (JIRCAS), the Africa Rice Center, the International Rice Research Institute (IRRI), and the West and Central African Council for Agricultural Research and Development (CORAF/WECARD) operating through several competitive funds. Unfortunately, the exact amounts contributed by these donors are unknown, so they could not be included in Figure 6. Moreover, France and North Korea provided nonmonetary support to IRAG by permanently outposting research staff to Guinea. Consequently, while the number of foreign researchers working at IRAG fell from 22 to 9 researchers during 2000–08, the overall number of expatriate researchers remained relatively high in Guinea compared with other African countries.

Under PSF, the French project to foster the national research system focusing on agriculture, animal sciences, and fisheries, IRAG received EUR 806,000 (in current prices) between September 2005 and March 2009. The project was carried out under the Department for Scientific and Technological Research (DNRST from the French title) within the Guinean Ministry of Higher Education and Scientific Research. PSF focused on enhancing communication and coordination among the various bodies participating in research, which often resided under different ministries. It also entailed strengthening scientific, technical, and managerial capacities both at IRAG and CNSHB. The project had three components, two focusing on building capacity at IRAG and CNSHB as previously discussed (training of young researchers and guidance on how to organize and manage institutions, structure and run scientific activities, foster scientific partnerships, improve relationships with end-users, and establish and develop research programs on topics of primary importance) and a third specifically focused on nurturing the national research system. DNRST played a major role in implementing this last component, while CIRAD and IRD took the lead in carrying out activities relating to IRAG and CNSHB (MAEE 2004). The project is generally considered a success because of the training opportunities it provided to IRAG.

The future of IRAG, as well as that of Guinea's other R&D agencies, remains highly uncertain based on the country's political climate and the reluctance of donor agencies to maintain their support.

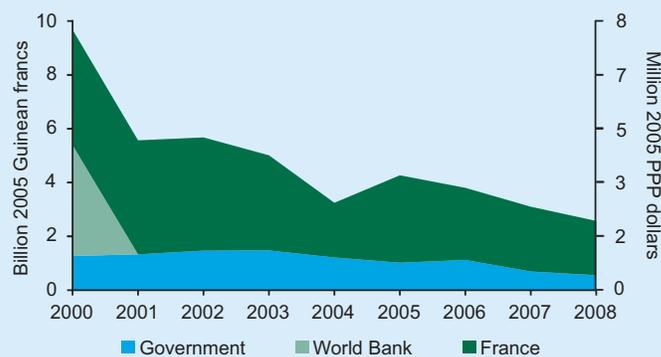
Figure 5— Cost category shares of IRAG, 2000–08



Source: Calculated by authors from IFPRI–IRAG 2009.

Note: Salaries exclude those of expatriate staff employed at IRAG.

Figure 6—Funding sources of IRAG, 2000–08



Sources: Calculated by authors from IFPRI–IRAG 2009 and Stads and Béavogui 2003.

Notes: Data includes donor funding from the World Bank and France. Exact amounts from other donors were unknown and hence had to be excluded. Donor funding from France includes the salaries of CIRAD expatriate staff employed at IRAG.

ALLOCATION OF RESEARCH ACROSS COMMODITIES

Given that the allocation of resources across various lines of research is a significant policy decision, detailed information was collected on the number of researchers working in specific commodity and thematic areas (in FTEs). In 2008, close to half of Guinea's 229 agricultural FTEs for whom data were available conducted crop research (Figure 7). Livestock research occupied 13 percent of all FTEs, while forestry and natural resources research each accounted for 3 percent. Notably, the share of Guinea's researchers conducting fisheries research had fallen to 8 percent in 2008 from 16 percent in 2001 based on contractions at CNSHB. The remainder of Guinea's researchers concentrated on socioeconomic, postharvest, or other research.

Commodity Focus

Rice was the most researched crop in Guinea in 2008, accounting for 21 percent of the FTE researchers involved in crop and livestock research (Table 2). Other important crops included potatoes, coffee, palm oil, corn, and ornamental plants. The Guinean government overtly prioritizes research on food crops over export crops due to the importance of food security. The country's livestock researchers primarily focus on beef, sheep, and goats.

CONCLUSION

During 2000–08, Guinean agricultural staffing levels remained relatively stable. Agricultural R&D expenditures, however, decreased significantly: in 2008, total investments were around

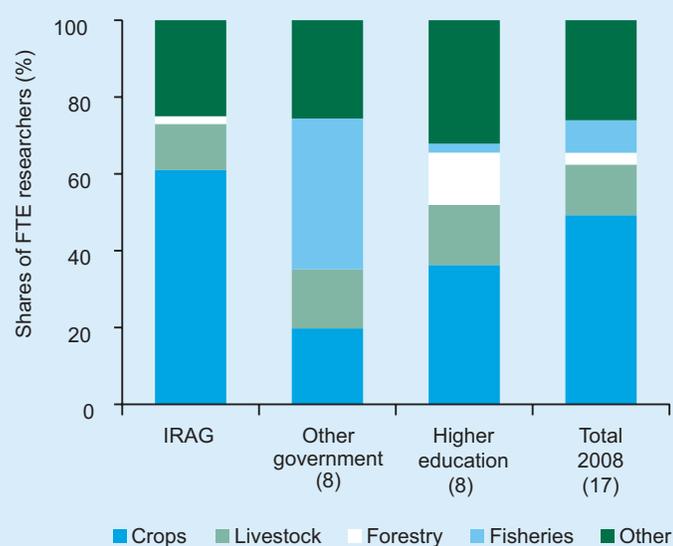
3.9 billion Guinean francs or 3.2 million PPP dollars (in constant 2005 prices), as opposed to 14.0 billion Guinean francs or 11.5 million PPP dollars in 2000. Guinea's principal agricultural research agency, IRAG, was largely responsible for this decline, given its high dependence on donor funding, particularly through consecutive projects led by the World Bank and the French government. The decline in the country's overall agricultural R&D, however, was not only due to reduced donor support, but also reflected cuts in government funding. In 2008, only 0.39 percent of Guinea's AgGDP was invested in agricultural R&D, among the lowest levels recorded in Africa.

Despite the fall in R&D expenditures, two positive developments mark the 2000–08 period: many young IRAG researchers received university training, and the institute was able to develop connectivity to the internet. Nevertheless, Guinea's agricultural R&D agencies face a bleak future due to the country's current political climate, which has affected foreign donors' willingness to support projects in Guinea and made it increasingly difficult for Guinean agencies to secure research funding from other sources. Faced with this situation, the national government will have to considerably increase its financial support to IRAG if the institute is to contribute to achieving food security and reducing poverty. The future of Guinea's agriculture R&D, and ultimately its agricultural development, will therefore be greatly determined by the country's political leaders and decisionmakers.

NOTES

¹ Financial data are also available in current local currencies or constant 2005 US dollars in the ASTI data tool (www.asti.cgiar.org/data).

Figure 7—Research focus by major commodity area, 2008



Source: Calculated by authors from IFPRI–IRAG 2009.

Note: Figures in parentheses indicate the number of agencies in each category.

Table 2—Crop and livestock research focus by major item, 2008

	IRAG	Other government (8)	Higher education (8)	Total (17)
Crop items				
Shares of FTE researchers (%)				
Rice	24.7	2.0	12.4	21.0
Potatoes	12.3	6.7	—	10.8
Coffee	8.2	—	—	6.6
Oilpalm	8.2	—	—	6.6
Maize	6.8	0.6	4.7	5.9
Ornamentals	2.7	—	35.1	4.7
Other crop	20.5	46.9	—	22.3
Livestock items				
Beef	11.0	—	16.2	10.0
Sheep and goats	5.5	—	10.5	5.2
Other livestock	—	43.8	21.1	6.8
Total crop and livestock	100	100	100	100

Source: Calculated by authors from IFPRI–IRAG 2009.

Note: Figures in parentheses indicate the number of agencies in each category.

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IFPRI is one of 15 agricultural research centers that receive their principal funding from governments, private foundations, and international and regional organizations, most of which are members of the Consultative Group on International Agricultural Research (www.cgiar.org).

IRAG is Guinea's principal institute charged with agricultural R&D. The institute was established in 1989 and falls under the administrative coordination of the country's Ministry of Agriculture and Livestock. It holds a broad mandate covering crop, livestock, forestry, and socioeconomic research. To learn more about IRAG visit <http://www.irag-guinee.org/>.

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.

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