

# THE GAMBIA

## RECENT DEVELOPMENTS IN PUBLIC AGRICULTURAL RESEARCH

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Country Note • July 2010

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

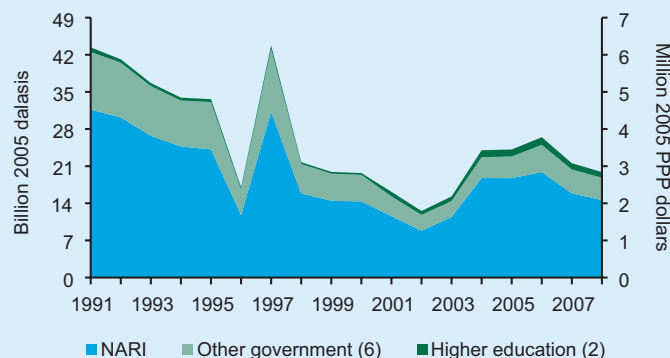
The Gambia is one of Africa's smallest countries, so its agricultural research and development (R&D) capacity and investment levels are understandably low compared with most of its neighbors. The country's total agricultural R&D investment levels have been erratic over the past two decades due to significant fluctuations in government and donor funding. In 2008, The Gambia invested close to 20 billion dalasis or 2.6 million PPP dollars in agricultural R&D, both in 2005 prices (Figure 1; Table 1). Unless otherwise stated, all dollar values in this note are based on purchasing power parity (PPP) exchange rates.<sup>1</sup> PPPs 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. Agricultural R&D capacity levels in The Gambia have contracted somewhat since the turn of the millennium. In 2008, the country employed 38 full-time equivalent (FTE) research staff compared with 42 in 2000 (Figure 2).

The National Agricultural Research Institute (NARI) is the country's principal agricultural research institute, accounting for two-thirds of public agricultural R&D staff and close to three-quarters of agricultural R&D expenditures in 2008. NARI was established in 1993 and is administered by the Ministry

### Key Trends Since 2000

- Levels of agricultural research and development (R&D) investment in The Gambia followed an erratic trend during 2000–08, largely due to annual fluctuations in government allocations and donor support.
- The Gambia's overall agricultural R&D capacity has declined somewhat since the turn of the millennium. The country's agricultural research staff remains among the least highly qualified in West Africa.
- The National Agricultural Research Institute (NARI), the country's main agricultural R&D agency, accounted for two-thirds of public agricultural research staff and close to three-quarters of agricultural R&D expenditures in 2008.
- The role of the private sector in Gambian agricultural R&D is limited.

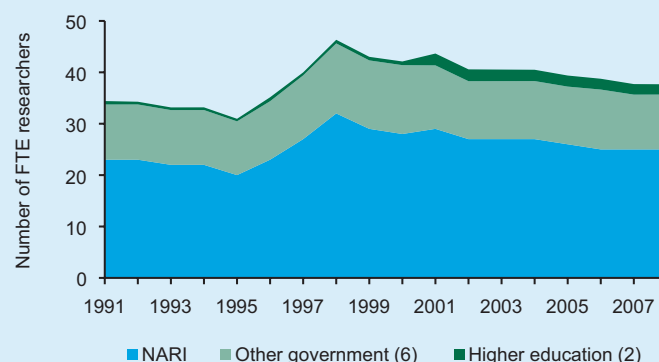
Figure 1—Public agricultural R&D spending adjusted for inflation, 1991–2008



Sources: ASTI–NARI 2009–10 and Stads, Fatajo, and Kunjo 2004.

Notes: Figures in parentheses indicate the number of agencies in each category. The other government category includes the Department of Forestry, which is no longer involved in research. For more information on coverage and estimation procedures, see The Gambia's country page on ASTI's website at <<http://asti.cgiar.org/gambia>>.

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



Sources: ASTI–NARI 2009–10 and Stads, Fatajo, and Kunjo 2004.

Notes: Figures in parentheses indicate the number of agencies in each category. The other government category includes the Department of Forestry, which is no longer involved in research. Data include expatriate researchers employed at NARI in the 1990s and early 2000s.

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

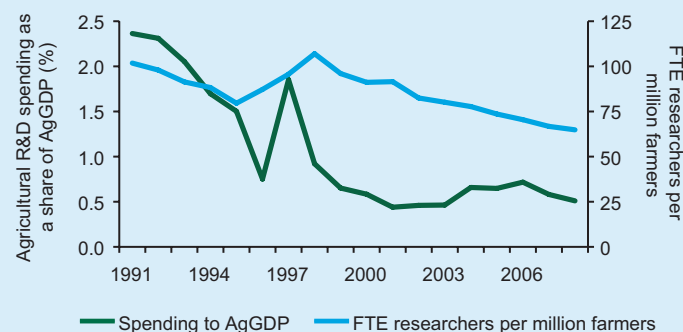
Type of agency	Total spending			Total staffing	
	Dalasis	PPP dollars	Shares	Number	Shares
	(million 2005 prices)	(%)	(%)	(FTEs)	(%)
NARI	14,605.3	1.9	73.5	25.0	66.4
Other government (5)	4,220.3	0.6	21.2	10.7	28.3
Higher education (2)	1,055.4	0.1	5.3	2.0	5.3
<b>Total (8)</b>	<b>19,881.1</b>	<b>2.6</b>	<b>100</b>	<b>37.7</b>	<b>100</b>

Source: ASTI–NARI 2009–10.

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

of Agriculture (MoA). The institute is charged with conducting adaptive and applied research on crops, livestock, forestry, fisheries, and other natural resources; providing technological solutions for producers; and informing policymakers on options for sustainably increasing agricultural productivity while protecting the environment and natural resource base (Stads, Fatajo, and Kunjo 2004). NARI is headquartered in Brikama near the capital, Banjul. These headquarters comprise three laboratories for pest management, soil analysis, and food quality control; a fourth laboratory for seed analysis is currently being inaugurated. In addition, NARI operates one research station in Sapu that addresses the agricultural research needs of the country's eastern region, and one in Yundum addressing the research needs of the western region. The institute also operates several satellite research stations countrywide. In 2008, NARI employed 25 FTE research staff, down from 32 a decade earlier. Total investment levels at NARI dropped with the completion in 1999 of the Agricultural Services Project (ASP), funded through a World Bank loan. Annual investment levels have fluctuated somewhat since, largely due to yearly shifts in government

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



Sources: Calculated by authors from ASTI–NARI 2009–10; Stads, Fatajo, and Kunjo 2004; FAO 2009; and World Bank 2009.

allocations and donor funding. Investments in 2008 totaled 14.6 billion dalasis or 1.9 million PPP dollars (both in 2005 prices).

Five other government agencies were identified as being involved in agricultural R&D in The Gambia. Combined, these five agencies accounted for just over one-fifth of the country's total agricultural R&D investments and close to 30 percent of agricultural R&D staff in 2008. The largest agency in this category is the Department of Fisheries, employing 5 FTE research staff in 2008. It is important to note that most of these researchers are involved in quality control and stock assessment in research laboratories rather than microbiological research. The remaining government agencies are much smaller, and the ad hoc nature of their research activities makes their capacity levels difficult to estimate. In 2008, the Department of Water Resources (DWR) and MoA's Agricultural Planning Services (APS) employed an estimated 2 FTE researchers each. The National Nutrition Agency (NaNA), and the Department of Livestock Services (DLS) employed just 1 FTE researcher each that year.

The higher education sector plays a very limited role in agricultural research in The Gambia, accounting for an estimated share of just 5 percent of total public agricultural R&D staff in 2008. The exact involvement of the higher education sector is very difficult to quantify, as most of their research activities are also ad hoc, either relating to student activities or carried out jointly with NARI or the Université Cheikh Anta Diop (UCAD) in neighboring Senegal. This situation is likely to change in 2011, when the only two higher education agencies involved in agricultural research—the School of Agricultural Sciences of the University of The Gambia and The Gambia College of Agriculture—are scheduled to be merged and be allocated an official annual R&D budget.

Agricultural R&D performed by the private sector in The Gambia is minimal. Many of the larger companies do not employ research staff but instead contract their research out to NARI and other agencies. NARI has active research contracts with Premier Agro Oil, Farmland, and Radville Farm. The only company that conducts (limited) agricultural R&D itself is The Gambia Horticultural Enterprise (GHE) Ltd. The company is involved in horticultural research and employed just 1 FTE researcher in 2008.

In 2008, just 14 percent of agricultural research staff in The Gambia was female (ASTI–NARI 2009–10). NARI is the only institute employing female researchers (1 MSc and 3 BScs in 2008, up from 1 MSc in 2001). That same year, on average, the country

## ASTI Website Interaction

 More details on institutional developments in agricultural research in The Gambia are available in the 2004 country brief at [asti.cgiar.org/pdf/Gambia\\_CB25.pdf](http://asti.cgiar.org/pdf/Gambia_CB25.pdf).

 Underlying datasets can be downloaded using ASTI's data tool at [www.asti.cgiar.org/data](http://www.asti.cgiar.org/data).

 A list of the 6 government agencies and 2 higher education agencies included in this brief is available at [asti.cgiar.org/gambia/agencies](http://asti.cgiar.org/gambia/agencies).

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employed 2.9 technicians, 0.7 administrative support staff, and 3.4 other support staff for each of its agricultural FTE researchers (ASTI–NARI 2009–10).




Total public spending as a percentage of agricultural output (AgGDP) is a commonly used indicator of comparative agricultural R&D spending across countries. Fluctuating between 0.4 and 0.7 percent, The Gambia's agricultural research intensity ratios during 2000–08 were much lower than those recorded a decade earlier. In 2008, the country invested \$0.51 for every \$100 of agricultural output (Figure 3). Similarly, the number of agricultural FTE researchers per million farmers fell from 91 to 65 during this period.

## INSTITUTIONAL STRUCTURE AND POLICY ENVIRONMENT

The institutional structure of agricultural R&D in The Gambia has changed little since the turn of the millennium. NARI continues to dominate, and R&D activities outside NARI are generally small and ad hoc. However, some important changes have taken place in recent years. The national government has begun to recognize the extensive impact that science and technology (S&T) can have on national development, as well as the need to build capacity to increase competitiveness, participate in and partake of today's global knowledge economy, and—importantly—redress the effects of capacity losses over the past decade. To this end, the Ministry of Higher Education, Research, Science and Technology (MoHERST) was established by presidential decree in February 2007 and commenced operations in May 2007. The new ministry consists of three directorates (higher education, research and planning, and science and technology) and is responsible for policy development and the management and coordination of programs and activities to enhance socioeconomic development (MoHERST 2010).

Nonetheless, the government is faced with huge challenges that hinder the accomplishment of its goals and the development of a national S&T system. Although there are close linkages between NARI and MoHERST, NARI is administered by MoA, which limits MoHERST's reach. Further, The Gambia currently lacks a

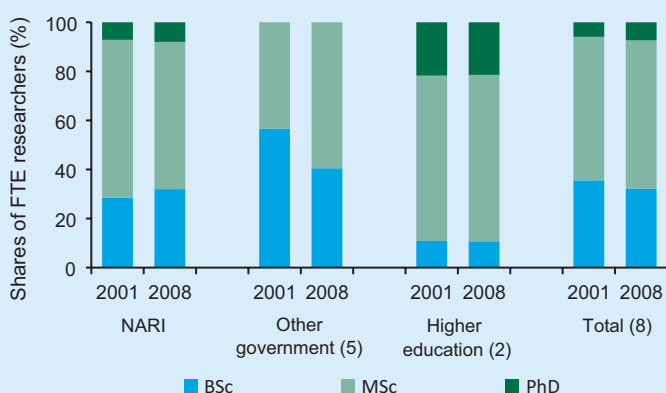
## ASTI Website Interaction

-  Detailed definitions of PPPs, FTEs, and other methodologies employed by ASTI are available at [asti.cgiar.org/methodology](http://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/gambia/datacoverage](http://asti.cgiar.org/gambia/datacoverage).
-  More relevant resources on agricultural R&D in The Gambia are available at [asti.cgiar.org/gambia](http://asti.cgiar.org/gambia).

[www.asti.cgiar.org/gambia](http://www.asti.cgiar.org/gambia)

science, technology, and innovation policy to define national S&T objectives and priorities and to provide a policy framework to underpin socioeconomic development. Other constraints affecting the development of the country's S&T system include limited S&T infrastructure and resources, and a lack of a critical mass of highly trained and competent S&T personnel. To address these shortcomings, the Directorate of Science and Technology was recently established. The directorate is charged with developing S&T policies, as well as managing and coordinating S&T programs and activities. It is also responsible for contributing to the attainment of the country's second Poverty Reduction Strategy Paper (PRSP II) and Vision 2020, two development plans. The directorate's overall goals include accelerating the development of S&T capability and capacity for national competitiveness by increasing the pool of competent R&D staff, and increasing investments in industrial development (MoHERST 2010). Given the relatively recent establishment of MoHERST, it is too early to predict the impact of the abovementioned measures.

**Figure 4—Degree levels of researchers by institutional category, 2001 and 2008**



Source: ASTI–NARI 2009–10.

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

## DEGREE LEVELS AND TRAINING OF RESEARCH STAFF

Agricultural R&D staff in The Gambia is among the least highly qualified in Africa in terms of PhD qualifications. In 2008, just 7 percent of agricultural researchers were trained to the PhD level, and 60 percent held MSc degrees (Figure 4). The University of The Gambia only offers BSc-level training in agricultural sciences, so students are required to travel abroad to pursue higher levels of training. This partly explains the relatively low share of the country's agricultural researchers with postgraduate degrees. In 2008, NARI employed just 2 researchers with a PhD degree, while the remaining agricultural R&D agencies employed none. Despite extensive degree-level training in the 1990s, funded through ASP, NARI has had difficulty retaining its most qualified scientists. During 2003–09, the institute lost 7 PhD-qualified researchers. Some retired or passed away, while others accepted

more lucrative opportunities at Monsanto, foreign universities, or centers of the Consultative Group on International Agricultural Research (CGIAR). Many MSc-qualified staff also left the institute during this period, and this exodus has understandably affected the quality of NARI's work. Many of its current staff members are not well-trained and are relatively inexperienced. PhD qualifications are important for leadership, research quality and development, and networking. This lack has also affected NARI's ability to attract external funding through regional and subregional competitive grant schemes.

The average age of Gambian agricultural scientists is much lower than their colleagues in most other countries in West Africa—one of the negative consequences of the erosion of R&D capacity over the past decade and recent attempts to regain ground through the recruitment and training of young researchers. Another negative consequence of the lack of capacity maintenance over the past decade is the aging population of senior, more experienced scientists, who are fast approaching retirement age. Current efforts to build capacity will ameliorate these issues in the coming years assuming funding levels continue to support these efforts.

In order to redress the lack of qualified agricultural R&D capacity in The Gambia, various initiatives have been launched in recent years. The Strengthening Capacity for Agricultural Research and Development in Africa (SCARDA), financed by the U.K.'s Department for International Development (DFID) began in 2007. This project aims to address research management capacity needs and to strengthen the professional development of agricultural scientists in a number of African countries, including The Gambia. The project also aims to strengthen the institutional and human capacity of African agricultural research systems in order to ensure that they are better able to identify, generate, and deliver research outputs that meet the needs of poor people. SCARDA is coordinated by the Forum for Agricultural Research in Africa (FARA) and is implemented by the West and Central African Council for Agricultural Research and Development (CORAF/WECARD). Ten NARI scientists are currently undergoing MSc-level training abroad (mostly in the United Kingdom) financed through the capacity strengthening program. In addition, one NARI scientist is currently undertaking PhD-level training in Taiwan

as part of a project financed by the Taiwanese government. The African Development Bank (AfDB) also financed MSc-level training for seven NARI scientists in the United Kingdom during 2009/10. In addition, seven students are currently undergoing BSc training at the University of The Gambia, directly funded by NARI. By the end of 2009, 15 NARI researchers were undertaking training abroad, which, while positive, affects the institute's short-term productivity. Many scientists are expected to return to NARI in 2010 and 2011, and will be required to commit to remain at the institute for at least 10 years.

Research staff at some of the other agricultural R&D agencies also received degree-level training as part of donor-financed projects. During 2003–09 for instance, AfDB financed MSc-level training for four staff members and diploma-level training for a further eight staff members of the Department of Fisheries.

## INVESTMENT TRENDS

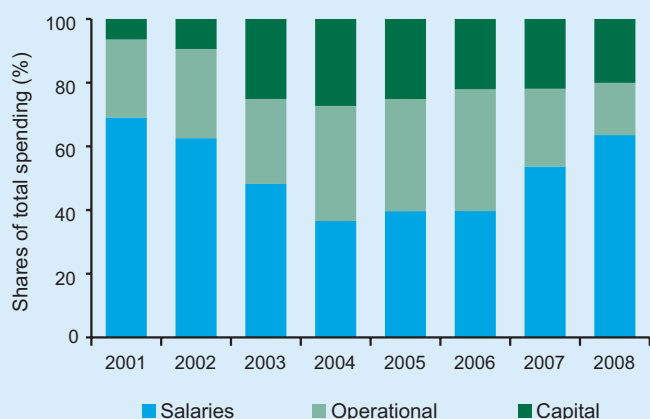
### Cost Categories

The allocation of research budgets across salaries, operating costs, and capital investments affects the efficiency of agricultural R&D, so detailed cost category data were collected from the government agencies as part of this study. During 2001–08, salaries constituted about half of NARI's total expenditures, operating costs accounted for 30 percent, and capital costs represented 21 percent (Figure 5). Before the start of each budget year, NARI submits estimates of revenues required to cover recurrent expenditures, research costs, and capital costs to the Ministry of Finance. Government contributions to NARI have fluctuated in recent years. The government typically pays the salaries of NARI's staff and some recurrent expenditures, but most of the program and capital costs associated with research are financed by foreign donors. The share of capital expenditures has been particularly high in recent years because donor support enabled many of NARI's vehicles to be replaced.

### Funding Sources

Agricultural R&D funding in The Gambia is derived from a variety of sources. During 2001–08, the national government accounted

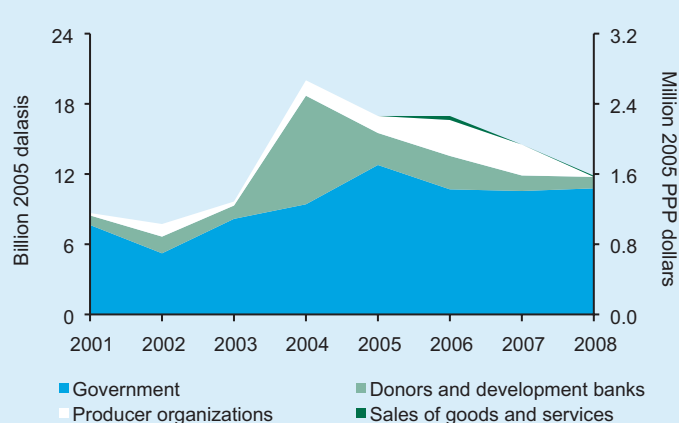
Figure 5— NARI's cost category shares, 2001–08



Source: ASTI–NARI 2009–10.

Note: Salary expenditures of expatriate research staff is excluded

Figure 6— NARI's funding sources, 2001–08



Source: ASTI–NARI 2009–10.

Note: Donor funding includes expatriate salaries.

for 71 percent of NARI's total funding, donors for 19 percent, producer organizations for 10 percent, and internally generated resources for less than 1 percent (Figure 6). Government funding levels follow an irregular pattern, in part because actual government allocations are often higher or lower than originally budgeted as a result of variations in government revenues derived from taxes. The fact that NARI never knows in advance how much funding it will receive from the government makes long-term planning difficult and causes delays in the implementation of activities, as well as research imbalances in certain areas, sectors, or regions. ASP attempted to create a sustainable funding mechanism for NARI—the Gambian Agricultural Research Fund (GARF)—but the endeavor was abandoned due to uncertainty within NARI as to how it should operate.

As previously mentioned, the completion of ASP caused a severe drop in NARI's overall agricultural R&D investment levels at the end of the 1990s. During 2000–08, various other donors funded NARI's agricultural R&D efforts, but overall levels were much lower than during the 1990s. NARI's main donors have been the centers of the CGIAR, notably the Africa Rice Center (AfricaRice) and the International Institute of Tropical Agriculture (IITA), as well as the Permanent Inter-State Committee for Drought Control in the Sahel (CILSS). NARI has also received limited revenues from CORAF/WECARD and FARA through competitive funds. Certain U.S. universities, such as the University of Hawaii, the University of Alabama, and the University of Wisconsin, have financed small projects at NARI. The main source of external support to NARI in recent years has been through AfricaRice's New Rice for Africa (NERICA) program. NERICA is a cultivar of rice developed by AfricaRice to improve the yield of African rice varieties. The program is funded by an AfDB loan and consists of a research support component financing R&D on complementary technologies for NERICA production. The research fund for The Gambia totals roughly US\$ 23,000 for the 2007–12 period.

After years of low funding, NARI's future is looking brighter. The NERICA project is expected to be extended for another five-year period, and the Taiwanese Agricultural Mission recently launched a 2009–12 rice expansion project. The West Africa Agricultural Productivity Program (WAAPP) is also expected to be launched in 2011. WAAPP is financed through World Bank loans

and is coordinated by CORAF and ECOWAS. The program supports crop and livestock research in West Africa. WAAPP was initiated in 2007 and the first phase covered Ghana, Mali, and Senegal. During its second phase, the program will be launched in seven additional countries, including The Gambia. A loan of US\$ 15 million is earmarked for The Gambia and will include a research component, a renovation component, and a competitive fund.

Research at the Department of Fisheries is entirely financed by foreign donors, notably AfDB, the World Wildlife Fund (WWF), the Food and Agriculture Organization of the United Nations (FAO), the International Foundation of the Banc d'Arguin (FIBA), and German Technical Cooperation (GTZ). During the late-1990s, the Department received a sizeable amount of funding for research and training as part of a preferential fisheries treaty with the European Union (EU). Since the completion of this treaty in 1999, no further EU funding has been forthcoming. Research activities by DLS are mostly financed by the government and the International Atomic Energy Agency (IAEA). Over the past few years, IAEA has provided roughly 8,000 Euros per year for research on river valley fever. The International Trypanotolerance Centre (ITC) also assists DLS by providing laboratory technologies for disease diagnosis and food safety analysis. APS is mostly government-funded, although CILSS has provided limited research funds in recent years.

## RESEARCH ALLOCATION

The allocation of resources across various lines of research is a significant policy decision; hence detailed survey information was collected on the number of FTE researchers working in specific commodity and thematic areas. In 2008, close to 60 percent of The Gambia's agricultural researchers were involved in crop research (Figure 7). Fisheries research accounted for 15 percent, livestock research for 14 percent, and natural resources research for 6 percent. The remaining researchers concentrated on postharvest, socioeconomic, and other matters. Of note is the absence of forestry research. Although NARI's official mandate covers forestry, fisheries, and natural resources, in reality it is not involved in these areas due to a lack of capacity and funding.

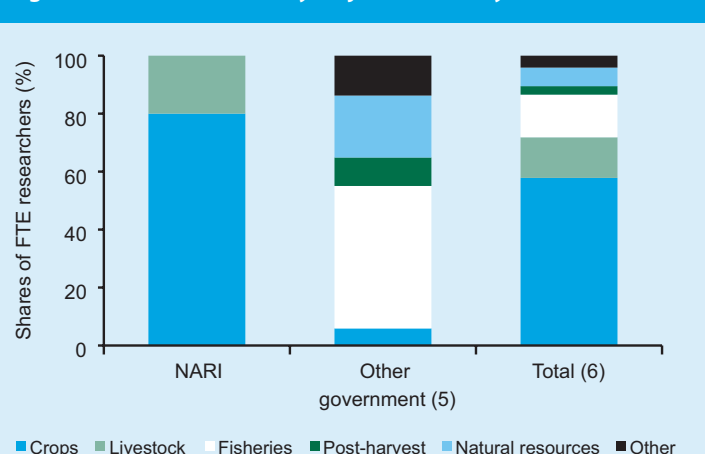
### Commodity Focus

NARI's most researched crop is rice, accounting for roughly a quarter of total crop and livestock research in 2008. Other important crops include maize (17 percent), groundnuts (14 percent), millet (8 percent), fruit (8 percent), and cassava (7 percent) (ASTI–NARI 2009–10). The country's livestock researchers concentrated primarily on beef, sheep and goats, and dairy. The relative share of groundnut research fell considerably in recent years, following a large drop in groundnut production due to climate change and poor marketing.

## CONCLUSION

Public agricultural R&D investments in The Gambia have followed an erratic pattern since the turn of the millennium, largely due to significant yearly fluctuations in government and donor support. In 2008, the country invested close to 20 billion dalasi or 2.6 million PPP dollars (in 2005 prices) in agricultural R&D, or 0.51 percent of its national agricultural GDP. NARI, the country's primary agricultural research agency, accounted for close to three-quarters of these investments. The completion of the large

Figure 7—Research focus by major commodity area, 2008



Source: ASTI–NARI 2009–10.

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

World Bank loan-funded project, ASP, in 1999 prompted a sudden decline in NARI's overall agricultural R&D investment levels. During 2000–08, various other donors funded agricultural R&D at NARI, but at much lower overall levels compared with those of the 1990s. It is expected, however, that funding will increase in the coming years, particularly with the 2011 launching of WAAPP, a new agricultural R&D program financed through a World Bank loan.

The establishment of MoHERST in 2007 was a promising sign that the Gambian government acknowledges the significant role S&T can play in the country's agricultural and overall development. Nonetheless, the creation of a dedicated S&T ministry has not translated into agricultural R&D funding growth. On the contrary, overall agricultural R&D spending levels have gradually fallen since 2006. Attaining some of the country's ambitious national S&T objectives will prove to be extremely difficult without accompanying funding.

One of the principal challenges to effective agricultural R&D in The Gambia is the serious lack of highly trained and competent agricultural scientists. In 2008, NARI employed just 2 PhD-qualified agricultural scientists, while the remaining agricultural R&D agencies employed none. Training of young agricultural scientists to the PhD level should therefore be a top priority in the years to come, as a critical mass of highly qualified research staff is crucial to producing high-level research and to securing future R&D funding, whether through regional competitive funds or other channels.

## NOTES

<sup>1</sup> Financial data in current local currencies or constant 2005 U.S. dollars are also accessible via ASTI's data tool, available at <<http://www.asti.cgiar.org/data>>.

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### IFPRI-ROME

Agricultural Science and Technology Indicators (ASTI) initiative  
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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](http://www.cgiar.org)).

NARI is The Gambia's principal agricultural R&D institute. The institute was established in 1993 and falls under the administrative coordination of the country's Ministry of Agriculture. The institute holds a broad mandate covering crop, livestock, forestry, fisheries, and natural resources research. To learn more about NARI visit <http://www.agrigambia.gm/nari.htm>.

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](http://www.asti.cgiar.org).

The authors thank the 8 agencies that participated in the ASTI survey in The Gambia; without their commitment this country note would not have been possible. The authors also thank Michael Rahija for his research assistance, and Nienke Beintema who provided comments on an early draft of this note. ASTI gratefully acknowledges the generous support from the Bill & Melinda Gates Foundation.

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