

NIGERIA

RECENT DEVELOPMENTS IN AGRICULTURAL RESEARCH

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Country Note • October 2010

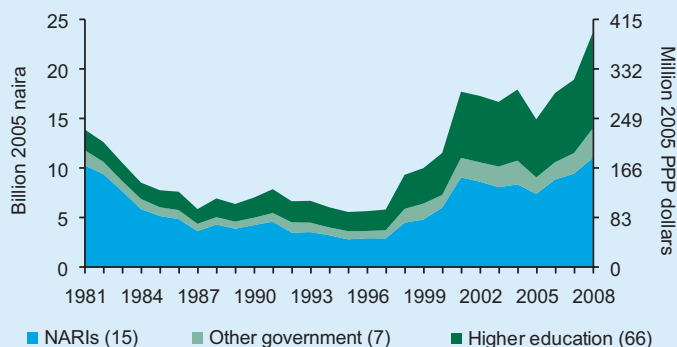
LONG-TERM INVESTMENT AND CAPACITY TRENDS IN AGRICULTURAL R&D

In the mid-1990s, average spending on agricultural research and development (R&D) in Nigeria began to increase substantially. This increase occurred after a long period of declining spending from the mid-1970s until the mid-1990s as a result of unstable and decreasing government contributions to agricultural research (Beintema and Ayoola 2004). The most significant budget cuts largely coincided with the implementation of structural adjustments to Nigeria's economy, featuring privatization and commercialization policies. Spending levels rebounded in the mid-1990s largely due to increased salary levels at the government and higher education agencies, which prompted increases in government contributions. Such contributions continued growing thereafter, resulting in a steep increase in overall spending levels during the 2005–08 period. In 2008, Nigeria spent 24 billion Nigerian naira or 392 million PPP dollars on agricultural R&D (both in 2005 constant prices), which is four times higher than the 1995 spending levels, and twice as much as those of the late-1970s and early 1980s (Figure 1; Table 1). Unless otherwise stated, all dollar values in this note are expressed in purchasing power parity (PPP) prices.¹ PPPs reflect the purchasing power of currencies more effectively than do

Key Trends Since 2000

- Agricultural research and development (R&D) spending in Nigeria doubled during 2000–08, largely as a result of rising salaries, as well as substantial investments in the rehabilitation of research infrastructure and equipment. Although this growth is impressive, the need for research-related infrastructure is still substantial, and the lack (or inadequacy) of research equipment and facilities is still cited as a serious constraint in the conduct of agricultural research.
- Capacity grew from about 1,300 full time equivalent (FTE) researchers in 2000 to more than 2,000 FTEs in 2008. However, during this time the composition of research staff shifted, on average, toward those qualified to the BSc-level only as opposed to the MSc or PhD levels.
- The higher education sector is playing an increasingly important role in agricultural R&D in Nigeria; in contrast, nonprofit and for-profit private companies have minimal involvement.
- Agricultural R&D is primarily funded by the national government, supplemented by donors and internally generated revenues from the sale of goods and services.
- A hiring freeze during the 1990s has created a gap between senior staff approaching retirement age and newly hired junior staff in need of training. Although the freeze was lifted in the late-1990s, recruitment efforts were delayed at certain agencies.

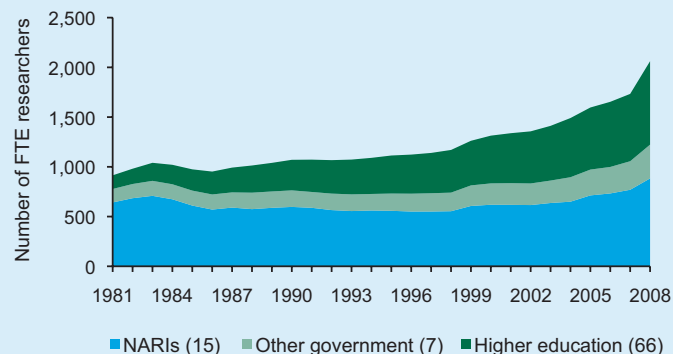
Figure 1—Agricultural R&D spending adjusted for inflation, 1981–2008



Sources: Calculated by authors from ASTI-FIF-ARC 2009–10 and Beintema and Ayoola 2004.

Notes: For more information on coverage and estimation procedures, see the Nigeria country page on ASTI's website at asti.cgiar.org/nigeria. Figures in parentheses indicate the number of agencies in each category.

Figure 2—Agricultural research staff in full-time equivalents, 1981–2008



Sources: Calculated by authors from ASTI-FIF-ARC 2009–10 and Beintema and Ayoola 2004.

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

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

Type of agency	Total spending			Total staffing	
	Naira	PPP dollars	Shares	Number	Shares
	(million 2005 prices)	(%)	(%)	(FTEs)	(%)
NARIs (15)	11,022.6	183.0	46.7	883.3	42.8
Other government (7)	2,976.2	49.4	12.6	340.0	16.5
Higher education (66)	9,598.2	159.4	40.7	838.7	40.7
Total (88)	23,597.0	391.8	100	2,062.0	100

Sources: Compiled by authors from ASTI-FIF-ARC 2009–10 and Beintema and Ayoola 2004.
 Notes: Figures in parentheses indicate the number of agencies in each category. Data for 38 higher education agencies were estimated using the agencies' combined 2000 share.




standard exchange rates because they compare the prices of a broader range of local—as opposed to internationally traded—goods and services.

Agricultural research capacity also grew after the mid-1980s, at first gradually, and then sharply after 1998 with the cessation of a hiring freeze. This growth affected both the government and higher education sectors, but was more intensive in the higher education sector. By 2008, the country's research capacity totaled 2,062 full-time equivalent (FTE) researchers (Figure 2). In addition, the country employed a large number of FTE technicians with university degree qualifications, but who do not have an official researcher status (see section on degree qualifications on pages 4–5).

Significant variation in spending and capacity was reported across agencies with some experiencing uneven growth and others negative growth from the 1990s. Nigeria now has the largest agricultural R&D system of all countries in Sub-Saharan Africa in terms of investments and numbers of researchers.

A large number of different government and higher education agencies are involved in agricultural research in Nigeria. The Agricultural Research Council of Nigeria (ARC) coordinates agricultural research undertaken by 15 national agricultural research institutes (NARIs) that together account for almost half of the country's agricultural R&D expenditures and 43 percent of its research capacity. These institutes include the Institute for Agricultural Research (IAR), the Institute of Agriculture Research and Training (IAR&T), the Lake Chad Research Institute (LCRI), the Cocoa Research Institute of Nigeria (CRIN), the National Agricultural Extension-Research Liaison Service (NAERLS), the National Animal Production Research Institute (NAPRI), the National Cereals Research Institute (NCRI), the National Institute for Freshwater Fisheries Research (NIFFR), the Nigerian Institute for Oil Palm Research (NIFOR), the National Institute of Horticultural Research (NIHORT), the Nigerian Institute for Oceanography and Marine Research (NIOMR), the National Root Crops Research Institute (NRCRI), the National Stored Products Research Institute (NSPRI), the National Veterinary Research Institute (NVRI), and the Rubber Research Institute of Nigeria (RRIN). In 2008 the largest of these agencies

ASTI Website Interaction

-  More details on institutional developments in agricultural research on Nigeria are available in the 2004 country brief at asti.cgiar.org/pdf/nigeria_CB10.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/nigeria/datatrends.

www.asti.cgiar.org/nigeria

were NVRI and NIOMR, employing 140 and 118 FTE researchers, respectively. NAERLS was the smallest of the NARIs, employing 21 FTE researchers in 2008, followed by LCRI, NAPRI, and NIFFR, each employing 26 FTE researchers in 2008.

In addition to the NARIs, seven other government agencies accounted for 13 percent of national agricultural R&D spending and 16 percent of research capacity in 2008. These agencies are the Federal Institute of Industrial Research, Oshodi (FIIRO); the Forestry Research Institute of Nigeria (FRIN); the National Centre for Genetic Research and Biotechnology (NACGRB); the National Research Institute of Chemical Technology (NARICT); the Nigerian Institute of Social and Economic Research (NISER); the National Institute for Trypanosomiasis Research (NITR); and the Projects Development Institute (PRODA). In 2008 the number of researchers employed at these agencies ranged from 20 FTEs at NISER to 84 at NACGRB.

Total combined spending at the government agencies declined substantially during the 1980s and 1990s as a result of the aforementioned unstable and decreasing government funding. In 1995, spending totaled 3 million naira compared with 10 million in 1981 (both in 2005 prices). As a result of the NARIs' financial crisis and an accompanying recruitment freeze during the 1990s, combined FTE researcher numbers dropped to 550–560 FTEs in the late-1980s and early 1990s (Beintema and Ayoola 2004).

For the current study, we identified 88 agricultural higher education agencies (including specialized universities, agricultural faculties, and smaller units), but, regrettably, a number of the smaller entities failed to provide data. Consequently, research capacity for the higher education sector was estimated to be 839 FTE researchers based on the 34-percent share reported in the 2004 study by Beintema and Ayoola (2004). The faculties of agriculture and veterinary medicine of Ahmadu Bello University, the University of Ibadan, the University of Nigeria, and Obafemi Awolowo University (the country's four older universities), continue to dominate the sector's contribution to agricultural research. Nevertheless, their combined research capacity has declined slightly due to the introduction of new higher education agencies, which attracted staff away from the

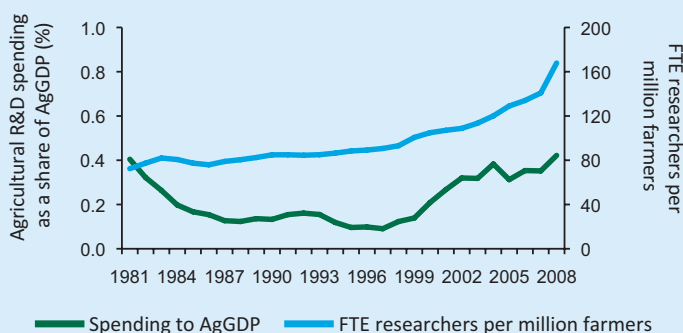
older universities. Many of these newer universities are private or state-based universities that primarily focus on BSc-level training, do not offer MSc- or PhD-degrees, and conduct only limited research. In addition, many of the senior professors and other academic staff at the older universities retired during 2000–08. In 2008, the older agencies accounted for 27 percent of total number of FTE researchers, which is slightly less than the 30-percent share reported around the turn of the millennium. Beintema and Ayoola (2004) concluded that despite the high number of higher education agencies involved in agricultural R&D in Nigeria, their individual capacities in terms of FTE researchers was very small. This remained the case in 2008 for some agencies, but for others capacity had increased: at least 11 higher education units employed between 25 and 50 FTE researchers in 2008 compared with only 3 in 2000.

Nonprofit and for-profit private companies, although involved in some collaboration with government and higher education agencies, were found to have minimal involvement in agricultural R&D in Nigeria. Beintema and Ayoola (2004) reported that in the early 2000s only a few seed companies conducted minor research activities, mostly related to varietal testing, while a number of agro-industrial companies funded some adaptive research at the government agencies. This lack of involvement was thought to stem from lack of incentives, long approval processes for new varieties, and political instability, and these conclusions appear to remain valid. In addition, unstable agricultural commodity prices, and low and uncertain demands for inputs like seeds, fertilizers, and pesticides have further hampered the involvement of the private sector. Consequently, analyses in this country note exclude the nonprofit and private sectors.

Female researchers constituted 23 percent of total agricultural research staff in Nigeria in 2008 (ASTI-FIF-ARCN 2009–10). The share of female staff varied significantly across government and higher education agencies and changed somewhat compared with the 18 percent share reported in 2000 (ASTI-FIF-ARCN 2009–10; Beintema and Ayoola 2004).





On average, the support-staff-per-researcher ratio decreased from 6.3 in 2001 to 4.2 in 2008 (ASTI-FIF-ARCN 2009–10) and comprised 1.6 technicians, 0.9 administrative staff, and 1.6 other support staff. Compared with the government agencies, ratios in the higher education sector were lower, averaging less than one supporting staff member for every researcher—a common

Figure 3—Intensity of agricultural research spending and capacity, 1981–2008



Sources: Calculated by authors from ASTI-FIF-ARCN 2009–10; Beintema and Ayoola 2004; World Bank 2009; FAO 2009.

ASTI Website Interaction

-  A list of all government and higher education agencies included in this brief is available at asti.cgiar.org/nigeria/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/nigeria/datacoverage.
-  More relevant resources on agricultural R&D in Nigeria are available at asti.cgiar.org/nigeria.

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phenomenon across countries, given that research is a secondary activity at the higher education agencies.

An often-used indicator to compare agricultural R&D spending across countries is the research intensity ratio—that is total agricultural R&D spending as a percentage of agricultural output (AgGDP). In Nigeria, the ratio declined sharply in the 1980s as spending on agricultural R&D contracted, but rebounded from 1998, reaching its highest point in 2008 (Figure 3). In that year, for every \$100 of agricultural output, \$0.42 was invested in agricultural R&D. Compared with other countries, however, Nigeria’s level of investment is low. For example, the ratios in Ghana, Uganda, and Kenya were \$0.94, \$1.40, and \$1.43, respectively. In contrast, Nigeria outpaced many other countries in terms of agricultural FTE researchers per million farmers. This ratio increased gradually over time, reaching 168 researchers per million in 2008.

INSTITUTIONAL STRUCTURE AND COLLABORATION

The main structural change in Nigeria’s agricultural R&D system between 2000 and 2008 was the creation of ARCN as a parastatal under the Federal Ministry of Agriculture and Rural Development (FMARD). Although the law re-establishing ARCN was passed in 1999, the Council’s Executive Secretariat was not instituted until the end of 2006. Prior to this, the 15 NARIs were overseen by the Agricultural Sciences Department (ASD) under FMARD. The creation of ARCN was intended to improve coordination issues, improve linkages between research and production, and redress overlaps in mandates within the NARIs, while at the same time

refocusing agricultural research to increase productivity and develop improved technologies. ARCN's specific purpose is to supervise, coordinate, and regulate agricultural research, training, and extension. In addition, ARCN is responsible for ensuring that the national agricultural research agenda is well integrated into the subregional, regional, and global research agendas. Future plans over the next decade include standardizing operations; ensuring that research is demand-driven, responsive to clients, and results-oriented; and above all promoting competitiveness and profitability.

The remaining government agencies continue to be administered by their respective ministries. FIIRO, PRODA, NACGRB, NARICT, and NITR fall under the Federal Ministry of Science and Technology (FMST), whereas FRIN reports to the Federal Ministry of the Environment, and NISER to the National Planning Commission in the Office of the President.

As indicated earlier, the older entities are still the main providers of agricultural research in the higher education sector. Only one of the newer agencies, the Faculty of Agriculture at the University of Abuja (established in 2006), was identified as conducting agricultural research activities in Nigeria.

Collaboration among agencies at national, regional, and international levels is integral to Nigerian agricultural research. Government and higher education agencies often collaborate on research projects. Collaboration or contracting with nonprofit agencies or private companies also occurs, for example, with the Centre for Environment, Renewable Natural Resources Management, Research and Development (CENRAD). In addition, many projects are jointly implemented with centers of the Consultative Group on International Agricultural Research (CGIAR), including the International Maize and Wheat Improvement Center (CIMMYT), the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), the International Institute of Tropical Agriculture (IITA, headquartered in Ibadan), the International Livestock Research Institute (ILRI), the International Food Policy Research Institute (IFPRI), and Bioversity International.

At the regional level, Nigeria is a member of the West and Central African Council for Agricultural Research and Development (CORAF/WECARD). It also participates in continental initiatives such as the African Union Commission's specialized technical office for the promotion of agricultural research for development in semi-arid Africa (SAFGRAD) and the Forum for Agricultural Research in Africa (FARA). Nevertheless, significant scope remains for Nigeria to maximize the benefits of international collaboration for the benefit of agricultural development.

RESEARCH STAFF QUALIFICATIONS AND TRAINING

The composition of agricultural research staff in Nigeria has shifted since 2001 toward junior staff qualified at the BSc level only; whereas researcher numbers increased across all degree levels, the number of BSc-qualified researchers increased faster, doubling since 2001. As a result, the share of PhD-qualified staff fell from 39 to 35 percent between 2001 and 2008, and the share of MSc-qualified staff fell from 40 to 37 percent (Figure 4). The number of female researchers increased across all degree levels, but most notably the number of PhD-qualified female researchers increased from 38 FTEs in 2001 to 70 FTEs in 2008,

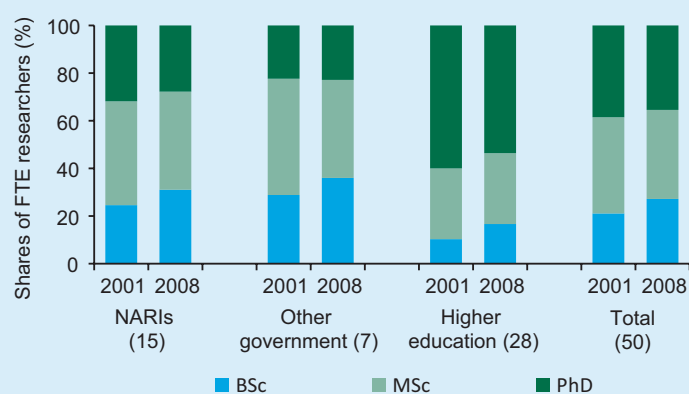
representing 15 percent of the PhD-qualified researchers (ASTI-FIF-ACRN 2009-10; Beintema and Ayoola 2004).

At the 15 NARIs, 28 percent of researchers held PhD degrees in 2008, while 41 percent were trained to the MSc level. There was, however, variation among the agencies, ranging from a 7 percent PhD share at NVRI to a 78 percent share at NAPRI (because NAPRI is based at Ahmadu Bello University). In comparison, the other government agencies reported shares of PhD-qualified researchers ranging from 15 to 33 percent. Universities worldwide generally have a higher share of staff with PhDs, and this holds true in Nigeria, where 54 percent of the FTE researchers in the higher education sector held PhD degrees in 2008, while 30 percent held MSc degrees.

As previously mentioned, Nigerian agricultural R&D agencies employ a large number of FTE technicians with university degree qualifications, but who do not have an official researcher status. In 2008, the government agencies combined employed 8 FTE technicians with PhD degrees, 30 with MSc degrees, and 306 with BSc degrees (Figure 5). From 2001 to 2008, the number of FTE technicians with degrees has grown at a slightly slower rate as total FTE researchers in the government sector.

The previously discussed hiring freeze has created a gap between senior staff approaching retirement age and junior staff requiring training. Although the freeze was lifted in the late-1990s, funding delays negatively affected numerous agencies, particularly in the higher education sector; NAERLS and NAPRI, for example, did not begin recruitment until 2010. The researcher pool in Nigeria is generally weighted toward older staff; in 2007, 62 percent of researchers were over 40 years old, and one-third were over 50 years old (ASTI-AWARD 2008). Consequently, many highly qualified staff are due to retire in the next five to 10 years. This could well leave the NARIs facing a human resource vacuum because it is likely to take at least five years for recent recruits to attain PhD degrees. At NIFOR, for example, recruitment has accelerated considerably in the past few years, but more than 20 researchers and half the current number of laboratory technicians are expected to retire in the next decade (NIFOR 2009).

Figure 4—Qualifications of researchers by institutional category, 2001 and 2008



Source: Calculated by authors from ASTI-FIF-ACRN 2009-10.
Notes: Figures in parentheses indicate the number of agencies in each category. Data include researchers only and hence exclude FTE technicians with degrees employed at the government and higher education agencies (see figure 5).

Many researchers obtain their PhD degrees from Nigerian universities because those who are already employed at research agencies can attend part-time with fees waived. Other researchers attend universities abroad in countries such as Canada, China, the Netherlands, the United Kingdom, and the United States, but opportunities for overseas training are limited by funding. One internal funding initiative, although not specific to agriculture, is the Educational Trust Fund (ETF), which was established in 1993 to promote projects that would improve the quality of the country's education. The fund is financed through a 2-percent tax on profits of companies registered in Nigeria. Universities submit proposals for training activities/facilities and infrastructure development. The ETF has faced some challenges, however, as not all universities eligible for funding have applied, and at times the funds have supplanted other forms of income as opposed to supplementing it as intended. In addition, there are issues with the collection of tax revenues and the management of the projects (ETF 2010).

INVESTMENT TRENDS

Expenditures

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.

Salaries as a share of total expenditures at the NARIs decreased from 62 percent in 2001 to 43 percent in 2008 (Figure 6). This reflects growth in capital expenditures, which doubled during the period, reaching 46 percent of total spending in 2008. Operating costs represented 11 percent of total spending in 2008.

At the other government agencies, salaries also constituted at least half of all expenditures. Despite recent increases in capital investments, research-related infrastructure needs are considerable, and lack of appropriate research equipment and facilities is still cited as a serious constraint to agricultural research in Nigeria. Inadequate and poorly timed disbursement of budgeted funding also remains an issue.

Salaries in the higher education sector (in inflation-adjusted terms) increased significantly from the 1990s. The influence of trade unions was key to this rapid growth. In 1996, for example, a prolonged nationwide strike prompted a negotiated settlement by the unions amounting to a 100-percent salary increase. Similarly, in 2003 a 20-percent increase in median salaries was implemented across the board. The latest adjustments resulted from a 2009 strike agreement between the government and unions that provided for a significant increase in the allowable benefits paid to academic researchers. However, implementation of the agreement was delayed in some cases because universities were required to generate the extra funding needed themselves, and some were unable to do so.

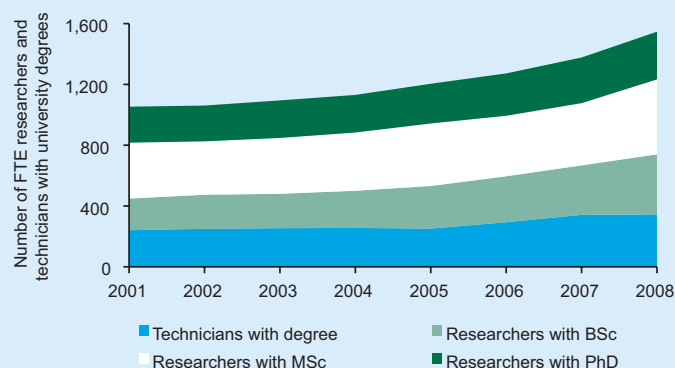
Funding Sources

Agricultural R&D in Nigeria is primarily funded by the government, supplemented by contributions from donors and internally generated revenues from the sale of goods and services. The government has significantly increased its funding to the NARIs and other government agencies since the late-1990s, which is reflected in the growth in expenditures. These increases have enabled salary increases and investments in new equipment and the rehabilitation of facilities. Nonetheless, the increased funding followed many years of underinvestment, and levels are still below those required to restore facilities to former levels and sustain the country's agricultural research needs.

Donor funding is minimal in Nigeria compared with many other African countries. There are currently no large-scale donor programs funding agricultural R&D. The World Bank was a major provider of funding in the 1990s, supporting the National Agricultural Research Project (NARP) from 1992 until 1999. Despite some achievements, the project received an unsatisfactory rating due to mismanagement and lack of counterpart funding, and this led to the cessation of further funding (see Beintema and Ayoola 2004).

The International Fund for Agricultural Development (IFAD) provided major funding for the Roots and Tubers Expansion Program (RTEP) from 2001 to 2009. At a cost of US\$36 million, the program focused on smallholder production of crops

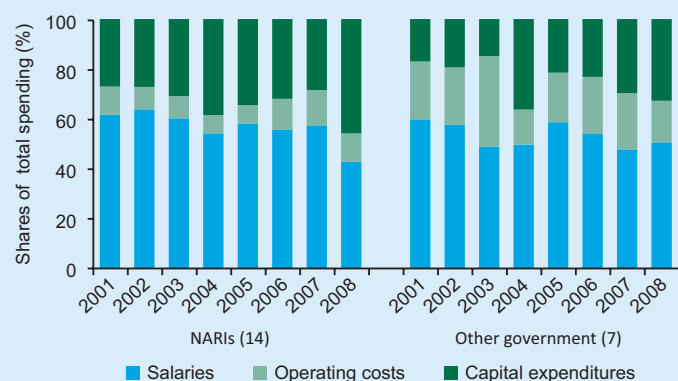
Figure 5—Trends in FTE researchers and technicians with a university degree at the government agencies, 2001–08



Source: Calculated by authors from ASTI-FIF-ARCN 2009–10.

Note: NAERLS was excluded due to lack of data.

Figure 6—Cost category shares of NARIs and other government agencies, 2001–08



Source: Calculated by authors from ASTI-FIF-ARCN 2009–10.

Note: IAR was excluded from NARI agencies due to lack of data.

such as cassava and yams through four main components: the development of improved root and tuber production technologies, the multiplication of improved planting material, improved adaptive research and extension, and the diversification of cassava-processing technologies and methods. Agencies such as NRCRI and NSPRI benefitted from the program (IFAD 2010).

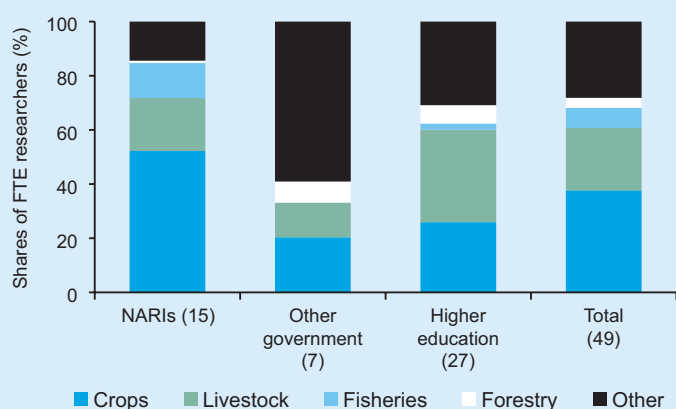
Other donors to agricultural research in Nigeria included the Food and Agriculture Organization of the United Nations (FAO), the United Nations Development Programme (UNDP), the United Nations Industrial Development Organization (UNIDO), the U.K. Department for International Development (DFID), the Canadian International Development Agency (CIDA), the French Agricultural Research Centre for International Development (CIRAD), the Ford Foundation, Sasakawa Global 2000, the Alliance for a Green Revolution in Africa (AGRA), the Common Fund for Commodities (which launched a research project at RRIN in 2009), and the World Cocoa Foundation.

ARCN operates a competitive grant scheme for agricultural research (CARGS). The scheme has three components. First, contract grants are awarded to priority projects addressing needs identified by ARCN. Second, research grants are available to institutions and individuals that submit proposals. Finally, it is expected that grants will promote partnerships between the NARIs and farmer organizations, civil society groups, and private companies to help develop innovative processes and products (ARCN 2009). CARGS has yet to be implemented, however. The first set of applicants have yet to be announced, so it will be some time before awards are determined and funds distributed.

Funding of research in the higher education sector is generally considered the responsibility of the government. As indicated earlier, allocations to the sector are still low, forcing faculty staff to seek their own funding, which can compromise the focus of research.

Weak linkages among end users of research limit funding from the private sector. Research on cash crops, for example, would best be funded and driven by local industries—such as cocoa, oil palm, rubber, and cotton—benefiting from their production.

Figure 7—Research focus by major commodity area, 2008



Source: Calculated by authors from ASTI-FIF-ARCN 2009–10.

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

RESEARCH ALLOCATION

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).

The focus of agricultural research in Nigeria was predominantly crops and livestock. In 2008, 38 percent of researchers were involved in crop research, and 23 percent in livestock research. Other important areas were fisheries (7 percent of researchers) and forestry (4 percent of researchers; Figure 7).

Commodity Focus

Taking a closer look at crop and livestock research, cassava was the most heavily researched crop with a share of 6 percent of total FTE crop and livestock researchers at the NARIs, and an 8 percent share at the higher education agencies. Other important crops at the NARIs included oil palm, fruit, yams, rice, coconut palm, maize, and vegetables, with shares ranging from 2 to 5 percent (Table 2). Maize was the second most researched crop at the higher education agencies (7 percent) followed by vegetables (4 percent). Within livestock research, the NARIs focused almost equally on poultry, beef, and swine, with shares of 6 percent of total FTE crop and livestock researchers. The higher education agencies predominantly focused on poultry research, (10 percent), followed by beef and swine (6 percent each).

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

	NARIs (12)	Higher education (27)	Total (39)
Crop items	Shares of FTE researchers (%)		
Cassava	6.3	7.8	6.8
Maize	2.4	7.1	4.1
Oil palm	5.3	2.3	4.2
Fruits	4.8	2.4	4.0
Vegetables	2.3	3.9	2.9
Yam	3.4	1.8	2.8
Rice	3.2	0.6	2.2
Coconut palm	3.1	0.5	2.1
Other crops	42.0	16.8	32.9
Livestock items			
Poultry	6.2	10.2	7.7
Beef	6.4	5.9	6.2
Swine	6.4	5.9	6.2
Other livestock	8.2	34.9	17.8
Total crop and livestock	100	100	100

Source: Calculated by authors from ASTI-FIF-ARCN 2009–10.

Notes: Figures in parentheses indicate the number of agencies in each category. Three NARIs and five other government agencies conducted no crop or livestock research. Two other government agencies, NACGRB and NITR, conducted crop and livestock research, but specific commodity shares were not clear from the data. This table excludes 38 higher education agencies for which data were unavailable.

Thematic Focus

In 2008, crop genetic improvement accounted for 11 percent of total FTE researchers, while 6 percent of researchers focused on crop pest and disease control (Table 3). Livestock genetic improvement and livestock pest and disease control were also major themes (6 and 8 percent of total FTE researchers, respectively). The thematic focus of the remaining researchers included natural resources, farming systems, food safety, socioeconomics, capacity training, agricultural engineering, and postharvest issues.

Table 3—Research focus by major theme, 2008

	NARIs (14)	Other government (7)	Higher education (28)	Total (49)
Shares of FTE researchers (%)				
Crop genetic improvement	12.0	15.5	9.1	11.5
Crop pest and disease control	7.5	—	6.2	5.9
Other crop	8.8	—	10.0	7.9
Livestock genetic improvement	4.2	9.3	7.3	6.0
Livestock pest and disease control	11.3	8.4	4.3	8.5
Other livestock	6.7	—	16.0	8.9
Soil	2.7	—	7.6	3.9
Water	2.4	—	2.6	2.1
Other natural resources	1.6	7.0	0.7	2.1
Postharvest	6.9	—	4.2	4.9
Other	36.0	59.9	31.9	38.3
Total	100	100	100	100

Source: Calculated by authors from ASTI-FIF-ARCN 2009–10.

Notes: Figures in parentheses indicate the number of agencies in each category. This table excludes 1 government agency and 38 higher education agencies for which data on thematic focus were unavailable.

CONCLUSION

After a period of stagnation in the late-1980s and early 1990s, investments in Nigeria's public agricultural R&D increased substantially around the turn of the millennium. Adjusted for inflation, investments doubled from 12 million naira in 2000 to 24 million in 2008 (in 2005 prices). This growth included increased researcher salaries and substantial investments for the rehabilitation of research infrastructure and equipment. Despite these increased investments, research-related infrastructure needs remain significant, and the lack of research equipment and facilities are still cited as serious constraints to agricultural research in Nigeria. Furthermore, the country's agricultural research spending intensity—measured as public agricultural R&D investment as a share of agricultural output—remains low compared with a number of key African countries (around 0.4 percent). In addition, commercialization of research outputs remains limited.

Along with the growing investment, Nigeria's public agricultural research capacity also increased between 2000 and 2008, resulting in growth in FTE researcher numbers from about 1,300 to more than 2,000. Notably, the role of the higher education sector in agricultural research increased during this period. In contrast, the role of the nonprofit and private for-profit sector in agricultural research remains very small.

The increases in research capacity and investment are positive signs of growing support for agricultural R&D. In addition, the establishment of ARCN should have a constructive influence on research by strengthening collaboration, lessening duplication, and hopefully encouraging even greater support, in particular from non-governmental sectors like the private sector. However, one disconcerting capacity trend (stemming from the long-term recruitment freeze) is the shift away from senior, well-qualified researchers toward more junior researchers qualified to the BSc level only. In addition, structural challenges caused by the many years of underinvestment remain. Consequently, addressing infrastructure and training needs will be especially critical in the years to come.

NOTE

¹ Financial data are also available in current local currencies or constant 2005 U.S. dollars via ASTI's Data Tool, available at www.asti.cgiar.org/data.

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The authors thank the 50 agricultural research agencies that participated in the ASTI-FIF-ARCEN survey, without whose commitment this country note would not have been possible. The authors also thank Michael Rahija for his research assistance and Aliyu Abdullahi, Celestine Ikuenobe, and Gert-Jan Stads for valuable comments on an early draft of this note. ASTI gratefully acknowledges the generous support from the Bill & Melinda Gates Foundation.

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