

ZAMBIA

RECENT DEVELOPMENTS IN AGRICULTURAL RESEARCH

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Country Note • July 2010

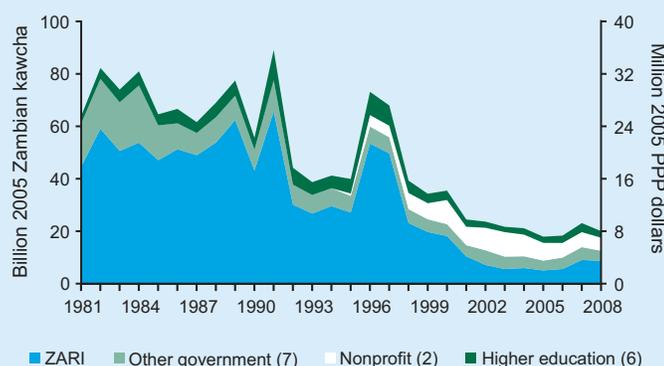
LONG-TERM INVESTMENT AND CAPACITY PATTERNS IN AGRICULTURAL R&D

After three decades of fluctuating but overall diminishing public agricultural research and development (R&D) spending in Zambia, the downward trend of investment accelerated during 2001–08. In 2008, Zambia spent 20 billion kwacha or 8 million PPP dollars on public agricultural R&D, both in 2005 constant prices (Figure 1, Table 1), compared with 24 billion kwacha or about 10 million PPP dollars in 2001, and 89 billion kwacha or 37 million PPP in 1991. 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 standard exchange rates because they compare the prices of a broader range of local—as opposed to internationally traded—goods and services. Public agricultural R&D capacity increased in the 1980s, then experienced a sharp decline in the early 1990s (Figure 2). A period of growth in the mid-1990s was then followed by another period of contraction, up through 2006, primarily due to a government-sector hiring freeze imposed from 2002 until 2007. When recruitment resumed, research capacity grew quickly and returned to mid-1990s levels by 2008, with a total of 209 full-time equivalent (FTE) research staff employed that year.

Key Trends Since 2000

- Zambia’s historical trend of declining public agricultural research and development (R&D) investments continued during 2001–08 due to weakened government and donor support.
- The country’s agricultural research capacity also deteriorated during 2001–06, both in terms of numbers of full-time equivalent researchers and levels of educational qualifications. This can largely be attributed to a government-sector hiring freeze during 2002–07, after which staff numbers once again began to rise, but predominantly in the category of junior (BSc-qualified) staff.
- The most significant institutional change in Zambia’s public agricultural research system was the 2005 upgrade of the Soil and Crops Research Branch (SCRB) to a ministerial department under the name Zambia Agricultural Research Institute (ZARI).
- Funding for agricultural research in Zambia is primarily derived from the national government, supplemented by limited support from foreign donors and development bank loans. Government funding, however, is largely allocated to salaries and overhead, making it crucial that agencies secure donor funding for operating and capital costs related to research.

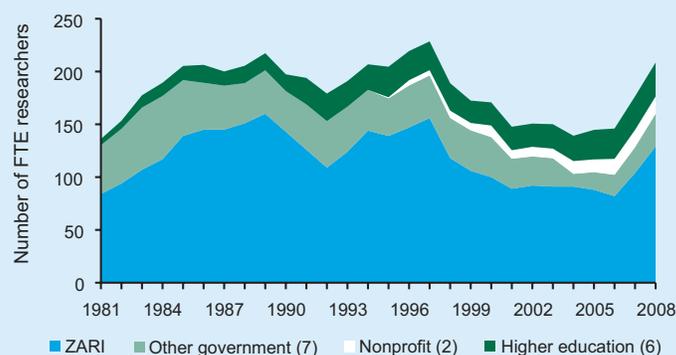
Figure 1—Public agricultural R&D spending adjusted for inflation, 1981–2008



Sources: Calculated by authors from ASTI 2009 and Beintema et al. 2004.

Notes: Figures in parentheses indicate the number of agencies in each category. Total agency sample includes two government agencies that discontinued research activities before 2008. For more information on coverage and estimation procedures, see the Zambia country page on ASTI’s website at asti.cgiar.org/zambia.

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



Sources: Calculated by authors from ASTI 2009; Copperbelt University 2010; and Beintema et al. 2004.

Notes: Figures in parentheses indicate the number of agencies in each category. Total agency sample includes two government agencies that discontinued research activities before 2008. Data include expatriate research staff employed at ZARI/SCRB in the 1980s and early 1990s.

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

Type of agency	Total spending			Total staffing	
	Zambian kwacha	PPP dollars	Shares	Number	Shares
	(million 2005 prices)		(%)	(FTEs)	(%)
Public					
ZARI	8,679.2	3.6	43.3	129.0	61.9
Other government (5)	3,851.7	1.6	19.2	31.0	14.9
Nonprofit (2)	4,983.0	2.1	24.9	16.4	7.9
Higher education (6)	2,514.0	1.0	12.6	32.1	15.4
Subtotal public (14)	20,028.0	8.3	100	208.5	100
Private (3)	na	na	—	3.5	—
Total (17)				212.0	

Sources: Compiled by authors from ASTI 2009 and Copperbelt University 2010.
 Notes: Figures in parentheses indicate the number of agencies in each category. NA indicates that sufficient information was not available.

The Zambia Agriculture Research Institute (ZARI) is the country’s primary agricultural research agency, accounting for 43 percent of public agricultural R&D spending and 62 percent of total research capacity in 2008. Although the number of researchers increased between 2001 and 2008 (89 FTE researchers compared with 129), the overall share changed little. Research staff growth mainly occurred during 2007–08 in response to the end of the hiring freeze. Agricultural research spending at ZARI decreased from 10 billion kwacha in 2001 to 9 billion in 2008 (both in constant 2005 prices). Spending had fallen to historical lows of around 5–6 billion kwacha during 2003–06, but rebounded somewhat during 2007–08.

Five other government agencies conduct agricultural research in Zambia: the Central Veterinary Research Institute (CVRI), the Central Fisheries Research Institute (CFRI), the Sustainable Use of Underutilised Genetic Resources Unit (SUUGR), the Livestock and Pest Research Centre (LPRC), and the Post Harvest Food Processing and Nutrition Unit (PHFPN). In 2008, these five government agencies accounted for 15 percent of Zambia’s public agricultural research capacity and 19 percent of its spending. The overall capacity at these five agencies declined during 2001–08 in terms of FTE researcher numbers compared with the nonprofit and higher education agencies.

Two nonprofit agencies conduct agricultural research in Zambia. The first, the Golden Valley Agricultural Research Trust (GART), which focuses on crop and livestock technologies that impact on smallholder productivity, more than doubled its research capacity between 2001 and 2008 to 15 FTE researchers, whereas the second, the Cotton Development Trust (CDT), employed only 1 FTE researcher in 2008. Together, these nonprofit agencies account for 8 percent of the country’s agricultural researchers. The nonprofit sector’s share of expenditures fluctuated during this timeframe, but accounted for a quarter of all public agricultural R&D spending in Zambia in 2008.

Six higher education agencies that conduct agricultural research were identified in Zambia. In 2008, the University of Zambia (UNZA) and Copperbelt University (CBU) were responsible for 15 percent of FTE researchers. UNZA is Zambia’s main university, comprising four units that conduct agricultural research: the School of Agricultural Sciences (SAS), the School of Veterinary Medicine (SVM), the Department of Agricultural Engineering or DAE (within the School of Engineering), and the Institute of Economic and Social Research (INESOR). In 2008, SAS employed 13 FTEs, SVM employed 8 FTEs, and DAE and INESOR employed 2 FTEs each. Two units under CBU conduct agricultural research: the Department of Forest Resources Management and the Department of Wood Science and Technology, both housed within the School of Natural Resources. Together, these units employed 7 FTE researchers in 2008.

Zambia has several long-established private enterprises involved in agricultural research,² but their combined capacity in terms of FTE researchers is quite small, and fell from 10 FTE researchers in 2000 to only 4 in 2008. These enterprises primarily focus on the seed production and marketing of maize, wheat, and soybeans. Three businesses involved in agricultural research were identified in 2008: the Zambia Seed Company (ZamSeed); MRI Seed Zambia, Ltd. (MRI); and the Seed Company of Zambia (Seed Co.). Dunavent Zambia, Ltd., which is a subsidiary of the multinational cotton producing company Dunavent, ceased research activities in Zambia in 2003 and hence is not included in this study. CDT, which was established in 1999, has assumed responsibility for cotton research and seed multiplication in Zambia.

In a 2008 sample of nine public agricultural research agencies in Zambia, almost a quarter of all FTE researchers were female—a significant increase over the 9 percent share reported in 2000 (ASTI 2009; Beintema et al. 2004). ZARI was largely responsible for this shift, increasing its share of female researchers from 5 percent in 2000 to 20 percent in 2008. Shares of female researchers varied significantly at the other government and higher education agencies.

The ratio of support staff to researchers decreased on average from 5.6 in 2001 to 3.9 in 2008 (ASTI 2009), comprising

ASTI Website Interaction

- More details on institutional developments in agricultural research on Zambia are available in the 2003 country brief at asti.cgiar.org/pdf/Zambia_CB18.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/zambia/datatrends.

www.asti.cgiar.org/zambia

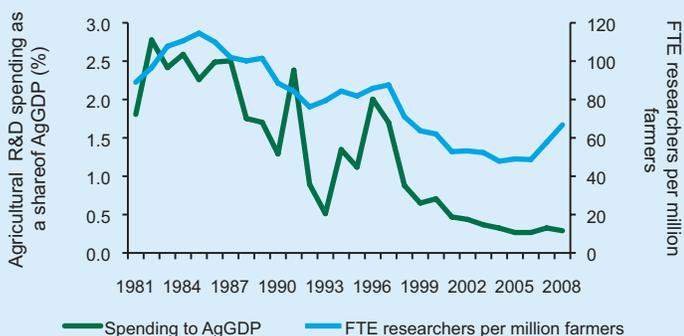
1.2 technicians, 0.7 administrative staff, and 2.0 other support staff. The nonprofit agencies reported high ratios of support staff to researchers (12.0 at GART and 8.0 at CDT), whereas the higher education sector employed only 1 to 2 support staff per researcher on average in 2008—a consistent and understandable finding given that research is not their primary mandate.

Intensity ratios are commonly used to compare agricultural R&D spending and capacities across countries. One indicator of public research intensity is total agricultural R&D spending as a percentage of agricultural output (AgGDP). Zambia's agricultural intensity ratio continued a sharp decline from the 1990s. In 2008, for every \$100 of agricultural output the country only invested \$0.29 in agricultural R&D, down from \$0.47 in 2001 (Figure 3). This decline was the combined result of increasing AgGDP and declining agricultural R&D spending. The ratio of agricultural researchers to farmers also declined to a low of 48 FTE researchers for every million farmers in 2005, before improving again in 2007, and finally reaching 67 FTE researchers per million farmers in 2008 based on the recommencement of staff recruitment in the government sector.

INSTITUTIONAL STRUCTURE AND POLICY ENVIRONMENT

The main change in the institutional structure of public agricultural R&D in Zambia since 2000 is the transformation of the Soil and Crops Research Branch (SCRB) under the Department of Research and Specialist Services (DRSS), which was administered by the Ministry of Agriculture, Food, and Fisheries (MAFF). In 2005, SCRB became ZARI, a department under the renamed Ministry of Agriculture and Cooperatives (MACO). ZARI comprises four technical divisions: Crop Improvement and Agronomy, Soil and Water Management, Plant Protection Quarantine, and Farming Systems and Social Sciences. The upgrade included an expanded management team from a single deputy director, to a director and two deputies—one to oversee the four technical divisions, and the other to centrally coordinate research services and zonal development programs, while maintaining a focus on Zambia's three agroecological regions. ZARI operates nine agricultural research stations with outreach

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



Sources: Calculated by authors from ASTI 2009; Beintema, et al. 2004; Copperbelt University 2010; World Bank 2009; and FAO 2009.

ASTI Website Interaction

-  A list of the 6 government agencies, 2 nonprofit, 6 higher education, and 3 private agencies included in this brief is available at asti.cgiar.org/zambia/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/zambia/datacoverage.
-  More relevant resources on agricultural R&D in Zambia are available at asti.cgiar.org/zambia.

www.asti.cgiar.org/zambia

programs to focus on local constraints. It was originally intended that ZARI would be given semiautonomous status (Elliott and Perrault 2006) to increase its ability to charge for services and directly attract donor funding; as it stands, however, ZARI continues to operate as a department under MACO.

Other significant changes since 2000 involved the restructuring of MACO, which resulted in the creation of a separate ministry for livestock and fisheries that now administers both CFRI and CVRI. Previously, forestry research was conducted by the Forestry Research Branch (FRB) under the Ministry of Environment and Natural Resources. In 1995, CBU was requested to run FRB as a research and training entity and in 2004, it became part of CBU.

The National Institute for Scientific and Industrial Research (NISIR) manages SUUGR, LPRC, and PHFPN. Some of its programs and units underwent reorganization since 2000. SUUGR was formed from the Tree Improvement Research Centre, while PHFPN had previously been known as the Food Technology Research Unit. The Water Resources Research unit merged with the unit dealing with energy and the environment. Responsibility for NISIR falls under the Ministry of Science, Technology, and Vocational Training (MSTVT). The Science and Technology Policy of 1996 that established NISIR also established the National Science and Technology Council (NSTC) under MSTVT. The legislation enacting the policy allowed for the centralization of all agricultural research activities under the management of MSTVT and under the coordination of NSTC, but MAFF was reluctant to relinquish its research mandate (Elliott and Perrault 2006). In 2009, MSTVT revised the 1996 policy. The new policy

confirms that overall regulation and coordination of science and technology activities in the country is the responsibility of NSTC and MSTVT, but that the line ministries are responsible for the development and implementation of the activities (MSTVT 2009).

The two nonprofit agencies in the sample, GART and CDT, are technically public–private partnerships resulting from a desire by both the government and foreign donors to promote the privatization of agricultural research. Although GART and CDT are autonomous, they maintain links with MACO and receive some funding from the government. GART was established in cooperation with the Zambian National Farmers Union in 1993 and has developed a strong partnership with UNZA. CDT was created in 1999 with a specific focus on cotton research. Two other trusts, the Livestock Development Trust and the Lyambai Agricultural Development Trust were established in 2002, but they focus on training and commercial activities and hence were not included under this study.³

Forestry research is now officially administered by CBU, as previously mentioned. Further, CBU's role in agricultural research may increase in the years to come because the recent expansion of its School of Natural Resources to include degrees in agroforestry, wildlife management, and fisheries and aquaculture.

Collaboration among agencies at national, regional, and international levels is integral to Zambian agricultural research. Numerous projects on a range of commodities and themes are implemented jointly with centers of the Consultative Group on International Agricultural Research (CGIAR). ZARI participates in a number of South African Development Community (SADC) regional networks, such as the SADC Plant Genetic Resources Center (SPGRC) and its Food, Agriculture, and Natural Resources (FANR) Directorate, as well as the Southern Africa Root and Tuber Research Network (SARRNET), and the African Center for Fertilizer Development (ACFD). UNZA belongs to the Regional Universities Forum for Capacity Building in Agriculture (RUFORUM) and the SADC Bean Research Network (Haazele 2008).

PUBLIC RESEARCH STAFF QUALIFICATIONS AND TRAINING

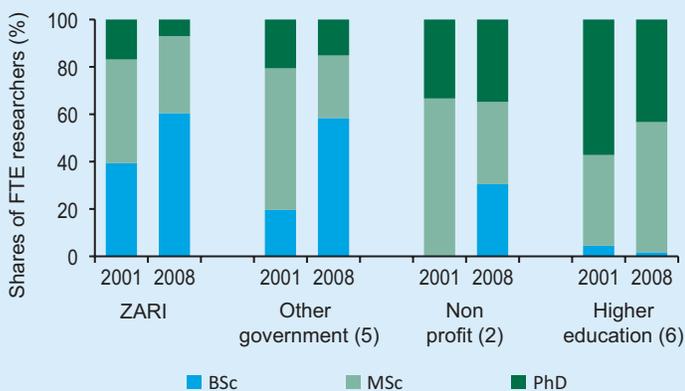
Half of all the public agricultural researchers employed in Zambia in 2008 were trained to the postgraduate level, a significant shift from 2001 when 70 percent of researchers held postgraduate degrees (Figure 4). The increasing share of BSc-qualified staff at ZARI and other government agencies stems from the aforementioned government-sector hiring freeze; lack of appropriate training opportunities; and the concurrent reduction in the number of senior researchers based on losses to other agencies, retirement, or death. The loss of PhD-qualified researchers particularly affected ZARI, where the number of PhD-qualified staff fell from 15 FTEs in 2001 to 9 in 2008. The number of female researchers with PhD degrees changed little, although the share shifted significantly given that the majority of newly hired female researchers were BSc-qualified (ASTI 2009; Beintema et al. 2004). A recent ZARI report noted a number of constraints to hiring and retaining qualified staff, including inadequate compensation and benefits, low morale, a slow recruitment process, and a lack of an established staff training program (ZARI 2009). Public agricultural research institutions in many developing countries are facing similar challenges because agencies in the higher education sector, the private sector, and abroad are able to offer more lucrative packages, often under more attractive conditions.

The general increase in the number of BSc-qualified researchers was even more apparent at the other government agencies and GART. Overall, the share of BSc-qualified staff at the other government agencies increased from 20 percent in 2001 to 58 percent in 2008. At GART, the increase in researchers with BSc degrees equalized shares of all three types of degree qualifications.

As is the case in most universities in Africa and other regions of the world, a greater share of staff in the higher education sector in Zambia have postgraduate degrees compared with government agencies. The number of staff with PhDs remained relatively stable during 2001–08, but an increase in the number of MSc-qualified staff caused a shift in the share of staff with PhD degrees from 57 percent in 2001 to 43 percent in 2008. MSc-qualified faculty staff now represent more than half of the FTE research staff at the agricultural higher education agencies. Again, this structural shift stems from the retirement of many PhD holders while newly recruited staff have had limited training opportunities. In addition, the high proportion of PhD-qualified staff reported during the late-1990s and early 2000s resulted from training programs supported by the U.S. Agency for International Development (USAID), the World Bank, and the Swedish International Development Cooperation Agency (Sida), but no programs have been offered in more recent years.

The majority of technicians in the government, nonprofit, and higher education sectors held some type of diploma or degree, but relatively few held BSc or higher degrees. At ZARI, for example, no technicians held BSc or higher degrees in 2008, whereas 195 technicians had some other type of diploma or degree (ASTI 2009).

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



Sources: Calculated by authors from ASTI 2009 and Copperbelt University 2010.
Notes: Figures in parentheses indicate the number of agencies in each category. Data are for researchers only and therefore exclude 2 FTE technicians holding BSc degrees in the higher education sector.

INVESTMENT TRENDS IN PUBLIC AGRICULTURAL R&D

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. On average, at least half of all expenditures at ZARI and the other government agencies during 2001–08 were allocated to salaries (Figure 5). In 2008, expenditures at ZARI were evenly split between salary and nonsalary costs.⁴ The 4 billion kwacha (in constant 2005 prices) spent on operating and capital costs by ZARI represented a significant increase over the 2006 levels of only 1 billion kwacha. The government began investing in capital improvements at ZARI in 2008, but at a fraction of the levels recorded in the late-1990s (Beintema et al. 2004). In a recent report by ZARI, lack of infrastructure was noted as a major constraint to research, particularly in terms of lack of laboratory equipment and vehicles, and inadequate buildings, staff housing, irrigation, and communication facilities (ZARI 2009). Delays in and shortfalls from budgeted funding were also cited as significant constraints, both from the government and from foreign donors. Given the size of the country, transportation costs are also a continual challenge for ZARI and other agencies.

Funding Sources

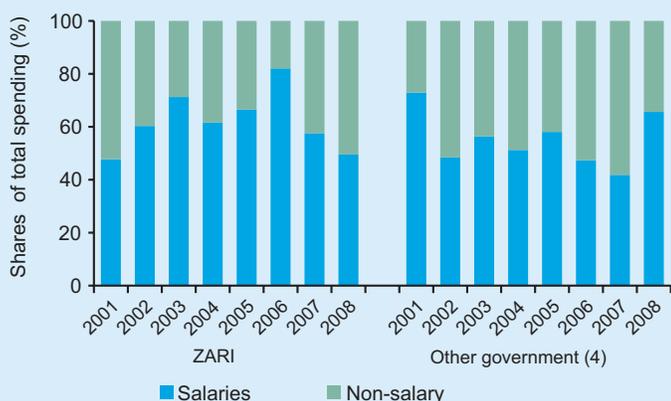
Agricultural R&D in Zambia was primarily funded by the government, supplemented by foreign donors and minor contributions on the part of the agencies through the sale of goods and services. In 2008, 96 percent of funding for ZARI was supplied by the national government, with donors contributing 4 percent (Figure 6). Donor funding to ZARI that year represented a third of the amount contributed in 2001. Other government agencies received higher shares of funding from donor agencies and through the sale of goods and services. In general, government funding mainly supports salaries and overhead, making donor funding crucial to the support of operating and capital costs associated with research.

A recent public expenditure review notes that it is difficult to accurately identify the levels of donor funding to MACO because financial reports often omit such data (Orlowski et al. 2010). The review does estimate that 78 percent of donor funding to MACO in 2009 was provided by three major donors: the African Development Bank, the World Bank, and the European Union. Other donors to agricultural research agencies in Zambia include the International Fund for Agricultural Development (IFAD), the Food and Agriculture Organization of the United Nations (FAO), the Norwegian Agency for Development (NORAD), the governments of France and Finland, Sida, USAID, the Japan International Cooperation Agency (JICA), the Department for International Development (DFID), the International Atomic Energy Agency (IAEA), 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), the International Livestock Research Institute (ILRI), the International Center for Agricultural Research in the Dry Areas (ICARDA), and the World Resources Institute.

In the nonprofit sector, the government and foreign donors contributed most of CDT’s funding, but a small amount was derived from cotton producer organizations such as the Zambia Cotton Ginners Association. In contrast, GART only received a small share of its funding from the government, given that its major source of funding is the sale of goods and services, including commercial farming and contract research. GART also received donor funding from the governments of Norway and Sweden and the UN Common Fund for Commodities (GART 2008).

The World Bank was a major source of funding to agricultural research in Zambia during the 1990s and early 2000s, providing loans through projects co-financed by the government and other donors. The first project, the Zambia Agricultural Research and Extension Project (ZAREP), began in 1987 and provided US\$40 million in funding for infrastructure, staff training, and improved institutional management and collaboration (Beintema et al. 2004). The Agricultural Sector Investment Program (ASIP), which took a broader sectoral approach, followed from 1996 until 2001 (World Bank 1995). The agricultural research component of this project, which totaled US\$35 million, focused on supporting

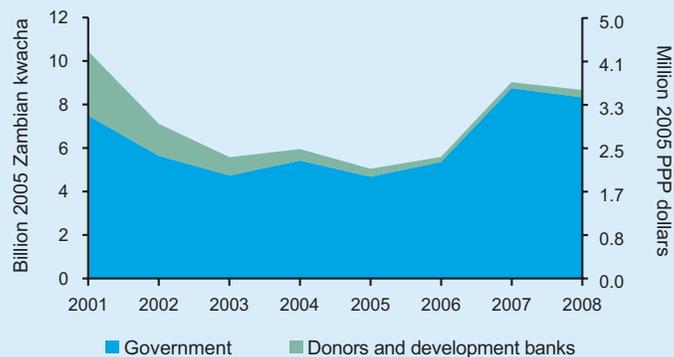
Figure 5—Cost category shares of ZARI and other government agencies, 2001–08



Source: Calculated by authors from ASTI 2009.

Notes: Figures in parentheses indicate the number of agencies in each category. CVRI was excluded from the sample of other government agencies.

Figure 6—Funding sources of ZARI, 2001–08



Source: Calculated by authors from ASTI 2009.

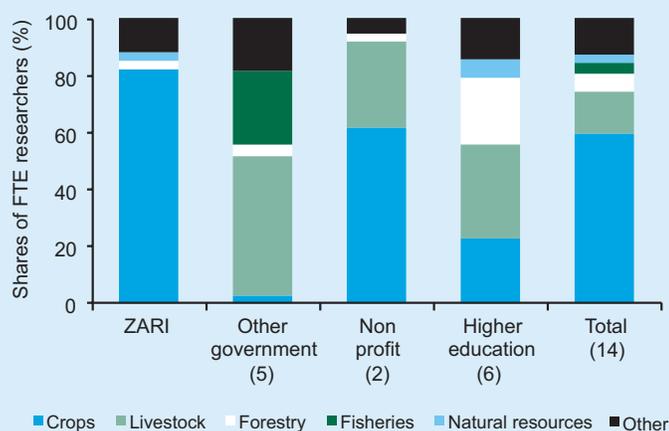
privatization through the creation of GART, funding staff training, and re-equipping and rehabilitating the country's research stations.

There were no large-scale donor-funded projects from 2002 to 2006, so funding levels declined significantly. In 2006, the World Bank-funded Agricultural Development Support Project (ADSP) began, which is expected to run until 2012 at a total project cost of US\$37 million (World Bank 2006). ADSP focuses on market-oriented development, supporting feeder roads and agro-industry. A small amount of funding is allocated to agricultural research and extension. ZARI and CDT were named as beneficiaries of the institutional development component of the project, with budgets of US\$0.8 and US\$1.5 million, respectively.

A number of competitive grants are available for agricultural R&D in Zambia. The Agricultural Innovation Fund (AGRIFU) is one such source of funding, for CDT and other agencies. Details on the size and scope of this fund were unavailable, however. There are two competitive funds for research managed by NSTC on behalf of MSTVT: the Strategic Research Fund (SRF) and the Youth Innovators Fund (YIF) (NSTC 2010). SRF grants aim to support research projects on an institutional basis, whereas YIF supports individuals or groups of researchers between the ages of 15 and 35 years. Another fund—the Science and Technology Development Fund (STDF)—was enacted in 1997, but it is not yet operational. It is intended that STDF grants will target individual researchers or agencies, and could fund postgraduate research studies, capacity building, research-related travel, and various research projects. In contrast with AGRIFU, agriculture is one of several priority areas of these three funds.

Funding for agricultural research at universities is derived from diverse sources. As a public institution, UNZA, for example, solicits research funding through competitive grants at both the institutional and individual levels. At the university level, the Directorate of Research and Postgraduate Studies oversees institutional-level efforts to raise funding, whereas individuals can source funding by responding to (local or international) public announcements or by securing research on a contract basis.

Figure 7—Research focus by major commodity area, 2008



Source: Calculated by authors from ASTI 2009.

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

ALLOCATION OF PUBLIC RESEARCH ACROSS THEMES AND 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).

The predominant focus of agricultural research in Zambia was crops. In 2008, 59 percent of researchers were involved in crop research, while 15 percent focused on livestock, 6 percent focused on forestry, 4 percent focused on fisheries, and 3 percent focused on natural resources (Figure 7). These shares shifted somewhat from 2000, when crop research accounted for half the country's FTE researchers, and natural resources was the focus of 11 percent of researchers (Beintema et al. 2004).

Commodity Focus

Taking a closer look at crop and livestock research, maize was the most heavily researched crop, accounting for 18 percent of the crop researchers at ZARI and 20 percent of crop and livestock researchers at GART (Table 2). Other important crops included sorghum, cassava, fruit, and vegetables. At CVRI and LPRC—the government agencies with livestock research mandates—dairy and beef were the major areas of research. Researchers at GART and the higher education agencies also spent significant time on livestock research, with poultry being their primary focus.

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

	ZARI	Other government (3)	Nonprofit (2)	Higher education (2)	Total (8)
Crop items	Shares of FTE researchers (%)				
Maize	18.3	—	20.4	7.2	15.3
Sorghum	12.2	—	10.0	10.8	10.6
Fruits	12.2	0.7	—	2.2	8.7
Cassava	11.0	2.4	1.0	1.4	8.0
Vegetables	9.8	—	—	1.4	6.8
Soybeans	6.1	—	—	—	4.2
Groundnuts	6.1	—	—	—	4.2
Wheat	4.9	—	3.0	2.9	4.0
Other crops	19.5	2.2	32.8	15.1	18.5
Livestock items					
Dairy	—	28.4	12.0	10.0	5.3
Beef	—	28.4	—	12.7	4.4
Poultry	—	5.1	13.0	16.8	3.7
Other livestock	—	32.8	8.0	19.5	6.4
Total crop and livestock	100	100	100	100	100

Source: Calculated by authors from ASTI 2009.

Notes: Figures in parentheses indicate the number of agencies in each category. Two government and four higher education agencies in the total public agency sample of 14 did not conduct crops or livestock research.

Thematic Focus

Crop research dominates in terms of thematic focus at ZARI and in the nonprofit sector. In 2008, crop genetic improvement and crop pest and disease control each accounted for 7–8 percent of FTE researchers (Table 3). Natural resources themes were also strong at ZARI and in the higher education sector, resulting in a 9 percent share of FTE researchers focusing on soil issues, 7 percent focusing on water issues, and 9 percent focusing on other issues related to natural resource research (including forestry). The remaining researchers focused on issues related to socioeconomics, farming systems, storage and processing, and other postharvest issues. A majority of researchers at CVRI, CFRI, and LPRC focused on livestock and fisheries genetic improvement and pest and disease control.

Table 3—Research focus by major theme, 2008

	ZARI	Other government (5)	Nonprofit (2)	Higher education (6)	Total (14)
Shares of FTE researchers (%)					
Crop genetic improvement	9.0	—	3.8	6.2	6.8
Crop pest and disease control	12.0	—	1.7	2.1	7.9
Other crop	19.0	6.6	36.4	2.1	15.9
Livestock genetic improvement	—	35.5	—	0.8	5.4
Livestock pest and disease control	—	31.5	9.1	19.5	8.4
Other livestock	—	—	18.3	12.9	3.4
Soil	12.0	0.1	9.1	4.3	8.8
Water	8.0	9.7	—	2.3	6.7
Other natural resources	6.0	8.1	—	23.4	8.5
Other	34.0	8.4	21.5	26.4	28.0
Total	100	100	100	100	100

Source: Calculated by authors from ASTI 2009.

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

CONCLUSION

Long-term trends indicate a serious decline in investment in agricultural R&D in Zambia. Public agricultural R&D spending fell to an historical low of 18 billion kwacha or 7 million PPP dollars in 2005 (both in 2005 constant prices), compared with 52 billion kwacha or 22 million PPP dollars per year on average during the 1990s. Although expenditures recovered slightly in 2007, spending was still low in 2008.

The combined effects of a government-sector hiring freeze and lack of training opportunities resulted in significant erosion of research staff capacity. Although staffing levels increased to 209 FTE researchers in 2008, the composition shifted towards junior rather than senior researchers, meaning those holding BSc rather than PhD degrees. ZARI was particularly affected by a reduction in the number of PhD-qualified researchers.

In addition to training and capacity limitations, ZARI and the other government research agencies have also faced challenges in supporting the operating and capital costs associated with research. A number of needs have been identified at ZARI, such as infrastructure, laboratory equipment, communication facilities, and vehicles. Delays and reductions in the disbursement of budgeted funding from both the national government and foreign donors continue to constrain the efficient management of research funding.

Although GART has been successful in generating funding through the sales of goods and services, as well as attracting donor funding and strengthening linkages with UNZA, other trusts within the nonprofit sector have not fared as well. They were originally created for the purpose of increasing the flexibility and efficiency of research funding and management, in addition to promoting public–private partnerships. They, however, still depend on national government funding and have yet to meet the expectations of their mandate.

Although the recent rise in the number of agricultural researchers is positive—as is the upgrade of ZARI to a ministerial department, and increased investment under ADSP since 2007—Zambia’s agricultural R&D agencies are still contending with the effects of long-term underinvestment and continue to struggle with funding issues that hinder their ability to contribute more effectively to the country’s agricultural and economic development.

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.

² Financial data for these private companies were unavailable; for more detailed information on the private sector in Zambia, see Mwala and Gisselquist (2010, forthcoming).

³ Of note, operations by both these development trusts have been severely constrained by lack of funding, so they have not performed as expected.

⁴ Donor funding allocated collectively to operating and capital costs could not be disaggregated; hence, only salary and nonsalary costs could be identified.

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The authors thank the 15 agricultural research agencies that participated in the ASTI survey; 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 earlier draft of this note. ASTI gratefully acknowledges the generous support from the Bill & Melinda Gates Foundation.

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