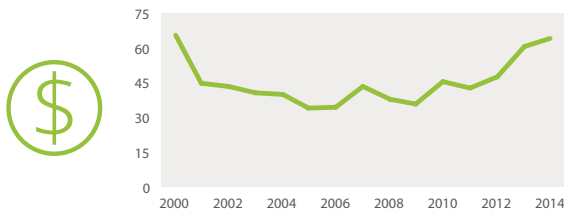


ZAMBIA

Nienke Beintema, Rhoda Mumba, Moses Mwala, and Lang Gao

AGRICULTURAL RESEARCH SPENDING



Billion Zambian kwacha
(2011 constant prices)

64.1

Million PPP dollars
(2011 constant prices)

26.9

MALAWI

MOZAMBIQUE

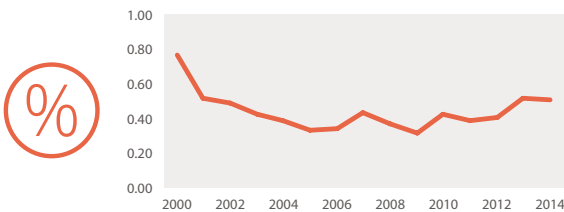
ZIMBABWE

28.1

29.3

43.4

SPENDING INTENSITY



Agricultural research
spending as a share
of AgGDP

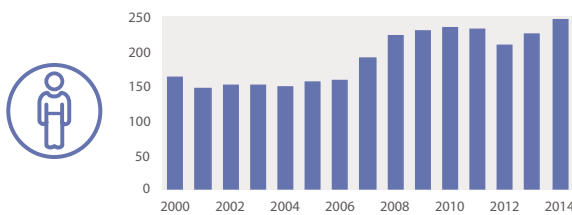
0.51%

0.53%

0.36%

1.44%

AGRICULTURAL RESEARCHERS



Full-time
equivalents

245.6

158.3

308.4

208.7

Share of researchers with
MSc and PhD degrees

57%

81%

56%

58%

Notes: Data above are for 2014. Research conducted by the private for-profit sector is excluded from this factsheet due to lack of available data. Information on access to further resources, data procedures and methodologies, and acronyms and definitions are provided on Page 4. See www.asti.cgiar.org/Zambia/directory for an overview of Zambia's agricultural R&D agencies.



Donor-led investment growth

Despite decreasing government funding, agricultural research spending in Zambia grew by 70 percent during 2008–2014 as a result of a large influx of funding through a World Bank loan, associated with APPSA, and additional donor contributions. Despite this strong growth, as of 2014 Zambia only invested 0.51 percent of its AgGDP in agricultural research, half the 1 percent minimum recommended by the African Union and the United Nations.



Donor dependency at ZARI

Government support to ZARI mostly covers the cost of salaries and day-to-day operations. ZARI has successfully secured funding through regional competitive research programs and donor grants. It has received a World Bank loan of US\$30 million through APPSA, which targets research on legumes, maize, rice, and sorghum. Still the government will need to raise its financial support if the country's agricultural research system is to avoid a severe decline at the conclusion of APPSA.



Training the next generation

In 2014, only 14 percent of Zambia's agricultural researchers were trained to the PhD level. The provision of local postgraduate training remains limited, so most MSc and PhD training is undertaken abroad. APPSA has included a significant training component (15 PhD, 40 MSc, and 40 BSc degrees), although the areas of focus are limited to legumes and, hence, do not necessarily address the disciplines in which ZARI has gaps.

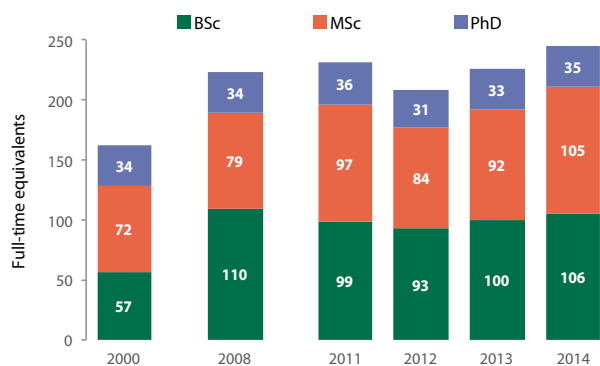


Limited private sector involvement

In the late 1990s, the government and foreign donors focused on increasing the role of privately performed agricultural research. Two nonprofit organizations were established, GART and CDT. In particular, GART—which focuses on crop and livestock technologies to improve smallholder productivity—increased its capacity to 15 FTE researchers in 2008. Funding and capacity have dwindled since then, because most of the donor-funded projects were completed. As of 2014, the four nonprofit and for-profit agencies involved in agricultural research employed a total of 16 FTE researchers.

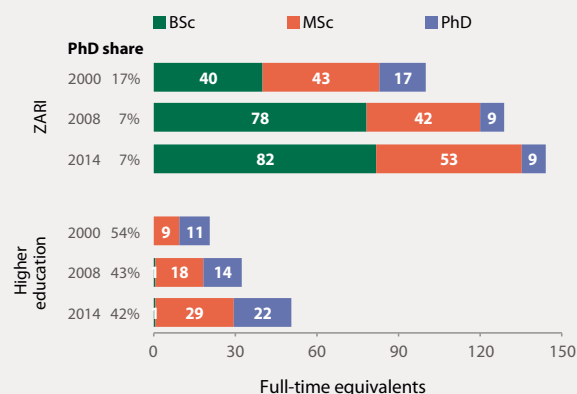
Zambia's agricultural researchers by qualification level

After a period of growth, the total number of agricultural researchers in Zambia fluctuated from year to year, peaking at 246 in 2014. More than 80 percent of the researchers held BSc or MSc degrees. Researchers qualified to the PhD level accounted for only 14 percent that year.



Total agricultural researchers by qualification level

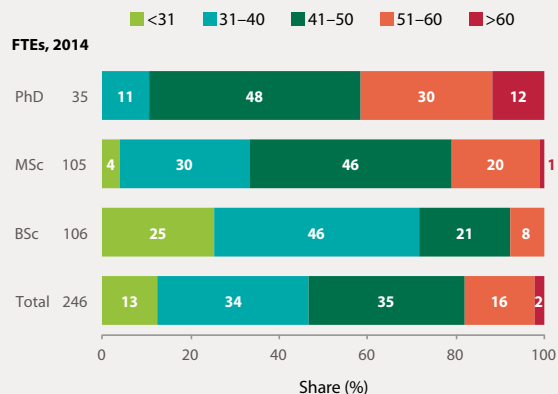
Capacity growth at ZARI during 2000–2014 primarily occurred among BSc-qualified researchers, and to a lesser extent those with MSc degrees. Capacity is significantly smaller within the higher education sector in terms of the number of FTEs, but qualification levels are higher (22 researchers with PhD degrees in 2014 compared with only 9 at ZARI).



Note: Figure excludes other government and nonprofit agencies.

Zambia's agricultural researchers by age bracket

As of 2014, more than 40 percent of Zambia's PhD-qualified researchers were in their 50s and 60s, whereas close to three-quarters of those qualified to the BSc-degree level were in their 20s and 30s.



Zambia's share of female researchers

Overall, the share of female researchers rose from 22 percent in 2008 to 28 percent in 2014. ZARI and the other government and nonprofit agencies employ comparatively more women than the higher education agencies. On average, as of 2014, female researchers were generally younger and less well-qualified than their male colleagues.



By qualification level, 2014

Qualification	Share (%)
BSc	38%
MSc	24%
PhD	14%

By age bracket, 2014

Age Bracket	Share (%)
< 41	43%
41-50	17%
> 50	12%

Zambia's MSc- and PhD-qualified agricultural researchers by discipline

Soil sciences, veterinary medicine, plant physiology, and plant breeding/genetics are strong disciplines in Zambia, accounting for a combined 42 percent of the country's total number of MSc- and PhD-qualified agricultural researchers in 2014. Surprisingly, veterinary medicine alone accounted for about a quarter of researchers with PhD degrees despite the dominance of crop researchers in Zambia's overall agricultural researcher capacity.

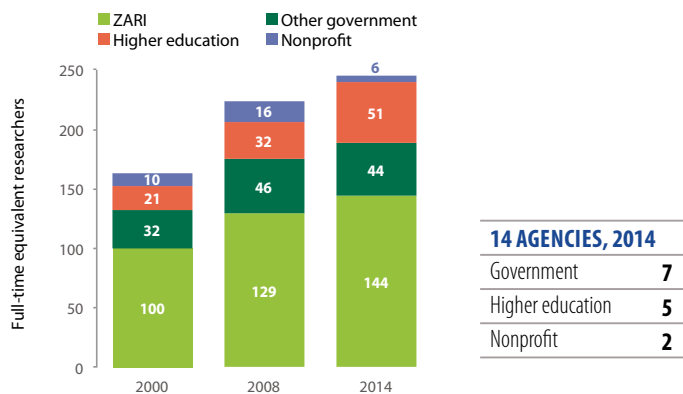
Agricultural researchers, 2014	FTEs		Share (%)	
	MSc	PhD	MSc	PhD
Plant breeding/genetics (incl. biotechnology)	10	3	9	8
Plant pathology	6	1	6	3
Plant physiology	13	1	12	4
Seed science and technology	1	1	1	2
Other crop sciences	4	—	3	—
Animal breeding/genetics	1	0.3	1	1
Animal husbandry	0.3	1	0.2	3
Animal nutrition	1	1	1	3
Dairy science	0.3	—	0.2	—
Poultry	0.3	—	0.2	—
Veterinary medicine	6	8	5	24
Zoology/entomology	1	1	1	3
Other animal and livestock	2	—	2	—

Agricultural researchers, 2014	FTEs		Share (%)	
	MSc	PhD	MSc	PhD
Forestry and agroforestry	9	2	9	5
Fisheries and aquatic resources	3	1	2	1
Soil sciences	14	4	13	12
Natural resources management	9	2	8	6
Water and irrigation management	4	1	4	3
Ecology	3	1	3	2
Biodiversity conservation	5	2	5	5
Food sciences and nutrition	5	2	4	6
Socioeconomics (incl. agricultural economics)	7	2	7	5
Extension and education	0.3	0.3	0.3	1
Other sciences	3	1	3	3
Total	105	35	100	100

Note: Data are estimates based on an agency sample representing 80 percent of the total number of FTE researchers.

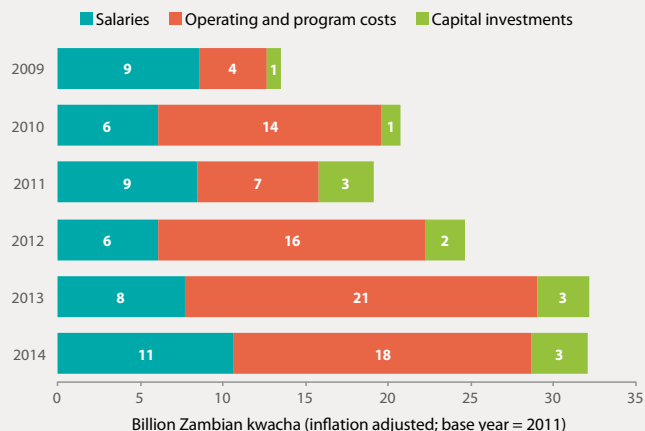
Institutional composition of Zambia's agricultural research

The institutional composition of agricultural research in Zambia has changed little since 2000. Strong growth in the number of researchers employed in the higher education sector caused its share to rise from 13 to 21 percent during 2000–2014; nevertheless, as of 2014, ZARI still accounted for about 60 percent of the country's total FTE researchers.



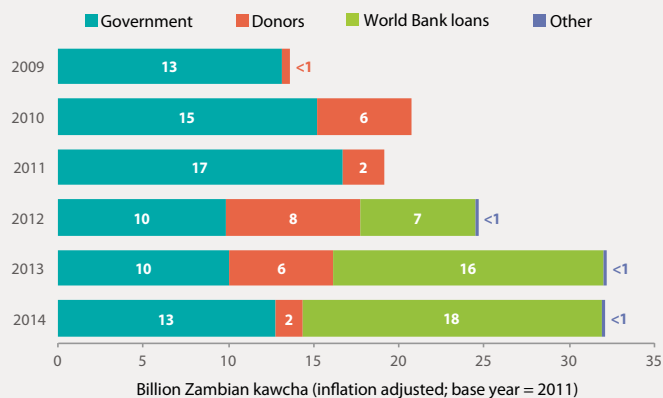
ZARI's spending by cost category

Because of the comparatively high levels of funding ZARI received for research, infrastructure and human capacity investments through the regional APPSA program during 2012–2014, the institute's salary-related costs represented a very low share of its total spending (an average of only 28 percent per year) during this three-year period.



ZARI's funding sources

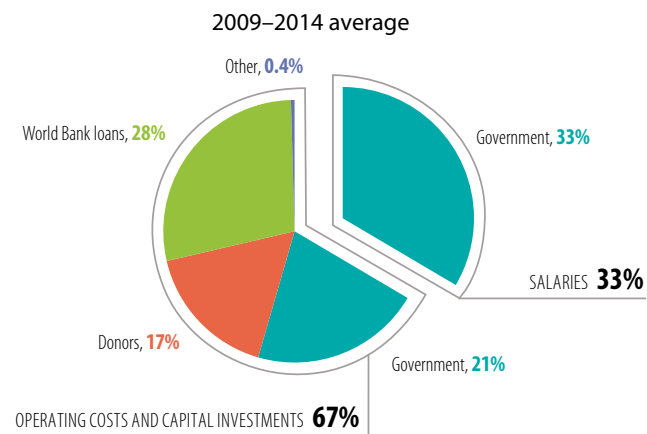
ZARI received substantial funding through APPSA (a US\$30 million World Bank loan for the period 2012–2019) for institutional and human capacity investments in legume, maize, rice, and sorghum research. ZARI also received funding from a number of other donor organizations. In contrast, government contributions to ZARI decreased during 2009–2014.



Note: 2009–2011 data exclude revenues generated through the sale of goods and services. However, such revenues are channeled back to the national Treasury.

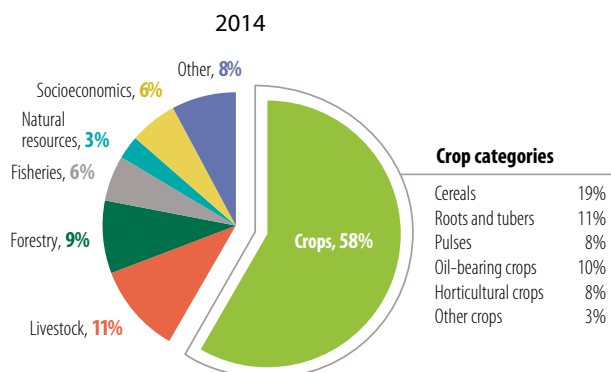
ZARI's funding and spending compared

Government support to ZARI covers salary-related costs and a portion of the institute's operating expenses. In addition, government disbursements are often considerably lower than budgeted allocations. Close to half of ZARI's funding during 2009–2014 was provided by a World Bank loan and donor contributions.



Zambia's agricultural researchers by area of focus

In 2014, 58 percent of the country's FTE researchers conducted crop research, whereas 11 and 9 percent undertook livestock and forestry research, respectively. Major crops under investigation were the cereals maize and rice, along with cassava, beans, soybeans, fruits, groundnuts, and sweet potatoes.



ZARI's recently released crop varieties

ZARI, Zambia's main agricultural research agency involved in crop breeding, released seven maize varieties resistant to cold, three high pro-vitamin A maize varieties, and seven other crop varieties during 2012–2014.

Crop	Number of varieties, 2012–2014
Maize	10
Beans	3
Sweet potatoes	3
Sorghum	1
Total	17

Resources for Zambia

This factsheet presents recent data on the performance of agricultural research in Zambia, primarily focusing on key financial, human resource, institutional, and output indicators, while also highlighting relevant trends, challenges, and institutional changes. Additional resources are available at www.asti.cgiar.org and include:



ASTI's **interactive country page** for Zambia features national agricultural research investment and capacity data, a data exploration and download tool, as well as access to a variety of country publications.



ASTI's **benchmarking tool** allows key agricultural research indicators to be ranked and compared across African countries.



ASTI's **data download tool** provides access to more in-depth ASTI datasets and graphs for Zambia and many other countries.



ASTI's **agency directory** provides a view of agencies that conduct agricultural research in Zambia, along with their locations and key agency-level indicators.

ASTI Data Procedures and Methodologies

- ▶ The **data underlying this factsheet** were predominantly derived through primary surveys, although some data were drawn from secondary sources or were estimated.
- ▶ **Agricultural research** includes research conducted by the government, higher education, and nonprofit sectors; research conducted by the private for-profit sector is excluded due to lack of available data.
- ▶ ASTI bases its calculations of human resource and financial data on **full-time equivalent (FTE) researchers**, which take into account the proportion of time staff actually spend on research compared with other activities.
- ▶ ASTI presents its financial data in 2011 local currencies and **2011 purchasing power parity (PPP) dollars**. PPPs reflect the relative purchasing power of currencies more effectively than do standard exchange rates because they compare prices of a broader range of local—as opposed to internationally traded—goods and services.
- ▶ ASTI estimates the **higher education sector's research expenditures** because it is not possible to isolate them from the sector's other expenditures.
- ▶ Note that **decimal rounding** can cause totals to be one point higher or lower than the sum of their parts.



For more information on ASTI's data procedures and methodology, visit www.asti.cgiar.org/methodology.

Acronyms

AgGDP	agricultural gross domestic product
APPSA	Agricultural Productivity Program for Southern Africa
CDT	Cotton Development Trust
FTE(s)	full-time equivalent(s)
GART	Golden Valley Agricultural Research Trust
PPP(s)	purchasing power parity (exchange rates)
R&D	research and development
ZARI	Zambia Agriculture Research Institute

ABOUT ASTI, IFPRI, AND ZARI

Working through collaborative alliances with numerous national and regional R&D agencies and international institutions, **Agricultural Science and Technology Indicators (ASTI)** is a comprehensive and trusted source of information on agricultural R&D systems across the developing world. ASTI is led by the **International Food Policy Research Institute (IFPRI)**, which—as a CGIAR member—provides evidence-based policy solutions to sustainably end hunger and malnutrition and reduce poverty. The **Zambia Agriculture Research Institute (ZARI)** is Zambia's principal agricultural research agency. The institute's overall objectives is to develop and adapt crop, soil and plant protection technologies and to provide a high quality, appropriate, and cost effective service to farmers.

ASTI/IFPRI and ZARI gratefully acknowledge participating agricultural R&D agencies for their contributions to the data collection and preparation of this factsheet. ASTI also acknowledges the Bill & Melinda Gates Foundation and CGIAR Research Program on Policies, Institutions, and Markets for their generous support of ASTI's work in Africa south of the Sahara. This factsheet has been prepared as an ASTI output and has not been peer reviewed; any opinions are those of the authors and do not necessarily reflect the policies or opinions of IFPRI or ZARI.