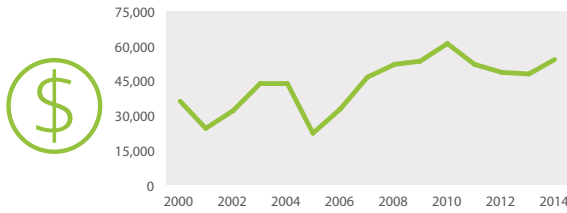




# TANZANIA

Nienke Beintema, Deogratias Lwezuara, and Bernadetha Munishi

## AGRICULTURAL RESEARCH SPENDING



Million Tanzanian shillings  
(2011 constant prices)

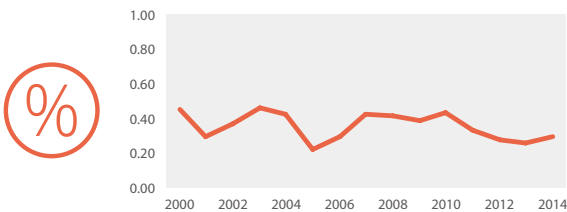
54,264.0

Million PPP dollars  
(2011 constant prices)

103.9

	TANZANIA	ETHIOPIA	KENYA	UGANDA
Million PPP dollars (2011 constant prices)	103.9	127.3	274.1	152.5

## SPENDING INTENSITY

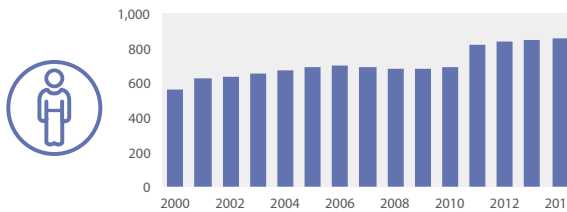


Agricultural research  
spending as a share  
of AgGDP

0.29%

	TANZANIA	ETHIOPIA	KENYA	UGANDA
Agricultural research spending as a share of AgGDP	0.29%	0.24%	0.79%	0.97%

## AGRICULTURAL RESEARCHERS



Full-time  
equivalents

857.7

Share of researchers with  
MSc and PhD degrees

70%

	TANZANIA	ETHIOPIA	KENYA	UGANDA
Full-time equivalents	857.7	2,768.5	1,178.5	477.9
Share of researchers with MSc and PhD degrees	70%	42%	80%	80%

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/Tanzania/directory](http://www.asti.cgiar.org/Tanzania/directory) for an overview of Tanzania's agricultural R&D agencies.



### Serious underinvestment

Volatility in yearly government and donor funding caused agricultural research spending to fluctuate during 2000–2014 and decline from 2010, despite additional funding from a World Bank loan through EAAPP. Underinvestment in agricultural R&D is serious. As of 2014, funding levels appeared to be rebounding, but Tanzania still only invested 0.29 percent of its AgGDP in agricultural R&D, well below the African Union and the United Nation's recommended 1 percent target.



### Serious capacity constraints

DRD and TALIRI struggled to attract and retain well-qualified staff during 2000–2014. New recruits—even those with PhD degrees—lacked experience, and most senior researchers were approaching retirement age. Both agencies contracted retired researchers to mentor the new recruits short-term, but this strategy ultimately failed due to insufficient project funding and lack of clear guidelines and assessment criteria for mentors. DRD and TALIRI both need solid training and mentorship plans, backed by government support.



### DRD's funding challenges

Agricultural R&D spending at DRD was low and declining during 2008–2014 (adjusted for inflation). The completion of phase 1 of the Agricultural Sector Development Program prompted withdrawal of donor funding, leaving little available for research. Long-term under-investment means infrastructure at DRD and TALIRI is outdated and poorly maintained. The agencies are now even more dependent on government support, especially given uncertainty around phase II of EAAPP.

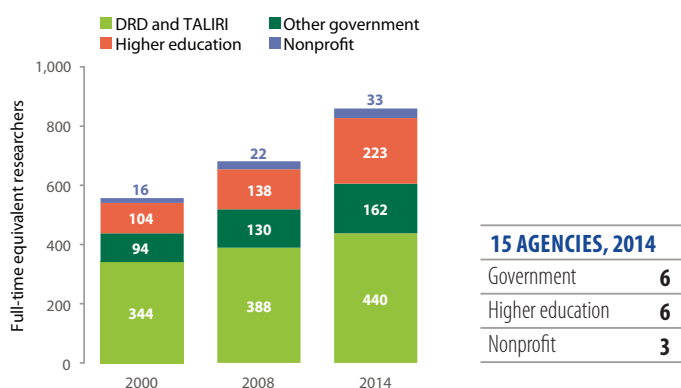


### Transformation of DRD

In efforts to increase administrative flexibility, funding diversity, competitiveness, and effectiveness, Tanzania made the decision to transform its government agricultural and livestock research departments into semiautonomous bodies. TALIRI was established for livestock research in 2012 and the bill to establish TARI was approved by Parliament in September 2016. This is an important step based on current financial and human resource capacity constraints.

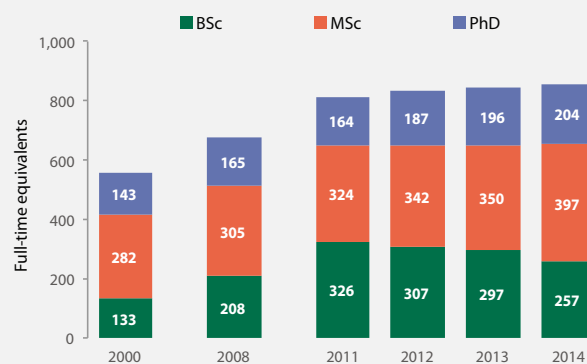
## Institutional composition of Tanzania's agricultural research

The overall institutional composition of the country's research has changed little since 2000, but the shares by institutional category have changed. DRD's share of agricultural researchers fell from 62 to 40 percent during 2000–2014, whereas shares at SUA and the other government and higher education agencies all increased.



## Tanzania's agricultural researchers by qualification level

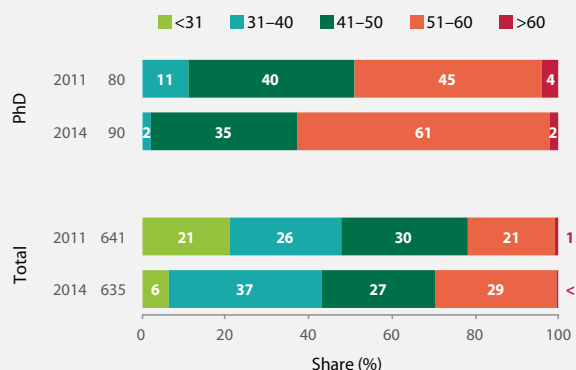
After a period of stagnation, the total number of PhD-qualified researchers increased during 2011–2014, but mainly comprised recent graduates with limited research experience. During this timeframe, the number of MSc-qualified researchers also increased, whereas the number of researchers with BSc degrees declined.



Note: The government and higher education agencies employed a small number of technical support staff qualified to the BSc- and MSc-level; these staff members do not have official researcher status.

## Tanzania's agricultural researchers by age bracket

In 2014, 63 percent of the country's PhD-qualified researchers were in their 50s or 60s compared with 49 percent in 2011. As is reflected in the overall age distribution, BSc- and MSc-qualified researchers were, unsurprisingly, much younger.



Note: Due to availability, age data exclude the higher education sector.

## Tanzania's share of female researchers

Overall, the share of female researchers rose from 21 percent in 2008 to 32 percent in 2014. Shares also grew at all agencies, but particularly at SUA. As of 2014, shares were fairly uniform across qualification levels, but declined by age bracket from youngest to oldest (from 44 to 21 percent).



### By qualification level, 2014

BSc	30%	MSc	33%	PhD	32%
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### By age bracket, 2014

< 41	44%	41–50	28%	> 50	21%
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## Tanzania's MSc- and PhD-qualified agricultural researchers by discipline

Tanzania employed more than 60 plant breeders and geneticists with postgraduate degrees; 11 percent of total MSc- and PhD-qualified researchers in 2014 and about three-quarters of those were employed by DRD. Socioeconomics was another strong discipline, accounting for 13 percent of all PhD-qualified researchers.

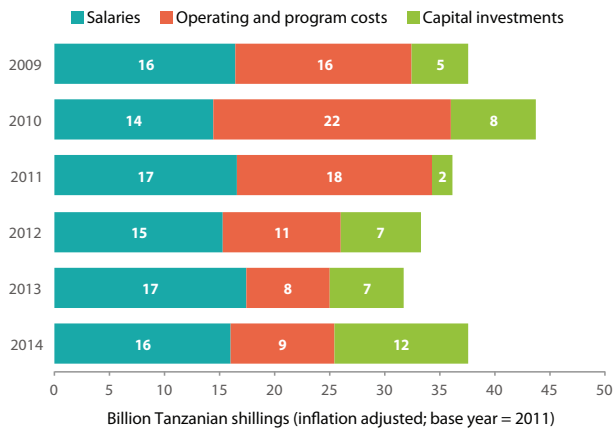
Agricultural researchers, 2014	FTEs		Share (%)	
	MSc	PhD	MSc	PhD
Plant breeding/genetics (incl. biotechnology)	44	21	11	10
Plant pathology	7	3	2	2
Plant physiology	1	1	0.3	1
Botany	12	13	3	6
Other crop sciences	13	2	4	1
Animal breeding/genetics	10	8	3	4
Animal husbandry	13	3	3	1
Animal nutrition	19	13	5	7
Dairy science	5	3	1	2
Poultry	2	1	0.5	0.4
Veterinary medicine	9	8	2	4
Zoology/entomology	7	3	2	2
Other animal and livestock	4	5	1	2
Forestry and agroforestry	25	9	7	5

Agricultural researchers, 2014	FTEs		Share (%)	
	MSc	PhD	MSc	PhD
Fisheries and aquatic resources	25	6	6	3
Soil sciences	26	18	7	9
Natural resources management	21	3	6	2
Water and irrigation management	–	–	–	–
Ecology	3	–	1	–
Biodiversity conservation	0.3	2	0.1	1
Food sciences and nutrition	17	20	4	10
Socioeconomics (incl. agricultural economics)	48	25	13	12
Extension and education	11	14	3	7
Other sciences	60	21	16	10
<b>Total</b>	<b>381</b>	<b>200</b>	<b>100</b>	<b>100</b>

Note: Data are estimates based on an agency sample representing 88 percent of the total number of FTE researchers.

## Government sector's spending by cost category

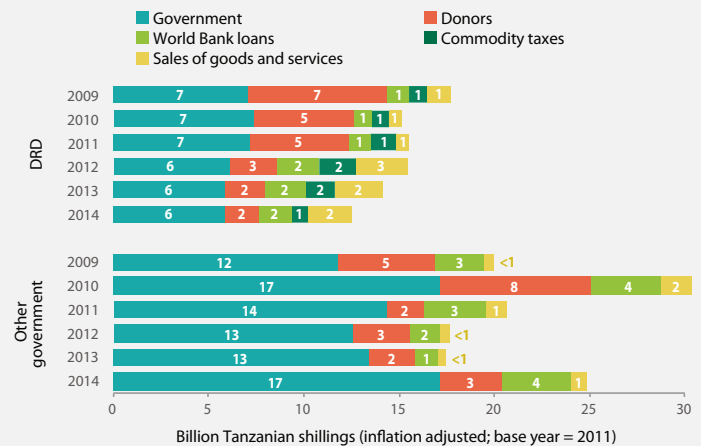
The government's yearly budget allocation was highly volatile during 2009–2014, which caused wide fluctuations in spending from year to year.



Note: Data for Tanzania correlate with financial rather than calendar years; hence, 2012 represents data for the period July 1, 2011 to June 30, 2012, and so on.

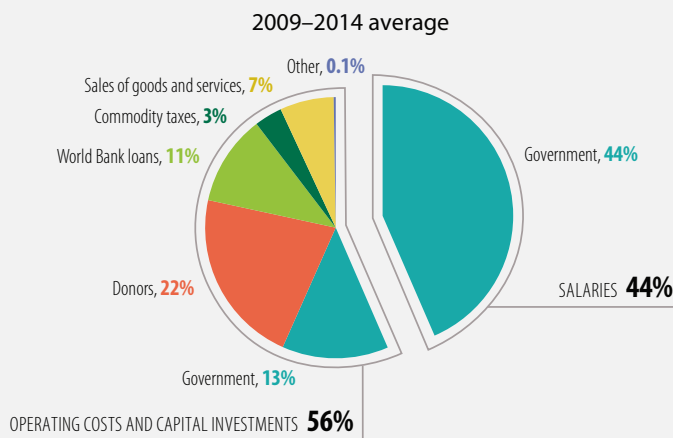
## Government sector and DRD's funding sources

During 2009–2014, support for government agencies conducting agricultural research fluctuated, in inflation adjusted terms, and donor contributions contracted. The situation was more grave at DRD, where government funding, donor contributions, and World Bank loan revenues all declined significantly.



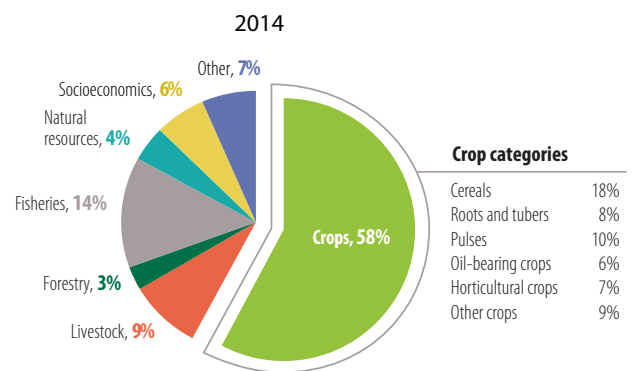
## Government sector's funding and spending compared

The vast majority of government funding is allocated to staff salaries, leaving moderate shares for operating costs and capital investments. Costs associated with research programs are primarily funded through donor contributions or with sales of goods and services, and commodity tax revenues.



## Tanzania's agricultural researchers by area of focus

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



## DRD's recently released crop varieties

Tanzania's main agricultural research agency involved in crop breeding, DRD, released 17 new varieties during 2012–2014, including 3 vegetable, 2 maize, and 2 groundnut varieties.

Crop	Number of varieties, 2012–2014
Vegetables	3
Maize	2
Groundnut	2
Potatoes	1
Sweet potatoes	1
Wheat	1
Cassava	1
Beans	1
Soybeans	1
Cotton	1
Sugar	1
Other	2
<b>Total</b>	<b>17</b>

## Recent peer-reviewed publications by DRD, TAFIRI, TAFORI, and TALIRI

During 2012–2014, government researchers published an average of 158 journal articles per year. Close to one half of these were in national journals; the remaining in either regional or international journals. Publications per researcher averaged close to 0.3 per year.

Type	Number of publications, 2012–2014 annual average	Per FTE researcher
Journal articles		
International	41.3	0.076
Regional	42.3	0.078
National	74.0	0.137
<b>Total</b>	<b>157.7</b>	<b>0.291</b>

Notes: Due to availability, publication data exclude the other two government agencies. No data on the number of books and book chapters published were available.

## Resources for Tanzania

This factsheet presents recent data on the performance of agricultural research in Tanzania, 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](http://www.asti.cgiar.org) and include:



ASTI's **interactive country page** for Tanzania 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 Tanzania and many other countries.



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

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ASTI led by IFPRI

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TANZANIA

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Key Indicators Financial Resources Human Resources Research Focus Regional comparison

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

## Acronyms

AgGDP	agricultural gross domestic product
DRD	Department of Research and Development
EAAPP	Eastern Africa Agricultural Productivity Project
FTE(s)	full-time equivalent(s)
PPP(s)	purchasing power parity (exchange rates)
R&D	research and development
SUA	Sokoine University of Agriculture
TALIRI	Tanzanian Livestock Research Institute
TARI	Tanzanian Agricultural Research Institute

## ABOUT ASTI, IFPRI, AND DRD

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 **Department of Research and Development (DRD)** is Tanzania's principal agricultural research agency; the department falls under the Ministry of Agriculture, Livestock and Fisheries and focuses on crop and natural resource research.

ASTI/IFPRI and DRD 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 DRD.

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