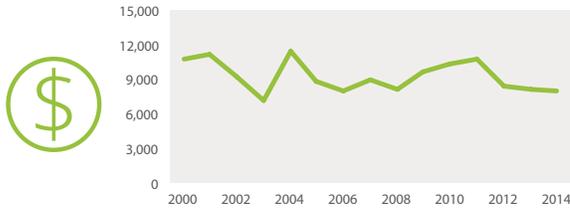




# MALI

Léa Vicky Magne Domgho, Ouleymatou Traoré, and Gert-Jan Stads

## AGRICULTURAL RESEARCH SPENDING



Million CFA francs  
(2011 constant prices)

7,956.4

Million PPP dollars  
(2011 constant prices)

37.9

	MALI	BURKINA FASO	NIGER	SENEGAL
Million CFA francs (2011 constant prices)	7,956.4			
Million PPP dollars (2011 constant prices)	37.9	48.5	14.5	51.3

## SPENDING INTENSITY

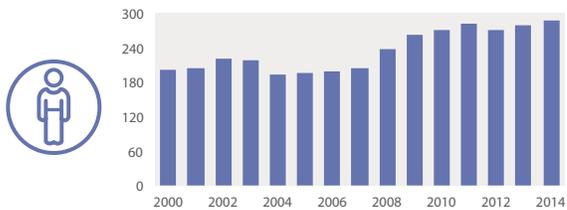


Agricultural research  
spending as a share  
of AgGDP

0.38%

Agricultural research spending as a share of AgGDP	0.38%	1.01%	0.23%	1.15%
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## AGRICULTURAL RESEARCHERS



Full-time  
equivalents

285.7

Share of researchers with  
MSc and PhD degrees

96%

Full-time equivalents	285.7	310.8	182.0	124.4
Share of researchers with MSc and PhD degrees	96%	99%	89%	100%

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



### Strong donor dependency

Agricultural research in Mali is among the most donor-dependent in Africa. Strong reliance on short-term projects funded by donors and development banks, combined with modest levels of public funding, have driven significant fluctuations in agricultural research spending over time. Events like the 2012 military coup and unrest in the country's north—which prompted a temporary freeze on aid—highlight the country's vulnerability to funding shocks and, hence, its need to diversify its sources of agricultural research funding.



### Severe underinvestment

In 2000, Mali invested 1 percent of its AgGDP in agricultural research, the minimum recommended by the United Nations and the African Union, but by 2014 spending had fallen to just 0.38 percent of AgGDP. Increased government funding is needed, not only to cover the cost of salaries, but also to allow sufficient funding for the day-to-day running of research programs, as well as necessary investments in infrastructure. Creative mechanisms should be explored to stimulate private-sector research funding beyond the cotton industry.



### Aging pool of researchers

With 87 percent of its PhD-qualified researchers in their 50s and 60s, Mali has one of the oldest pools of agricultural researchers in Africa. As a result, large-scale capacity losses are imminent due to retirement. WAAPP has supported significant training of young researchers in recent years. However, more recruitment and training is needed, as are mechanisms to motivate and maintain staff over time.

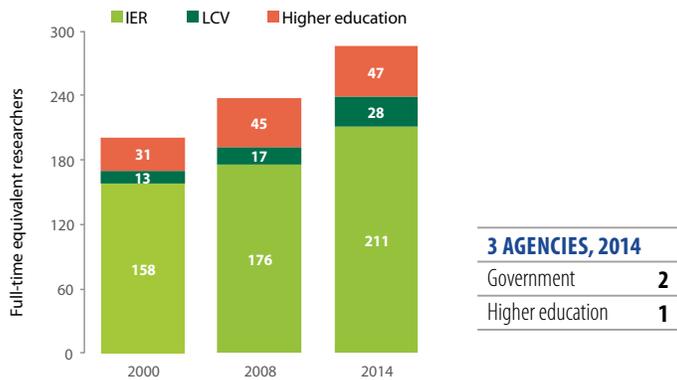


### Low female participation

Women constitute the majority of Mali's farmers, yet only 15 percent of the country's agricultural researchers are female. Since women offer different insights and perspectives to address the unique and pressing challenges of Mali's farmers, it is important that the country focus on improving the gender balance—both among its agricultural researchers and its research managers—in order to more effectively address the breadth of priorities and challenges facing its farmers.

## Institutional composition of Mali's agricultural research

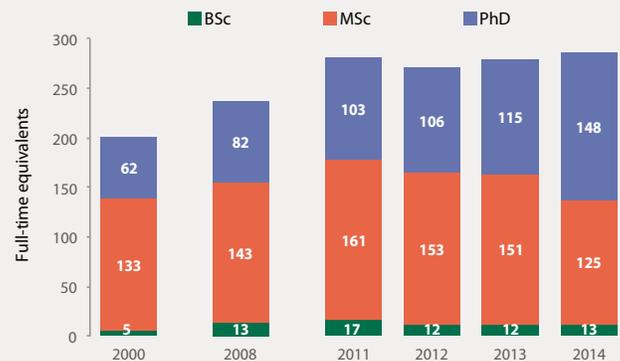
Three entities conduct agricultural research in Mali: IER, LCV, and IPR-IFRA. All three agencies reported a steady rise in agricultural researcher numbers during 2000–2014, but growth was most significant at LCV. In 2014, IER accounted for 74 percent of Mali's agricultural researchers, IPR-IFRA for 16 percent, and LCV for 10 percent.



Note: Data for higher education for 2000 and 2008 include ISFRA, which no longer conducts agricultural research.

## Mali's agricultural researchers by qualification level

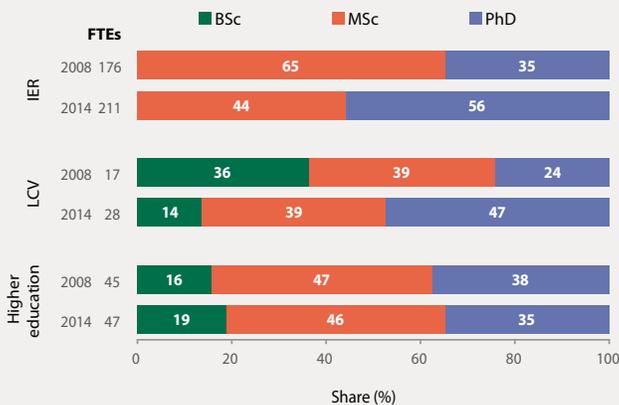
The number of PhD-qualified agricultural researchers in Mali has increased rapidly in recent years. As of 2014, for the first time, the country employed more agricultural researchers with PhD degrees than with MSc degrees. Training under two consecutive phases of WAAPP, spanning 2008–2018, drove this shift for large numbers of researchers.



Note: Mali's research agencies employ a number of technical support staff qualified to the BSc-level. These staff members do not hold official research positions.

## Mali's agricultural researchers by sector and qualification level

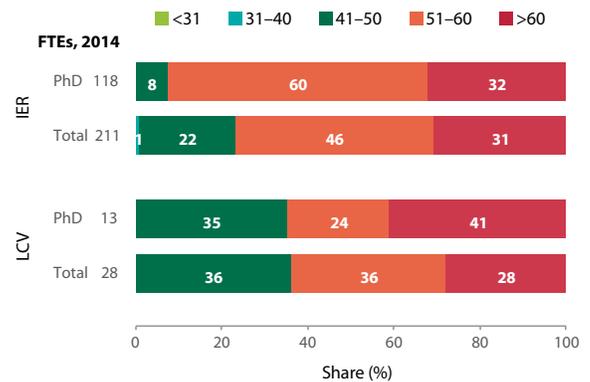
On average, IER's researchers hold higher qualifications than their colleagues at LCV and IPR-IFRA. Qualification levels improved considerably at IER and LCV during 2008–2014 but deteriorated marginally at IPR-IFRA.



Note: Data for higher education for 2008 include ISFRA, which no longer conducts agricultural research.

## Mali's agricultural researchers by age bracket

In 2014, just 8 of Mali's 286 agricultural researchers were younger than 40. The vast majority of researchers—especially those with PhD degrees—are in their 50s or 60s and approaching the mandatory retirement age of 63 or 65 years (depending on rank). Without urgent recruitment and training efforts, large-scale capacity losses are imminent.



Note: Data for IPR-IFRA were unavailable.

## IER's and LCV's MSc- and PhD-qualified agricultural researchers by discipline

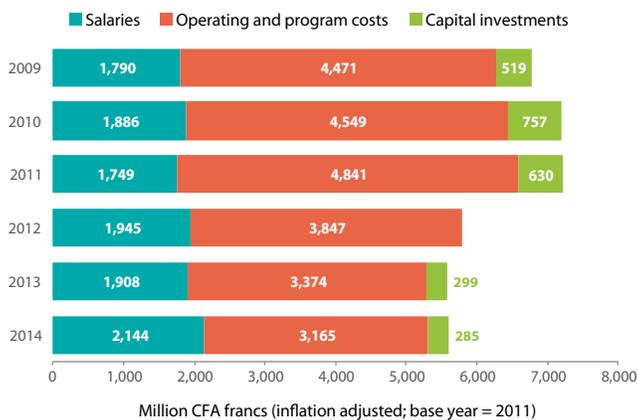
Scientists employed at IER and LCV specialize in a broad range of disciplines. Given the large number of researchers approaching retirement in the coming years, it is anticipated that Mali will face acute shortages of researchers in the areas of socioeconomics, agricultural machinery, biotechnology, and fisheries.

Agricultural researchers, 2014	FTEs		Share (%)	
	MSc	PhD	MSc	PhD
Plant breeding/genetics (incl. biotechnology)	3	10	3	8
Plant pathology	4	11	4	9
Plant physiology	2	3	2	2
Botany	—	1	—	1
Seed science and technology	—	1	—	1
Animal breeding/genetics	1	3	1	2
Animal husbandry	9	4	9	3
Animal nutrition	6	7	6	5
Dairy science	4	2	4	2
Poultry	4	2	4	2
Veterinary medicine	4	8	4	6
Zoology/entomology	8	9	8	7
Other animal and livestock	2	4	1	3

Agricultural researchers, 2014	FTEs		Share (%)	
	MSc	PhD	MSc	PhD
Forestry and agroforestry	7	8	7	6
Fisheries and aquatic resources	3	2	3	2
Soil sciences	4	3	4	2
Natural resources management	2	3	2	2
Water and irrigation management	1	2	1	2
Ecology	3	5	3	4
Biodiversity conservation	2	1	2	1
Food sciences and nutrition	4	3	4	2
Socioeconomics (incl. agricultural economics)	9	4	9	3
Extension and education	5	—	5	—
Other sciences	18	35	17	26
<b>Total</b>	<b>104</b>	<b>131</b>	<b>100</b>	<b>100</b>

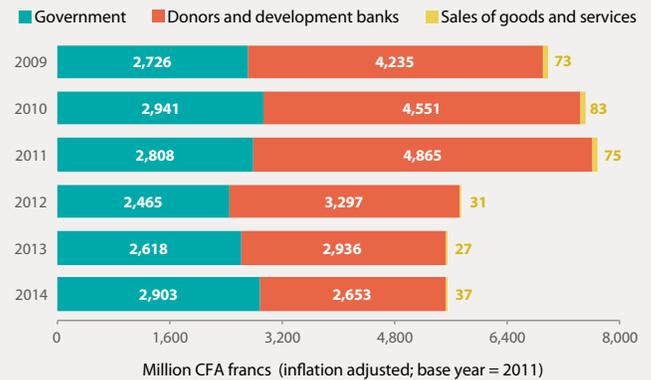
## IER's spending by cost category

IER's salary costs have gradually increased over time, but other expenses have contracted in recent years. In 2014, salaries accounted for 38 percent of IER's expenditures, operating and program costs for 57 percent, and capital investments for 5 percent.



## Sources of IER's funding

The 2012 military coup and conflict in the north of Mali prompted the temporary suspension of donor aid. Activities under the World Bank-funded WAAPP and PAPAM continued with funding that had already been disbursed, but IER's research program was, nonetheless, significantly affected. IER generates only limited funding through the sale of goods and services.



## Mali's share of female researchers

As of 2014, just 12 percent of Mali's agricultural researchers were women, up from 13 percent in 2008. Female participation in agricultural research is much lower at IER than at LCV. On average, female researchers hold lower qualification levels compared with their male counterparts.



### By qualification level, 2014

BSc	80%	MSc	13%	PhD	9%
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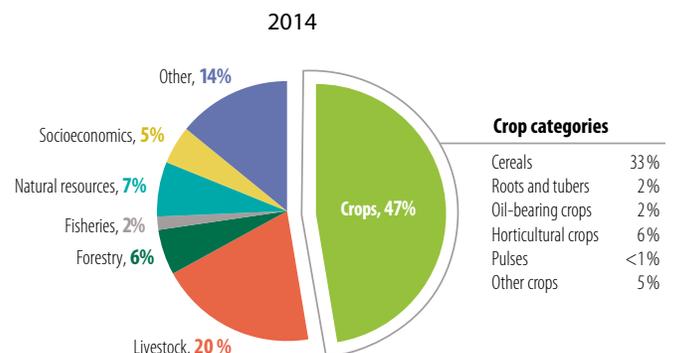
### By institutional category, 2014

IER	9%	LCV	28%
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Note: Data for IPR-IFRA were unavailable.

## Mali's agricultural researchers by area of focus

Almost half of Mali's agricultural researchers focused on crops; in 2014, 20 percent focused on livestock, 7 percent on natural resources, 6 percent on forestry, and 5 percent on socioeconomics. Cereals are the most researched crops, especially sorghum, rice, maize, millet, and wheat. Other important crops include vegetables and cotton.



## IER's recently released crop varieties

Between 2012 and 2014, IER released 14 new crops varieties, all of which were cereals; these included millet, rice, sorghum, maize, and wheat varieties.

Crop	Number of varieties, 2012–2014
Millet	3
Rice	3
Sorghum	3
Maize	3
Wheat	2
<b>Total</b>	<b>14</b>

## IER's recent peer-reviewed publications

During 2012–2014, IER's researchers published an average of 16 journal articles per year in national, regional, as well international journals. No books or book chapters were published during this period. Peer-reviewed publications per FTE researcher averaged 0.076 per year, which is very low by international standards.

Type	Number of publications, 2012–2014 annual average	Per FTE researcher
Journal articles		
International	3.7	0.018
Regional	5.0	0.024
National	7.0	0.034
Books	–	–
Book chapters	–	–
<b>Total</b>	<b>15.7</b>	<b>0.076</b>

## Resources for Mali

This factsheet presents recent data on the performance of agricultural research in Mali, 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 Mali 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 Mali and many other countries.



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

**Strong donor dependency**  
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**Severe underinvestment**  
In 2005, Mali invested 1 percent of its AgGDP in agricultural research, the minimum recommended by the United Nations and the African Union, but by 2014 spending had fallen to just 0.38 percent of AgGDP. Increased government funding is needed, not only to cover the cost of salaries, but also to allow sufficient funding for the day-to-day running of research programs, as well as necessary investments in infrastructure. Creative mechanisms should be explored to stimulate private-sector research funding beyond the cotton industry.

**Aging pool of researchers**  
With 87 percent of its PhD-qualified researchers in their 50s and 60s, Mali has one of the oldest stocks of agricultural researchers in Africa. As a result, large-scale capacity issues are imminent due to retirement. IFPRI has supported significant training of young researchers in recent years, however, more recruitment and training is needed, as are mechanisms to motivate and maintain staff over time.

## 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
FTE(s)	full-time equivalent(s)
IER	Institute of Rural Economy
IPR-IFRA	Rural Polytechnic Institute of Training and Applied Research Katibougou
ISFRA	Higher Institute of Training and Applied Research
LCV	Central Veterinary Laboratory
PAPAM	Project to Increase Agricultural Productivity in Mali
PPP(s)	purchasing power parity (exchange rates)
R&D	research and development
USAID	United States Agency for International Development
WAAPP	West Africa Agricultural Productivity Program

## ABOUT ASTI, IFPRI, AND IER

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 **Institute of Rural Economy (IER)** is Mali's principal agricultural research agency, primarily focusing on research agricultural and livestock production, postharvest, food technology, and socioeconomics research.

ASTI/IFPRI and IER 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 IER.

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