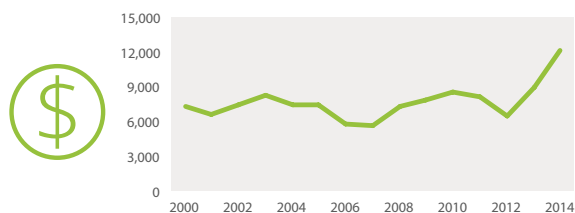


# SENEGAL

Léa Vicky Magne Domgho, Lamine Gaye, and Gert-Jan Stads

## AGRICULTURAL RESEARCH SPENDING



Million CFA francs  
(2011 constant prices)

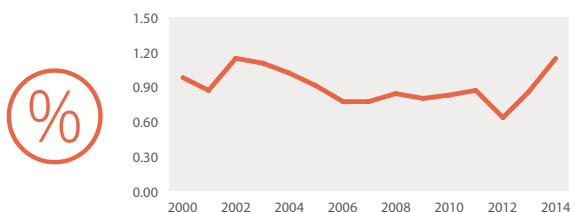
12,121.4

Million PPP dollars  
(2011 constant prices)

51.3

	SENEGAL	BURKINA FASO	CÔTE D'IVOIRE	MALI
Million CFA francs (2011 constant prices)	12,121.4			
Million PPP dollars (2011 constant prices)	51.3	48.5	82.1	37.9

## SPENDING INTENSITY

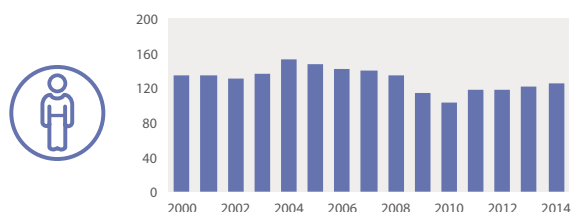


Agricultural research  
spending as a share  
of AgGDP

1.15%

Agricultural research spending as a share of AgGDP	1.15%	1.01%	0.53%	0.38%
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## AGRICULTURAL RESEARCHERS



Full-time  
equivalents

124.4

Share of researchers with  
MSc and PhD degrees

100%

Full-time equivalents	124.4	310.8	253.2	285.7
Share of researchers with MSc and PhD degrees	100%	99%	99%	96%

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



### Increased investment

Agricultural research spending increased significantly in Senegal in recent years, largely driven by a doubling of researcher salaries at ISRA and the launch of Phase II of the World Bank loan-funded WAAPP, which drove spending on research programs and infrastructure. In 2014, Senegal invested 1.15 percent of its agricultural output in agricultural research, up from just 0.63 percent two years earlier. The country's agricultural research intensity ratio is now well above the minimum target of 1 percent of AgGDP set by the African Union and the United Nations.



### Expansion of WAAPP

Senegal received a CFA 7.5 billion loan under WAAPP to develop the country's capacity in research on dryland cereals during 2008–2012. This funding was mostly allocated to researcher training and the rehabilitation of facilities related to cereal research. In 2013, the World Bank approved a second phase of WAAPP in Senegal, widening the scope of the project to include livestock and horticulture. The budget for Phase II is CFA 30 billion for 2013–2017. WAAPP also funds a competitive research scheme, FNRAA, which accepts multi-disciplinary research proposals from stakeholders.



### Improved capacity

Compared with similarly sized African countries, Senegal's agricultural researcher capacity is low, and insufficient to fulfill its ambitious research agenda. Researcher numbers declined in recent years through a combination of recruitment bans, retirement, and staff departures. In 2012, the government approved an increase in researcher salary levels and the extension of the retirement age from 60 to 65 years. The government also approved the recruitment and training of 10 researchers per year by ISRA over ten years in efforts to address the institute's capacity needs.

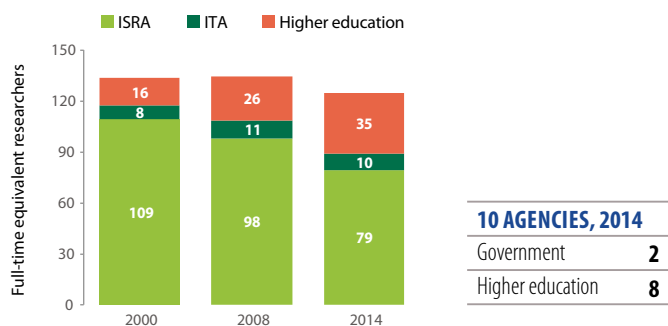


### Weak extension linkages

Despite being administered by the Ministry of Agriculture, ISRA and the country's agricultural extension agencies have weak cooperation linkages. Moreover, ISRA and the extension agencies compete for scarce resources rather than collaborating as part of a broader agricultural innovation system. Linkages between research and extension need to be strengthened to ensure that improved varieties and technologies released by ISRA are successfully adopted by farmers.

## Institutional composition of Senegal's agricultural research

As of 2014, ISRA accounted for 63 percent of Senegal's agricultural researchers, ITA for 8 percent, and the higher education sector for 28 percent. ISRA's human resource capacity is low compared with NARIs in similarly sized countries, and is insufficient for ISRA to fulfill its mandate. The universities' role in conducting research has grown over time.

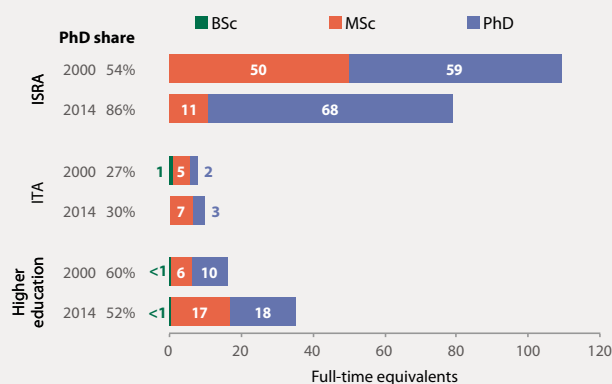


### 10 AGENCIES, 2014

Government	2
Higher education	8

## Senegal's agricultural researchers by qualification level

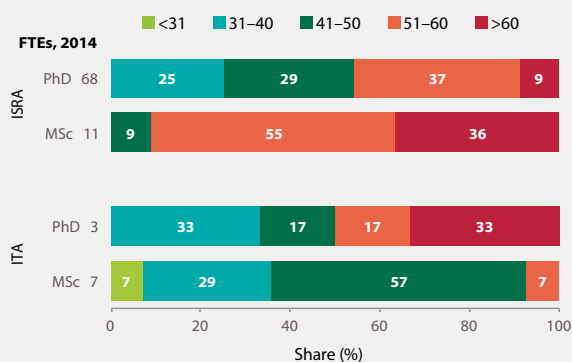
On average, Senegal's pool of agricultural researchers has become more highly qualified over time. At ISRA, although the total number of researchers declined during 2000–2014, the number of PhD-qualified researchers rose. PhD-qualified researcher numbers also increased at ITA and within the higher education sector during this period.



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

## ISRA's and ITA's agricultural researchers by age bracket

Recruitment restrictions, retirement, and voluntary departures of researchers led to a significant decline in ISRA's capacity during 2004–2014. In addition, more than half of ISRA's researchers were over 50 years old as of 2014. The government's decision to recruit and train 100 (young) researchers over ten years will redress this imbalance.



## ISRA's and ITA's share of female researchers

As of 2014, 22 percent of Senegalese agricultural researchers were female, up from just 10 percent in 2008. ITA's share (40 percent) was twice as high as ISRA's (20 percent). In general, women were better represented in the lower age brackets.



### By qualification level, 2014

MSc	25%	PhD	22%
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### By age bracket, 2014

< 41	39%	41–50	24%	> 50	14%
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Note: Data exclude higher education agencies.

## ISRA's and ITA's agricultural researchers by discipline

As of 2014, ISRA employed 11 plant breeders. Other strong disciplines were socioeconomics, fisheries, and forestry. ISRA has an acute lack of soil and veterinary scientists, as well as entomologists, challenging the institute's ability to fulfill its mandate effectively. Unsurprisingly, the vast majority of ITA's researchers are food scientists.

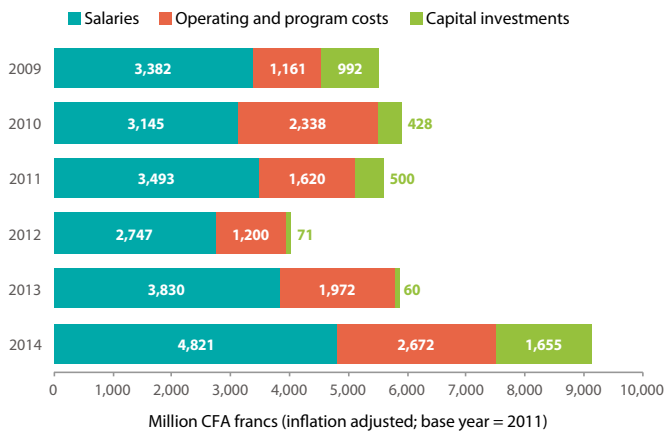
Agricultural researchers, 2014	FTEs		Share (%)	
	MSc	PhD	MSc	PhD
Plant breeding/genetics (incl. biotechnology)	4	7	22	10
Plant pathology	–	2	–	3
Plant physiology	–	2	–	3
Other crop sciences	1	8	6	11
Veterinary medicine	1	1	6	1
Zoology/entomology	2	4	11	5
Other animal and livestock	–	4	–	6
Forestry and agroforestry	2	4	11	6
Fisheries and aquatic resources	1	6	3	8
Soil sciences	–	3	–	4

Agricultural researchers, 2014	FTEs		Share (%)	
	MSc	PhD	MSc	PhD
Water and irrigation management	–	3	–	4
Ecology	–	2	–	3
Food sciences and nutrition	7	4	36	5
Socioeconomics (incl. agricultural economics)	1	7	6	10
Other sciences	–	15	–	21
<b>Total</b>	<b>18</b>	<b>71</b>	<b>100</b>	<b>100</b>

Note: Data for higher education agencies are excluded due to lack of availability.

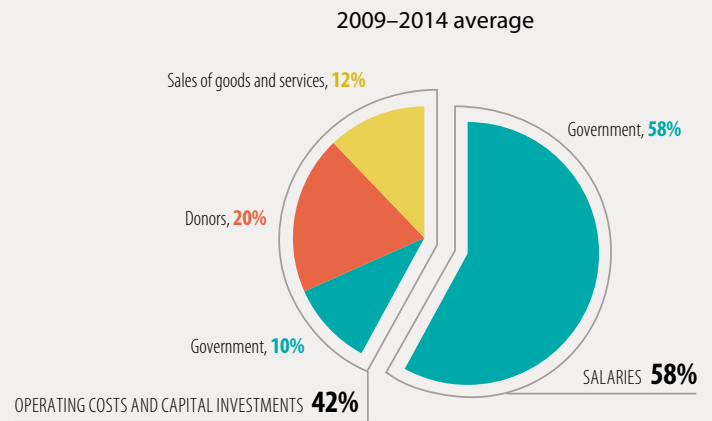
## ISRA's spending by cost category

During 2009–2014, salaries accounted for close to 60 percent of ISRA's spending. Recent increases in spending were partly driven by a doubling of researcher salaries. In addition, both the launch of the second phase of WAAPP and the government's Reconstitution of Seed Capital project boosted spending on research programs and infrastructure.



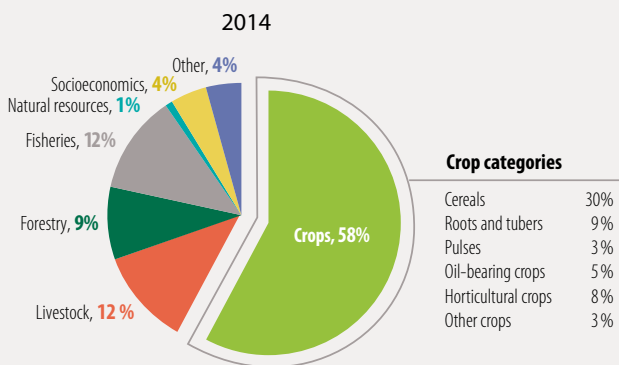
## ISRA's spending and funding compared

During 2009–2014, government funding covered ISRA's salary bill, but little remained to support operating costs or capital investments. As a result, the institute largely depended on donors and internally generated resources to meet the costs of research activities.



## ISRA's and ITA's agricultural researchers by area of focus

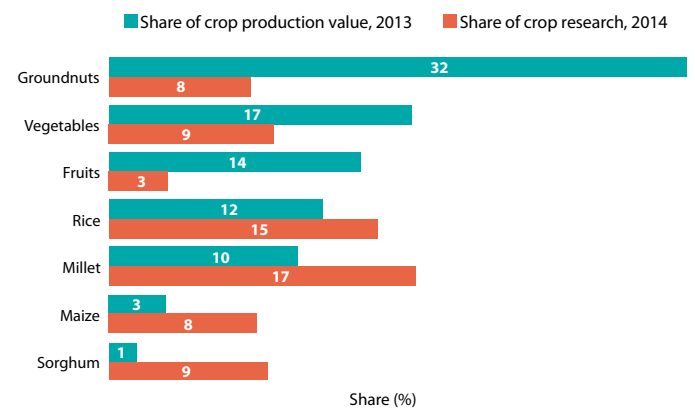
As of 2014, 58 percent of Senegal's researchers conducted crop research, while livestock and fisheries research accounted for 12 percent each. Major crops under investigation included rice, millet, vegetables, sorghum, maize, groundnuts, potatoes, sweet potatoes, and beans.



Note: Data exclude higher education agencies.

## Alignment of research focus with production value, selected crops

Based on data for 2013/2014, groundnuts, fruits, and vegetables all receive less research attention than their crop production values would indicate, whereas maize and sorghum receive significantly more research attention than would appear to be warranted by their production values alone.



Note: Data on production value are from FAO (<http://faostat.fao.org>).

## ISRA's recently released crop varieties

During 2008–2014, ISRA developed 26 new varieties—including 10 groundnut, 7 cowpea, 5 sorghum, 3 millet, and 1 maize varieties—resulting in 40 to 60 percent performance improvements over existing varieties. ISRA also adapted a large number of varieties that were developed by CGIAR centers. No new ISRA varieties have been patented.

Crop	Number of varieties, 2008–2014
Groundnuts	10
Cowpeas	7
Sorghum	5
Maize	1
Millet	3
<b>Total</b>	<b>26</b>

## ISRA's recent peer-reviewed publications

Promotional opportunities at ISRA are tied to performance, encouraging researchers to publish the results of their research. ISRA researchers published 38 peer-reviewed publications per year on average during 2012–2014. The institute's average of nearly 0.5 publications per researcher per year is significantly higher than the West African average.

Type	Number of publications, 2012–2014 annual average	Per FTE researcher
Journal articles		
International	28.3	0.366
Regional	4.0	0.052
National	2.3	0.030
Books	0.3	0.004
Book chapters	3.0	0.039
<b>Total</b>	<b>38.0</b>	<b>0.491</b>

## Resources for Senegal

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



ASTI's **agency directory** provides a view of agencies that conduct agricultural research in Senegal, 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](http://www.asti.cgiar.org/methodology).

## Acronyms

AgGDP	agricultural gross domestic product
CFA	West African franc (currency)
FNRAA	National Agricultural and Food Research Fund
FTE(s)	full-time equivalent(s)
ISRA	Senegalese Agricultural Research Institute
ITA	Food Technology Institute
NARI(s)	national agricultural research institute(s)
PPP(s)	purchasing power parity (exchange rates)
R&D	research and development
WAAPP	West Africa Agricultural Productivity Program

## ABOUT ASTI, IFPRI, AND ISRA

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 **Senegalese Agricultural Research Institute (ISRA)** is Senegal's principal agricultural research agency. It falls under the Ministry of Agriculture and Rural Infrastructure and focuses on crop, livestock, forestry, fisheries, and socioeconomic research.

ASTI/IFPRI and ISRA 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 ISRA.

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