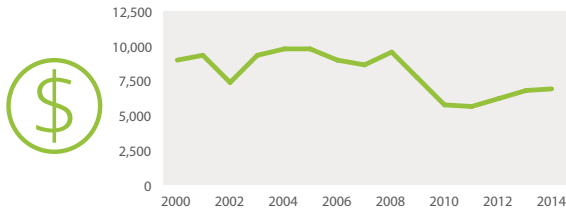




MADAGASCAR

Léa Vicky Magne Domgho, Rivonjaka Randriamanamisa, and Gert-Jan Stads

AGRICULTURAL RESEARCH SPENDING



Million ariary
(2011 constant prices)

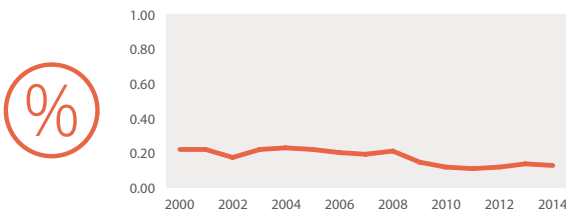
6,925.3

Million PPP dollars
(2011 constant prices)

10.3

MADAGASCAR	MALAWI	MAURITIUS	MOZAMBIQUE
6,925.3			
10.3	28.1	35.2	29.3

SPENDING INTENSITY

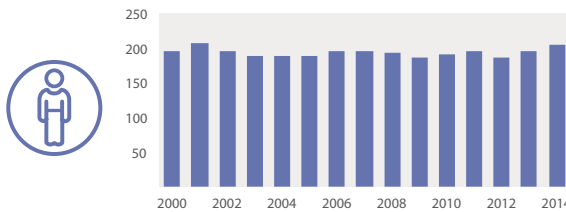


Agricultural research
spending as a share
of AgGDP

0.13%

0.13%	0.53%	5.89%	0.36%
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AGRICULTURAL RESEARCHERS



Full-time
equivalents

204.8

Share of researchers with
MSc and PhD degrees

98%

204.8	158.3	152.9	308.4
98%	81%	73%	56%

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/Madagascar/directory for an overview of Madagascar's agricultural R&D agencies.



Severe underinvestment

Madagascar's political and economic instability have had a severe adverse impact on the country's agricultural research spending in recent years. Expenditure levels dropped by 40 percent between 2008 and 2010, and have only slowly increased since. Spending just 0.13 percent of AgGDP on agricultural research in 2014, Madagascar's agricultural research intensity ratio is one of the lowest in Africa.



Aging research capacity

Madagascar's number of agricultural researchers has remained relatively stable over time. However, maintaining high-quality research and avoiding capacity erosion will be crucial challenges in the coming years as large numbers of senior researchers are set to retire. FOFIFA's recent recruitment of 10 MSc researchers is a positive first step, but more recruitment and training are urgently needed. Sustainable long-term funding must be made available to ensure that these short-term gains can be maintained, built upon, and translated in tangible research results over time.



High donor dependency

Compared to most national agricultural research institutes across Africa, FOFIFA is highly dependent on donor and development funding. By nature, this type of funding tends to be short-term and ad hoc, potentially skewing research agendas toward short-term goals that may not necessarily be aligned with national priorities. The government will need to clearly identify its long-term research priorities and allocate sustained funding, not just for salaries but also to sustain research programs. Creative mechanisms to stimulate private funding should also be explored.

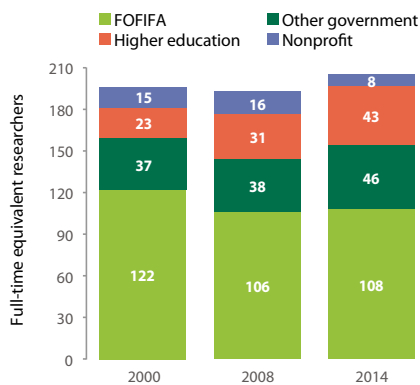


Challenges to food security

Madagascar faces frequent food production shortages. Research has the potential to provide the necessary technological solutions to enable the country to reverse declining agricultural productivity and achieve food security. Increased investments in human resources, infrastructure, and research programs are needed, as is the creation of incentives and mechanisms to strengthen the provision of extension and advisory services and to incentivize the private sector to conduct agricultural research.

Institutional composition of Madagascar's agricultural research

Madagascar's number of FTE agricultural researchers hovered around the 200 FTE mark between 2000 and 2014. Falling researcher numbers at FOFIFA were offset by increases at other government and higher education agencies. In 2014, FOFIFA accounted for 53 percent of the country's total number of agricultural researchers.

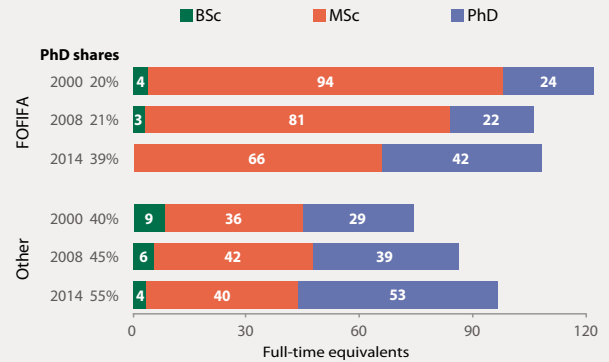


22 AGENCIES, 2014

Government	9
Higher education	6
Nonprofit	7

Madagascar's agricultural researchers by qualification level

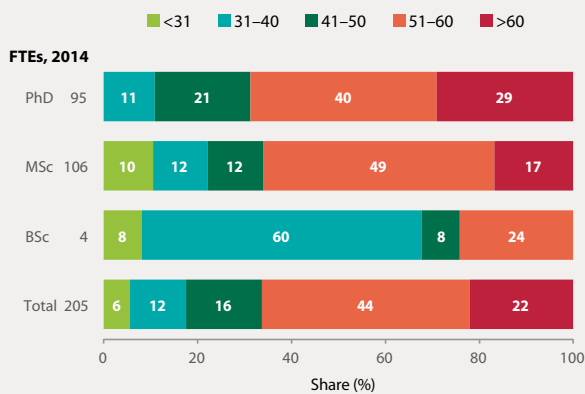
Despite the overall decline in FTE researchers employed at FOFIFA during 2000–2014, the institute's number of PhD-qualified researchers nearly doubled. Researchers with PhDs at the other agricultural research agencies also rose markedly. In 2014, 46 percent of Madagascar's agricultural researchers held PhD degrees, up from 27 percent in 2000.



Note: Data exclude expatriate researchers and support staff with BSc degrees who do not hold official researcher positions.

Madagascar's agricultural researchers by age bracket

Long-term recruitment restrictions have led to aging research capacity. More than two-thirds of Madagascar's agricultural researchers are older than fifty. In 2012, FOFIFA received permission to recruit 10 young MSc holders. Yet, much more recruitment and training is needed in the coming years to maintain research capacity over time.



Note: Data exclude expatriate researchers and support staff with BSc degrees who do not hold official researcher positions.

Madagascar's share of female researchers

In 2014, roughly one out of three agricultural researchers in Madagascar was female, which represents a slight improvement over the country's 2008 level. Despite an aging researcher pool, it is encouraging to see that the majority of agricultural researchers in their twenties and thirties are in fact women.



By qualification level, 2014

BSc	37%	MSc	32%	PhD	36%
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By age bracket, 2014

< 41	63%	41-50	31%	> 50	26%
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Madagascar's MSc- and PhD-qualified agricultural researchers by discipline

As of 2014, Madagascar's government agricultural research agencies employed 25 FTE plant breeders and geneticists with postgraduate degrees, 20 of whom were employed at FOFIFA. Other strong disciplines included botany, forestry, and food sciences and nutrition.

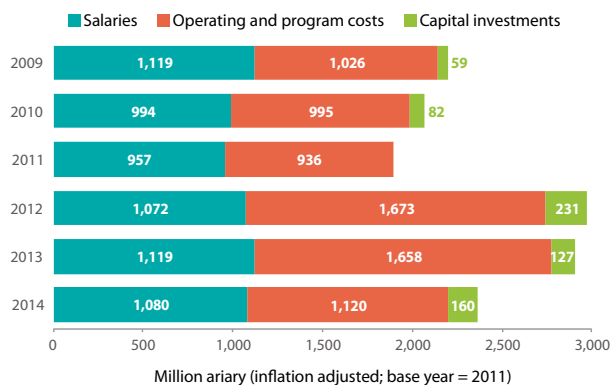
Agricultural researchers, 2014	FTEs		Share (%)	
	MSc	PhD	MSc	PhD
Plant breeding/genetics (incl. biotechnology)	19	6	20	10
Plant pathology	4	2	4	4
Plant physiology	–	1	–	2
Botany	8	7	8	13
Animal husbandry	8	–	8	–
Veterinary medicine	4	2	4	4
Zoology/entomology	3	2	3	4
Forestry and agroforestry	12	2	12	4
Fisheries and aquatic resources	1	0.3	1	1
Soil sciences	4	1	4	2
Biodiversity conservation	1	0.3	1	1
Food sciences and nutrition	2	6	2	10

Agricultural researchers, 2014	FTEs		Share (%)	
	MSc	PhD	MSc	PhD
Socioeconomics (incl. agricultural economics)	5	2	5	4
Other sciences	27	23	28	41
Total	97	56	100	100

Notes: These are estimates based on an agency sample, representing 81 percent of the total number of FTE researchers based at government agencies. Data exclude the nonprofit and higher education sectors as well as expatriate researchers.

FOFIFA's spending by cost category

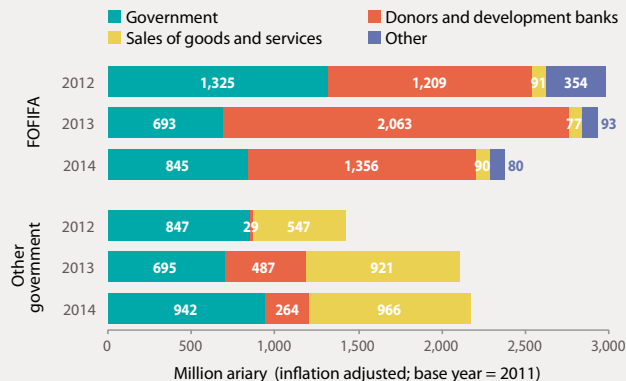
Madagascar's protracted political crisis is at the basis of the severe volatility in FOFIFA's yearly expenditures. Salary costs have remained relatively stable over time, but operating and program costs as well as capital investments fluctuated considerably from one year to the next, impacting the continuity of research.



Note: Data exclude salary costs of expatriate researchers.

FOFIFA and other government agencies' funding sources

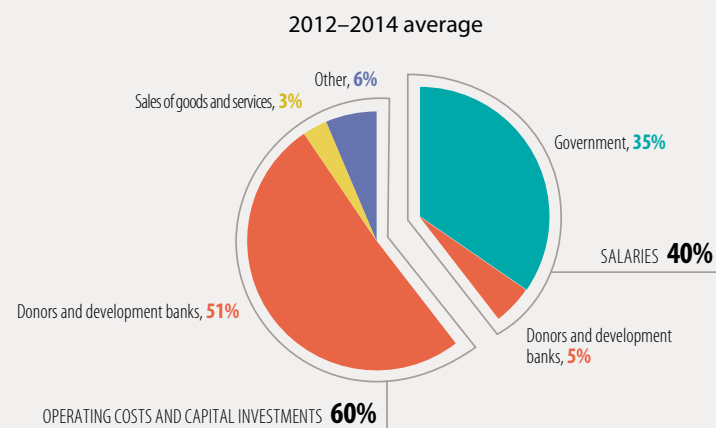
During 2012–2014, 56 percent of FOFIFA funding came from donors and development banks, notably the World Bank, France, and Japan. In contrast, the bulk of funding to other government agencies is provided by the national government. Internally generated resources play a more important role at the other government agencies than they do at FOFIFA.



Notes: Other government agencies include CDA, CNARP, CNRE, CNRIT, CNRO, FIFAMANOR, and PBZT. Funding data exclude the cost of expatriate researchers.

FOFIFA's funding and spending compared

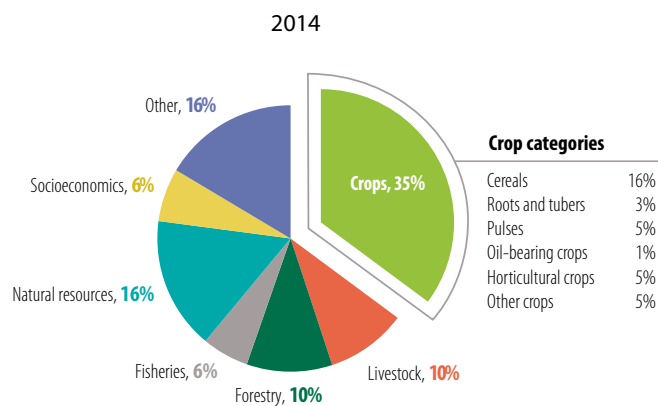
FOFIFA is highly dependent on donor and development funding. In fact, government funding was insufficient to cover the institute's salary bill during 2012–2014.



Note: Data exclude the cost of expatriate researchers.

Madagascar's agricultural researchers by area of focus

In 2014, 35 percent of Madagascar's agricultural research conducted crop research, followed by natural resources research (16 percent), livestock research (10 percent), and forestry research (10 percent). Rice research accounted for more than half of total crop researchers. Other major crops under investigation in 2014 include beans, fruits, and coffee.



Crop categories

Cereals	16%
Roots and tubers	3%
Pulses	5%
Oil-bearing crops	1%
Horticultural crops	5%
Other crops	5%

FOFIFA's recently released crop varieties

FOFIFA, released a total of six new crop varieties during 2012–2014. This included two new rice varieties resistant to cold, one aromatic rice variety, and one yellow mottle virus-resistant rice variety. In addition, FOFIFA released two new bean varieties resistant to rust.

Crop	Number of varieties, 2012–2014
Rice	4
Beans	2
Total	6

FOFIFA's recent peer-reviewed publications

Researchers at FOFIFA publish their work infrequently. An average of just 5 journal articles per year were published during 2012–2014. The institute's resulting ratio of publications per researcher (0.05) is very low when compared to other national agricultural research institutes across Africa.

Type	Number of publications, 2012–2014 annual average	Per FTE researcher
Journal articles		
International	0.7	0.007
Regional	—	—
National	4.3	0.042
Books	—	—
Book chapters	—	—
Total	5.0	0.049

Resources for Madagascar

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



ASTI's **agency directory** provides a view of agencies that conduct agricultural research in Madagascar, 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
CDA	Aquaculture Development Center
CNARP	National Pharmaceutical Research Center
CNRE	National Environmental Research Center
CNRIT	National Industrial and Technological Research Center
CNRO	National Oceanographic Research Center
FIFAMANOR	Center for Rural Development and Applied Research
FOFIFA	National Center for Applied Research and Rural Development
FTE(s)	full-time equivalent(s)
PBZT	Tsimbazaza Botanical and Zoological Park
PPP(s)	purchasing power parity (exchange rates)
R&D	research and development

ABOUT ASTI, IFPRI, AND FOFIFA

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 **National Center for Applied Research and Rural Development (FOFIFA)** is Madagascar's principal agricultural research agency. The institute falls under the Ministry of Agriculture and focuses on crop, livestock, forestry, postharvest, and socioeconomic research.

ASTI/IFPRI and FOFIFA 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 FOFIFA.