

MOROCCO

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KEY INDICATORS, 2009–2012

Total Public Agricultural Research Spending	2009		2012
Dirham (million constant 2005 prices)	460.2		473.9
PPP dollars (million constant 2005 prices)	127.4		131.2
Overall Growth		3%	
Total Number of Public Agricultural Researchers			
Full-time equivalents (FTEs)	520.7		556.3
Overall Growth		7%	
Agricultural Research Intensity			
Spending as a share of agricultural GDP	0.49%		0.49%
FTE researchers per 100,000 farmers	17.30		18.99

Note: Acronyms, definitions, and an overview of agricultural R&D agencies are available on page 4.

► Following considerable losses of agricultural researchers and technicians (as well as administrative and support staff) in response to government remuneration for voluntary retirement in 2005 and 2009, Morocco's agricultural research capacity has begun to increase again in more recent years.

► Agricultural R&D in Morocco is predominantly funded by the national government. Expenditure levels remained relatively stable during 2009–2012.

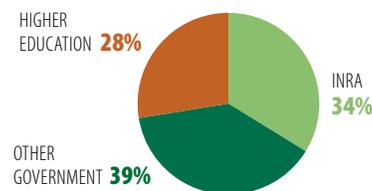
► Average qualification levels of Morocco's agricultural researchers improved during 2002–2012, with increases in both the absolute numbers as well as shares of researchers with MSc and PhD degrees.

FINANCIAL RESOURCES, 2012

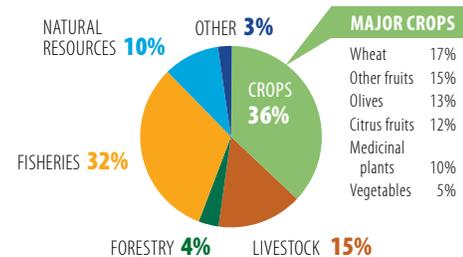
Spending Allocation	
Salaries	62%
Operating and program costs	20%
Capital investments	18%
Funding Sources	
Government	93%
Donors	0.5%
Sales of goods and services	4%
Other	2%

Note: Shares are based on data for government agencies only.

INSTITUTIONAL PROFILE, 2012



RESEARCH FOCUS, 2012



Notes: Major crops include those that are the focus of at least 5 percent of all crop researchers; 28 percent of total crop researchers focused on a wide variety of other crops.

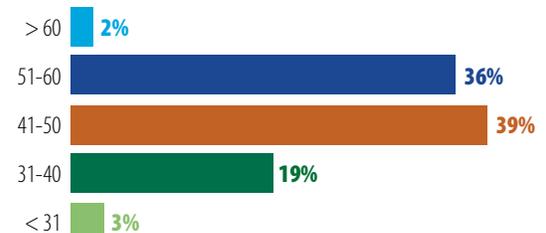
RESEARCHER PROFILE, 2012



Number by qualification (FTEs)



Share by age group (years)



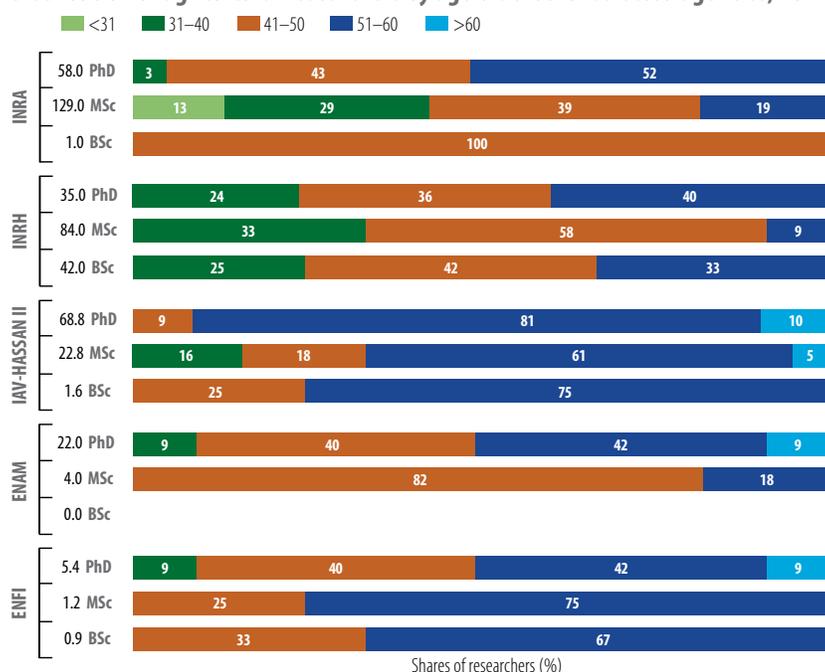
CHALLENGE

- ▶ Two consecutive voluntary-retirement schemes, coupled with limited recruitment, resulted in a considerable contraction in Morocco's agricultural R&D capacity over the past decade. Close to two-thirds of the country's PhD-qualified agricultural researchers are currently 50 years or older. Given an official retirement age of 60 years at government agencies and 65 years at universities, further capacity losses are imminent in the coming years unless immediate measures are taken to address this issue.

POLICY OPTIONS

- ▶ If Morocco is to maintain a critical mass of highly qualified agricultural researchers at the national level, the government needs to recruit and train young researchers without delay, and provide sufficient funding to support the remuneration, working conditions, and other incentives needed to secure their commitment over time. Removing the disparity in the retirement age between government and university appointments would be a necessary first step.

Distribution of agricultural researchers by age bracket for selected agencies, 2012



▶ VOLUNTARY RETIREMENT SCHEMES PROMPT A MASS DEPARTURE OF EXPERIENCED SCIENTISTS AND SUPPORT STAFF

With a view to reducing the country's number of civil servants and shake up Morocco's administration, in December 2004 the government began offering compensation for early retirement. This prompted a massive exodus of professors, researchers, and technicians almost overnight: during 2005–2006, INRA lost 88 researchers, IAV-Hassan II lost 48, ENAM lost 17, and ENFI lost 8 (in headcounts). INRH was less affected because most of its researchers were considerably younger than their colleagues at the other public R&D agencies and hence did not meet the minimum requirement of 21 years of service.

A second round of reductions was introduced in 2009, from which professors, researchers, and technicians were excluded, but this time agricultural R&D agencies lost administrative and other support staff. In addition to these early retirements, many more researchers and support staff left the system under regular retirement. Despite recent recruitment efforts, it goes without saying that the sudden departure of so many long-term, highly experienced staff members has had a tremendously negative impact on the day-to-day operations of agricultural R&D agencies in Morocco, and the effects are still being felt.

A large number of Morocco's agricultural researchers—especially those with PhD degrees—are in their fifties or sixties. The situation is particularly severe at IAV-Hassan II, where 85 percent of faculty staff is 50 years or older. At INRA, 30 of 58 PhD-qualified researchers are set to retire by 2022, underlining the urgent need for recruitment and training of the next generation of scientists.

CROSS-COUNTRY COMPARISONS OF KEY INDICATORS

	Total number of researchers, 2012 (FTEs)	Growth in number of researchers, 2009–2012	Share of PhD researchers, 2012 (FTEs)
Morocco	556.3	7%	40%
Algeria	593.4	16%	23%
Tunisia	541.6	26%	62%
Mauritania ^a	62.9	26%	25%

^a Mauritania data refer to 2011 or the 2009–2011 period.

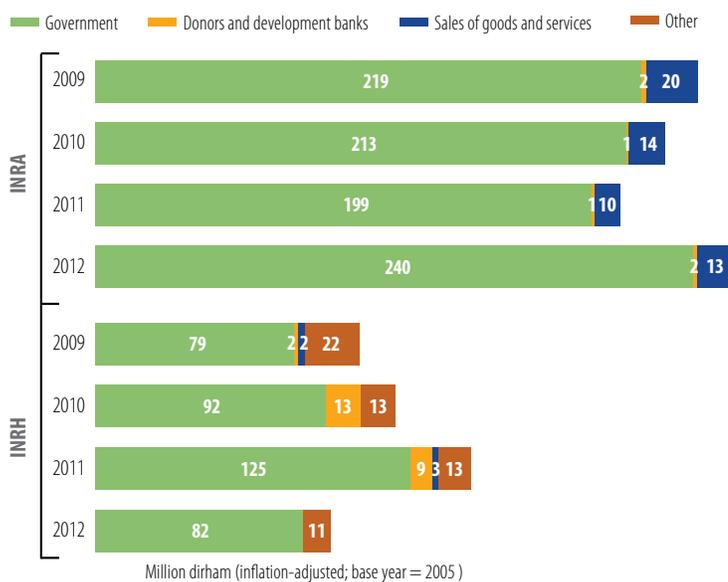
CHALLENGE

- ▶ Despite recent upgrades of INRA centers in Agadir and Er-Rachidia, more capital investments are needed to modernize and equip INRA's other regional centers and renew its fleet of vehicles. Much of IAV-Hassan II's infrastructure is in need of rehabilitation as well. The absence of a regulatory framework and long administrative procedures prevent agricultural R&D agencies from securing the necessary funding from the Ministry of Finance to enable much-needed upgrades to their infrastructure.

POLICY OPTION

- ▶ Modern and well-functioning research infrastructure and equipment are vital to the quality and quantity of research outputs, not to mention staff motivation and performance. If agricultural R&D is to have a positive long-term impact on agricultural productivity growth, food security, and poverty reduction, it is crucial that the government sets more funding aside for necessary upgrades to R&D infrastructure and equipment, and that it eases the bureaucratic procedures surrounding the allocation and release of these funds.

INRA's and INRH's funding sources, 2009–2012



Government funding, which has remained fairly stable over time, is by far the most important source of funding for INRA and INRH, as its near 90-percent share of these agencies' funding during 2009–2012 indicates. Donors and development banks and the private sector play a relatively minor role as funders of agricultural research in Morocco.

AGRICULTURAL R&D FUNDING

INRA and INRH are the only public agricultural R&D agencies in Morocco that receive research budgets from the national government on a yearly basis. Government funding for higher education agencies is for teaching purposes only, and hence does not cover research activities. IAV-Hassan II, for example, receives about 250 million dirham per year from the Moroccan government. In 2012, it generated 14 million dirham (roughly 5 percent of its total budget) through research contracts, including those from the US-funded MCA program and ARIMNet—a European Union-funded program that aims to enhance collaboration in agricultural R&D around the Mediterranean and which funds joint research programs on a competitive basis. The fact that IAV-Hassan II and other higher education agencies lack dedicated research budgets, depending largely on ad hoc external funding, complicates the design of focused, coherent, and long-term R&D programs.

In addition to direct government support, a number of government-operated competitive funds finance agricultural R&D in Morocco. FNSRSDT was established in 2000 and is a general science and technology fund supporting both agricultural and nonagricultural research projects. INRA, IAV-Hassan II, ENAM, and ENFI have all received funding through FNSRSDT over the years. MCRDV is the Ministry of Agriculture and Fisheries' competitive fund specifically targeting agricultural research projects. It aims to enhance interagency collaboration by limiting proposals to multi-agency, multidisciplinary initiatives that aim to spend at least 20 percent of the total project amount on extension-related activities.

CROSS-COUNTRY COMPARISONS OF KEY INDICATORS *continued*

	Total spending, 2012 (million 2005 PPP dollars)	Overall spending growth, 2009–2012	Spending as a share of AgGDP, 2012
Morocco	131.2	3%	0.49
Algeria	81.7	19%	0.21
Tunisia	55.9	13%	0.64
Mauritania ^b	8.9	-21%	0.80

^b Mauritania data refer to 2011 or the 2009–2011 period.

OVERVIEW OF MOROCCO'S AGRICULTURAL RESEARCH AGENCIES

Nineteen agencies perform agricultural R&D in Morocco. INRA (employing 188 FTE researchers in 2012) is the country's largest agricultural R&D agency. In addition to its headquarters in Rabat, INRA operates ten regional research centers and 23 experimental stations covering various agroecosystems. INRA's scientists conduct research on crops (mainly wheat), fruit trees (date palm and citrus), olives, livestock, pastures and forages, and natural resources. INRH (employing 161 FTEs in 2012) is Morocco's main fisheries research institute. Its mandate includes fisheries stock assessment, conservation of the marine environment, marine technology research, and the development of fisheries products. CRF (49 FTEs) is Morocco's primary forestry research agency and conducts research on genetics and improvement of tree species, forest technology, and ecology. Fourteen higher education agencies are actively engaged in agricultural R&D, together constituting roughly a quarter of Morocco's FTE agricultural researchers. The country's largest higher education agency involved in agricultural research is IAV-Hassan II (93 FTEs). In addition to its primary campus in Rabat, IAV-Hassan II operates a satellite campus in Agadir, which specializes in horticulture and plant breeding. Moreover, an experiment farm at Ait Melloul supports IAV-Hassan II's applied research activities on crops, livestock, and natural resources. ENAM (26 FTEs) conducts research largely focusing on crops, livestock, and socioeconomic issues, while ENFI (8 FTEs) conducts research on forestry, natural resources, and mountain economies. The faculties of science at the universities of Agadir, Beni-Mellal, Casablanca, Errachidia, Fès, Kénitra, Marrakech, Meknès, Oujda, and Settat are all involved in (limited) agricultural R&D as well. The private for-profit sector plays a negligible role in Moroccan agricultural R&D.



 For a complete list of the agencies included in ASTI's dataset for Morocco, visit www.asti.cgiar.org/morocco.

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.
- ▶ **Public agricultural research** includes research conducted by government agencies, higher education agencies, and nonprofit institutions.
- ▶ 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 2005 local currencies and **2005 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, due to **decimal rounding**, the percentages presented can sum to more than 100.

 For more information on ASTI's data procedures and methodology, visit www.asti.cgiar.org/methodology; for more information on agricultural R&D in Morocco, visit www.asti.cgiar.org/morocco.

ACRONYMS USED IN THIS FACTSHEET

ARIMNet	Coordination of Agricultural Research in the Mediterranean Area
CRF	Forestry Research Center
ENAM	Meknès National School of Agriculture
ENFI	National Forestry Engineering School
FNSRSDT	National Fund to Support Scientific Research and Technological Development
FTE(s)	Full-time equivalent (researchers)
GDP	Gross domestic product
IAV-Hassan II	Agronomy and Veterinary Institute Hassan II
INRA	National Agricultural Research Institute
INRH	National Fisheries Research Institute
MCA	Millennium Challenge Account
MCRDV	Competitive Mechanism for Research and Development and Extension
PPP(s)	Purchasing power parity (exchange rates)

ABOUT ASTI, IFPRI, AND INRA

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 Agricultural Research Institute (INRA)** is Morocco's principal agricultural R&D agency; it is administered by the Ministry of Agriculture and Marine Fisheries and conducts research on crops, livestock, pastures and forages, and natural resources.

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