

CHILE

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KEY INDICATORS, 2006–2013

Total Agricultural Research Spending	2006		2009		2013
Chilean pesos (million constant 2011 prices)	52,807.5		66,221.4		64,881.8
PPP dollars (million constant 2011 prices)	151.7		190.3		186.4
Overall Growth		25%		-2%	
Total Number of Agricultural Researchers					
Full-time equivalents (FTEs)	665.5		671.4		715.7
Overall Growth		1%		6%	
Agricultural Research Intensity					
Spending as a share of agricultural GDP	1.47%		1.86%		1.65%
FTE researchers per 100,000 farmers	67.56		69.29		74.86

Notes: Research conducted by the private for-profit sector is excluded from this factsheet due to lack of available data. Acronyms, definitions, and an overview of agricultural R&D agencies are provided on page 4.

► Chile's overall number of agricultural researchers has gradually increased in recent years. Agricultural R&D expenditures grew rapidly during 2006–2008, but have stagnated from 2009 onwards.

► In 2013, Chile invested 1.65 percent of its AgGDP in agricultural research, which is the second highest level in Latin America after Brazil.

► INIA remains, by far, Chile's largest agricultural R&D agency, accounting for 45 percent of the country's agricultural researchers. A number of nonprofit agencies have been established over the past decade, and their role in national agricultural R&D has become increasingly important.

FINANCIAL RESOURCES, 2013

Spending Allocation

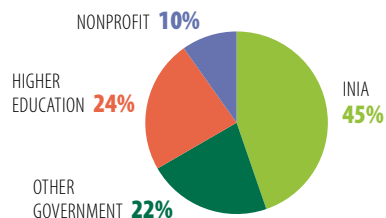
Salaries	52%
Operating and program costs	34%
Capital investments	14%

Funding Sources

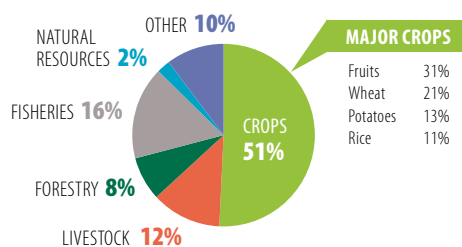
Government	57%
Sales of goods and services	21%
Other	22%

Note: Shares are based on data for INIA only.

INSTITUTIONAL PROFILE, 2013



RESEARCH FOCUS, 2013

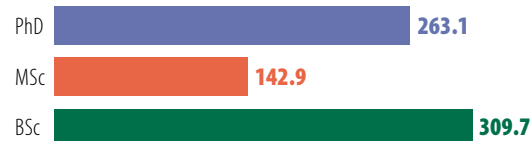


Notes: Major crops include those that are the focus of at least 5 percent of all crop researchers; 25 percent of total crop researchers focused on a wide variety of other crops.

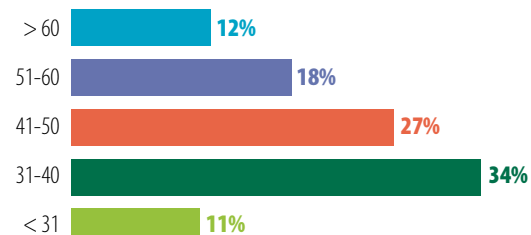
RESEARCHER PROFILE, 2013



Number by qualification (FTEs)



Share by age group (years)



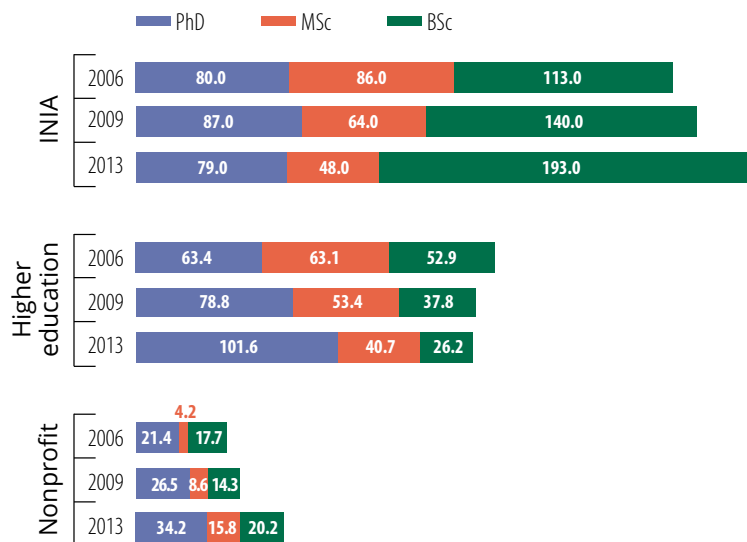
CHALLENGE

- ▶ In recent years, a significant number of researchers benefited from postgraduate training opportunities, both in-country and abroad, as part of CONICYT's *Becas Chile* program. Nevertheless, hindered by recruitment restrictions, INIA and the other agricultural R&D agencies lack sufficient vacancies to be able to employ all of these highly qualified researchers once they complete their degrees.

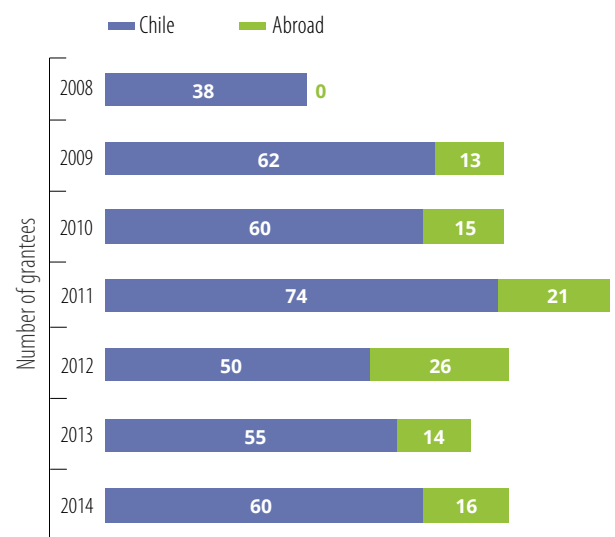
POLICY OPTION

- ▶ In order to prevent the supply of highly qualified researchers to outstrip the capacity of the agricultural R&D system, it is crucial that PhD scholarships are planned based on a more coordinated assessment of capacity needs and emerging areas of research focus. In the meantime, incentives need to be provided to private companies to absorb these qualified researchers. CONICYT is currently exploring options to keep some of the most promising PhD graduates employed abroad, where they can gain valuable research experience, as well as incentives to attract them back to Chile when the time is right.

Number of researchers by sector and qualification level, 2006, 2009, and 2013 (FTEs)



Number of *Becas Chile* PhD grantees in agricultural sciences by start year, 2008–2014



Source: CONICYT

- ▶ The number of agricultural researchers employed at INIA and the nonprofit sector rose steadily between 2006 and 2013, but growth at INIA was actually driven by a substantial increase in the number of BSc-qualified researchers combined with a decline in the number of PhD- and MSc-qualified researchers. Unlike Chile's higher education and nonprofit agencies, recruitment restrictions have prevented INIA from enhancing its research capacity with PhD graduates entering the job market after completing *Becas Chile*-funded training.

- ▶ During 2008–2014, *Becas Chile* awarded 504 PhD grants to Chilean agricultural scientists. 80 percent of grantees were trained at Chilean universities, and 20 percent were trained abroad (mostly in the United States, Spain, and Australia). Grantees trained abroad were typically in their thirties, whereas grantees trained in Chile tended to be in their late-twenties.

CROSS-COUNTRY COMPARISONS OF KEY INDICATORS

	Total number of researchers, 2013 (FTEs)	Growth in number of researchers, 2009–2013	Share of PhD researchers, 2013 (FTEs)	Total spending, 2013 (million 2011 PPP dollars)	Overall spending growth, 2009–2013	Spending as a share of AgGDP, 2013
Chile	715.7	6%	37%	186.4	-2%	1.65%
Argentina	5,824.5	18%	21%	732.1	26%	1.29%
Uruguay	371.9	1%	26%	77.4	20%	1.40%
Paraguay	209.5	36%	5%	26.8	32%	0.26%

Note: Please visit www.asti.cgiar.org/benchmarking/lac to benchmark Chile with other countries in Latin America and the Caribbean or compare the country's key indicators with regional averages.

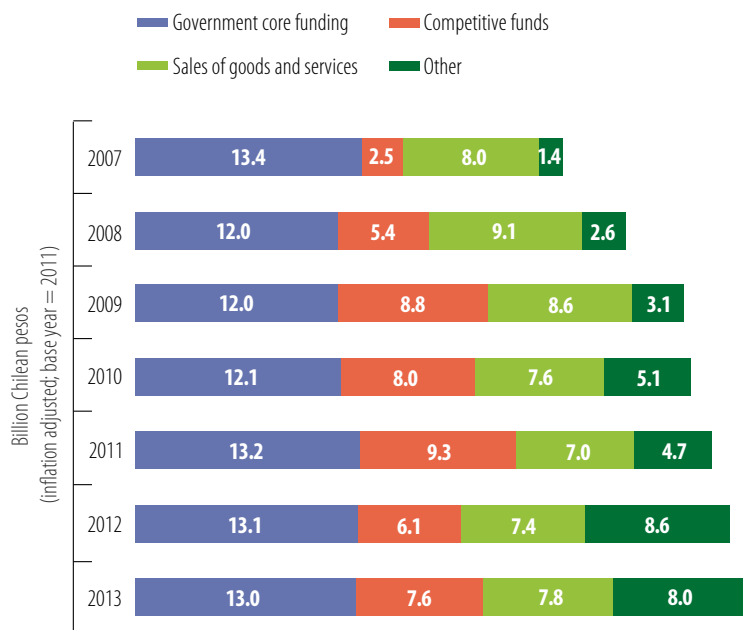
CHALLENGE

- ▶ Competitive funds play an important role in funding Chilean agricultural research. Although the majority of these funds function well individually, some degree of duplication does occur among them. In addition, the reliance on short-term competitive funding sometimes gives rise to opportunistic research programs—solely initiated in response to funding availability—that do not necessarily reflect national priorities or contribute to a coherent national research portfolio.

POLICY OPTION

- ▶ The establishment of a single body to oversee the various competitive funds could address some of these concerns. Some also call for the introduction of more sector-specific competitive funds, because the specificities of certain sectors are too complex to be solved with so-called horizontal funds. In addition, the government needs to set aside more funding for basic research, an important area of focus that competitive funds generally overlook.

INIA's funding by source, 2007–2013



- ▶ Total direct government appropriations are insufficient to cover INIA's yearly salary bill. Researchers are required to secure funding for actual research programs through competitive grant schemes, but this funding source tends to fluctuate significantly from year to year. During 2007–2013, roughly a quarter of INIA's funding was derived through the sale of goods (mainly seeds) and technologies, and through the provision of contract research to the private sector.

▶ COMPETITIVE FUNDS FOR AGRICULTURAL RESEARCH

Starting in the 1980s, Chile was one of the first countries in Latin America to introduce competitive funding mechanisms for agricultural R&D. Several funds are currently in operation with substantial public financial support. These funds seek to increase the accountability of researchers, improve research resource allocation and technology transfer by promoting more effective linkages between research institutes and agricultural producers, and lower costs by supporting demand-driven research. The most important competitive funds for agricultural research currently operating in Chile are the National Fund for Science and Technology Development, the Fund for the Promotion of Scientific and Technological Development, InnovaChile, the Agricultural Innovation Fund, the Innovation Fund for Competitiveness, and the Fund for Fisheries Research. Each of these funds focuses on different agricultural themes or aspects of science and technology. Private-sector involvement through counterpart funding or collaborative research is a prerequisite for eligibility to ensure that the research is commercially viable.

Overall, competitive funds have enhanced the responsiveness of the Chilean national innovation system to R&D needs. Nonetheless, they do have limitations. The maximum duration of projects financed by most funds is just three years, thereby impeding the long-term continuity of research or the chances of achieving major scientific breakthroughs. In addition, mandatory private-sector involvement prioritizes projects with a commercial interest over those that serve broader social interests (such as climate change or environmental sustainability). Finally, many of the competitively funded projects are very small, which promotes fragmentation of the national agricultural research agenda.

New varieties released by INIA, 2007–2013

COMMODITY	NUMBER OF VARIETIES
Wheat	9
Grass (fodder)	3
Grape	2
Guava	2
Potatoes	2
Lupine	1
Oats	1
Onion	1
Rice	1
Triticale	1

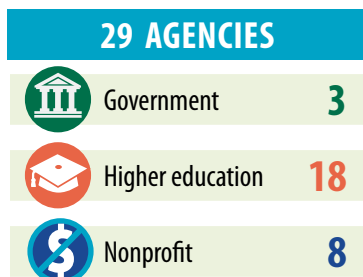
- ▶ INIA, Chile's main agricultural research agency focusing on crop breeding, released 23 new crop varieties and numerous other technologies during 2007–2013.

Knowledge transfer activities by INIA, 2013

ACTIVITY/OUTPUT/PARTICIPATION	NUMBER OF EVENTS/OUTPUTS/PARTICIPANTS
Field days organized	83
Training events conducted	492
Brochures published	20
People trained	15,542

OVERVIEW OF CHILE'S AGRICULTURAL RESEARCH AGENCIES

Excluding the private sector, 29 agencies conduct agricultural R&D in Chile. The main government agency, INIA (employing 320 FTE researchers in 2013) is the country's largest agricultural R&D agency by far. Headquartered in Santiago de Chile, INIA operates ten regional centers across the country. INIA's researchers focus on a variety of commodities and themes, including crops (mostly wheat, rice, potatoes, grapes, and other fruits), livestock, and pastures and forages. Two other government agencies are involved in agricultural research: IFOP and INFOR. IFOP (107 FTEs) conducts fisheries research, whereas INFOR (50 FTEs) is involved in forestry research. The higher education sector accounts for about a quarter of Chilean agricultural researchers. Although 18 separate higher education units (faculties, departments, and institutes) were identified as conducting agricultural research, most is undertaken within the faculties of agriculture of the University of Chile and the University of Concepción. Increasing numbers of private universities have been established in recent years, but the quality of their education and research remains below that of the more established universities. With the establishment of a number of nongovernmental research centers over the past decade, the nonprofit sector has begun to play an increasingly important role in agricultural research. Examples of recently established nonprofit agencies include the Agro-aquaculture Nutritional Genomic Centre (19 FTEs focusing on pulses and oil-bearing crops), the Center for Advanced Study in Fruit (14 FTEs), and the Regional Centre for Innovation in Horticulture (13 FTEs).



Note: Excludes private for-profit agencies.

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

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, 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 Chile, visit www.asti.cgiar.org/chile.

ACRONYMS USED IN THIS FACTSHEET

AgGDP	Agricultural gross domestic product
CONICYT	National Commission of Scientific and Technological Research
FTE(s)	Full-time equivalent (researchers)
IFOP	Fisheries Development Institute
INFOR	Forestry Institute
INIA	Institute for Agricultural Research
PPP(s)	Purchasing power parity (exchange rates)
R&D	Research and development

ABOUT ASTI, IFPRI, AND INIA

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 for Agricultural Research (INIA)** is Chile's principal agricultural research agency; the institute falls under the Ministry of Agriculture and predominantly focuses on crop and livestock research.

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