Agricultural R&D Indicators Factsheet | April 2016

PARAGUAY

Gert-Jan Stads, Sandra Perez, Justo López, and Nienke Beintema

KEY INDICATORS, 2006–2013

Total Agricultural Research Spending	2006		2009		2013
Guaraní (million constant 2011 prices)	29,977.9		45,249.9		59,592.3
PPP dollars (million constant 2011 prices)	13.5		20.3		26.8
Overall Growth	|	**51%**	|	**32%**	|
Total Number of Agricultural Researchers					
Full-time equivalents (FTEs)	131.3		154.3		209.5
Overall Growth	|	**18%**	|	**36%**	|
Agricultural Research Intensity					
Spending as a share of agricultural GDP	0.21%		0.29%		0.26%
FTE researchers per 100,000 farmers	16.66		18.79		24.30

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.

- National agricultural R&D spending doubled during 2006–2013. Nonetheless, the country still has one of the lowest agricultural R&D intensity ratios in the region. Paraguay relies heavily on technologies generated elsewhere—mainly in Brazil and Argentina.
- The total number of agricultural researchers almost doubled between 2006 and 2013 as a result of the 2010 establishment of IPTA and increased involvement in agricultural R&D by the higher education sector.
- Despite recent capacity increases, Paraguay's pool of PhD-qualified agricultural researchers is among the lowest in South America.

FINANCIAL RESOURCES, 2013

Spending Allocation

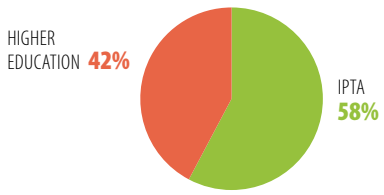
Salaries	84%
Operating and program costs	13%
Capital investments	2%

Funding Sources

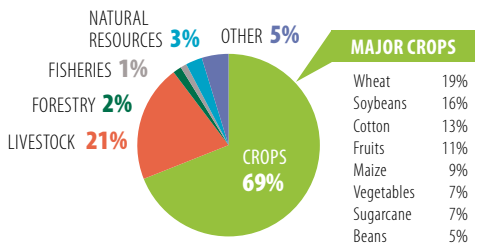
Government	69%
Sales of goods and services	31%

Note: Shares are based on data for IPTA only.

INSTITUTIONAL PROFILE, 2013



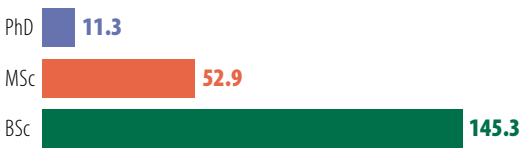
RESEARCH FOCUS, 2013



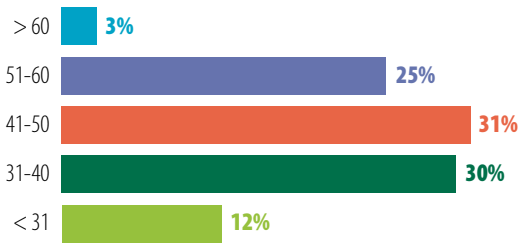
Notes: Major crops include those that are the focus of at least 5 percent of all crop researchers; 13 percent of total crop researchers focused on a wide variety of other crops.

RESEARCHER PROFILE, 2013

Number by qualification (FTEs)



Share by age group (years)



Note: Due to availability, data by age bracket are for IPTA only.

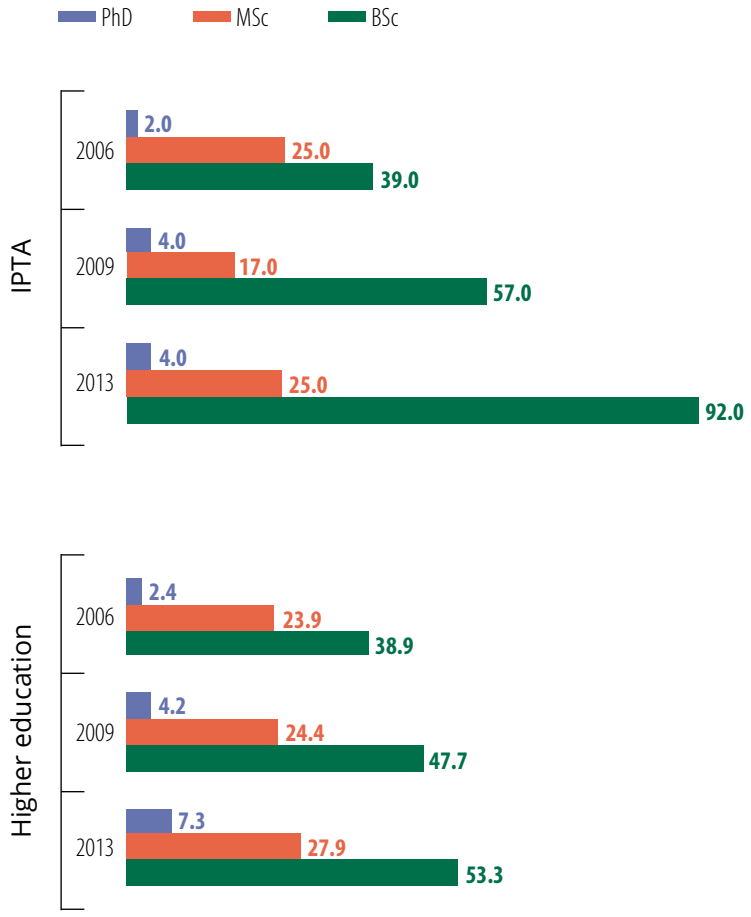
CHALLENGE

- Paraguayan researchers lack sufficient PhD-level training opportunities in their own country. Consequently, the bulk of agricultural researchers at IPTA and the higher education agencies are only qualified to the BSc- and MSc-degree level. Despite the significant increase in the total number of researchers, Paraguay still lacks a critical mass of highly qualified researchers for its research to have a tangible impact.

POLICY OPTION

- The government needs to invest in higher agricultural education to enable the country's universities to increase the number and size of their MSc and PhD programs and to improve existing curriculums. The recent implementation of salary increases, performance-based incentives, and career opportunities for IPTA's researchers is a positive development, but more incentives will be needed to attract and motivate scientists over time.

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



Most of the 2006–2013 increase in the number of agricultural researchers in Paraguay occurred at the BSc level. In 2013, PhD-qualified researchers represented just 3 and 8 percent of total agricultural researchers at IPTA and the higher education agencies, respectively.

LIMITED PHD TRAINING OPPORTUNITIES FOR YOUNG RESEARCHERS

A minimum number of PhD-qualified scientists is generally considered fundamental to the conception, execution, and management of high-quality research and to effective interaction with policymakers, donors, and other stakeholders, both locally and through regional and international forums. Paraguay's universities currently offer very limited PhD training in agricultural science, so scientists wanting to increase their qualifications have little choice but to travel abroad. Lack of training opportunities also means that IPTA has difficulty finding qualified researchers for certain key disciplines, including crop and animal genetic improvement through biotechnology, and precision agriculture. Since 2011, IPTA has had a budget for short-term and MSc-level training. In addition, various grants exist for in-country and external degree-level training. Researchers who accept grants also commit to remaining in employment with IPTA for at least the same number of years as the duration of their postgraduate training.

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
Paraguay	**209.5**	**36%**	**5%**	**26.8**	**32%**	**0.26%**
Chile	715.7	6%	37%	186.4	–2%	1.65%
Peru	339.1	14%	13%	83.4	–12%	0.35%
Ecuador	149.9	46%	10%	27.3	9%[a]	0.18%

[a] For Ecuador, this overall spending growth is based on data for the 2010–2013 period. Note: Please visit *www.asti.cgiar.org/benchmarking/lac* to benchmark Paraguay with other countries in Latin America and the Caribbean or compare the country's key indicators with regional averages.

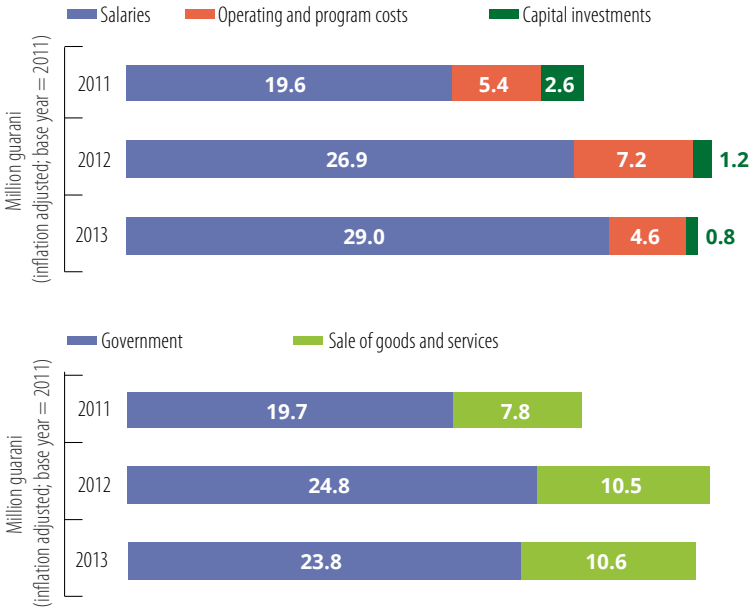
CHALLENGE

- The day-to-day operation of IPTA's research programs is clearly underfunded, which understandably has negative impacts on the quality and quantity of its research outputs. Government funding to IPTA barely covers the institute's salary bill, leaving the costs of conducting research and maintaining and upgrading R&D infrastructure entirely dependent on internally generated revenues from the sale of goods and services. Much of IPTA's facilities and equipment are in urgent need of renovation or replacement.

POLICY OPTION

- To generate high-quality, effective outputs the Paraguayan government needs to clearly define its long-term R&D priorities and secure sustained funding, not only in support of salaries, but also to cover the day-to-day costs of operating R&D programs. Alternative strategies and mechanisms are also needed for raising complementary funding, such as through donor contributions and enhanced private-sector participation. Cultivating private funding requires that national governments provide a more enabling policy environment through tax incentives and protection of intellectual property rights.

IPTA's spending by cost category and funding by source, 2011–2013



Salary-related expenditures represented close to 80 percent of IPTA's spending during 2011–2013, all of which is supported by government funding allocations. The remaining costs of conducting research and maintaining facilities and equipment depend on a combination of internally generated revenues (through seed- and livestock-related sales and services and the performance of on-demand trials for the private sector) and donor support, especially from Japan (most of which takes the form of in-kind, not financial contributions, which are difficult to quantify).

IPTA ESTABLISHED TO STRENGTHEN AGRICULTURAL R&D IN PARAGUAY

In 2012, after a progressive weakening of agricultural and forestry research in Paraguay, IPTA was established through the merger of the Agricultural Research Directorate and the Animal Research and Production Directorate for the purpose of consolidating the country's government-based crop, livestock, and forestry research. As part of this process and with the support of IICA, the country developed a strategic plan for the 2012–2021 period and a medium-term action plan to 2016. IPTA is a semiautonomous body with administrative, financial, and human resource flexibility, including, for example, the ability to revenues generated through the sale of goods and services. Despite these beneficial changes, however, more will be needed for IPTA to achieve financial stability and develop the necessary levels of human resource capacity. Over the next few years, it is intended that IPTA will strengthen its research capacity by recruiting and training staff. The institute will also need to ensure its competitiveness by offering higher salary levels, developing an equitable and transparent system of staff promotion, and providing other incentives. Despite its recent establishment, the institute has already made considerable achievements in terms of releasing new varieties. In addition, IPTA has signed collaborative agreements with Embrapa, FONTAGRO, IICA, JIRCAS, PROCISUR, and others.

New varieties released by IPTA, 2007–2013

COMMODITY	NUMBER OF VARIETIES
Soybeans	3
Wheat	3
Cotton	2
Maize	2
Stevia	1

IPTA, Paraguay's main agricultural R&D agency involved in crop breeding, released 11 new varieties and numerous other technologies during 2007–2013, but the majority of the new varieties that Paraguay adopts each year are developed in Argentina and Brazil.

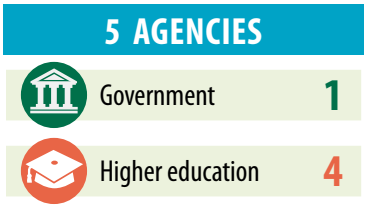
Knowledge transfer activities by IPTA, 2013

ACTIVITY/OUTPUT/ PARTICIPATION	NUMBER OF EVENTS/ OUTPUTS/PARTICIPANTS
Field days organized	2,047
Training events conducted	10
Brochures published	na
People trained	3,255

Note: na indicates that data is not available.

OVERVIEW OF PARAGUAY'S AGRICULTURAL RESEARCH AGENCIES

Five agencies conduct agricultural R&D in Paraguay. IPTA (employing 121 FTE researchers in 2013) is by far the largest, accounting for close to 60 percent of the country's agricultural researchers (in FTEs). IPTA is headquartered in San Lorenzo, just outside the capital Asunción; it operates 3 centers and 8 experiment fields located across the country. IPTA's researchers predominantly focus on crops (mostly wheat, soybean, maize, and fruit). Despite also having a livestock research mandate, IPTA employs relatively few livestock researchers. Four higher education agencies conduct agricultural research in Paraguay, three of which fall under the University of Asunción: the Faculty of Agriculture (43 FTEs), which focuses on crops, forestry, human ecology, and fruit trees; the Faculty of Veterinary Science (33 FTEs), which focuses on animal production and veterinary medicine; and CEMIT (13 FTEs), which conducts crop research, especially relating to soybeans and wheat. The fourth higher education agency is the Faculty of Agriculture of Catholic University Nuestra Señora de la Asunción (0.6 FTEs), which is a private institution that conducts very limited research. No private for-profit agencies conducting agricultural R&D were identified.



Note: Excludes private for-profit agencies.

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

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 Paraguay, visit* **www.asti.cgiar.org/paraguay**.

ACRONYMS USED IN THIS FACTSHEET

AgGDP	Agricultural gross domestic product
CEMIT	Multidisciplinary Technology Research Center
Embrapa	Brazilian Agricultural Research Corporation
FONTAGRO	Regional Fund for Agricultural Technology
FTE(s)	Full-time equivalent (researchers)
IICA	Inter-American Institute for Cooperation on Agriculture
IPTA	Paraguayan Institute of Agricultural Technology
JIRCAS	Japan International Research Center for Agricultural Sciences
PPP(s)	Purchasing power parity (exchange rates)
PROCISUR	Cooperative Program for the Development of Agricultural Technology in the Southern Cone
R&D	Research and development

ABOUT ASTI, IFPRI, AND IPTA

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 **Paraguayan Institute of Agricultural Technology (IPTA)** is Paraguay's principal agricultural research agency; the institute falls under the Ministry of Agriculture and Livestock and focuses on crop and livestock research.

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