

# Key trends in public agricultural research capacity and investments in Argentina

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*This brief provides an overview of the major investment trends in public agricultural research in Argentina since the early 1980s, drawing on a new set of data developed through a comprehensive survey by the International Food Policy Research Institute (IFPRI) and the National Institute of Agricultural Technology (INTA).<sup>1</sup>*

## Institutional Composition

The current study identified 74 public sector agencies involved in agricultural research in Argentina. Combined, these agencies employed 3,940 full-time equivalent (fte) researchers in 2006. The National Institute of Agricultural Technology (INTA) is the most important player in agricultural research and development (R&D) in Argentina. In 2006, 1,910 fte researchers were active at INTA, accounting for roughly half of the country's agricultural research staff (Table 1). INTA is placed under the Secretary of Agriculture, but is relatively autonomous in its functioning. Headquartered in Buenos Aires, INTA is organized in 15 regional centers that interact closely with local producers and that conduct research focused on regional production needs. Besides these regional centers, INTA also operates 47 agricultural experiment stations and 260 agricultural extension units spread over the country.

The National Institute of Fisheries Research and Development (INIDEP) is Argentina's principal agency charged with fisheries research and accounted for 3 percent of the country's total agricultural research staff in 2006. The National Council of Scientific and Technical Research (CONICET) is Argentina's leading government agency charged with scientific and technical research. It oversees a very large number of scientific research institutes and centers, 26 of which are involved in R&D related to agriculture.

The higher education sector plays a very important role in the conduct of agricultural R&D in Argentina. 46 university faculties were identified as carrying out agricultural research. Combined, they employed 1,759 fte agricultural scientists in 2006, or 45 percent of the country's agricultural R&D capacity. The largest universities in terms of fte agricultural research staff are the University of Buenos Aires, the National University of La Plata, the National University of Tucumán, the National University of Río Cuarto, and the National University of the Center of Buenos Aires Province, all of which employed 100 fte agricultural researchers or more in 2006.

<sup>1</sup> This brief was prepared as background material for a presentation by Nienke Beintema at the Inter-American Development Bank, Washington, D.C., 16 January, 2009. It is based on a longer country brief on Argentina's public agricultural research capacity and investment trends, which will be available shortly at <http://www.asti.cgiar.org>. This brief has not undergone a formal review process. The interpretations and conclusions are those of the author, not necessarily those of IFPRI.

**Table 1—Institutional composition of public agricultural R&D staff, 2006**

	Total research staff (fte's)	Share (percentage)	Agencies in sample (number)
INTA	1,910.0	48.5	1
INIDEP	101.0	2.6	1
CONICET	170.5	4.3	26
Higher education agencies	1,758.9	44.6	46
<i>Total</i>	<i>3,940.3</i>	<i>100.0</i>	<i>74</i>

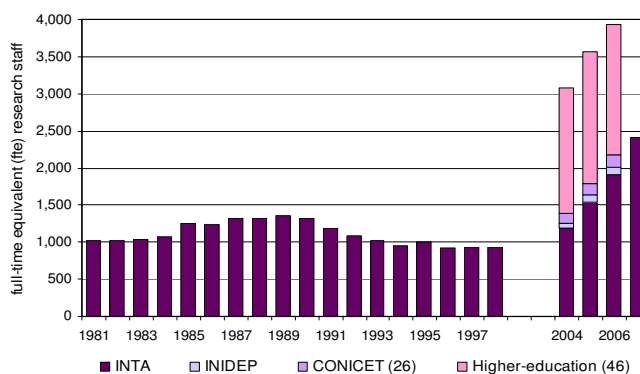
Source: Stads, Ruiz, and de Greef. 2009.

Notes: The 26 CONICET agencies and the 46 higher education agencies spent between 10 and 100 percent of their time on agricultural research, resulting in 170.5 and 1,758.9 fte researchers, respectively.

## Agricultural R&D Capacity

Argentina's total agricultural research capacity has risen rapidly after the 1999-2002 economic crisis (Figure 1). This increase is mainly due to strong growth in INTA's research staff totals, which rose from 1,180 fte's in 2004 to 2,410 in 2007 following a large injection of national government and Inter-American Development Bank (IDB) funds in support of agricultural R&D. It should be noted, however, that the majority of these newly hired researchers are young scientists that are appointed shortly after completing BSc training in college. Though growth in agricultural R&D capacity for the other agencies was much slower than for INTA (62 percent during 2004-06), all three categories reported growth in recent years. INIDEP's research capacity increased by 38 percent, CONICET's by 18 percent, and the higher education agencies combined by 5 percent during 2004-06.

**Figure 1—Composition of public agricultural research staff, 1981-98 and 2004-07**

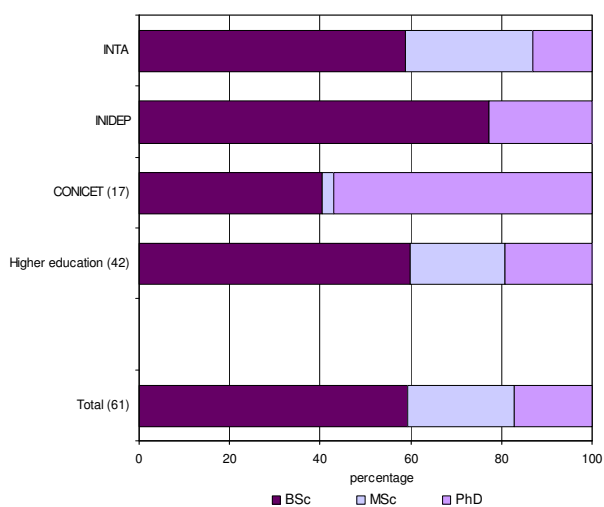


Source: Stads, Ruiz, and de Greef. 2009.

Notes: See Table 1. Figures in parentheses indicate the number of agencies in each category. Data for INTA were unavailable for 1999-2003.

In 2006, 41 percent of the 3,793 fte researchers in a 61-agency sample of Argentinean agricultural R&D agencies were trained to the postgraduate level, and 17 percent held PhD degrees (Figure 2). Compared to many other countries in Latin America, average degree levels in Argentina are relatively low. In neighboring Chile and Uruguay, for example, the share of agricultural research staff with postgraduate training in 2006 was 62 and 55 percent, respectively (Stads and Beintema 2009). The reason for the relatively low average qualification levels of Argentinean agricultural scientists can be ascribed to the influx of 500 young BSc holders in INTA between 2004 and 2006, causing the institute's share of postgraduate holders to drop from 56 to 41 percent. With 364 PhD holders in 2007 (up from 247 one year earlier), INTA has a very qualified capacity nonetheless. Average degree levels varied widely among the other agency categories. At the CONICET agencies, for example, 57 percent of research staff held PhD degrees in 2006, while at INIDEP, more than three-quarters of agricultural researchers were trained to the BSc level. The 2006 share of postgraduate holders in the higher education sector is lower than in the government sector, which is in sharp contrast with observations in most low and middle income countries worldwide.

**Figure 2—Educational attainment of researchers by institutional category, 2006**

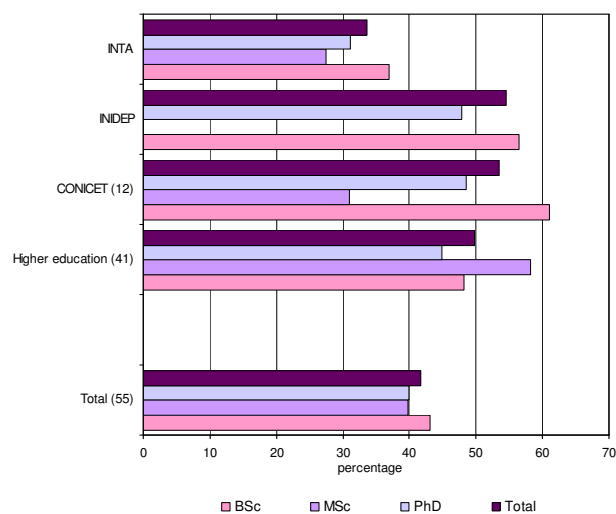


Source: Stads, Ruíz, and de Greef. 2009.

Notes: Figures in parentheses indicate the number of agencies in each category. The 17 CONICET agencies account for 64 percent of CONICET's agricultural R&D staff. The 42 higher education agencies account for 95 percent of the R&D staff in the higher education sector.

In 2006, 42 percent of Argentina's total fte researchers in a 55-agency sample were women, a share that is well above the average for Latin America as a whole (31 percent; Stads and Beintema 2009). These averages mask some important cross-agency variations. INIDEP and CONICET employed more female than male researchers. At INTA, on the other hand, just 1 out of every 3 scientists was a woman in 2006 (Figure 3). Unlike many other countries in the region, average qualification levels of female Argentinean researchers are not much lower than those of their male colleagues.

**Figure 3—Share of female researchers, 2006**



Source: Stads, Ruíz, and de Greef. 2009.

Note: Figures in parentheses indicate the number of agencies in each category.

### Agricultural R&D Spending

In 2006, Argentina spent close to \$450 million (in 2005 PPP prices) (Table 2).<sup>2</sup> Close to 60 percent of this total was spent by INTA and 36 percent by the higher education agencies.

**Table 2—Public agricultural research spending, 2006**

	In 2005 Argentine pesos	In 2005 international (PPP) dollars	Share	Agencies in sample
	(millions)	(percentage)	(number)	
INTA	333.3	262.5	58.5	1
INIDEP	19.9	15.7	3.5	1
CONICET	8.7	6.9	1.5	26
Higher education agencies	207.5	163.4	36.4	46
<b>Total</b>	<b>569.5</b>	<b>448.4</b>	<b>100.0</b>	<b>74</b>

Source: Stads, Ruíz, and de Greef. 2009.

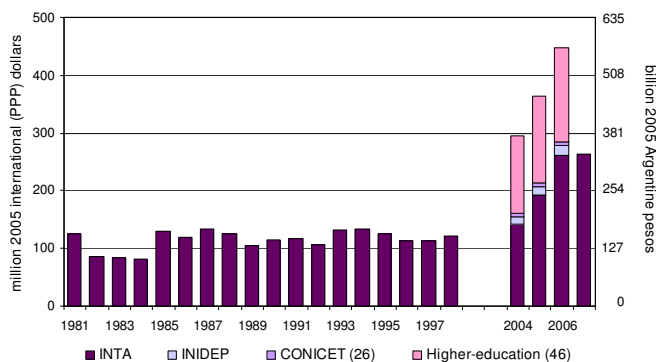
Notes: Expenditures for certain CONICET agencies are estimates based on average expenditures per researcher at the other CONICET agencies. Expenditures for the higher education agencies are estimates based on average expenditures per researcher at the government agencies.

Agricultural R&D spending in Argentina has shown rapid growth in recent years. This is largely due to increased spending by INTA. After a dip in spending during the years of the financial crisis (1999-2002), total spending has quickly recovered. The Néstor Kirchner administration (2003-07) has substantially increased its support to agricultural R&D. Besides, since 2003, IDB has also financed an important Science and Technology (S&T) project that led to an influx of funding for S&T more generally, and for agricultural research in particular. During 2002-06, Argentina's total agricultural R&D expenditures more than doubled (Figure 4). Once again, this increase is largely due to a boost in spending by INTA. The institute's expenditures rose from \$141 million in 2004 to \$263

<sup>2</sup> Financial data in this brief are reported in real values using GDP deflators and purchasing power parity (PPP) indexes taken from the World Bank (2008). PPP's are synthetic exchange rates used to reflect the purchasing power of currencies, typically comparing prices among a broader range of goods and services than conventional exchange rates. See Beintema and Stads (2008) for a further explanation on the use of PPP dollars.

million in 2006. Spending by INIDEP and the country's higher education agencies also rose, albeit at slower rates than at INTA. Total agricultural R&D spending by CONICET agencies, on the other hand, remained stable during 2004-06.

**Figure 4—Composition of public agricultural expenditures, 1981-98 and 2004-07**

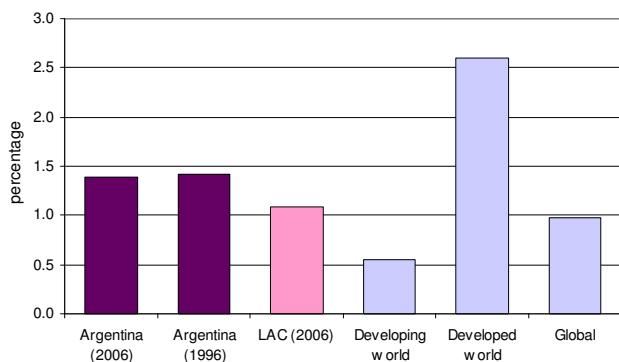


Source: Stads, Ruíz, and de Greef. 2009.

Notes: See Table 2. Figures in parentheses indicate the number of agencies in each category.

Total public agricultural R&D spending as a percentage of agricultural output (AgGDP) is a commonly used indicator of a county's research investment levels and a useful means of comparing agricultural R&D spending across countries. In 2006, Argentina invested \$1.27 on agricultural research for every \$100 of agricultural output, which was double the corresponding ratio for the early 2000s during the height of the economic crisis when agricultural R&D spending and output were very low. By way of comparison, the 2006 intensity ratios for other countries in the region, such as Uruguay (1.99), Brazil (1.68) were higher than the one for Argentina, while those for Chile (1.22) and Paraguay (0.20) were lower (Stads and Beintema 2009). The 2006 ratio for Argentina was higher than the reported 2006 average for Latin America and the Caribbean (1.14), and the 2000 ratios for the developing world (0.55) and global averages (0.98; Beintema and Stads 2008).

**Figure 5—Argentina's public agricultural research intensity compared regionally and globally**

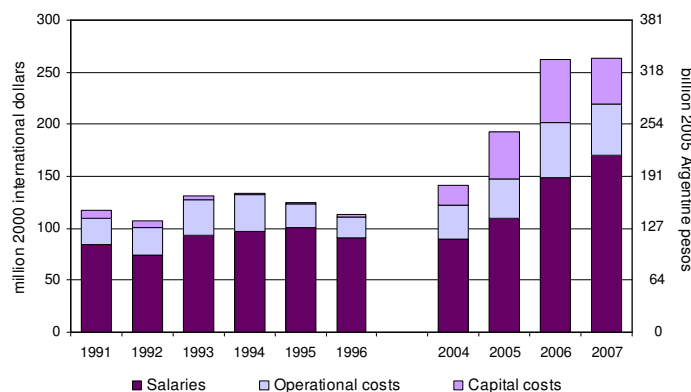


Sources: Argentina data compiled from Figure 4; AgGDP data are from World Bank (2008); LAC intensity ratio is from Stads and Beintema (2009); 2000 intensity ratios are from Beintema and Stads (2008).

Note: LAC stands for Latin America and Caribbean.

The allocation of research budgets across salaries, operating costs, and capital costs affects the efficiency of agricultural R&D, and therefore detailed data on cost categories of government agencies were collected as part of this study. In 2007, salaries accounted for 65 percent of INTA's expenditures, operating costs for 19 percent, and capital costs for 17 percent (Figure 6). After a decade without noteworthy capital investments, INTA boosted its laboratory equipment expenditures in more recent years, following a large influx of (government and IDB) funding. The 2006 share of capital expenditures at INTA was much higher than at INIDEP (3 percent) and the CONICET agencies combined (8 percent).

**Figure 6—Cost category shares in INTA's expenditures, 1991-96 and 2004-07**



Source: Stads, Ruíz, and de Greef. 2009.

Note: Data for 1997-2003 were unavailable.

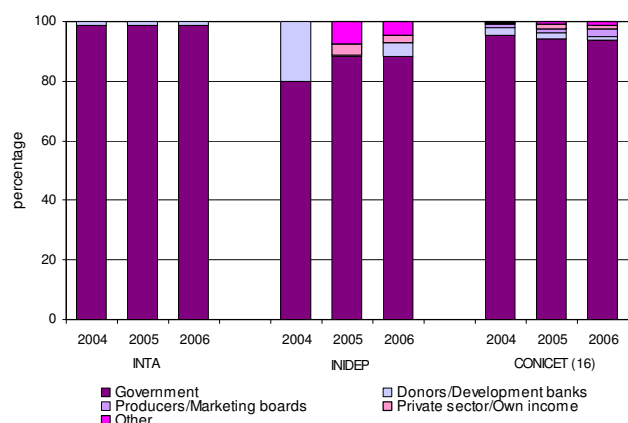
### Agricultural R&D Funding

Public agricultural research in Argentina is largely financed by the national government with donors and multilateral development banks, producer organizations, and the private sector accounting for minimal shares of the total (Figure 7). During the 1980s, INTA automatically received between 1.5 and 3.0 percent of the country's total annual agricultural export proceeds from the national government. The Carlos Meném administration (1989-99), however, abolished this system and INTA became directly dependent on allocations from the Secretary of Agriculture. Government funding during those years was just enough to cover salary expenditures, while costs for actual research programs needed to be secured elsewhere. The Meném administration even had plans to close down INTA, but this spurred widespread resistance. Agricultural R&D funding remained low during the years of the economic crisis, but increased rapidly during the years of the Néstor Kirchner administration (2003-07). During this period, INTA gained financial autonomy from the Secretary of Agriculture when a system was introduced whereby the institute receives 0.35 percent of Argentina's total (agricultural and non-agricultural) imports, as well as a very small share of the country's exports, from the national government. This system is in place until today.

IDB is an important donor to S&T in Argentina in general. However, the exact amounts of IDB funding to agricultural research are difficult to determine, as the funds are transferred through a complex system involving (the recently founded) Ministry of Science and Technology and the National Agency

for the Promotion of Science and Technology (ANPCYT). Nonetheless, the injection of IDB funds has allowed for some long overdue research equipment upgrades in agricultural R&D agencies. INTA is currently in negotiation with IDB on a separate loan to finance necessary capital expenditures. Other donors to agricultural research in Argentina include the European Union and the World Bank, the funds of which are also managed by ANPCYT.

Figure 7—Funding sources of government agencies, 2004-06



Source: Stads, Ruíz, and de Greef. 2009.

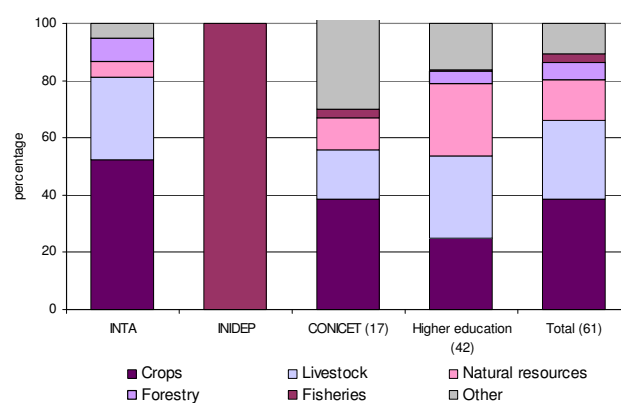
Notes: Figures in parentheses indicate the number of agencies in each category. Exact funding amounts by multilateral development banks were difficult to determine as these funds are channeled through the national government. These funds are therefore reported under "government".

## Research Orientation

The allocation of resources across various lines of research is a significant policy decision; hence the survey collected detailed information on the number of full-time researchers working in specific commodity areas. In 2006, close to 40 percent of the 3,804 full-time researchers in a 61-agency sample conducted crop research. Livestock research accounted for 28 percent, natural resources research for 14 percent, forestry research for 6 percent, and fisheries research for just 3 percent (Figure 8). More than two-thirds of the country's crop research is carried out by INTA.

Wheat accounted for 8 percent of all research conducted on crops in Argentina. Other important crops include soybean (7 percent), maize (7 percent), sunflowers (6 percent), vegetables (6 percent), citrus fruits (5 percent), and grapes (5 percent). Most of the country's livestock researchers focus on beef (31 percent), dairy (19 percent), pastures and forages (16 percent), sheep and goats (13 percent), swine (8 percent), and poultry (5 percent). Livestock research plays a relatively more important role in the higher education agencies than crop research.

Figure 8—Commodity focus by major item, 2006



Source: Stads, Ruíz, and de Greef. 2009.

Note: Figures in parentheses indicate the number of agencies in each category.

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