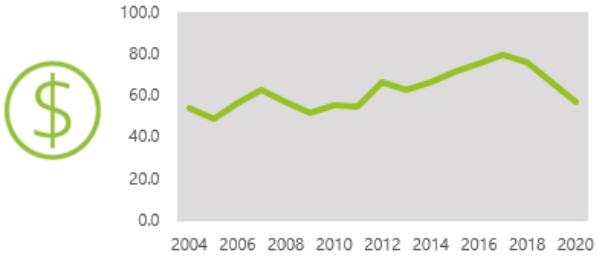
Agricultural R&D Indicators Factsheet | March 2023

GUATEMALA

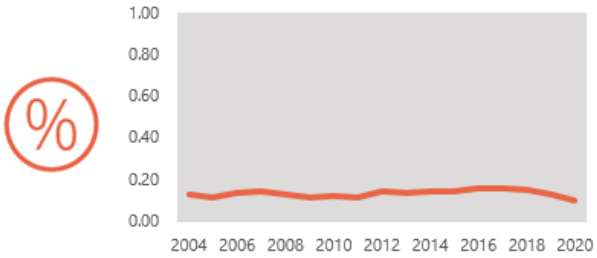
Gert-Jan Stads and Luis de los Santos

AGRICULTURAL RESEARCH SPENDING



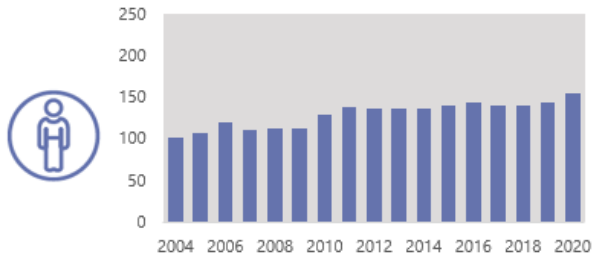
	GUATEMALA	HONDURAS	COSTA RICA	PANAMA
Million quetzales (2017 constant prices)	56.5			
Million PPP dollars (2017 constant prices)	14.4	9.8	38.1	33.6

SPENDING INTENSITY



	GUATEMALA	HONDURAS	COSTA RICA	PANAMA
Agricultural research spending as a % of agricultural GDP	0.10%	0.20%	0.87%	1.12%

AGRICULTURAL RESEARCHERS



	GUATEMALA	HONDURAS	COSTA RICA	PANAMA
Full-time equivalents	154.3	109.1	237.7	184.3

Severe underinvestment

Research has the potential to provide the necessary technological solutions to enable Guatemala to reverse declining agricultural productivity and achieve food security. Yet, the country's agricultural R&D spending has declined in recent years. In 2020, Guatemala invested only 0.10 percent of its agricultural GDP in agricultural research, which is among the lowest ratios in the world.

Capacity challenges

An absence of PhD-qualified researchers and the inability to recruit new ones—due to a lack of funding and of competitive salary and benefit packages—have constrained ICTA's human resource capacity and, ultimately, its ability to fulfill its mandate. The need for highly qualified researchers will become even more critical over time because a significant number of experienced MSc-qualified researchers are set to retire in the next decade.

Diversifying research funding

Outdated equipment and facilities are increasingly compromising the volume and quality of research outputs. If agricultural R&D in Guatemala is to become more effective, higher levels of funding must be secured. Complementary private funding should be attracted from value chains other than sugarcane and coffee. Success in securing private funding for research requires a more enabling policy environment, including tax incentives and the protection of intellectual property rights.

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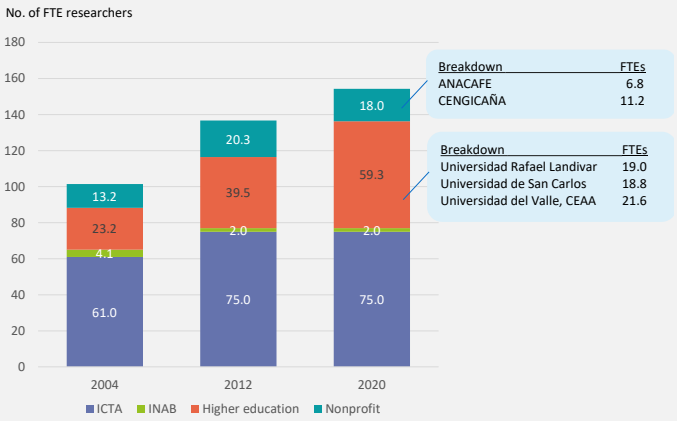
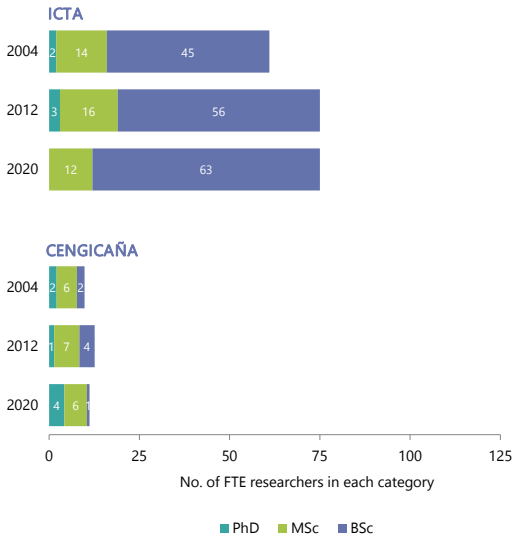
Institutional composition of Guatemalan agricultural R&D

The composition of Guatemala's agricultural research system has gradually shifted over time. While the number of agricultural researchers at ICTA has remained constant over the past decade, researcher numbers at the country's higher education agencies have steadily increased (not in the least because universities are considered more attractive employers than ICTA). Nonprofit producer organizations play an important role in conducting (and funding) sugarcane and coffee research in Guatemala.



Guatemalan agricultural researchers by qualification level

Average qualification levels of ICTA researchers are extremely low by international standards. In 2020, the institute employed no researchers with PhD degrees, and just 12 researchers with MSc degrees. The bulk of ICTA's researchers are BSc-qualified. Research staff at the higher education sector and the nonprofit agencies are significantly higher qualified, not in the least because of the more attractive salaries and benefits that these agencies can offer compared to ICTA.



Guatemala's agricultural researchers broken down by gender

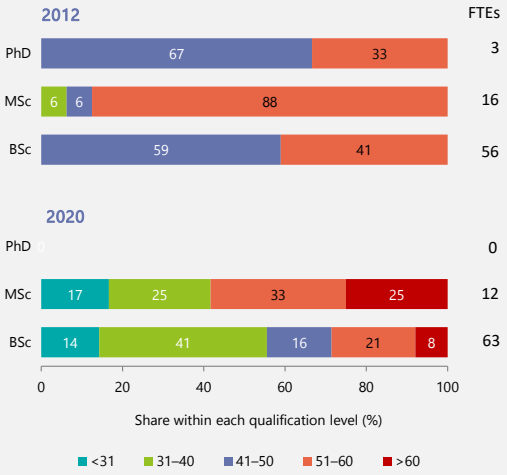
Guatemala still has a long way ahead to achieve true gender balance in the staffing of its agricultural research system. Overall, the share of female researchers at the country's agricultural R&D agencies rose from 20 percent in 2012 to 23 percent in 2020. These national averages mask a considerable degree of variation across R&D agencies, however. While INAB employed no female researchers in 2020, 44 percent of academic staff at CEAA were women.

By main agricultural R&D agencies

ICTA	**24%**
INAB	**0%**
Universidad de San Carlos	**5%**
Universidad del Valle de Guatemala, CEAA	**44%**
CENGICAÑA	**13%**

ICTA's researchers by qualification level and age bracket

In 2012, 74 out of ICTA's 75 researchers were over 40 years of age. The institute has lost many experienced researchers to retirement over the past decade. The recent recruitment of a large number of MSc- and BSc-qualified scientists in their twenties and thirties has considerably reduced the average age of ICTA's research staff. It will be crucial, however, that these young researchers receive appropriate training and mentoring, and that the appropriate conditions and incentives are established to encourage their long-term commitment.



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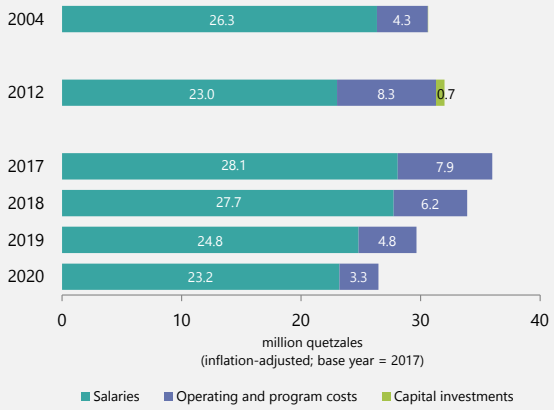
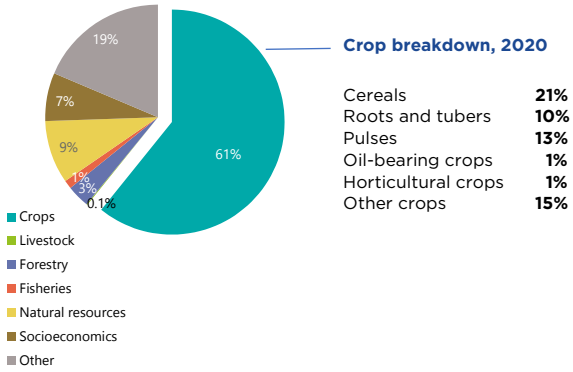
ICTA's spending broken down by cost category

ICTA's spending levels have steadily declined during 2017–2020. In 2020, salaries accounted for nearly 90 percent of the institute's expenditures, leaving hardly any resources to maintain and upgrade the institute's R&D infrastructure and fund actual research programs. The government has identified a number of priorities for improving agricultural productivity and reducing malnutrition, to which ICTA has already made a demonstrable contribution. Nevertheless, these priorities need to be accompanied by sufficient funding to enable ICTA to contribute effectively. Generating such funding will require major donor support and international collaboration aligned with national research priorities.



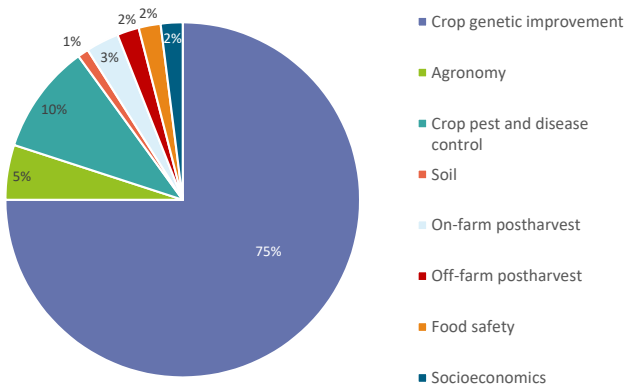
Commodity focus of Guatemalan agricultural researchers

Crop research dominates Guatemala's agricultural research agenda. Sixty-one percent of the country's agricultural researchers focus their research on crops, especially on maize, beans, sugarcane, potato, and coffee. While ICTA and the producer organizations focus almost exclusively on crops, the higher education agencies have a more diverse research focus, ranging from crops, fisheries, agricultural engineering, to socioeconomics. Compared to most countries in Latin America, livestock research accounts for a negligible share of agricultural research in Guatemala (0.1 percent).



Thematic focus areas of ICTA's research

More than 80 percent of ICTA's research efforts are focused on just four staple crops: maize, beans, potatoes, and rice. The bulk of researchers' time is spent on developing and adapting improved varieties rich in protein, iron, and zinc, or varieties that are resistant to certain pests and diseases. Other thematic areas on which ICTA researchers concentrate their research activities include agronomy, on- and off-farm postharvest research, food safety, socioeconomic, and soil research.



New crop varieties released by ICTA, 2007–2020

During 2007–2020, ICTA released 20 improved crop varieties, 14 of which were bean and maize varieties. As part of the implementation of Guatemala's Zero Hunger plan, which focuses on reducing chronic childhood malnutrition, ICTA developed improved maize and bean varieties containing high levels of iron and zinc.

Variety name	Crop type	Year of release	Protection mechanism
ICTA Super ChivaACM	Bean	2007	Registered
ICTA B-7	Maize	2007	Registered
Rosicta	Hibiscus	2007	Registered
ICTA Ligero	Bean	2008	Registered
ICTA Dorada	Dragon fruit	2008	Registered
ICTA MayaQPM	Maize	2009	Registered
ICTA PeténACM	Bean	2010	Registered
ICTA Sayaxché	Bean	2010	Registered
ICTA F947BMR	Sorghum	2012	Registered
ICTA DoradoBC	Sweet potato	2016	Registered
ICTA PacíficoBC	Sweet potato	2016	Registered
ICTA Chortí	Bean	2017	Registered
ICTA Labor Ovalle	Bean	2017	Registered
ICTA Utatlán	Bean	2017	Registered
ICTA B-9	Maize	2017	Registered
ICTA HB-18	Maize	2018	Registered
ICTA B-15	Maize	2018	Registered
ICTA HB-17	Maize	2018	Registered
ICTA Rendidor	Sorghum	2019	Registered
ICTA Patriarca	Bean	2019	Registered

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ASTI RESOURCES FOR GUATEMALA

This factsheet presents recent data on the agricultural research system of Guatemala, 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 Guatemala 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 Latin American countries.
- ASTI's **data download tool** provides access to more in-depth ASTI datasets and graphs for Guatemala and many other countries.
- ASTI's **agency directory** provides an overview of agencies involved in agricultural research in Guatemala, along with their location and key agency-level indicators.

ASTI DATA PROCEDURES AND METHODOLOGY

The data underlying this factsheet were derived through detailed primary surveys from the country's principal agricultural R&D agencies. Data from smaller R&D agencies 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 incomplete data coverage.

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 (non-research) activities.

ASTI presents its financial data in 2017 local currencies and 2017 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 USED IN THIS FACTSHEET

ANACAFE	National Coffee Association
ASTI	Agricultural Science and Technology Indicators
CEAA	Center for Agricultural and Food Studies
CENGICAÑA	Guatemalan Sugarcane Research and Training Center
FTEs	full-time equivalent(s)
GDP	gross domestic product
ICTA	Agricultural Science and Technology Institute
IDB	Inter-American Development Bank
INAB	National Forestry Institute
IFPRI	International Food Policy Research Institute
PPP	purchasing power parity (exchange rate)
R&D	research and development

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ABOUT ASTI and ACKNOWLEDGEMENTS

The Inter-American Development Bank would like to acknowledge the **International Food Policy Research Institute (IFPRI).**

Working through collaborative alliances with numerous national and regional R&D agencies and international institutions, ASTI is a comprehensive and trusted source of information on agricultural R&D systems across the developing world. ASTI is facilitated by the International Food Policy Research Institute (IFPRI). ICTA coordinated in-country data collection. For more information on ASTI, please visit **www.asti.cgiar.org/about**

ASTI gratefully acknowledges participating agricultural R&D agencies for their contributions to the data collection and preparation of this country factsheet. They also thank the Inter-American Development Bank (IDB) for its generous support of ASTI's work in Latin America.

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