

# AGRICULTURAL R&D IN GHANA

## An Assessment of the Council for Scientific and Industrial Research

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### OVERVIEW OF NATIONAL AGRICULTURAL R&D

Twelve government agencies conduct agricultural research in Ghana, of which 10 fall under the Council for Scientific and Industrial Research (CSIR). CSIR operates largely autonomously under the Ministry of Environment, Science, Technology, and Innovation and collectively employed 62 percent of the country's full-time equivalent (FTE) agricultural researchers in 2011, or 379 FTEs.<sup>1</sup> CSIR institutes conduct agriculture-related research focusing on crops, livestock, forestry, savannah, soil, water, food, oil palm, plant genetic resources, and science and technology policy. The other government institutes involved in agricultural research are the Cocoa Research Institute of Ghana (CRIG) under the Ministry of Finance (51 FTEs in 2011), which conducts research on tree crops of economic importance to Ghana (cocoa, coffee, kola, and cashews), and the Marine Fisheries Research Division (MFRD) of the Ministry of Food and Agriculture (12 FTEs in 2011). Agricultural R&D is also a core activity of numerous agricultural faculties of Ghana's public universities, notably the University of Ghana (66 FTEs), Kwame Nkrumah University of Science and Technology (41 FTEs), University of Cape Coast (27 FTEs), and University for Development Studies (28 FTEs). Nonprofit and for profit private companies, although involved in some collaboration

with CSIR and the higher education sector, have minimal involvement in agricultural R&D in Ghana.

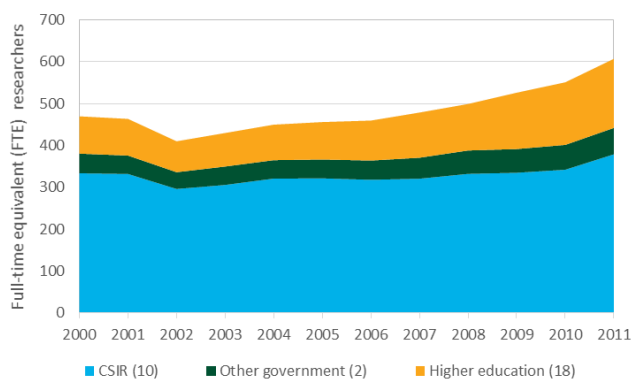
Overall, the national number of agricultural researchers steadily increased from 470 FTEs in 2000 to 607 FTEs in 2011 (Figure 1). Agricultural research spending also increased considerably during this period, from 15.8 million 2005 cedis in 2000 to 25.1 million 2005 cedis in 2011 (Figure 2). The spending trend did, however, follow an erratic pattern, in part due to the country's high dependence on donor funding for agricultural research, combined with declining government support.

### CSIR'S CURRENT STATUS

#### Institutional Issues

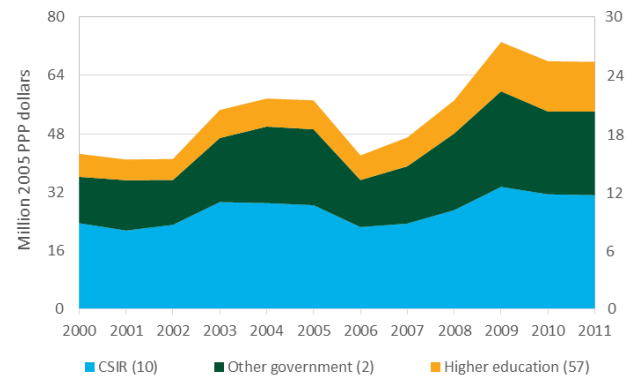
- To date, overarching strategic planning by CSIR has been limited, and the council's most recent plan (for 2005-2009) has long-since been outdated. Institute-level planning strategies also need to be updated.
- Collaboration among CSIR institutes and with other ministries and the higher education sector does occur but could be enhanced and encouraged to improve outputs, increase their dissemination, and potentially support the institutes in developing new funding mechanisms and generating their own income.

**Figure 1. Agricultural researchers by institutional category, 2000–2011**



Source: Compiled by authors based on ASTI–STEPRI survey data.  
 Note: Other government comprises CRIG and MFRD; Higher education comprises 18 faculties, departments, and institutes. For full details of the agencies included in the dataset, see [www.asti.cgiar/ghana/directory](http://www.asti.cgiar/ghana/directory).

**Figure 2. Agricultural research spending by institutional category, 2000–2011**



Source: Compiled by authors based on ASTI–STEPRI survey data.  
 Note: Other government comprises CRIG and MFRD; Higher education comprises 18 faculties, departments, and institutes. For full details of the agencies included in the dataset, see [www.asti.cgiar/ghana/directory](http://www.asti.cgiar/ghana/directory).

- The Research–Extension–Farmer Linkage Committees (RELCs) were established to encourage demand-oriented research involving farmers with the goal of enhancing farming practices and productivity. In reality, however, the RELCs perform steering rather implementation functions, so the dynamic interface to promote technology transfer has not been realized.

### Human Resources

- Overall, the composition of researchers by qualification level at CSIR is well-balanced, in part because the minimum requirement for a researcher is an MSc degree (Table 1). Nevertheless, given the high level of specialization required across the 10 institutes, the number of researchers with PhD degrees is still low—exacerbated by the departure of 63 researchers between 2008 and 2012, two-thirds of whom were qualified to the PhD-degree level. Since new recruits are most often only qualified to the MSc level, and considering that about 60 percent of the remaining PhD-qualified researchers are 50 years or older, PhD-level training will need to be a priority in the coming years, particularly to fill existing and anticipated gaps.
- To curb the high turnover of researchers, the government instituted the “Single Spine Pay Policy,” which came into effect in 2012 and put CSIR researchers’ salaries on par with their university-based counterparts. These measures should have a significant impact on the researcher attrition rate, although they have significantly widened the salary gap between researchers and support staff.
- In efforts to further address human resource issues, CSIR has incorporated capacity building into some of its research projects, and recruitment efforts continue despite a general public-sector employment freeze. The availability of paid study leave acts as an incentive for researchers to pursue training opportunities.
- Female researchers only constituted 20 percent of CSIR’s agricultural researchers in 2011. The gender disparity stems in part from the minimum (MSc degree) qualification requirement, since fewer women pursue higher degrees in physical and applied sciences.

### Financial Resources

- Financing is the most pressing issue for CSIR’s institutes. Although total expenditures grew from 12.3 million 2005 cedis in 2000 to 24.7 million 2005 cedis in 2011, salaries represented 79 percent of CSIR’s expenditures in 2011, leaving little remaining resources for operating costs or capital investments (Figure 3).
- Although government support to CSIR has remained strong, the institutes are almost fully dependent on donor funding for their research activities. Apart from being an uncertain source of funding, the high dependence of donor funding has the potential side effect of skewing the research agenda away from national priorities.

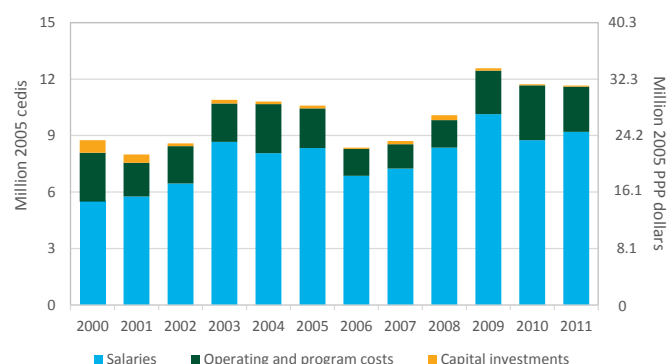
**Table 1. CSIR’s project funding by source, 2009–2012 (1,000 Ghana cedis)**

Donor	2009	2010	2011	2012	Total	Share (%)
Government	326.1	406.1	233.1	235.9	1,391.6	4
AGRA	816.5	640.0	20.0	20.0	1,790.1	6
CORAF/ WECARD	82.8	237.1	483.4	447.4	1,250.7	4
Other regional	293.7	1,255.6	2,165.4	1,841.0	6,046.9	19
Canada	74.0	180.0	555.8	102.9	935.7	3
European Union	50.4	91.0	104.2	2,913.8	3,371.1	11
United Kingdom	10.4	7.1	62.5	1,102.2	1,201.5	4
Other bilateral	199.4	352.5	696.3	498.8	1,938.5	6
World Bank	220.0	367.5	732.0	867.2	2,834.0	9
CGIAR	432.9	321.1	1,172.8	928.5	3,231.7	10
IFDC	318.5	12.0	545.2	24.3	947.5	3
IITO	286.6	223.9	166.0	95.0	1,091.6	3
Other	382.7	1,384.3	1,492.1	1,227.5	5,617.8	18
<b>Total</b>	<b>3,494.0</b>	<b>5,478.2</b>	<b>8,428.8</b>	<b>10,304.5</b>	<b>31,648.7</b>	<b>100</b>

Source: Compiled by authors from ASTI/IFPRI–CORAF/WECARD survey data. Notes: AGRA = Alliance for a Green Revolution in Africa; CORAF/WECARD = West and Central African Council for Agricultural Research and Development; IFDC = International Fertilizer Development Center; IITO = International Tropical Timber Organization.

- The key policy issue is the government’s intention that the institutes generate a significant share of their financial resources through commercial means. This is a sound long-term goal, but it is impeded in the short- to medium-term given the level of funding required, lack of capacity at CSIR to generate funds internally, and patent issues (discussed below).
- Funding for actual research activities during 2009–2012 was derived from international agencies (29 percent), regional organizations (28 percent, and bilateral donors (24 percent). Among these, the European Union and CGIAR

**Figure 3. CSIR’s expenditures by cost category, 2000–2011**



Source: Compiled by authors based on ASTI–STEPRI survey data. Note: PPP = purchasing power parity (exchange rates).

centers are the main donors. World Bank funding, mostly through WAAPP, accounted for 9 percent of the total during this timeframe. Domestic sources of funding accounted for only 5 percent of total project funding received during 2008–2012. Specific institutes, such as Crop Research Institute (CRI), the Savanna Agricultural Research Institute (SARI), and Forestry Research Institute of Ghana (FORIG), receive significant amounts of donor funding for their research activities.

- WAAPP has become an important donor to CSIR. Most institutes have benefited from WAAPP's competitive grant scheme, especially CRI, SARI, and the Soil Research Institute (SRI).

### R&D Infrastructure

- Most CSIR laboratories are considered adequate, but issues have been raised related to the need for maintenance and upgrades. Challenges cited include lack of funding (and tax exemptions) for the purchase of scientific equipment, obsolete equipment, and inadequate staff training on the use of equipment.

### Research Outputs

- The number of publications during 2008–2012 totaled 1,204, resulting in an average of 0.7 publications per researcher per year. These include journal articles, books and book chapters, and other scientific and nonscientific publications. Researchers' record of publications is already included as a criterion for promotion. To increase the publication per researcher ratio, other incentives—such as grants and yearly prizes for the best papers/articles—could be instituted.
- CRI, SARI, and the Oil Palm Research Institute (OPRI) produce a diverse range of plant genetic resources for food crops with high value for food security, such as maize. The issue is that the technologies produced do not meet the criteria for being patented. Even the crops were not registered because Ghana is yet to pass regulations governing plant breeders' rights.
- The issue of technology transfer has become crucial to increase and sustain productivity in Ghana, especially in

light of the current policy drive toward greater commercialization. Improving linkages between research and extension systems is vital to ensure outcomes.

## CONCLUSION AND POLICY RECOMMENDATIONS

Key considerations for policy directions in relation to CSIR's agricultural research institutes include

- developing, regularly maintaining, and effectively implementing strategic plans—both for CSIR as a whole and for the individual institutes—to support CSIR in identifying, shaping, and achieving its goals;
- developing training and succession plans (including skills-gap analyses), involving present and past tenured researchers in providing mentorship for their younger colleagues, and developing incentives—such as opportunities for scientific achievement and career advancement—to create a more conducive work environment;
- continuing to maintain and build researcher capacity so that at least 50 percent of the institutes' researchers are trained to the PhD-degree level in order to be able to initiate and drive research projects across the institutes' diverse range of disciplines and specializations;
- ensuring the government's constructive engagement in enhancing public funding, while supporting the institutes in diversifying their funding sources and developing the means of increasing internally generated funds over time;
- devising clear strategies for improving and sustaining government support;
- improving R&D outputs and dissemination through better coordination and collaboration across research agencies and with the relevant sectors, such as the extension system and the private sector;
- devising better strategies to improve linkages with the agricultural extension system through extension officers, especially now that MOFA's extension system has been decentralized to the districts and municipalities; and
- ensuring effective systems for monitoring, evaluation, and performance assessment to enhance outcomes.

## FOR FURTHER READING

[www.asti.cgiar.org/pdf/factsheets/ghana-factsheet.pdf](http://www.asti.cgiar.org/pdf/factsheets/ghana-factsheet.pdf)  
(forthcoming)

## NOTES

1. FTEs only take into account the time researchers actually spend on research, as opposed to other activities like teaching or unrelated administrative duties.

## ABOUT THE ASSESSMENT

Given the importance of agriculture in West Africa, the Economic Community of West African States (ECOWAS) asked the West and Central African Council for Agricultural Research and Development (CORAF/WECARD) to undertake an in-depth assessment of agricultural research capacity in the region focusing on key institutional, human resource, and financial resource issues. The assessment is a critical input into the development of national and regional agricultural policy recommendations, which will in turn feed into a regional agricultural research strategy for West Africa.

To accomplish the assessment, CORAF/WECARD requested the support of the Agricultural Science and Technology Indicators (ASTI) initiative of the International Food Policy Research Institute (IFPRI). ASTI facilitated the assessment in six countries—Benin, Burkina Faso, Ghana, Senegal, Sierra Leone, and Togo—which included a quantitative survey on human and financial resources, R&D infrastructure, and R&D outputs; a series of interviews with selected research and managerial staff; and a staff motivation survey distributed to a selected group of researchers and managerial staff.



## ABOUT THE AUTHORS

**George Essegbey** is the director of the Science and Technology Policy Research Institute (STEPRI). **Roland Asare** is a research scientist at STEPRI. **Nienke Beintema** is program head of the Agricultural Science and Technology Indicators (ASTI) initiative of the International Food Policy Research Institute (IFPRI).

## ABOUT ASTI, IFPRI, AND CORAF/WECARD

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 **West and Central African Council for Agricultural Research and Development (CORAF/WECARD)** is a nonpolitical organization of the national agricultural research systems of 23 countries of West and Central Africa. It aims to increase the efficiency of agricultural research in the region in order to facilitate economic growth, food security, and export competitiveness through productive and sustainable agriculture.

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