

AGRICULTURAL R&D IN SIERRA LEONE

An Assessment of the Sierra Leone Agricultural Research Institute

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OVERVIEW OF NATIONAL AGRICULTURAL R&D

Three agencies conduct agricultural research in Sierra Leone: the Sierra Leone Agricultural Research Institute (SLARI), Njala University School of Agriculture, and Fourah Bay College Institute of Marine Biology and Oceanography (IMBO). SLARI is the country's principal agricultural research agency, accounting for more than 80 percent of national agricultural researchers and expenditures in 2011. The institute falls under the Ministry of Agriculture, Forestry, and Food Security (MAFFS) and, in addition to its headquarters, comprises five centers: Njala Agricultural Research Center (NARC), which conducts research on roots, tubers, and legumes; Rokupr Agricultural Research Center (RARC), which conducts research on cereals; Kenema Forestry and Tree Crops Research Center (KFTCRC); Teko Livestock Research Center (TLRC); and Magbosi Land and Water Research Center (MLWRC).

Between 2001 and 2011, the national number of full-time-equivalent (FTE) researchers grew from 37 to 70 at SLARI and from a combined 13 to 15 at the two higher education institutions (Figure 1).¹ Agricultural research spending increased dramatically between 2001 and 2011, based on a significant influx of donor funding and government grants (Figure 2). Spending rose from 3.1 billion Leones in 2005 prices in 2001 (while the war was still ongoing), to 7.3 billion Leones in 2011. Sierra Leone is still grappling with the effects of the country's 10-year civil

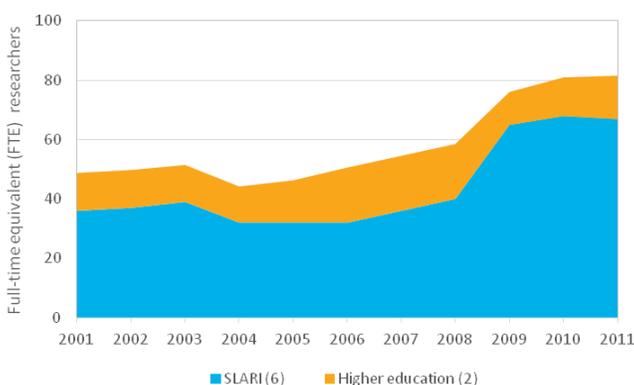
war, so it not surprising that its research intensity ratios are extremely low, especially compared with other countries in the region. Total spending as a share of agricultural GDP has fallen over time, from 0.22 in 2001 to 0.17 in 2011; the ratio of agricultural researchers to farmers grew somewhat over this timeframe, from 4.6 to 6.1 FTEs per 100,000 farmers.

SLARI'S CURRENT STATUS

Institutional Issues

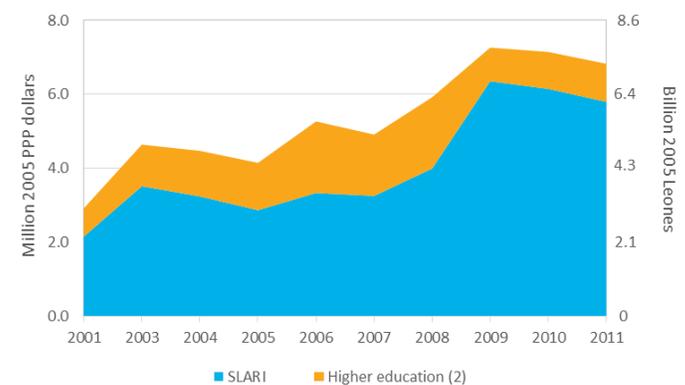
- SLARI has developed a strategic plan (for the 2012–2021 period), as well as operating and investment plans involving key stakeholders within and outside SLARI to ensure alignment with national and regional goals. The top priority of the first operating plan (2012–2016) is to develop the necessary human resources, infrastructure, and equipment to support the effective conduct of research at all levels. Value chain analysis (and prioritization given the limited resources available), infrastructure development analysis, and promotional strategies will also be undertaken as a means of allocating research resources to achieve the strongest economic and development outcomes.
- While MAFFS does not influence SLARI in setting research priorities, it does disseminate and promote the adoption of SLARI's technologies to farmers through 12 innovation

Figure 1. Agricultural researchers by institutional category, 2001–2011



Source: Compiled by authors based on ASTI–SLARI survey data.
Note: For full details of the agencies included in the dataset, see www.asti.cgiar.org/sierraleone.

Figure 2. Agricultural research spending by institutional category, 2001–2011



Source: Compiled by authors based on ASTI–SLARI survey data.
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- platforms; it also assists in implementing the West Africa Agricultural Productivity Program (WAAPP), as well as more generally disseminating information.

Human Resources

- Staff attrition is low at SLARI, aided by a 75-percent salary increase for senior staff as of January 2013, and a 38-percent increase as of January 2014. Training opportunities and overseas travel create additional incentives for researchers to remain at SLARI. Promotions are infrequent, however, based on limited financial resources. Furthermore, funds for research activities also remain very limited, which negatively impacts staff motivation.
- The number of newly recruited scientists grew from 22 in 2009 to 40 in 2012. SLARI's human resource plan recommended a focus on MSc-qualified recruits, but only 26 percent of recent recruits held MSc degrees, and 6 percent PhD degrees. Candidates with MSc degrees are lacking, so the default practice has been to recruit good BSc graduates with a minimum of second-class honors. Most of these recruits have been sent to complete MSc training, primarily through WAAPP: in 2013, 38 researchers were offered scholarships to pursue MSc and PhD degree training.
- Of the newly recruited researchers during 2009–2013, only 20 percent were female, but absolute numbers were higher in recent years (eight in 2012 and six in 2013), which is encouraging.
- The retirement age at SLARI is 65 years for researchers, and retired researchers may continue to work on a contract basis, renewable once a year. This is a beneficial strategy for supervising and mentoring younger researchers.

Financial Resources

- As an indication of its high priority for agriculture, Sierra Leone has allocated 10 percent of the national budget to agriculture, although not all the funds are approved or disbursed. Compounding the problem of poverty is corruption, distorting government priorities and promoting wasteful spending, which has contributed to the country's current economic recession and discrepancies in budgeted and disbursed government funding to SLARI.
- From 2009 to 2011, the government was SLARI's primary funding source both for salaries (and related expenses), and operating costs. During this period, salaries accounted for about two-thirds of SLARI's total expenditures, and operating and capital expenses accounted for the remainder. From 2009 to 2012, total government funding disbursed increased, indicating Sierra Leone's commitment to sustainable food security, but growth was lower than the inflation rate, so in real terms represented a decline.

- SLARI receives funding support from numerous donors, the largest during 2009–2012 being the African Development Bank (Table 1).
- WAAPP provides financial support for training; rehabilitation and building of infrastructure; and the generation, dissemination, and adoption of modern varieties of rice and cassava.
- Implementing SLARI's first operating plan (2012–2017) will require a total of US\$274.1 million for SLARI's headquarters and seven research centers. Expected funding levels from government contributions, development partners, and the private sector over this period were estimated at only US\$ 105.6 million, resulting in a shortfall of more than 60 percent, or US\$168.4 million.

R&D Infrastructure

- SLARI's R&D infrastructure is poor. Laboratories at RARC and NARC are poorly equipped, and researchers lack training on the use of some equipment (although this is being address through training under WAAPP). The other research centers have no equipment at all and hence are not fully operational (Table 2).

Table 1. SLARI's project funding by source, 2009–2012 (million Leones)

Donor	2009	2010	2011	2012	Total	Share (%)
Government	143.4	18.0	46.0	0	207.4	2
World Bank	77.8	190.0	268.5	0	536.4	6
AfricaRice	510.6	115.3	105.0	148.5	879.4	10
Other						
CGIAR	117.1	1.0	0.0	187.2	305.3	3
IAEA	36.7	41.5	0.0	78.5	156.7	2
IFAD	71.0	284.9	52.4	0	408.3	4
CORAF/ WECARD	0	0.0	118.9	126.8	245.7	3
FAO	0	309.3	186.6	73.3	569.2	6
FARA	87.2	76.6	46.1	129.3	339.1	4
IRC	0	16.7	153.2	291.4	461.3	5
CFC	244.9	263.2	151.9	0	660.0	7
AfDB	299.7	477.5	608.7	1,252.0	2,637.9	29
AGRA	0	0	525.2	94.7	619.9	7
Other	496.3	85.3	246.6	294.3	1,122.6	12
Total	2,084.7	1,879.2	2,509.1	2,675.9	9,149.0	100

Source: Compiled by authors from ASTI/IFPRI–CORAF/WECARD survey data. Notes AfDB = African Development Bank; AGRA = Alliance for a Green Revolution in Africa; CORAF/WECARD = West and Central African Council for Agricultural Research and Development; CFC = Common Fund for Commodities; IAEA = International Atomic Energy Agency; IFAD = International Fund for Agricultural Development; FAO = Food and Agricultural Organization of the United Nations; FARA = Forum for Agricultural Research in Africa; IRC = International Rescue Committee.

Table 2. The condition of SLARI’s research laboratories

Research center/station	Laboratory	Satellite stations
Njala Agricultural Research Center (3)	<ul style="list-style-type: none"> • Tissue culture • Molecular biology • Food and nutrition technology 	8
Rokupr Agricultural Research Center (4)	<ul style="list-style-type: none"> • Tissue culture • Molecular biology • Soils • Biotechnology 	7
Kenema Forestry and Tree Crops Research Center (2)	Two laboratories are newly built labs but yet to be equipped	3
Teko Livestock Research Center (2)	Two laboratories are newly built but have yet to be equipped	1
Magbosi Land and Water Research Center (0)	No laboratories have been built or rehabilitated as of 2014	None

Source: Compiled by authors from ASTI/IFPRI–CORAF/WECARD survey data.

- Internet and water facilities are available at NARC, but not at the other research centers. Adequate vehicles are not available at the centers, and one center has only two roadworthy vehicles. Not all researchers have computers, and there are only two computer specialists (based at headquarters) to meet the needs of the entire institute. Important research areas are ignored due to lack of equipment and adequate training to operate the equipment; these include biotechnology, tissue culture, molecular biology, and irrigation systems.

Research Outputs

- During 2004–2012 NARC developed two varieties of cassava, two of sweetpotatoes, one of groundnuts, and one of cowpeas. RARC’s new varieties were developed both in-house and externally, including two varieties of rice developed in-house, and seven developed externally. All varieties were interspecific rice hybrids released in 2012, but none have been patented.
- SLARI has not yet established an entity to oversee the release of new varieties; the seed board is currently in its formative stage.
- On average, SLARI publishes 0.25 publication per researcher per year for the period 2009–2013.

CONCLUSION AND RECOMMENDATIONS

Ten years of civil war virtually destroyed Sierra Leone’s agricultural research capacity. Although the war ended in 2002, it has taken a long time to re-establish a national system, rehabilitate research infrastructure, and rebuild human resource capacity. Despite these challenges, SLARI has made marked progress in developing human and financial resources, and WAAPP and other donor agencies have significantly contributed. Several challenges remain, however, that pose serious barriers to agricultural R&D in Sierra Leone:

- low rates of adoption of research technologies;
- lack of appropriate policies, standards for food products, and marketing opportunities, and limited stakeholder involvement in the rice and cassava value chains—SLARI’s mandated crops;
- limited infrastructure, inadequate human resource capacity, limited access to current and relevant scientific literature, inadequate support services, and logistical issues;
- inadequate development and validation of new technologies, and release and information sharing to value chain participants, including farmers, processors, marketers, service providers, researchers, policymakers, and consumers.

Additional research is needed regarding policy constraints that have inhibited the growth of agricultural research in Sierra Leone, and on opportunities that may form the basis for advocacy for policy reform. Potential measures needed to address remaining agricultural R&D challenges include

- developing appropriate policies to promote the production, processing, and consumption of agricultural products and food diversification;
- adopting participatory approaches to technology adoption, and developing appropriate communication systems for agricultural information;
- analyzing the influence of constraints, such as the lack of protocols for the release of new varieties and seed regulation, in order to gather sufficient data to address current restrictions;
- increasing government funding, ensuring the full disbursement of approved budgets, and improving the alignment of donor funding; and
- increasing training in the use and development of improved databases and monitoring and evaluation systems.

FOR FURTHER READING

www.asti.cgiar.org/pdf/factsheets/sierraleone-factsheet
(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.



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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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