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SRI LANKA

RECENT DEVELOPMENTS IN PUBLIC AGRICULTURAL RESEARCH

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LONG-TERM INVESTMENT AND CAPACITY PATTERNS IN PUBLIC AGRICULTURAL R&D

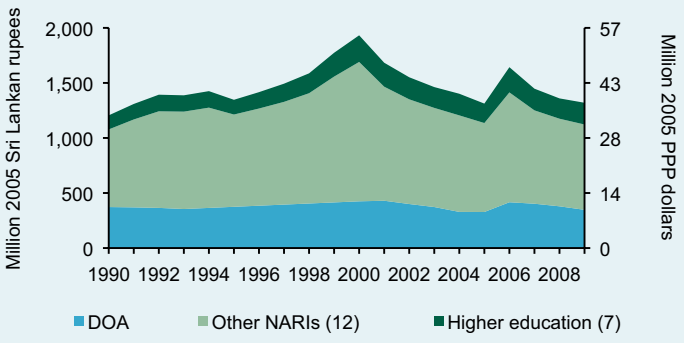
Sri Lanka has faced enormous challenges in recent years. A 26-year-long civil war has scarred the nation, and a tsunami in 2004 left tens of thousands of its people dead, injured, or homeless. Despite these catastrophes, Sri Lanka's economy grew at a yearly rate of almost 6 percent during 2000-2010 (World Bank 2012). In 2010, agriculture accounted for 13 percent of the country's gross domestic product (GDP). However, the actual contribution of agriculture to the overall economy is much higher, due to the sector's close linkages with the food industry. For this reason, it could be argued that official agricultural GDP (AgGDP) figures fail to fully capture the importance of the agricultural sector to the national economy. Investment in public agricultural research and development (R&D) dropped by one-third from 1.9 billion Sri Lankan rupees, or 54.9 million PPP dollars in 2000, to 1.3 billion rupees or 37.5 million PPP dollars in 2009 (all amounts in constant 2005 prices) (Figure 1; Table 1).[1] Note that unless otherwise stated all dollar values in this report are based on purchasing power parity (PPP) exchange rates. PPPs reflect the purchasing power of currencies better than standard exchange rates because they compare the prices of a broader range of local goods and services—as opposed to internationally traded ones.

Recent Key Trends

- Sri Lanka reduced its public investment in agricultural research and development (R&D) by one-third from 2000 to 2009, mainly because the worsening security situation forced the government to divert resources to national security.
- Total agricultural R&D staff increased by 20 percent during 2000–09, but recruitment restrictions in the public sector have prevented many of these scientists from being granted full researcher status.
- The Sri Lanka Council for Agricultural Research Policy (SLCARP) is the umbrella organization that oversees the national agricultural research system.
- At 48 percent, Sri Lanka's share of women scientists is among the highest in the developing world.

The reason for the decline in public agricultural R&D expenditures is twofold. First, the country's security situation pressed the government to divert resources toward combating civil unrest at the expense of other public causes. Second, revenues from a cess on the production and export of plantation crops were gradually channeled away from R&D.

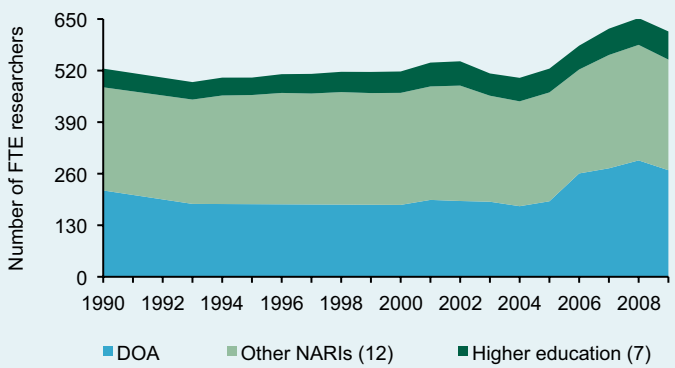
Figure 1—Public agricultural R&D spending adjusted for inflation, 1990–2009



Sources: ASTI 2010–11; Stads, Gunasena, and Herath 2005; SLCARP 2003–09.

Notes: Figures in parentheses indicate the number of agencies in each category. For more information on coverage and estimation procedures, see the Sri Lanka country page on ASTI's website at www.asti.cgiar.org/sri-lanka.

Figure 2—Public agricultural research staffing in full-time equivalents, 1990–2009



Sources: SLCARP 2003–09; Stads, Gunasena, and Herath 2005.

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

Table 1—Overview of public agricultural R&D spending and research staffing levels, 2009

Type of agency	Total spending			Total staffing	
	Sri Lankan rupees	PPP dollars	Shares	Number	Shares
	(million 2005 prices)		(%)	(FTEs)	(%)
DOA	347.1	9.9	26	268.7	43
Other NARIs (12)	775.1	22.0	59	278.9	45
Higher education (7)	197.5	5.6	15	71.1	11
Total (20)	**1,319.8**	**37.5**	**100**	**618.8**	**100**

Sources: SLCARP 2009; ASTI 2010–11.

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

In terms of human resource capacity, the number of agricultural researchers employed in Sri Lanka rose from 518 full-time equivalents (FTEs) in 2000 to 619 in 2009 (Figure 2; Table 1). Despite this overall increasing trend, some year-to-year fluctuations were observed. Starting in 2001, the government restricted recruitment across the public sector. This caused an overall decline in the number of FTE researchers. In 2004, in an effort to circumvent this policy and compensate for declining research capacity, many new scientists were hired, though they were not given full researcher status. The total number of agricultural R&D staff decreased slightly during 2008–2009, as scientists retired or left to seek opportunities in the private sector and abroad.

The Sri Lanka Council for Agricultural Research Policy (SLCARP) is the umbrella organization that oversees the country's public agricultural R&D system. The system is made up of 13 national agricultural research institutes (NARIs) including the SLCARP Secretariat, and a smaller higher education sector. The Secretariat is located in Colombo and was established in 1987 to develop policies and strategies for a productive national agricultural research system (SLCARP 2012a).

The NARIs accounted for 85 percent of Sri Lanka's public agricultural R&D spending in 2009. Excluding the SLCARP Secretariat, the following eight NARIs fall under the Ministry of Agriculture: the Department of Agriculture (DOA), the Department of Export Agriculture (DEA), the Forest Department (FD), the Hector Kobbe Kaduwa Agrarian Research and Training Institute (HARTI), the Institute of Post Harvest Technology (IPHT), the National Aquatic Resources Research and Development Agency (NARA), the Veterinary Research Institute (VRI), and the National Botanical Gardens (NBG). The four remaining NARIs are the Coconut Research Institute (CRI), the Sugarcane Research Institute (SRI), the Tea Research Institute (TRI), and the Rubber Research Institute (RRI), which fall under the Ministry of Plantations.

The largest NARI by far is the DOA which focuses on increasing productivity in the food crop sector. It also engages in a number of agricultural activities outside of research, such as seed distribution, the production of seed and planting materials, and education (DOA 2006). Overall, DOA employs 43 percent of Sri Lanka's agricultural scientists, but it accounted for just 26 percent of public agricultural R&D spending in 2009. The number of researchers employed by DOA increased from 181 FTEs in 2000 to 269 in 2009. In contrast, DOA's expenditures fell by 18 percent over this period, from 424.5 million rupees or 12.1 million PPP dollars to 347.1 million rupees or 9.9 million PPP dollars (all in 2005 prices). These somewhat contradictory trends can be explained by the fact that many of DOA's recently hired scientists were not given official researcher status and thus received lower salaries and benefits. Additionally, funding from a grants scheme, the Competitive Contract Research Program (CCRP), ended in 2005, and foreign donors reduced their contributions.

DOA has a complex structure that includes three research institutes, a number of smaller technical service centers, and other support services. The three research institutes are the Food Crops Research and Development Institute (FCRDI), the Horticulture Research and Development Institute (HORDI), and the Rice Research and Development Institute (RRDI). As the country's largest agency engaged in agricultural R&D, HORDI was a major driver of growth in capacity at DOA. From 2000 to 2009, the number of FTE researchers at HORDI increased from 31 to 57, respectively (ASTI 2010–11). Many agricultural scientists consider HORDI an attractive employer because of its proximity to Kandy, a city with a higher standard of living than more remote areas.

In contrast to DOA's rising trend in researcher numbers, staffing at the other NARIs has been relatively stable since the turn of the millennium. However, total agricultural R&D spending at these agencies fell drastically, from 1.3 billion rupees or 32.5 million PPP dollars in 2000 to 77.5 million rupees or 22.0 million PPP dollars in 2009 (in constant 2005 prices). The plantation research institutes were hit particularly hard due to cess revenues being gradually channeled away from agricultural R&D. During 2000–2009, spending at the TRI and CRI declined by 61 and 44 percent, respectively.

Seven Sri Lankan universities were engaged in agricultural R&D in 2009. Their faculties of agriculture employed a total of 71 FTEs, up from 54 in 2003. The seven are Sabaragamuwa University of Sri Lanka, Wayamba University of Sri Lanka, the University of Jaffna, Eastern University, the University of Ruhuna,

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- More details on investments and capacity in agricultural research in Sri Lanka are available in the 2005 country brief at www.asti.cgiar.org/pdf/SriLanka_CB31.pdf.
- Underlying datasets can be downloaded using ASTI's data tool at asti.cgiar.org/data.
- A list of the thirteen government agencies, and seven higher education agencies included in this brief is available at asti.cgiar.org/sri-lanka/agencies.

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the University of Peradeniya, and Rajarata University of Sri Lanka. The Faculty of Agriculture of the University of Peradeniya (FA-UP) is by far the largest of these, employing 31 FTEs in agriculture-related sciences in 2009.

Private-sector agricultural R&D investment data in Sri Lanka is hard to come by. For this reason, the private sector has been excluded from the current study. Private-sector engagement in agricultural R&D is believed to be limited to export crops, rice, vegetable seeds, and floriculture. Currently, there are partnerships between private companies and SLCARP institutes. The private sector is involved in SLCARP's planning activities too, through representation on the national committees that provide advice on research spending allocations.

During 2000–2009, Sri Lanka reduced its agricultural research intensity, measured as R&D spending as a percentage of the country's agricultural output (AgGDP). The research intensity is a useful indicator to compare investment in agricultural research over time and across countries. Sri Lanka's agricultural research intensity declined from $0.54 for every $100 of AgGDP in 2000 to just $0.34 in 2009 (Figure 3). Most of this drop occurred after 2006, due to a combination of strong growth in agricultural production and falling agricultural R&D spending. In comparison, neighboring India invested 0.40 and Bangladesh invested 0.32 percent of AgGDP in agricultural research in 2009 (Pal, Rahija, and Beintema 2012; Rahija, et al. 2012).

On the other hand, the number of FTE researchers per farmer, another comparative indicator of R&D intensity, followed an increasing trend. In 2009, for every one million farmers, the country employed 154 FTE agricultural researchers, up from 143 in 2000.

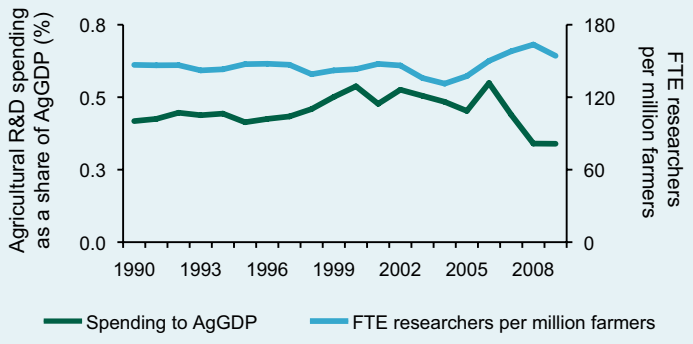
INSTITUTIONAL STRUCTURE AND POLICY ENVIRONMENT

The Sri Lanka Council for Agricultural Research Policy (SLCARP) has 14 members, five of whom are heads of institutions or representatives of specific areas of agriculture. The other members represent the Ministry of Finance, the National Science Foundation, the Secretary of Agriculture, the private sector, and smallholders. Council members are the decision makers of SLCARP, and the SLCARP Secretariat executes their decisions. The Council also appoints "national committees" for three-year intervals, with special committees sometimes created on an ad hoc basis. These committees are composed of experts from specific areas of agricultural research (e.g., biotechnology, plant protection, postharvest technologies). They make recommendations to the Council regarding their area of expertise. At present there are 11 national committees, each one coordinated by a staff member of the SLCARP Secretariat.

In 2012, SLCARP published the National Agricultural Research Plan (NARP). This plan outlines and prioritizes areas of research and sets out the envisioned role of the national agricultural research system for the future of the agricultural sector. The plan acknowledges that Sri Lanka's agricultural research environment is below international standards and that its impact at the farm level is insufficient. Further, it states that to meet the demands of competition from trade liberalization while satisfying the food requirements of a growing population, agricultural research in the country must be better funded and perform at a higher level.

To address these issues, the national plan recommends an agricultural research intensity ratio of at least 1.5 percent (SLCARP 2012b). Given that Sri Lanka's 2009 intensity ratio was just 0.34 percent, this would require a more than fourfold increase in agricultural research investment, a very ambitious target.

Figure 3—Intensity of agricultural research spending and capacity, 1990–2009



Sources: Calculated by authors from ASTI 2010–11; Stads, Gunasena, and Herath 2005; FAO 2012; and World Bank 2012.

Note: "Farmers" are defined as economically active agricultural population according to FAO.

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- Detailed definitions of PPPs, FTEs, and other methodologies employed by ASTI are available at asti.cgiar.org/methodology.
- The data in this brief are predominantly derived from secondary sources. Some data are from surveys or were estimated. More information on data coverage is available at asti.cgiar.org/sri-lanka/datacoverage.
- More relevant sources on agricultural R&D are available at asti.cgiar.org/sri-lanka.

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DEVELOPMENTS IN AGRICULTURAL R&D STAFFING

Sri Lanka's agricultural researchers became on average slightly better qualified during 2003–2009. The overall share of PhD-level researchers rose from 31 to 33 percent, and the share of MSc-level researchers climbed from 37 to 42 percent. However,

this positive trend did not occur across all of the institutions. At DOA, the share of PhD-qualified researchers fell from 24 percent in 2003 to just 11 percent in 2009 (Figure 4). This sizeable drop is explained by the large number of young BSc-level recruits hired by HORDI.

Government restrictions on public-sector hiring implemented over the past decade adversely affected all NARIs, as well as the higher education sector. To comply with the restrictions while filling gaps in research capacity, many institutes hired researchers under special schemes that did not grant new recruits the title of full researcher. They were thereby denied the status, benefits, and opportunities to which they would otherwise be entitled. One such benefit is that the national government funds postgraduate training, mostly at Sri Lankan universities, for scientists once they have attained three years of experience in an official research capacity. The aforementioned slight increase in the qualification levels of researchers would have been much larger if these scientists had been allowed access to the training opportunities of official researchers. This represents a considerable opportunity cost to agricultural R&D.

Overseas postgraduate training opportunities for Sri Lankan agricultural scientists are rare and under-funded. In 2000, SLCARP initiated postgraduate education programs with the Indian Council for Agricultural Research (ICAR) and the Bangladesh Agricultural Research Council (BARC). Through these programs, SLCARP provided some training, but it was very ad hoc and dependent on availability of government funds. From 2000 to 2010, 82 agricultural scientists received MSc training and 41 received PhD training through SLCARP's collaboration with ICAR. However, in 2011, no funds were available, so no scientists could receive training through the program (SLCARP 2011). Overall, SLCARP lacks a coherent strategy to determine and fulfill its long-term training needs.

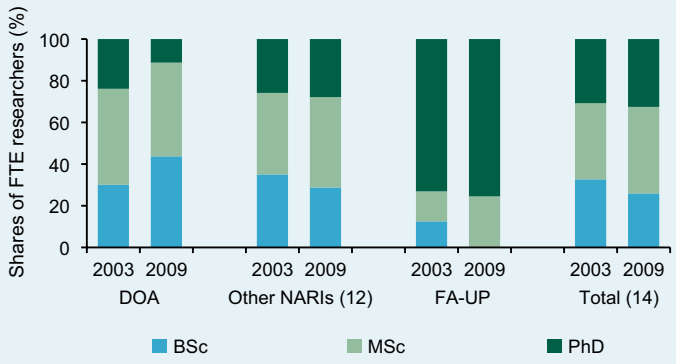
Locally, there are ample opportunities for postgraduate studies, with most scientists being trained at the University of Peradeniya. Still, "brain drain" remains a challenge for the country. Many Sri Lankan scientists who complete their PhD training in Europe, Australia, or the United States seek higher paying jobs outside of Sri Lanka.

The share of women among researchers in government agencies in Sri Lanka reached 48 percent in 2009 (ASTI 2010–11). This is one of the highest shares in the developing world. It is a significant improvement over 2003, when women accounted for 35 percent of scientific staff. Despite the overall positive trend, the share of women among PhD-qualified researchers fell markedly, from 43 percent in 2003 to 28 percent in 2009 (Figure 5). This is due to an influx of young women researchers holding MSc and BSc degrees, accompanied by a slight decline in those holding PhDs.

Recruitment of scientists remains a challenge in all of the institutes. Sri Lanka's public agricultural researchers have civil servant status. It is thus the national government that regulates their recruitment; SLCARP has no influence on recruitment numbers and procedures. Moreover, the hiring process is overly bureaucratic and arduous, adding another obstacle to prevent the NARIs from obtaining sufficient agricultural R&D capacity. Low public-sector salaries, in addition to the aforementioned recruitment restrictions, have made it difficult for the NARIs to attract new talent.

Overall, the age distribution of agricultural researchers in Sri Lanka is fairly even (Figure 6). In 2009, scientists between ages 31 and 40 accounted for 36 percent of total agricultural R&D capacity, those between 41 and 50 accounted for 38 percent, and researchers over the age of 50 made up 27 percent. FA-UP employed the largest share of researchers over the age of 60, at 24 percent. This is due to the higher retirement age in universities. At government agencies, the age of retirement is 55; however, scientists can work until the age of 60 with special permission. Notably, over 27 percent of scientists at DOA were younger than 31. This is primarily because 37 percent of the scientists at HORDI were under the age of 31.

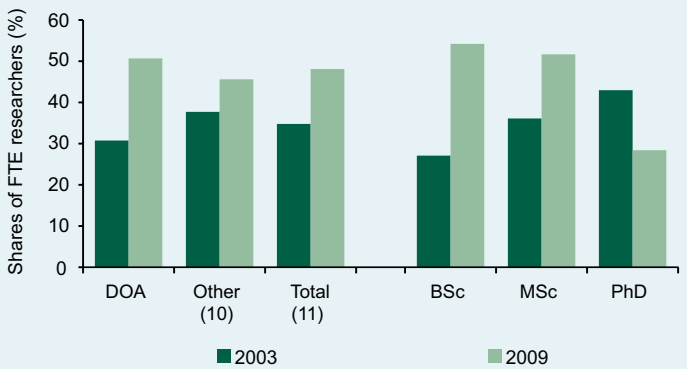
Figure 4—Degree qualifications of researchers by institutional category, 2003 and 2009



Sources: SLCARP 2003–09; Stads, Gunasena, and Herath 2005.

Notes: Figures in parentheses indicate the number of agencies in each category. FA-UP indicates Faculty of Agriculture - University of Peradeniya.

Figure 5—Share of female researchers at the NARIs by degree qualification, 2003 and 2009



Sources: SLCARP 2003–09; Stads, Gunasena, and Herath 2005.

Notes: Figures in parentheses indicate the number of agencies in each category. "Other NARIs" excludes data for the National Botanical Gardens (NBG) and the SLCARP Secretariat.

INVESTMENT TRENDS AND FUNDING

The funding of agricultural R&D in Sri Lanka has undergone a few changes since the turn of the millennium. However, the lion's share of agricultural R&D is still financed by the national government. All of the NARIs except the four plantation institutes are almost entirely dependent on government funding, supplemented with a few research grants from local and international sources. CRI, RRI, SRI, and TRI fall under the Ministry of Plantations and, until recently, were subject to a dual funding system. One component of this system was public funding from the national treasury, and the second component was revenues from a cess imposed on the import and export of plantation crops. However, during 2000–2006, the government began channeling some of the cess revenues through the treasury. Over the years, an increasingly larger share of these funds went to national security. Since 2006, all of the cess revenues have been channeled through the treasury and the share allocated to agricultural R&D has continued to decline.

The higher education sector follows national research priorities, but the universities are more dependent on external funding sources than government agencies. Often the research priorities of donors and the national government do not coincide, which makes it difficult for higher education to both adhere to national research priorities and receive funding from donors. On the other hand, because researchers in higher education are accustomed to competing for funding, they have an advantage over their NARI colleagues when it comes to applying for competitive funds.

The Competitive Contract Research Program (CCRP) was a key funding source for Sri Lankan agricultural research from 1989 until recently. CCRP was initiated by the World Bank, but it ceased awarding grants in 2006. The program was completely terminated in 2010. CCRP funded 523 research projects in government agencies, universities, and the private sector. Awards were based on a competitive grants scheme administered by SLCARP. Apart from funding research, a small component of the program provided assistance for postgraduate studies.

In 2011, a new funding scheme was established as part of NARP, essentially taking the place of CCRP. Like CCRP, it is a competitive grants scheme funded by the national government and administered by the Ministry of Agriculture. The national committees evaluate proposals and make recommendations to SLCARP. Then SLCARP advises the Ministry of Agriculture, which authorizes the treasury to release the funds. After the funds are disbursed, SLCARP monitors the grants through the national committees. In 2011, 70 projects were financed via this scheme.

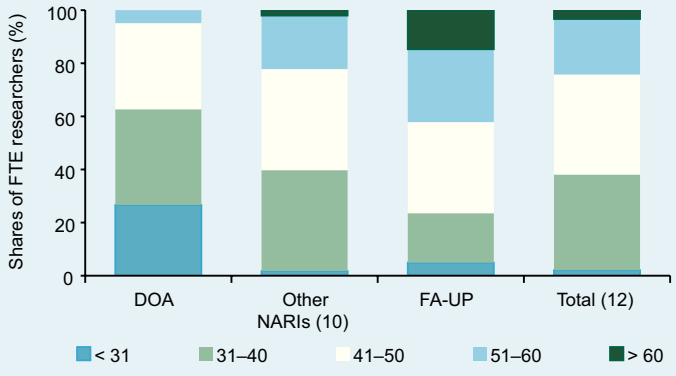
ALLOCATION OF RESEARCH ACROSS COMMODITIES

The allocation of resources across various lines of research is a significant policy decision. ASTI investigates research priorities by collecting data on the amount of research time devoted to specific commodities and thematic areas (in FTEs). In 2009, Sri Lanka devoted 56 percent of its agricultural research time to crops, 12 percent to fisheries, 10 percent to livestock, and 5 percent to natural resources and forestry combined.

There was variation in research focus across the NARIs and university departments (Figure 7). DOA focused overwhelmingly on crops (81 percent), with this category broadly defined to include vegetables, fruits, tea, rubber, and coconut palm, among others. DOA also did a fair amount of work on natural resources (8 percent). Other SLCARP agencies concentrated mainly on crops (59 percent), fisheries (14 percent), and livestock (11 percent). At the two higher education institutions for which data were available, the "other" category accounted for 31 percent and included such themes as agricultural engineering, postharvest, and pastures and forages. Climate change and biotechnology are also priority areas within the research system.

Vegetables are the most researched crops in Sri Lanka, accounting for 13 percent of the researcher capacity involved in crop and livestock research in 2009. Other key commodities

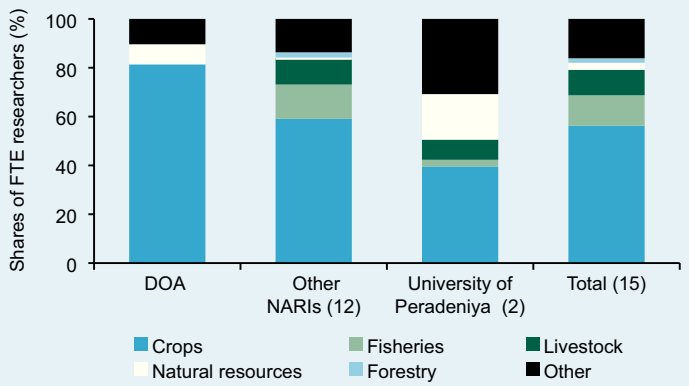
Figure 6—Age distribution of researchers by institutional category, 2009



Source: SLCARP 2009.

Notes: "Other NARIs" excludes data for the National Botanical Gardens (NBG) and the SLCARP Secretariat. FA-UP indicates Faculty of Agriculture - University of Peradeniya. Figures in parentheses indicate the number of agencies in each category.

Figure 7—Research focus by major commodity area, 2009



Source: ASTI 2010–11.

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

were fruits (11 percent), tea (10 percent), rubber (10 percent), and coconut palm (9 percent). Overall, livestock accounted for only about 10 percent of researcher time.

CONCLUSION

During the first decade of the new millennium, Sri Lanka's worsening security situation forced the national government to allocate an increasing share of public resources to national security. This was at the expense of other public investments, including agricultural research. Moreover, revenues generated by a cess on plantation crops were gradually channeled away from agricultural R&D. Both factors had a notable impact on the country's total agricultural R&D spending, which declined by roughly one-third during 2000–2009.

In contrast, the country's overall number of agricultural researchers increased by 20 percent during the same period. Many of the new scientists, however, were not hired into official research positions, due to restrictions on recruitment instituted by the national government. This deprived these scientists of training opportunities, and other benefits commensurate with their colleagues who did hold full researcher status.

Attracting and retaining high-quality agricultural scientists will remain a key challenge for Sri Lanka's public agricultural R&D agencies in the coming years. Granting all SLCARP scientists full researcher status would boost motivation and staff morale, and it could be an effective way to counter brain drain.

Another major challenge will be to increase agricultural R&D investment to 1.5 percent of AgGDP, as targeted in the current national plan for agricultural research. Sri Lanka's 2009 investment levels totaled only 0.34 percent of AgGDP (less than the 0.40 percent of neighboring India). To reach the ambitious 1.5 percent target will require a firm financial and political commitment from government in the coming years.

NOTES

[1] Financial data in current local currencies and constant 2005 US dollars are accessible via ASTI's data tool, available at www.asti.cgiar.org/data.

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