

NAMIBIA

RECENT DEVELOPMENTS IN AGRICULTURAL RESEARCH

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

After attaining independence from South Africa in 1990, Namibia shifted the focus of its agricultural research and development (R&D) away from commercial landholders toward small-scale subsistence farmers. In the early 1990s, agricultural R&D investment and capacity levels rose rapidly (Beintema, Pardey, and Roseboom 1994), but levels have been somewhat erratic since 2000. In 2008, the country spent 94 million Namibian dollars or 22 million PPP dollars, down from a high of 132 million Namibian dollars or 31 million PPP dollars, all in 2005 constant prices (Figure 1, Table 1). Unless otherwise stated, financial data in this note are based on PPP exchange rates, which reflect the purchasing power of currencies more effectively than do standard exchange rates because they compare the prices of a broader range of local—as opposed to internationally traded—goods and services.¹ The total number of full-time equivalent (FTE) agricultural R&D staff active in Namibia increased slightly during 2001–08, from 66 to 70, despite yearly fluctuations (Figure 2).

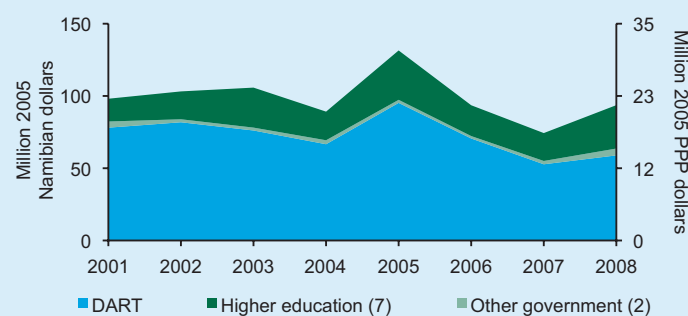
Unlike many other countries in the region, Namibia lacks a national agricultural research institute. Instead, agricultural R&D is carried out by a number of government and higher education agencies under the administration of different ministries. Accounting for roughly 60 percent of total agricultural R&D expenditures and staff, the Directorate of Agricultural Research and

Key Trends Since 2000

- Despite yearly fluctuations, total agricultural research and development (R&D) capacity and investment levels remained relatively stable in Namibia during 2001–08.
- The Directorate of Agricultural Research and Training (DART) accounted for roughly 60 percent of the country's total agricultural R&D investments and staff in 2008.
- The vast majority of DART funding is provided by the national government.
- Namibia's agricultural researchers are among the least highly qualified in Sub-Saharan Africa.
- The establishment of a National Agricultural Research Institute (NARI), tentatively scheduled for 2013/14, is expected to have a positive impact on the country's agricultural R&D system.

Training (DART) under the Ministry of Agriculture, Water, and Forestry (MAWF) is Namibia's largest agency involved in agricultural R&D. Formerly known as the Division of Agricultural Investigation of the Directorate of Agricultural Development, DART was established

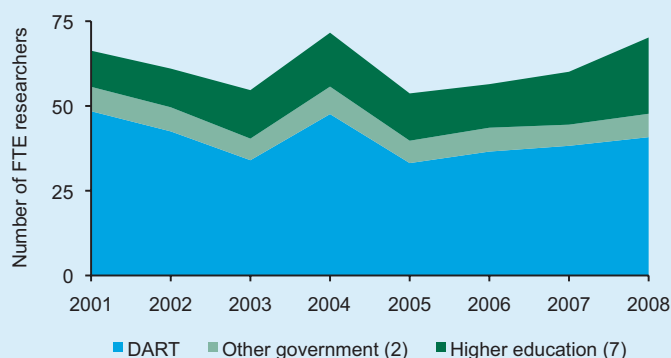
Figure 1—Agricultural R&D spending adjusted for inflation, 2001–08



Source: ASTI 2009–10.

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

Figure 2—Agricultural research staff in full-time equivalents, 2001–08



Source: ASTI 2009–10.

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

Table 1—Overview of agricultural R&D spending and research staff levels, 2008

Type of agency	Total spending			Total staffing	
	Namibian dollars	PPP dollars	Shares	Number	Shares
	(million 2005 prices)		(%)	(FTEs)	(%)
DART	58.9	13.8	62.9	40.8	58.1
Other government (2)	4.7	1.1	5.1	6.9	9.8
Higher education (7)	30.0	7.0	32.1	22.5	32.1
Total (10)	93.6	22.0	100	70.2	100

Source: ASTI 2009–10.

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

in the early 1990s, shortly after Namibia's independence. DART is headquartered in Windhoek and comprises two divisions, one for agricultural training and the other for agricultural research. The Agricultural Research Division's primary objective is to conduct crop, livestock, and natural resource research within the communal and commercial sectors, and to contribute to increased productivity and the sustainable utilization of natural resources under arid, semi-arid, and subhumid conditions, thereby improving the living standards of the Namibian population (MAWF 2010). During 2001–08, total R&D expenditure levels fluctuated from year to year. Overall spending levels were higher during 2003–06 when the Directorate received sizeable funding from the European Union and the government of Luxembourg. In 2008, the Agricultural Research Division of DART spent 59 million Namibian dollars or 14 million PPP dollars on agricultural R&D (both in 2005 constant prices) and employed 41 FTE research staff.

Two other government agencies perform agricultural R&D in Namibia. In 2008, these agencies employed a combined 10 percent of Namibia's total agricultural R&D staff and accounted for 5 percent of the country's R&D spending. Employing 2 FTE researchers in 2008, MAWF's Directorate of Forestry is headquartered in Windhoek and comprises two divisions focusing on forest management and forest research. The Forest Research Division operates two subdivisions, one of which—the Subdivision of Research Programs and Station—is located in Okahandja, 70 kilometers north of Windhoek (MAWF 2010). The 5 FTE researchers at the Swakopmund-based National Marine Information and Research Centre (NATMIRC), under the Ministry of Fisheries and Marine Resources (MFMR), conduct research on applied fisheries and the environment; aquaculture and inland fisheries; and physical, biological, and chemical oceanography, as well as undertaking stock surveys and assessment and advising MFMR on commercial stocks and other management measures.

The higher education sector plays an important role in agricultural R&D in Namibia, accounting for close to one-third of the country's total agricultural R&D staff and expenditures in 2008. The Faculty of Agriculture and Natural Resources (FANR) of the University of Namibia (UNAM) has six departments on three campuses. The Departments of Animal Sciences, Agricultural Economics, and Food Science and Technology are housed at Neudamm Agricultural Campus, approximately 40 kilometers from Windhoek. The Ogongo Agricultural Campus near the Angolan border houses the Departments of Crop Science and Integrated Environmental Science, while the Department of Fisheries and

ASTI Website Interaction



Underlying datasets can be downloaded using ASTI's data tool at asti.cgiar.org/data.



A list of the 3 government and 7 higher education agencies included in this brief is available at asti.cgiar.org/namibia/agencies.

www.asti.cgiar.org/namibia

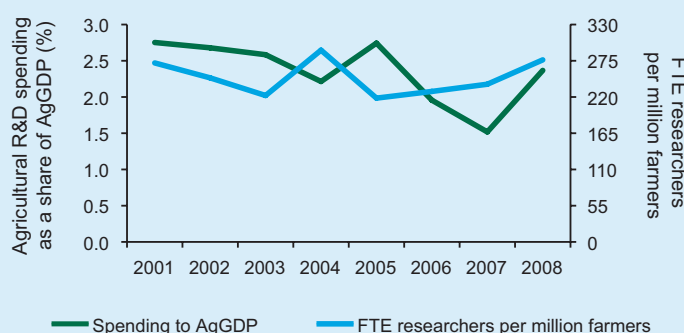
Aquatic Sciences is based at the university's main campus in Windhoek. In 2008, FANR employed 20 FTEs in agricultural R&D. The Department of Agriculture of the Polytechnic of Namibia did not become involved in agricultural R&D until 1999. In 2008, the department's 3 FTE researchers carried out research on halophytic plants under irrigation with brackish water, highland savanna shrub encroachment, restoration of degraded systems and preventative rangeland management, and broiler chicken.

No private for-profit companies were identified as carrying out agricultural R&D in Namibia.²

In 2008, just 10 percent of Namibia's agricultural researchers were female (ASTI 2009–10), compared with 22 percent for Sub-Saharan Africa as a whole (Beintema and Stads 2011). During 2001–08, Namibia's overall ratio of support staff per FTE researcher fell by more than half, from 3.8 to 1.6. On average in 2008, Namibia employed 0.2 technicians, 0.1 administrative support staff, and 1.1 other support staff per agricultural researcher (ASTI 2009–10).

Total public spending as a percentage of agricultural output (AgGDP)—a comparative indicator of agricultural R&D spending across countries—followed an erratic but declining trend during 2001–08. In 2008, Namibia invested \$2.37 for every \$100 of agricultural output compared with \$2.75 in 2001 (Figure 3). Despite this decline, Namibia still has one of the highest agricultural R&D intensity ratios in Sub-Saharan Africa. In comparison, the 2008 intensity ratio for Sub-Saharan Africa as a whole was 0.61 (Beintema

Figure 3—Intensity of agricultural research spending and capacity, 2001–08



Sources: Calculated by authors from FAO 2009, ASTI 2009–10, and World Bank 2010.

and Stads 2011). The cause of Namibia's high agricultural research intensity has little to do with high investment levels, but rather reflects the small size of the country's agricultural sector and hence its AgGDP. Research intensity levels are often higher in countries with small populations and relative high per capita income levels. This is logical when you consider that human and capital investments have a fixed based component, regardless of population size, especially when facilities and services are spread across the country (Pardey, Roseboom, and Anderson 1991). The number of agricultural researchers per million farmers also followed an erratic pattern, increasing marginally during this period from 272 FTEs in 2001 to 276 FTEs in 2008.

INSTITUTIONAL STRUCTURE AND POLICY ENVIRONMENT

The institutional structure of agricultural R&D has changed little since Namibia's independence. Over the years, research stations have been established or strengthened in the communal areas, particularly in the north of the country where crop breeding and production became a priority. One major institutional change in recent years was the 2006/07 transfer of the Ogongo and Neudamm agricultural colleges from the Division of Agricultural Training under DART to the University of Namibia. Namibia's Research, Science, and Technology Act of 2004 recognizes that science and technology (S&T) interventions are critical to both promoting and optimizing niches and opportunities in the agricultural sector. The country's agricultural R&D policy follows the goals set forth in three important policy documents: the long-term Vision 2030, the Millennium Challenge Account (MCA), and the short-term National Development Plan (NDP). Vision 2030 covers areas such as achieving sustainability in the crop, fishery, and forestry subsectors and the need for diversified livelihoods. MCA aims to increase on- and off-farm productivity in rural areas and improve human resource capacity and skills. NDP stresses, among many other things, the importance of agricultural R&D in addressing the sustainability of the country's agricultural sector. Despite having various policies affecting agricultural R&D, Namibia lacks a mechanism for coordinating agricultural R&D activities to achieve its development objectives (SADC–FANR 2008). Greater synergies could be gained if research activities were better coordinated.

MAWF's mandate was expanded with the ministry's Strategic Plan for 2008/09 to 2012/13. Key priorities of this plan include increasing crop and livestock product development, enhancing relevance of rangeland research, and increasing the focus on food science and value addition. In order to respond to these challenges, MAWF's laboratory has been renovated and equipment has been purchased. In addition, plans are under way to consolidate the agricultural research activities of a number of ministerial departments through the creation of the proposed Namibian Agricultural Research Institute (NARI). Namibia's Cabinet has already given this plan its approval in-principal, and institutional development experts have been engaged to develop the governance structure and other logistical arrangements. As a state-owned enterprise, NARI will have the benefit of being able to generate its own income through the sale of goods and services, to enter into direct agreements with funding agencies, and to receive direct appropriations from the Ministry of Education's research fund. Furthermore, NARI will have the

ASTI Website Interaction

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

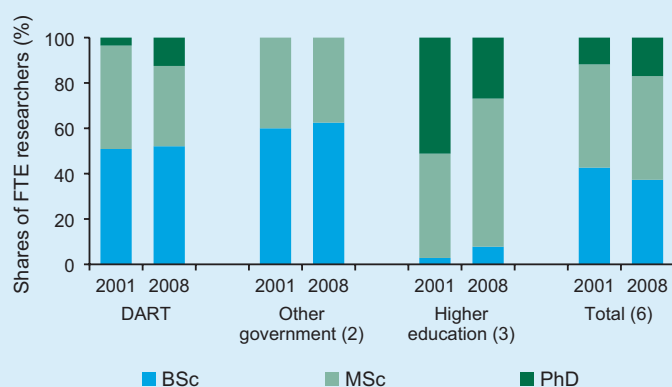
www.asti.cgiar.org/namibia

flexibility to offer more competitive salaries, enabling it to attract and retain more highly qualified personnel. The current target date for the establishment of NARI is the 2013/14 financial year.

RESEARCH STAFF QUALIFICATIONS AND TRAINING

In 2008, 17 percent of Namibia's agricultural researchers held PhD degrees, 46 percent held MSc degrees, and 37 percent held BSc degrees (Figure 4). Though average degree levels have increased since the turn of the millennium, the share of Namibian agricultural scientists holding PhD degrees is well below the African average. Compatible with agricultural researchers in most African countries, staff at Namibia's higher education agencies are more highly qualified than those at the government agencies. The overall decrease in the share of PhD-qualified staff at the higher education agencies during 2001–08 actually reflects a large increase of MSc-qualified scientists at the Neudamm College

Figure 4—Qualifications of researchers by institutional category, 2001 and 2008



Source: ASTI 2009–10.

Notes: Figures in parentheses indicate the number of agencies included in each category. Four smaller higher education agencies were excluded due to data unavailability.

because in 2006 when the Neudamm and Ogongo colleges were transferred to the University of Namibia, the majority of the lecturers held only BSc degrees and were required to upgrade their qualifications to at least the MSc level. During 2001–08, DART expanded its capacity of PhD-qualified scientists from 2 to 5, but the Directorate of Forestry and NATMIRC employed no researchers with PhD degrees. Namibia's higher education agencies currently do not offer PhD-level training, so Namibian agricultural scientists are forced to seek doctorate training abroad. These low numbers of PhD-qualified researchers are an indicator of the constraints on Namibia's agricultural R&D programs given that a critical mass of highly qualified research staff is considered crucial not only to producing high-quality, relevant research, but also to securing future R&D funding.

MAWF offers bursaries through DART to both research and nonresearch staff interested in pursuing higher education in areas in which critical capacity is lacking in the agriculture, water, and forestry sectors. For agricultural R&D, these areas include seed technology, plant breeding, plant physiology, plant pathology, animal breeding, animal nutrition, soil science, and rangeland science. Most DART scientists who have benefited from these bursaries are pursuing MSc training, and the majority of students are attending Bloemfontein, Free State, and Kwazulu-Natal universities in South Africa. Others are attending the University of Nairobi, Kenya (plant pathology), the University of Dar es Salaam, Tanzania (horticulture), the University of Nagoya, Japan (plant physiology), and the University of Zambia (plant breeding and seed science). DART has also benefitted from a bilateral agreement with India, allowing two of its scientists to obtain MSc degrees in soil science and horticulture at Indian agricultural universities. In addition, four DART researchers are receiving PhD training and one MSc training in Hungary as part of a sponsorship from the Food and Agriculture Organization of the United Nations (FAO). The majority of Namibia's fisheries scientists have been trained with Norwegian support, many at the University of Bergen.

Unlike many other countries in Africa, Namibia is not facing the problem of an aging pool of scientists; in contrast, most of DART's researchers are only 25–35 years old. MAWF encourages these scientists to pursue higher education by providing numerous grants. Staff mobility, however, is a major challenge in Namibia's public sector. Research staff employed at agencies under MAWF lack the benefit of clear career paths. It is not uncommon for an experienced senior researcher to be promoted

to an administrative position at a different division or directorate under the ministry. Although salaries are more attractive at the higher education agencies, the public service agencies offer greater job security. Nevertheless, over the past three years, DART has lost some of its staff to the University of Namibia and the Polytechnic of Namibia. The establishment of the proposed NARI is expected to halt this exodus. NARI will be able to offer competitive salaries, and its institutional status will preclude the promotion of researchers to nonresearch positions.

INVESTMENT TRENDS

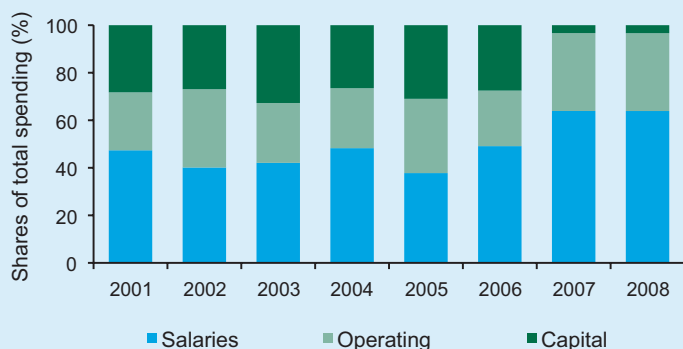
Cost Categories

The allocation of research budgets across salaries, operating costs, and capital investments affects the efficiency of agricultural R&D, so detailed cost-category data were collected from government agencies as part of this study. In 2008, of DART's total expenditures, salaries accounted for 64 percent, operating costs for 33 percent, and capital costs for 3 percent (Figure 5). During 2001–06, the yearly share of capital expenditures was much higher as a result of funding from the Luxembourg Agency for Development Corporation (LuxDev) and the European Union. LuxDev aid was instrumental in rehabilitating the directorate's Mashare Agricultural Development Institute (MADI). The Supporting the Transition of Extension and Agricultural Research (STEAR project—implemented by the United Kingdom's Department for International Development (DFID) with European Union funding—also led to the purchase of movable assets, including vehicles and computers.

Funding Sources

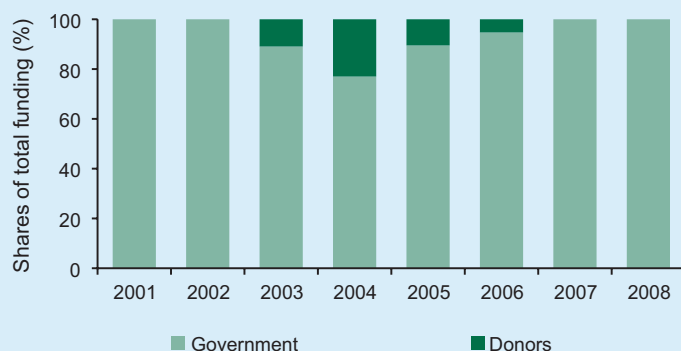
Agricultural R&D funding in Namibia is derived from the national government and, to a lesser extent, foreign donors (Figure 6). The government was the primary funder of DART's agricultural R&D activities during 2000–08 (salaries, operating and capital costs), with the exception of the period 2003–06 when, as previously mentioned, the Directorate received sizeable funding from LuxDev and the European Union. Unlike certain other countries in the region, donor funding plays a relatively minor role in funding agricultural R&D, and no producer organizations are involved. Even though DART currently conducts some pest and disease control research for third parties and sells livestock breeding

Figure 5— Cost category shares of DART, 2001–08



Source: ASTI 2009–10.

Figure 6— Funding sources of DART, 2001–08



Source: ASTI 2009–10.

material and improved seed varieties to farmers, funds generated by these activities are channeled back to the Treasury. The proposed NARI, as a state-owned enterprise, will be able to keep any funds it generates, which will be an incentive for the institute to develop this source of funding.

DART's scientists, like all civil servants, are paid directly by the Ministry of Finance. MAWF's budget process is complex, and budgets are determined by program rather than by directorate. MAWF's livestock program, for instance, cuts across three directorates: DART, the Directorate of Extension and Engineering Services (DEES), and the Directorate of Veterinary Services (DVS). Similarly, the ministry's plant production program cuts across DART and DEES. Government allocations are typically structured as three-year rolling budgets. The University of Namibia and Polytechnic of Namibia receive their funding from the Ministry of Education but are expected to raise supplementary funding through consultancies. During 2001–05, the Ogongo and Neudamm Agricultural College received large amounts of funding from the Namibian government to rehabilitate their infrastructure.

In Namibia, like neighboring South Africa and Botswana, donor funding plays a limited role in financing agricultural R&D. Donor support mostly takes the form of consultancies and the procurement of assets such as computer hardware and software. As previously mentioned, some donor funding was provided by the European Union and LuxDev during 2000–08. NATMIRC reported higher shares of donor funding than DART, largely due to collaborative programs with Iceland and Spain, and the training of many of the center's scientists at the University of Bergen with Norwegian support. The private sector also plays an important role in funding NATMIRC's R&D programs.

RESEARCH ALLOCATION

Given that the allocation of resources across various lines of research is a significant policy decision, detailed information was collected on the number of researchers working in specific commodity and thematic areas. In 2008, 35 percent of the FTE researchers for which research focus data were available were involved in crop research (Figure 7). Livestock research accounted for 25 percent, natural resources research for 17 percent, fisheries

research for 13 percent, and forestry research for 4 percent. The remaining researchers concentrated on socioeconomic research, pasture and forage research, or other matters.

Commodity Focus

Namibia's most researched crop is millet, accounting for 18 percent of all crop and livestock research in 2008 (Table 2). Other important crops include sorghum (7 percent), potatoes (5 percent), fruit (3 percent), and vegetables (3 percent). The country's livestock researchers concentrated primarily on beef (21 percent) and sheep and goats (11 percent).

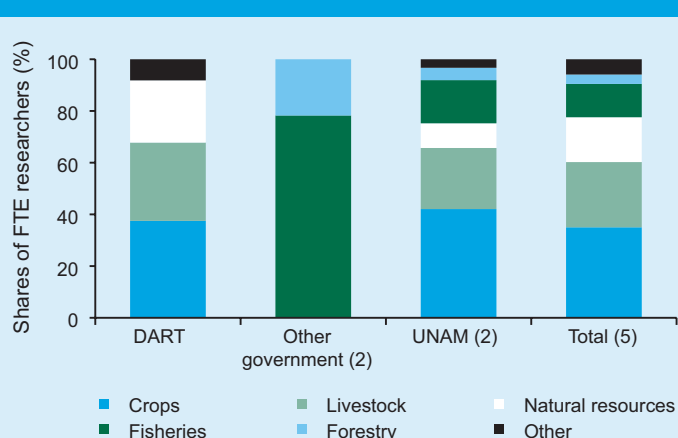
CONCLUSION

Agricultural R&D in Namibia differs from most other African countries in several key ways. The country's agricultural R&D intensity ratio is nearly four times the African average, its R&D agencies are relatively well-funded by the national government, and foreign donors play only a marginal role in financing agricultural R&D efforts. In 2008, the country invested 94 million Namibian dollars or 22 million dollars (both in 2005 PPP prices) and employed 70 FTE agricultural researchers.

Despite these positive indicators, the major constraint to effective agricultural R&D is the reality that Namibia's agricultural scientists are among the least highly qualified in Africa. The country's universities currently do not offer PhD programs in agricultural sciences, so scientists seeking training beyond the MSc level must travel abroad. Notwithstanding numerous government-funded training efforts that have improved average qualification levels in recent years, Namibia still lacks a critical mass of PhD-qualified scientists, which is crucial to both producing effective research results and securing future R&D funding.

DART is currently the country's principal agricultural R&D agency, accounting for roughly 60 percent of its agricultural R&D staff and investments. Being a directorate under MAWF, DART is constrained in its ability to offer competitive salaries and attract and retain well-qualified researchers. Moreover, even though DART generates substantial funding through the sale of goods and

Figure 7—Research focus by major commodity area, 2008



Source: ASTI 2009–10.

Notes: Figures in parentheses indicate the number of agencies in each category. Five smaller higher education agencies were excluded due to data unavailability.

Table 2—Focus of crop and livestock research by major item, 2008

	DART	UNAM (2)	Total (3)
Crop Items			
Shares of FTE researchers (%)			
Millet	18.4	18.1	18.3
Sorghum	7.1	7.3	7.1
Potatoes	7.1	—	4.8
Fruits	1.4	7.6	3.4
Vegetables	0.7	7.6	2.9
Other crops	20.5	23.2	21.4
Livestock items			
Beef	28.4	5.5	21.0
Sheep and goats	14.2	3.6	10.8
Other livestock	2.1	26.1	10.1
Total crop and livestock	100	100	100

Source: ASTI 2009–10.

Notes: Figures in parentheses indicate the number of agencies in each category. Five smaller higher education agencies were excluded due to data unavailability.

services, these funds are channeled back to the Treasury, leaving little incentive for the directorate to develop this income stream. The recent Cabinet approval of the creation of a national agricultural research institute or NARI, tentatively scheduled for 2013/14, is set to change all this. As a state-owned company the proposed NARI will be more client-driven, have the flexibility to offer higher salaries, and be able to generate funding through its own activities. All these factors are likely to have a positive effect on future agricultural R&D investment levels and staff development in Namibia.

NOTES

- ¹ Financial data are also available in current local currencies or constant 2005 U.S. dollars via ASTI's data tool, available at www.asti.cgiar.org.
- ² The Desert Research Foundation of Namibia (DRFN) is a private nonprofit center conducting research on desert ecological systems. DRFN's research, however, is only indirectly linked to the agricultural sector, so the foundation is excluded from further analysis in this note.

REFERENCES

- ASTI 2009–10. Agricultural Science and Technology Indicators survey. Unpublished surveys. Washington, D.C.
- Beintema, N. M., and G. J. Stads. 2011. *African agricultural R&D in the new millennium: Progress for some, challenges for many*. Food Policy Report. Washington, D.C.: International Food Policy Research Institute.
- Beintema, N. M., P. Pardey, J. Roseboom. 1994. *Statistical brief on the national agricultural research system of Namibia*. Statistical Brief No. 13. The Hague: International Service for National Agricultural Research.
- FAO (Food and Agriculture Organization of the United Nations). 2009. FAOSTAT databases. <<http://faostat.fao.org/site/452/default.aspx>> (accessed March 8, 2010).
- MAWF (Ministry of Agriculture, Water and Forestry). 2010. Directorate of Research and Training. <<http://www.mawf.gov.na/Directorates/ResearchTraining/researchtraining.html>> (accessed September 28, 2010).
- Pardey, P. G., J. Roseboom, J. R. Anderson, eds. 1991. *Agricultural research policy: International quantitative perspectives*. Cambridge University Press.
- SADC–FANR (Southern African Development Community and Food, Agriculture, and Natural Resources Directorate). 2008. Situation analysis of agricultural research and training, in order to assess and formulate strategies for the national agricultural research systems and agricultural research networks in the SADC region: Implementation and Coordination of Agricultural Research and Training in the SADC Region (ICART). Gaborone, Botswana.
- World Bank. 2010. World Development Indicators and Global Development Finance. <http://databank.worldbank.org/ddp/home.do?Step=2&id=4&hActiveDimensionId=WDI_Series> (accessed November 10, 2010).

IFPRI-ROME

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