

BOTSWANA

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This country brief reviews the major investment and institutional trends in Botswana's agricultural research system since the early 1970s, including a new set of survey data for the 1990s collected through the Agricultural Science and Technology Indicators (ASTI) initiative (IFPRI–ISNAR 2003–04).¹

INSTITUTIONAL DEVELOPMENTS

The agricultural sector's share of gross domestic product (GDP) has fallen significantly in Botswana, from 35 percent at independence in 1966 to only 2 percent by 2001. This change is mainly because of the growing prominence of the diamond industry.² Despite this, however, half of the country's population lives in rural areas and depends on agriculture for food, income, and employment. In fact, over 40 percent of the total laborforce works in the agricultural sector. Livestock predominates, mainly in the form of cattle, sheep, and goats—while beef is an important export commodity. But in recent years persistent drought occurrence and poor soil conditions have resulted into low crop yields (Whiteside 1997; World Bank 2003; FAO 2004). Close to half Botswana's population lives under the poverty line, making agricultural research and development (R&D) an important factor in the pursuit of food security and improved living conditions.

Table 1—Composition of agricultural research expenditures and total researchers, 2001

Type of agency	Spending		Researchers ^a (fte's)	Share		Agencies in sample ^b (number)
	1999 pula (millions)	1993 international dollars		Spending (percent)	Researchers	
<i>Public agencies</i>						
DAR/MoA	33.3	12.9	43.0	65.9	42.4	1
NVL/MoA ^c	5.9	2.3	21.0	11.6	20.7	1
<i>Other</i>						
government ^d	4.7	1.8	17.0	9.4	16.8	2
VPR&D (nonprofit)	1.8	0.7	3.0	3.5	3.0	1
BCA ^e	4.9	1.9	17.4	9.6	17.2	1
Total	50.6	19.6	101.4	100	100	6

Sources: Compiled by authors from ASTI survey data (IFPRI–ISNAR 2003–04).

^a Include national and expatriate staff.

^b See note 2 for details of all agencies.

^c The 30 staff from NVL/MoA spent an estimated 70 percent of their time on research, resulting in the 21 fte researchers.

^d Expenditure data for the two other government agencies (RICC and NFTRC) are estimates using spending-per-researcher data from NVL/MoA. The 60 staff spent an estimated 22 percent (RICC) and 50 percent (NFTRC) of their time on research, resulting in the 17 fte researchers.

^e Research expenditure for BCA is estimated based on average expenditures per researcher for the government agencies (excluding DAR/MoA). The 87 faculty staff employed at BCA spent an estimated 20 percent of their time on research, resulting in 17.4 fte researchers.

KEY TRENDS

- Total investments in Botswana's agricultural research have almost doubled since the early 1990s, largely as the result of increased government contributions.
- The primary agricultural research agency in Botswana is the Department of Agricultural Research (DAR) under the Ministry of Agriculture. In 2001 DAR accounted for about two-thirds of the country's total agricultural research spending and 42 percent of all agricultural researchers. DAR's main constraint, nevertheless, is the lack of well-qualified researchers because of the relatively low salary levels offered within the government sector.
- Agricultural research is mainly funded by the government. Donor funding played a major role during the 1980s but has since been very limited.
- Private-sector involvement in agricultural research is minimal.

ABOUT ASTI

The Agricultural Science and Technology Indicators (ASTI) initiative comprises a network of national, regional, and international agricultural R&D agencies and is managed by the International Service for National Agricultural Research (ISNAR) division of the International Food Policy Research Institute (IFPRI). The ASTI initiative compiles, processes, and makes available internationally comparable data on institutional developments and investments in public and private agricultural R&D worldwide, and analyses and reports on these trends in the form of occasional policy digests for research policy formulation and priority setting purposes.

Primary funding for the ASTI initiative was provided by the CGIAR Finance Committee/World Bank with additional support from the Australian Center for International Agricultural Research (ACIAR), the European Union, and the U.S. Agency for International Development (USAID).

We identified six agencies involved in agricultural R&D in Botswana in 2000.³ These agencies employed about 100 full-time equivalent (fte) researchers and had a combined agricultural research expenditure of 51 million 1999 pula—equivalent to \$20 million in 1993 international prices (Table 1).⁴

The Department of Agricultural Research (DAR) under the Ministry of Agriculture (MoA) is Botswana's principal agricultural research agency. In 2001 it accounted for two-thirds of total agricultural R&D spending and 42 percent of all fte researchers. DAR comprises three divisions, the Division of Arable Research, the Division of Animal Production and Range Research, and the Support Services Division. Research activities cover crops—including cereal crop improvement, horticulture, oil seeds, grain legumes, crop pest and disease management, and water and soil management—and livestock management—including work on animal breeding, dairy, small livestock, feed, and sustainable deployment of range resources. In addition, DAR provides research support services in seed production and certification; soil, plant, and feed analysis; and genetic resources conservation (DAR n.d.; WISARD 2001).

DAR, which is headquartered at the Sebele Station in Gaborone, was reorganized in 1990 based on the recommendations of a review of the national agricultural research system conducted by the International Service of National Agricultural Research (ISNAR 1990). (See *A Short History of Government-Based Agricultural Research* below). Plans included the establishment of regional research stations across the country's agroecological zones with a view to decentralizing the department's research activities and improving the management of the 10 arable research substations and 14 research farms. The first regional research station was opened in the Ngamiland area (northwest of the country) in 1995; the Francistown Regional Station was opened in the northeast in 2000; and a third regional station is due to be opened at Kang, in the west, later this year (2004). Significantly, the three new regional stations each have a full complement of senior staff and are responsible for the direct supervision of the technical staff in the substations within their region; where previously all the substations were supervised at a distance from the Sebele headquarters.

The National Veterinary Laboratory (NVL) falls under expenditures. NVL's mandate has expanded over the years and MOA's Department of Animal Health and Production. In 2001 it accounted for 12 percent of total agricultural research currently includes disease diagnosis and control; applied research designed to maintain the health, welfare, and production of farm animals; and the preservation of high standards of meat hygiene. NVL staff spend about 70 percent of their time on research and 30 percent on diagnostic services. All of NVL's research activities are conducted at a laboratory in Gaborone.

Two other government agencies, both under the administrative responsibility of the Ministry of Communications, Science, and Technology (MSCT), conduct agricultural R&D. The Rural Industries Innovation Centre (RIIC) designs and tests agricultural equipment and farm machinery relevant to the farming community, such as planters, feed mixers, and chaff cutters. In 2001, 10 of RIIC's 45 researchers were involved in postharvest and natural resources research or socioeconomics research related to agriculture.⁵ RICC is headquartered in Gaborone and has three regional offices. The National Food Technology Research Centre (NFTRC) conducts food and nutrition research with the aim of improving Botswana's food security, nutritional well-being, and overall health.⁶ In 2001, the center had 7 fte researchers, all located in Gaborone.

We identified one nongovernmental organization (NGO) involved in agricultural research: the Veld Products Research and Development (VPR&D), which in 2001 employed 3 fte researchers.⁷ VPR&D was established in 1981 to conduct research on field products, indigenous fruit trees, and sustainable natural resources management systems, and to raise the rural population's quality of life through income generation and improved food security. VPR&D is governed by a board comprising representatives from the government, other NGOs, and the farmer community in Gabane, where the organization's primary facilities are located (VPR&D n.d.).

The Botswana College of Agriculture (BCA), established in 1966, is a parastatal body under MOA and associated with the University of Botswana. Although BCA has always had close links with DAR (and is located adjacent to the DAR's

A Short History of Government-Based Agricultural Research

Public agricultural research in Botswana began in the 1930s with the establishment of an experimental station in Mahalapye that focused on a variety of crops. Livestock research began about the same time, conducted at a ranch in Morale. Until the 1960s, agricultural research was primarily undertaken by a division within the Department of Agriculture's Agricultural Extension Services. In the years leading up to and following independence (1960–76), Botswana's research infrastructure grew considerably, and several new research stations were created, including a new headquarters at Sebele near Gaborone in 1968. By the late 1960s, a formal Department of Agricultural Research (DAR) was established under the Ministry of Agriculture. At independence most of DAR's research activities were limited to crop production and pastures. In 1970, the Animal Production Research Unit (APRU) was created to broaden DAR's focus to livestock research. During the 1970s APRU's research program and capacity increased considerably to encompass 17 research sites throughout the country.

During the 1970s and 1980s, DAR expanded considerably given large donor-funded research projects, including FAO's fertilizer project in 1969, the Dry Land Farm Research Scheme (DLFRS) of 1971–83, the Evaluation of Farming Systems and Agricultural Implements Project of 1976–84, the Agricultural Technology Improvement Project (ATIP) of 1982–90, and the Molapo Development Project of 1983–92. These projects allowed DAR to grow substantially, positioning it to become the dominant provider of agricultural research in Botswana.

In 1961 veterinary research in Botswana was strengthened with the establishment of a veterinary laboratory in Mafeking. In 1968 the National Veterinary Laboratory (NVL) was transferred to the newly established capital Gaborone. In 1986, NVL was, once again, moved to its current location at Sebele.

Sources: Roseboom and Pardey (1993).

headquarters), the college's agricultural research activities only began in 1992; activities have grown, however, since then. In 2001, BCA's professional staff spent an estimated 30 percent of their time on research, focusing on areas such as crops, livestock, forestry, environmental sciences, and socioeconomics (BCA n.d.).

We did not identify any private-for-profit companies in Botswana with significant ongoing research activities.

Collaboration occurs between various agricultural research agencies in Botswana, as well as with regional and international agencies. DAR, for example, has ongoing involvement with the Food and Agriculture Organization of the United Nations (FAO) and various centers of the Consultative Group on International Agricultural Research (CGIAR). As a member of the Southern African Development Community (SADC), DAR also collaborates with neighboring countries on various regional projects, including SADC's groundnut program, its maize program—also involving the International Maize and Wheat Improvement Center (CIMMYT)—and projects undertaken by SADC's Plant Genetic Resource Centre. BCA also collaborates with SADC and is involved in international projects such as the Desert Margin Program, under the Global Environmental Facility (GEF), and the Peanut Collaborative Research Support Program (CRSP), which is funded by the United States Agency for International Development (USAID) and involves collaboration with the University of Wisconsin and University of Georgia.

HUMAN AND FINANCIAL RESOURCES IN AGRICULTURAL R&D

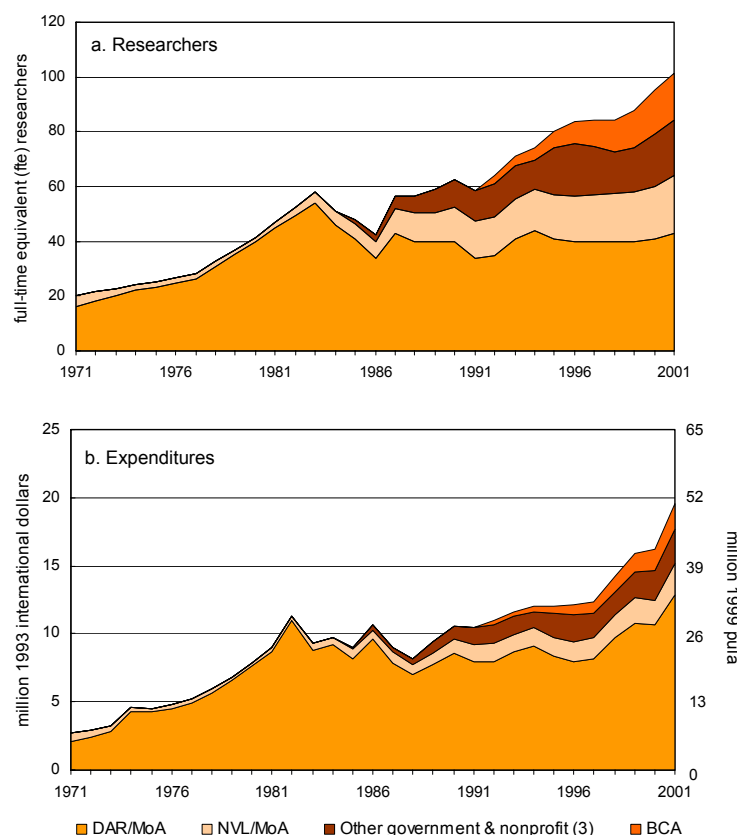
Overall Trends

Over the past three decades, total agricultural research staff numbers grew considerably in Botswana, at an annual average of 5.3 percent (Figure 1a).⁸ This growth continued throughout the 1990s for most of the agricultural research agencies, but slowed to 1.4 percent per year at DAR.

At independence in 1966, all of Botswana's agricultural research was conducted by expatriates. The expatriate share subsequently declined (Roseboom and Pardey 1993) but remains high compared with other Sub-Saharan African countries, at a combined 23 percent for the four government agencies during the 1990s. Most of these expatriates are employed by the Government of Botswana and most come from countries within the SADC region.

Total agricultural R&D spending increased, coincidentally, at the same average rate of 5.3 percent over the past three decades (Figure 1b). After a decade of growth in the 1970s, total spending remained fairly even during the 1980s. Contrasting most other Sub-Saharan African countries, total spending actually increased by nearly two-thirds in the late 1990s, from about \$12 million in 1995 to close to \$20 million by 2001. This significant growth resulted from increased government contributions to DAR of about 15 percent per year stemming from additional funding for the establishment of the first two regional centers. (See the section on financing for more information on how this funding was generated.)

Figure 1—Public agricultural R&D trends, 1971–2001

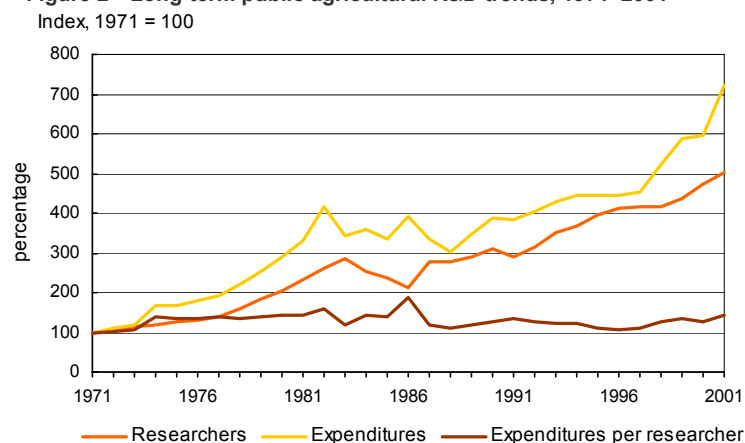


Sources: Compiled by authors from ASTI survey data (IFPRI–ISNAR 2003–04) and Roseboom and Pardey (1993).

Notes: See Table 1. Figures in parentheses indicate the number of agencies in each category. Underlying data are available at the ASTI website (www.asti.cgiar.org). 1994 and 1995 expenditure data for DAR/MoA were estimated.

Given this significant increase in expenditure in the late 1990s, spending per researcher also increased (Figure 2). In 2001, total spending per scientist was \$169,000, 23 percent higher the average level in the early 1970s.

Figure 2—Long-term public agricultural R&D trends, 1971–2001



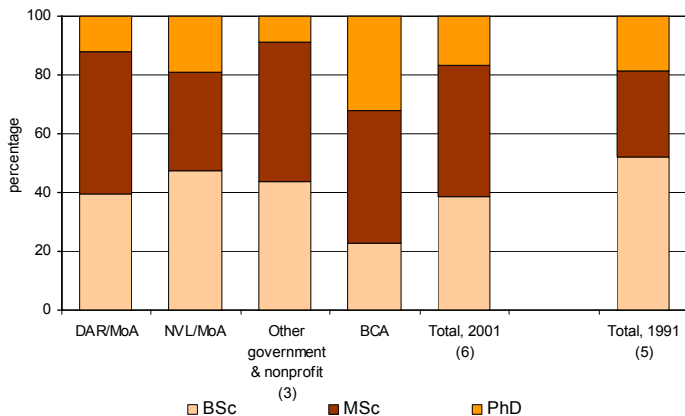
Source: Figure 1.

Human Resources

In 2001, close to two-thirds of all full-time researchers in our six-agency sample were trained to the postgraduate level, and 28 percent held doctorate degrees (Figure 3). A higher proportion of BCA staff held MSc and PhD degrees compared with staff at the government and nonprofit agencies—a consistent finding for the higher-education sector across most African countries (Beintema 2003; Pardey et al. 1997). The quality of staff at the government agencies—measured in terms of the share of researchers with PhD and MSc degrees—increased from 48 percent in 1991 to 62 percent in 2001. These averages, however, mask a decline in PhD staff at DAR (in absolute and relative numbers) from seven in 1991 to four in 2001. This reflects another trend in African and other developing countries, whereby lower salaries in the government sector compared with the higher-education and private sectors act as a disincentive in the hiring and retention of well-qualified staff. On this basis, DAR has recently been unable to fill all of its available positions; only 54 of the 75 professional positions, for example, were filled as of early 2003.⁹

The minimum requirement for newly recruited researchers at DAR is a BSc degree. After gaining practical experience, promising scientists can be recommended for MSc level training. Since BCA is not offering MSc training, the only available option for MSc training is outside Botswana in SADC or other countries. In the past, MSc or PhD training was funded through various donor projects, but this type of support has been significantly reduced in recent years. Currently most of the funding for training is provided by the Government of Botswana. This, however, puts a limit as to the number of scientists, which can be trained at any one time.

Figure 3—Educational attainment of researchers, 2001



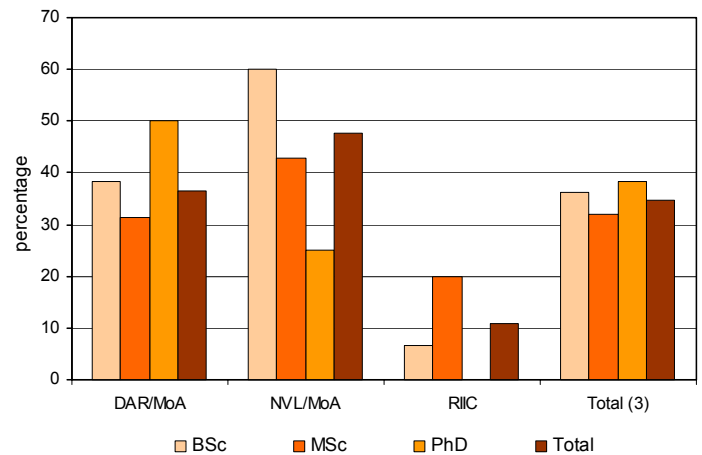
Source: Compiled by authors from ASTI survey data (IFPRI–ISNAR 2003–04) and Roseboom and Pardey (1993).

Note: Figures in parentheses indicate the number of agencies in each category. Data exclude expatriate staff. 1991 data exclude BCA, which initiated research activities in 1992.

Based on a three-agency sample for 2001, on average, 35 percent of all research staff were female, which is a considerably higher share than for many other Sub-Saharan African countries (Figure 4). Also in contrast to many other countries, the 2001 breakdown of female researcher numbers by degree showed comparatively small differences: 36 percent of researchers holding BA degrees were female (10 full-time equivalents), 32 percent of those holding MSc degrees were female (8 full-time equivalents), and

38 percent of researchers holding PhD degrees were female (3 full-time equivalents). Historical data on the proportion of female researchers were only available for DAR, and showed that in 1991 only 17 percent of DAR's total research staff were female (25 full-time equivalents) (Roseboom and Pardey 1993), considerably less than the corresponding share of 36 percent in 2001 (33 full-time equivalents).

Figure 4—Share of female researchers, 2001

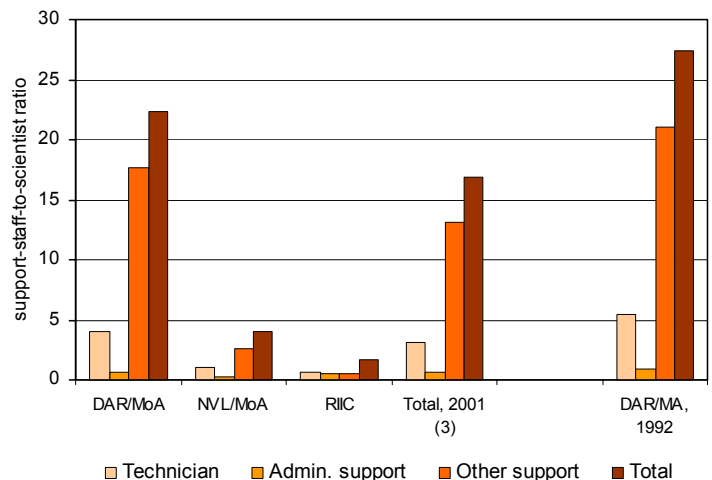


Source: Compiled by authors from ASTI survey data (IFPRI–ISNAR 2003–04) and Roseboom and Pardey (1993).

Note: Figures in parentheses indicate the number of agencies in each category. Data exclude expatriate staff.

In 2001, the average number of support staff per scientist for a three-agency sample was 16.9, comprising 3.1 technical staff, 0.7 administrative personnel, and 13.1 other support staff such as laborers, guards, drivers, and so on (Figure 5). The support-staff-per-scientist ratio for DAR, at 22.4, was substantially higher than at NVL and RIIC (3.6 and 1.7) and also higher than the corresponding ratios in other Sub-Saharan African countries such as 10.8 in Malawi and 3.7 in Zambia (Beintema et al. 2004a and 2004b). The 2001 ratio for DAR was slightly lower than the corresponding ratio of 27.4 in 1992.

Figure 5—Support-staff-to-researcher ratios, 1992 and 2001



Source: Compiled by authors from ASTI survey data (IFPRI–ISNAR 2003–04).

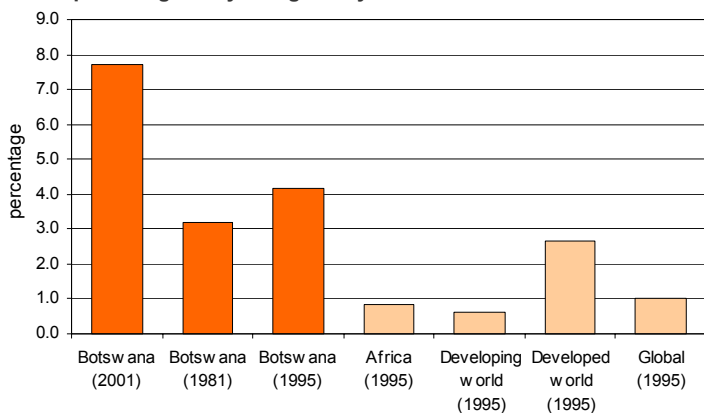
Note: Number of agencies in sample shown in brackets. Figure excludes expatriate staff.

Spending

Total public spending as a percentage of agricultural output (AgGDP) is a commonly used indicator for comparing agricultural R&D spending across countries. In 2001, Botswana invested \$7.71 for every \$100 of agricultural output, more than twice the 1981 ratio of \$3.20 (Figure 6). The 1995 ratio of 4.17 was also lower than the 2001 level but was still considerably higher than the average ratio for Africa (0.85 percent) and the average for the developing world (0.62 percent).

This represents an exceptionally high research intensity; the cause, however, is not so much high levels of investment (although this was a factor in the late 1990s given the influx of funding for the regional research centers) but rather the small AgGDP share. Pardey, Roseboom, and Anderson (1991) and Alston and Pardey (1993) found that research intensity ratios are often higher in countries with small populations and high levels of per capita income. This is also logical when you consider that human and capital investments have a fixed base component, regardless of population size, especially when facilities and services are spread across regions.

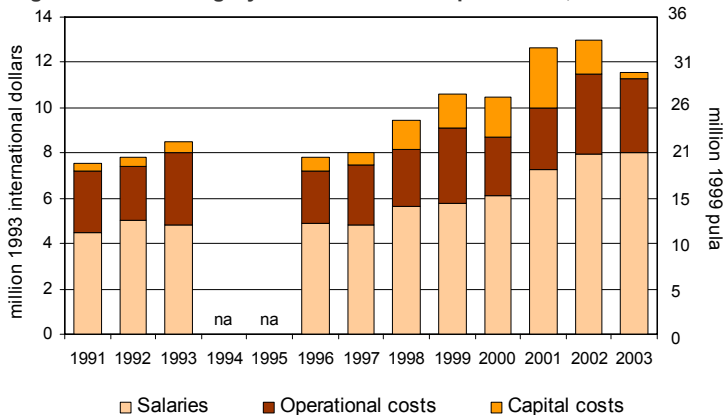
Figure 6—Botswana's public agricultural research intensity compared regionally and globally



Sources: Botswana compiled from Figure 1b; AgGDP from World Bank (2003); other intensity ratios from Pardey and Beintema (2001).

In recent years, DAR has invested considerably in infrastructure including offices, housing, farmhouses, and equipment, largely because of the aforementioned construction of three regional stations. Operational costs remained relatively constant during 1991–2002, while capital costs and salaries grew from the late 1990s, once again reflecting costs associated with establishing the regional research stations (Figure 7). In 2003, total capital spending was considerably lower than previous years, which reflected the completion of the third regional research station. Unfortunately, 1994 and 1995 data were unavailable, but likely would have shown an increase in total capital costs as well as a result of the establishment of the first regional research station, which was opened in 1995.

Figure 7—Cost-category shares in DAR's expenditures, 1991–2003

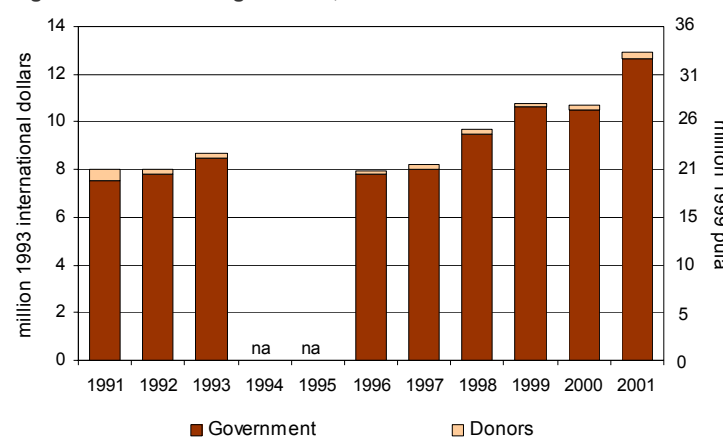


Source: Compiled by authors from ASTI survey data (IFPRI–ISNAR 2003–04). Notes: n.a. indicates data were not available.

FINANCING PUBLIC AGRICULTURAL R&D

Agricultural research in Botswana is mainly funded by the government. Donor organizations and private companies contribute very limited funding. In the 1990s, an average of 2 percent of total funding was received from donor organizations including the United Nations Environmental Programme (UNEP), FAO, and the SADC Plant Genetic Resource Centre (Figure 8). This is exceptional low compared with most other Sub-Saharan African countries. It is also a shift from the 1980s; donor contributions in 1984 represented over one-third DAR's funding sources, and in 1988 they represented 21 percent (Roseboom and Pardey 1993). DAR raises a small amount funding through the sale of products like vegetables, fruit, milk, and aged cattle, and funding is being allocated for ongoing commodity research to further develop this potential funding mechanism. In addition, funding is also allocated to new areas such as monogastric research to address challenges faced by farmers who produce indigenous chickens.

Figure 8—DAR funding sources, 1991–2001



Source: Compiled by authors from ASTI survey data (IFPRI–ISNAR 2003–04). Notes: n.a. indicates data were not available.

Research at BCA is funded by the national government and donor organizations. College-wide research projects are mainly funded by donors, but the college itself provided small amounts of funding for individual staff member and college-wide

research activities.

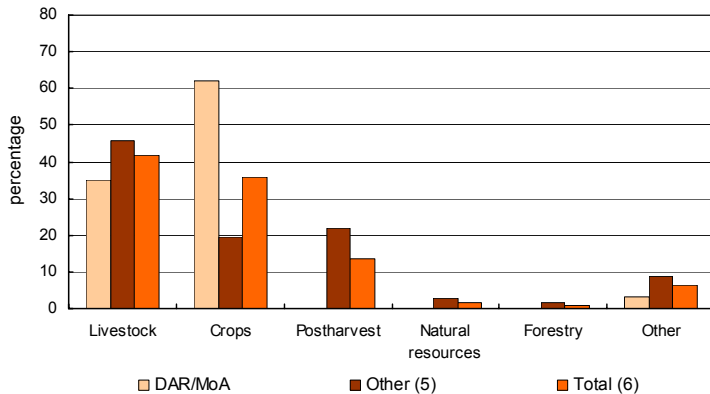
RESEARCH ORIENTATION

Commodity Focus

The allocation of resources across various lines of research is a significant policy decision; hence detailed survey information was collected on the number of fte-researchers working in specific commodity and thematic areas.

In 2001, 42 of the fte researchers in our 6-agency sample conducted livestock research (Figure 10). Crops accounted for 36 percent, while postharvest research accounted 13 percent. Very limited time was spent on natural resources, forestry, or other areas of research. In 2001, close to two-thirds the 43 fte researchers employed at DAR conducted crop research, which was considerably higher than the sample average. The main crop under research at DAR is sorghum, which was the focus of about a quarter of the fte crops researchers in 2001 (Figure 10a). Other import crops are millet, maize, and vegetables (16 percent each) and bananas and other fruits (8 percent each). Close to half the fte livestock researchers at DAR focused on beef, while dairy, pastures, sheep and goats, and poultry each represented shares in the range of 11–14 percent of the total (Figure 10b).

Figure 9—Commodity focus of fte researchers by major item, 2001

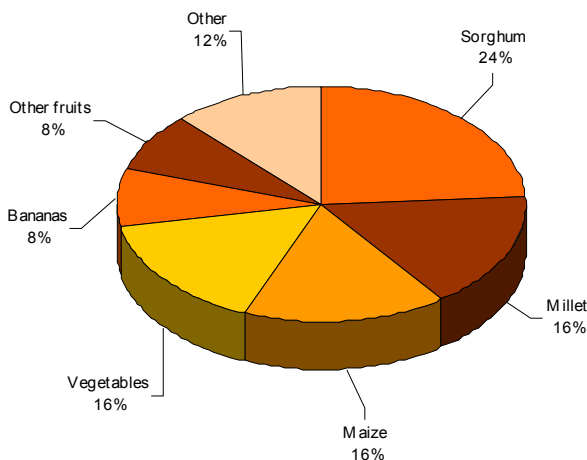


Sources: Compiled by authors from ASTI survey data (IFPRI–ISNAR 2003–04).

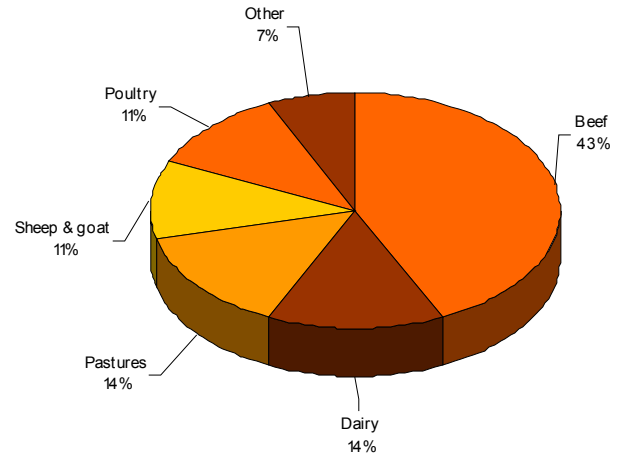
Note: Number of agencies in sample shown in brackets.

Figure 10—DAR commodity focus, 2001

a. DAR crop researchers by major item



b. DAR livestock researchers by major item



Sources: Compiled by authors from ASTI survey data (IFPRI–ISNAR 2003–04).

CONCLUSION

Botswana's national agricultural system differs from systems in many other African countries in several key ways. First, its funding level increased by nearly two-thirds in the 1990s given the 15 percent yearly increase in DAR's budget, largely for the establishment of three regional stations. Second, the level of donor funding throughout the 1990s and into the 2000s was very low. Third, Botswana has an extremely high research intensity level—not uncommon for a country with a small population and high per capita income. Finally, Botswana ranks high for the region in terms of the share of female research staff and the ratio support-staff per scientist.

On the negative side, the constraining factor for DAR is difficulty in attracting and keeping well-qualified staff because of low government-sector salary levels. As a result, the department has a large number of vacancies, and the number of researchers with PhD degrees dropped by almost half during the 1990s. Another area of concern, given the minimum MSc requirement for new recruits at DAR, is the absence of MSc training at BCA and the lack of 2003 government funding for MSc training outside the country. Another area of concern is the significant reduction in donor funding to enhance training of young scientists. Currently most of the training is done through limited government funding and this has significantly affected the number of researchers that DAR can send for training at any one time. If this situation continues it will no doubt further affect DAR's staffing levels.

NOTES

1. The authors are grateful to numerous colleagues in Botswana for their time and assistance with data collection and Joyce Macala and P. Mosupi for useful comments on drafts of this brief.
2. Diamonds were the main source of foreign exchange, accounting for over 80 percent of the country's total exports in recent years.
3. The six-agency sample consisted of:
 - Four government agencies: the Department of Agricultural Research (DAR) and the National Veterinary Laboratory (NVL), both under the Ministry of Agriculture (MoA), and the National Food Technology Research Centre (NFTRC) and Rural Industries Innovation Centre (RIIC), both under the Ministry of Communications, Science, and Technology;
 - One higher-education agency, the Botswana College of Agriculture (BCA); and
 - One nonprofit institution, Veld Products Research and Development (VPR&D).
4. Unless otherwise stated, all data on research expenditures are reported in 1993 international dollars or in 1999 pula.
5. RICC was established in 1974 funded by the Frederick Ebert Foundation. The center was taken over by the government in 1984 and placed under the Ministry of Trade and Industry. In 2002, RICC was transferred to MCST.
6. NFTRC was established in 1984 as a pilot project, called Botswana Food Laboratories, under the Ministry of Commerce, which was itself later renamed the Ministry of Trade and Industry. In 1987 the center was transferred to the Botswana Technology Centre. NFTRC was formed in 1997 following a recommendation of the Science and Technology Commission and was transferred to MSCT in 2002.
7. The Forestry Association of Botswana employed four professional staff in 2000; its mandate includes research, but activities are apparently very limited and focus mainly on the coordination of forestry research (KCS 2000).
8. Data are calculated as least squares growth rates.
9. Many of the support staff positions were also open: 3 of 47 technical staff positions, 20 of the 103 certificate and diploma positions; 5 of 31 general administrative positions, and 47 of the 579 general worker positions were vacant as of early 2003. This represents an average occupation rate of 90 percent.

METHODOLOGY

- Most of the data in this brief are taken from unpublished surveys (IFPRI and ISNAR 2003-04).
- The data were compiled using internationally accepted statistical procedures and definitions developed by the OECD and UNESCO for compiling R&D statistics (OECD 1994; UNESCO 1984). We grouped estimates using three major institutional categories—government agencies, higher-education agencies, and business enterprises, the latter comprising the subcategories private enterprises and nonprofit institutions. We defined public agricultural research to include government agencies, higher-education agencies, and nonprofit institutions, thereby excluding private enterprises. Private research includes research performed by private-for-profit enterprises developing pre, on, and postfarm technologies related to agriculture.
- Agricultural research includes crops, livestock, forestry, and fisheries research plus agriculturally related natural resources research, all measured on a performer basis.
- Financial data were converted to 1993 international dollars by deflating current local currency units with a Botswana GDP deflator of base year 1993 and then converting to U.S. dollars with a 1993 purchasing power parity (ppp) index, both taken from World Bank (2003). Ppp's are synthetic exchange rates used to reflect the purchasing power of currencies, typically comparing prices among a broader range of goods and services than conventional exchange rates.
- The salaries and living expenses of many expatriate researchers working on donor-supported projects are paid directly by the donor agency and are often excluded in the financial reports of the agricultural R&D agencies. These *implicit* costs have been estimated using the average cost per researcher in 1985 to be \$160,000 1993 international dollars and backcasting this figure using the rate of change in real personnel costs per fte researcher in the US state agricultural experiment station system. This extrapolation procedure has the assumption that the personnel-cost trend for US researchers is a reasonable proxy of the trend in real costs of internationally recruited staff in the agricultural R&D agencies.

See the ASTI website (<http://www.ASTI.cgiar.org>) for more details on methodology.

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