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NIGER

RECENT DEVELOPMENTS IN AGRICULTURAL RESEARCH

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

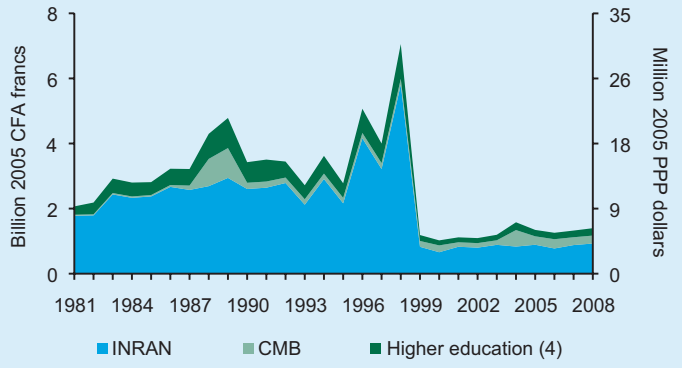
In Niger, public national agricultural research and development (R&D) spending – which had shown an erratic trend in the 1980s and 1990s – took a sudden nosedive following the completion, in 1998, of the important World Bank loan-funded National Agricultural Research Project (PNRA) (Stads, Kabaley, and Gandah 2004). By 2008, Niger's investments in agricultural R&D had dropped by 80 percent, totaling no more than approximately 1.4 billion CFA francs, or 6.2 million PPP dollars, both in 2005 constant prices (Figure 1; Table 1). Unless otherwise stated, all dollar values in this note are based on purchasing power parity (PPP) exchange rates.[1] PPPs 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. Niger's R&D capacity levels also show a negative trend in the last decade. In 2008 the country employed 93 full-time equivalent (FTE) researchers, down from a 118-FTE peak in 1996 (Figure 2).

The Niger National Institute of Agricultural Research (INRAN) is the country's main agricultural research agency, accounting for three-quarters of its research capacity and two-thirds of the total R&D expenditure. INRAN was established in 1975 as a public institution endowed with a legal personality

Key Trends Since 2000

- The closure of the World-Bank funded National Agricultural Research Project (PNRA) in 1998 plunged Niger's agricultural research into a severe financial crisis. Investments plummeted in 1999 and the situation has remained precarious since.
- Niger's agricultural research capacity has decreased since the mid-1990s. The average age of government-agency researchers is rising very rapidly as a public-sector recruitment freeze is putting a stop to new arrivals.
- The Niger National Institute of Agricultural Research (INRAN) is the country's main agricultural research and development (R&D) agency, accounting for roughly three-quarters of national agricultural R&D staff and two-thirds of R&D spending in 2008.
- Most of Niger's agricultural research programs are donor funded. National government funding covers just salary costs, and very limited operating costs.
- Agricultural R&D investment levels are expected to improve over the next few years: the Alliance for a Green Revolution in Africa (AGRA) is implementing several large projects and the World Bank loan-funded West Africa Agricultural Productivity Program (WAAPP) is due to launch its Niger component in 2011.

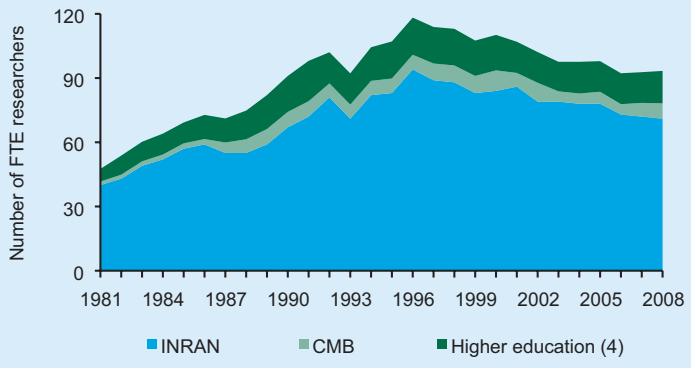
Figure 1—Agricultural R&D spending adjusted for inflation, 1981–2008



Sources: Calculated by authors from ASTI–INRAN 2009–10 and Stads, Kabaley, and Gandah 2004.

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

Figure 2—Agricultural research staff in full-time equivalents, 1981–2008



Sources: Calculated by authors from ASTI–INRAN 2009–10 and Stads, Kabaley, and Gandah 2004.

Notes: Figures in parentheses indicate the number of agencies in each category. Data include expatriate research staff employed at INRAN in the 1980s and 1990s.

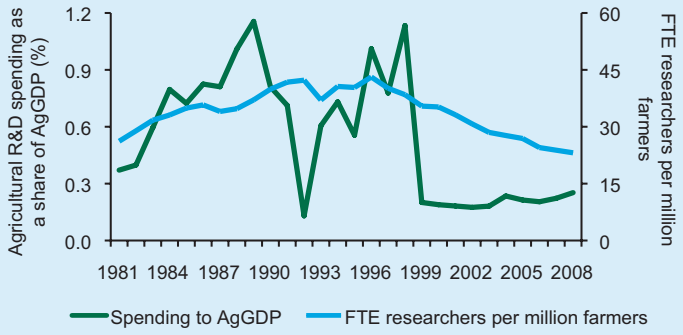
Table 1—Overview of levels of agricultural R&D spending and research staff, 2008

Type of agency	Total spending			Total staffing	
	CFA francs	PPP dollars	Shares	Number	Shares
	(million 2005 prices)		(%)	(FTEs)	(%)
INRAN	926.2	4.1	66.3	71.0	76.1
CMB	244.1	1.1	17.5	7.2	7.7
Higher education (4)	226.7	1.0	16.2	15.2	16.2
Total (6)	**1,397.0**	**6.2**	**100**	**93.4**	**100**

Source: ASTI–INRAN 2009–10.

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

Figure 3—Intensity of agricultural research spending and capacity, 1981-2008



Sources: Calculated by authors from ASTI–INRAN 2009–10; Stads, Kabaley, and Gandah, 2004; FAO 2009; and World Bank 2009.

and financial autonomy under the Ministry of Agriculture and Livestock (MAG/EL). Its purpose is to promote food security and rural development by conducting research on crops, agronomy, livestock, forestry, aquaculture and fisheries, as well on agroecological and environmental issues. INRAN's research is carried out in four regional centers, which are based in Niamey, Kollo, Maradi, and Tahoua (Stads, Kabaley, and Gandah 2004). Over the past few years, the institute recorded a considerable number of staff departures, at both research as well as support staff levels. In 2008, INRAN employed 71 FTE researchers, a sharp drop in capacity compared with the 86-FTE level recorded in 2001. Following the closure of PNRA, in 1998, INRAN fell into dire economic straits. While under PNRA, institute spending had risen—reaching 5.8 billion CFA francs, or $25.6 million in 1998 (2005 constant prices)—expenditures plummeted with the discontinuation of the inflow of funds from this source, and stagnation followed. Since the turn of the millennium, INRAN's level of expenditure hovers around the 0.8 billion CFA franc mark ($3.8 million, both in 2005 prices).

Niger's second government agency conducting agricultural research is the Livestock Multiplication Center (CMB) placed under MAG/EL, which employed seven FTE researchers in 2008. In that same year, CMB spent 0.2 billion CFA francs or $1.1 million (2005 constant prices) on agricultural R&D, which amounts to 17 percent of Niger's total agricultural R&D expenditures. CMB consists of seven secondary research centers spread throughout the country: five of these conduct research on cattle breeding, one on goats, and one on sheep. Research activities focus mainly on genetic improvement and on cattle breeding. Although the Central Laboratory for Animal Breeding (LABOCEL)'s mandate includes research, this institution has not conducted any research activities since the 1990s and, therefore, it was excluded from this country note.

All four higher education agencies identified as being involved in agricultural R&D come under the Abdou Moumouni University (UAM) in Niamey. They are the Faculty of Agronomy, the Faculty of Science and Technology, the Human Science Research Institute (IRSH) and the Radioisotope Research Institute (IRI). Together, these four agencies employed 15 FTE researchers in 2008, a slightly lower level compared with their combined staff total a decade earlier. Unlike INRAN, UAM is free to replace retiring staff members. However, UAM's infrastructure, as well as its human and logistical resources, remain insufficient. State contributions to the university have been kept to a strict minimum for many years and, while student numbers seem to be increasing at a regular pace, infrastructure and human resource levels are not following suit. This has led to numerous disruptions, including long strikes. No private companies were found to be involved in agricultural R&D, so subsequent analyses in this country note exclude the private sector.

In 2008, just 7 percent of Niger's agricultural researchers were women, identical to the ratio recorded in 2001 (Stads, Kabaley, and Gandah 2004). The 2008 support-staff-to-researcher ratio averaged 4.1, the break-up being as follows: 0.5 for technical support, 0.3 for administrative support, and 3.2 for the category "other," which comprises laborers, guards, drivers, etc. (Stads, Kabaley, and Gandah 2004).

In 2008, Niger's total public agricultural R&D spending as a percentage of agricultural output (AgGDP)—a common, internationally comparable indicator of a country's agricultural R&D investments—was $0.25 for every $100 of AgGDP, which is far lower than the ratios recorded during the course of PNRA (Figure 3). Niger's agricultural research intensity ratio is one of the lowest in the subregion. Since the 1990s, the number of FTE researchers per farmer has also declined. In 2008, Niger employed 23 agricultural FTEs per million farmers compared with 43 in 1996.

ASTI Website Interaction

- More details on institutional developments in agricultural research on Niger are available in the 2004 country brief at asti.cgiar.org/pdf/Niger_CB24.pdf.
- Underlying datasets can be downloaded using ASTI's data tool at www.asti.cgiar.org/data.
- This brief presents aggregated data; additional graphs with more detailed data are available at asti.cgiar.org/niger/datatrends.

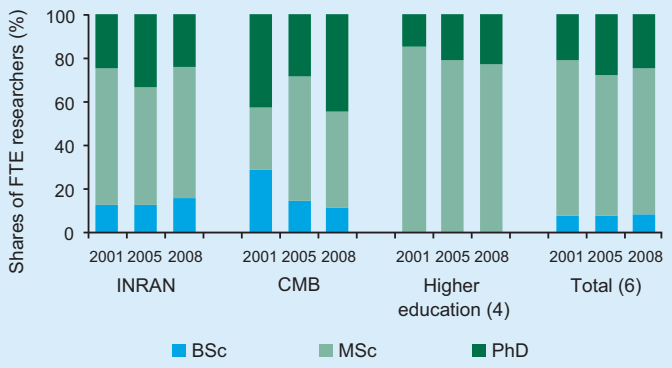
www.asti.cgiar.org/niger

INSTITUTIONAL STRUCTURE AND POLICY ENVIRONMENT

The institutional structure of Niger's agricultural research has remained relatively stable since the turn of the millennium: the research capacity spread over INRAN, CMB, and the higher education agencies underwent but few changes. However, significant political changes have recently been introduced with regard to the coordination of agricultural research. Indeed, in response to long-standing reproaches criticizing its lack of clear policy directives in the field of science and technology (S&T) as well as its lack of awareness regarding the role that agricultural S&T can play in fostering economic growth and poverty reduction, the Government of Niger launched an important reform. In April 2009, it undertook to redress the situation by creating an advisory body named the National Council for Agricultural Research (CNRA). CNRA is to help develop a countrywide strategy for agricultural research that it is to submit to the government, along with a list of recommended reliable and sustainable funding mechanisms. It will also provide assistance in implementing this strategy and in monitoring its implementation. This will include feedback on the government's long-term agricultural research plan and on the medium-term agricultural research programs, as well as on the outcome of external research program evaluations and on the audits carried out in individual agricultural institutions and agencies. CNRA is further charged with ensuring the effectiveness and efficiency of Niger's agricultural research by stimulating coordination of R&D activities and stronger cooperation among national and international agricultural research institutions. At the time of writing, it seems too early to venture an assessment of CNRA's results, seeing that it has been established only very recently and that political unrest stirred up Niger in early 2010. However, it can be safely assumed that CNRA will take on a prominent role once the launching in Niger of the West African Agricultural Productivity Program (WAAPP) becomes a reality. National implementation of WAAPP is to be financed through a World Bank loan and coordinated by West and Central African Council for Agricultural Research and Development (CORAF/WECARD). The national launching of WAAPP was suspended due to the political upheaval that shook Niger in February of 2010, but is now expected to take place in 2011. (See also under "Funding sources" on page 4).

Moreover, a change of status is currently under deliberation for INRAN, with a view to consolidating the institute's achievements and enabling it to carry out its mandate more effectively. From being a "public institution of an administrative nature," INRAN it is to be upgraded and become a "public institution of a scientific, cultural, and technical nature" (these are official public administration categories). Through this transformation, INRAN will gain more autonomy at all levels— academic, scientific, administrative, and financial—as well as obtaining better legal, operational, and financial tools to help it accomplish its mission successfully.

Figure 4—Researcher qualifications by institutional category, 2001, 2005, and 2008



Source: ASTI–INRAN 2009–10.

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

ASTI Website Interaction

- A list of the 2 government and 4 higher education agencies included in this brief is available at asti.cgiar.org/niger/agencies.
- 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 surveys. Some data are from secondary sources or were estimated. More information on data coverage is available at asti.cgiar.org/niger/datacoverage.
- More relevant resources on agricultural R&D in Niger are available at asti.cgiar.org/niger.

www.asti.cgiar.org/niger

RESEARCH STAFF QUALIFICATIONS

In 2008, 92 percent of Niger's FTE agricultural researchers had been trained to the postgraduate level and 24 percent held PhD-level degrees (Figure 4). In comparison, the higher education sector had a higher percentage of researchers with PhD degrees (92 percent) than INRAN (24 percent) or CMB (44 percent), which matches the corresponding trends observed in many other African countries. Most of the research staff holding PhD-level degrees went abroad to do their training, although, as a recent development, UAM now also offers PhD programs.

Over the past few years, INRAN has had to face severe capacity constraints. In the 1990s, the World Bank, through PNRA, had financed a large number of students enrolled in MSc or PhD programs, both in Niamey and abroad (Morocco, Côte d'Ivoire, Burkina Faso). When PNRA funding dried up, the stream of researchers taking study leave soon slowed down. In the meantime INRAN began losing a number of its most highly qualified staff. Some losses were caused by death or retirement, but others were due to senior staff leaving INRAN for better-paid positions with nongovernmental or international organizations. As a result INRAN saw its body of PhD-qualified research staff shrink from a total of 26 FTEs in 2005 to 17 in 2008. The capacity crisis did not affect the researcher level only: INRAN lost many of its technicians and accountants too. Given the public-sector recruitment freeze banning the replacement of departing staff,

INRAN finds itself unable to maintain a viable level of research capacity.

The average age of INRAN researchers currently hovers around 48 years but is climbing rapidly. The situation is exacerbated by the recruitment freeze, which remains applicable to date and, in the near future, this overall reality will pose a major challenge to the institute's capacity and funding. Based on the age pyramid of its research staff, INRAN management's forecast is that close to 44 percent of its research staff will reach retirement age between 2010 and 2020, the percentage rising to 82 by 2025. In order to maintain an adequate human resource capacity level, INRAN will have to recruit a total of 30 to 50 researchers in the next 15 years. On the other hand, a positive development is that, at the time of writing, the Alliance for a Green Africa (AGRA) and AfricaRice are funding PhD training for five INRAN researchers, four of whom are preparing a doctorate in cattle breeding at the University of Accra in Ghana, the fifth being a pathologist studying at UAM.

UAM's pool of faculty staff in agricultural disciplines grew, from 10 FTEs in 2001 to 14 in 2008. All UAM scientists—whether employed by the faculties of Agronomy and of Science & Technology or by the institutes, IRI and IRSH—have been able to complete PhD-level training, mainly through donor funding, particularly from the Swiss and French development cooperation agencies. It should be noted that UAM faculty staff wishing to continue their studies play an active role in seeking the required funding.

INVESTMENT TRENDS

Cost categories

Since the allocation of research budgets across salaries, operating costs, and capital expenses affects the efficiency of agricultural R&D, detailed cost category data were collected from INRAN as part of this study. During 2000–08, 60 percent of INRAN's expenditures went to salaries; operating and research program costs represented 39 percent; and capital expenses 1 percent (Figure 5). INRAN has been receiving a fixed annual government grant set at 500 million CFA francs (current prices) for over twenty years. However, in recent years, salary costs (which totaled 611 million CFA francs in 2008) started to exceed government contributions and INRAN was forced to generate income internally to foot the bill (by selling seeds or renting out farming equipment). Foreign donors and regional networks meet all of INRAN's research program expenses. Since 1998, the institute's capital expenditure has been next to nothing and as a result, many buildings and some of the machinery are in bad shape and require rehabilitating. Under WAAPP, important amounts of money are to be earmarked for the renovation of INRAN's infrastructure.

CMB's spending allocation paints a very different picture. During 2001–08, salaries, operational costs, and capital expenses each accounted for one-third of the center's total spending. No exact figures were available regarding UAM's resource allocation.

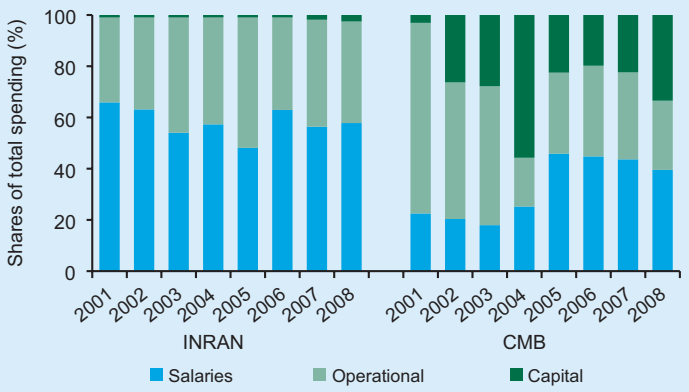
Funding Sources

Agricultural R&D in Niger derives its main funding from a variety of sources, including the national government, foreign donors, regional and subregional networks and the sales of goods and services. During 2000–08, more than half of INRAN's total funding was provided by the national government, with donor and research network contributions accounting for 35 percent, and the institute's internally generated resources for 10 percent (Figure 6). This constitutes a striking contrast with the map of funding sources drawn in the 1990s when INRAN received most of its funding as part of the World Bank loan-financed PNRA. The current divide provides a clear demonstration of how INRAN has been struggling with a financial crisis since PNRA ended in 1998. While other donors have stepped in to support some of the institute's research, the level of funding remains far below that of the 1990s.

As previously mentioned, the annual national government allocation to INRAN of 500 million CFA francs (current prices) does not even cover the institute's total salary costs. This means that to make ends meet, INRAN has to generate income internally (through the sale of seeds and other products, and by renting out farming equipment). Its research program is fully donor funded. Since the completion of PNRA, INRAN's research no longer presents itself as a series of thematic programs, but is organized according to donor-funded projects. Since the turn of the millennium, main donors include AGRA, the Forum for Agricultural Research in Africa (FARA), the McKnight Foundation, and the International Sorghum and Millet Collaborative Research Support Program (INTSORMIL CRSP).

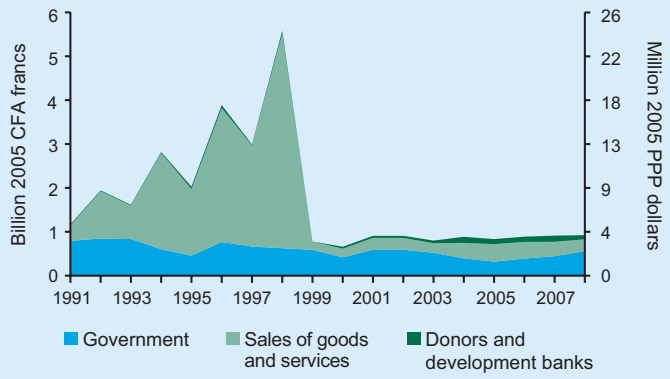
AGRA contributions since 2009 have consisted of a 33 million CFA franc grant for a project on breeding improved sorghum varieties, and 312 million CFA francs that are earmarked for research

Figure 5— INRAN and CMB's spending by cost category, 2001–08



Source: ASTI–INRAN 2009–10.

Figure 6—Funding sources of INRAN, 1991–2008



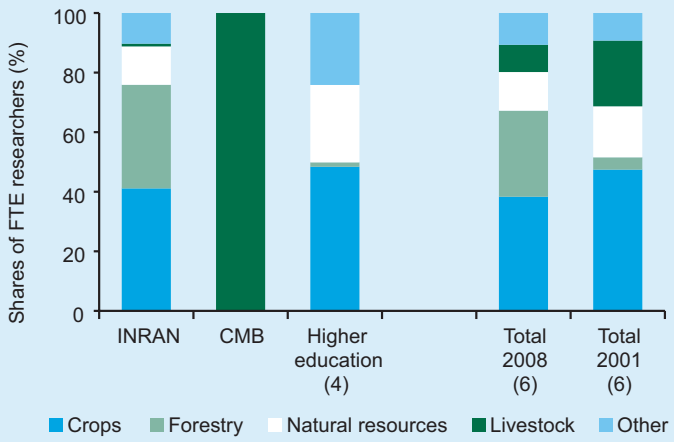
Sources: ASTI–INRAN 2009–10 and Stads, Kabaley, and Gandah 2004.

Note: Donor funding includes the salaries of Japanese, Dutch, American, and Egyptian expatriate staff employed at INRAN in the 1990s.

on the use of fertilizer microdosing techniques. Similar annual contributions are expected to be forthcoming during 2010–12. FARA is in charge of managing the Sub-Saharan Africa Challenge Program (SSACP). One of SSACP's objectives is to implement smallholder farming systems that are in harmony with good natural resource management. The SSACP method is based on the learning-by-doing principle, intended to enable farmers to develop their knowledge and experience. In Niger SSACP's agricultural R&D activities are being conducted on INRAN's Kano-Katsina-Maradi Pilot Learning Site (KKM-PLS). The McKnight Foundation's contribution to INRAN totaled 259 million CFA francs (in current prices) for the period 2006–09, through the funding of a comprehensive sorghum and millet project. Research focused on how to improve farmer access to sorghum and millet genetic resources and on developing improved varieties that are adapted to the region's specific growing conditions. INTSORMIL also supported INRAN's research on millet and sorghum: during 2000–09, cumulative grants amounted to 233 million CFA francs (current prices).

After years of shortage, it looks as if INRAN's financial situation is set to improve in 2010 and 2011. Total donor contributions are expected to reach 760 million CFA francs (current prices) in 2010—a marked increase compared with the 356 million CFA francs received in 2009. This rise is mainly attributable to the agreement INRAN signed with AGRA in support of research on improved sorghum varieties mentioned earlier. Furthermore, as previously pointed out, the national launching of WAAPP in Niger is currently scheduled to take place in early 2011. The aim of this program, which is being coordinated by CORAF/WECARD, is to generate and disseminate improved agricultural technologies in the participating countries' top priority areas that are aligned with regional priorities (as identified by CORAF/WECARD). The first phase of WAAPP was launched in 2007; it involved three countries and focused on three priority R&D areas: roots and tubers in Ghana, rice in Mali, and cereals in Senegal. In 2009, as part of planning the second phase, WAAPP-II, seven additional countries were included, one of which is Niger. Niger is to take charge of the priority area livestock breeding, for which it is to receive US$30 million (current prices) for a five-year period. INRAN, CMB and UAM will be involved in the implementation of WAAPP-II in Niger; the program will comprise two sections, labeled "research" and "rehabilitation," as well as a competitive fund.

Figure 7—Research focus by major commodity area, 2008



Sources: ASTI–INRAN 2009–10; Stads, Kabaley, and Gandah 2004.

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

National government assistance to CMB consists of the payment of all salary costs, in addition to a yearly allocation of 30 million CFA francs to help cover operational costs. Donor grants and internally generated income enable the center to finance the center's remaining expenditures. Between 2000 and 2009, CMB received large contributions from the Belgian and Italian development assistance departments.[2] Following the closure of Belgium-funded projects in 2009, CMB's research work began slowing down. In addition, when 1,200 of the center's cows were transferred to a program aimed at assisting rural women, CMB sustained a loss in internally generated income as it could no longer sell as much milk and cheese, nor gain from the sale of the animals. The center's activities are expected to pick up once implementation of WAAPP-II takes off, as well as following the launching of a new Belgium-funded cattle breeding program, which comes with an 11 billion CFA franc budget and includes a research component.

UAM allocates one quarter of the governments funds it receives to research. Since UAM enjoys the status of "a public institution of a scientific, cultural and technical nature," it has a real research budget; this feature is not available to "public institutions of an administrative nature," to which category INRAN and CMB belong. Within UAM, a committee on science is responsible for evaluating the proposals submitted by the university's research teams, in order to select those that qualify for funding under the competitive grant scheme created for this purpose. Forming partnerships with other research or extension agencies, UAM also participates in several projects that have successfully competed for funding from CORAF/WECARD and the European Union. IRSH has been granted considerable funding through the Chronic Poverty Research Centre managed by the University of Manchester in the United Kingdom.

ALLOCATION OF RESEARCH ACROSS THEMES AND COMMODITIES

Given that the allocation of resources across various lines of research is a significant policy decision, detailed information was collected on the number of FTE researchers working in specific

Table 2—Crop and livestock research focus by major item, 2008

	INRAN	CMB	Higher education (3)	Total (5)
Crop items	Shares of FTE researchers (%)			
Groundnuts	28.9	—	—	23.9
Cowpea	26.4	—	—	21.9
Millet	11.1	—	40.1	12.8
Sorghum	13.3	—	6.2	11.6
Sesame	11.3	—	—	9.4
Other crop	6.7	—	53.7	10.3
Livestock items				
Beef	—	80.0	—	6.7
Sheep and goats	—	20.0	—	1.7
Other livestock	2.2	—	—	1.8
Total crop and livestock	**100**	**100**	**100**	**100**

Source: ASTI–INRAN 2009–10.

Notes: Figures in parentheses indicate the number of agencies in each category. The higher education category excludes the biology unit of UAM's Faculty of Science & Technology.

commodity and thematic areas. In 2008, 38 percent of Niger's researchers were involved in crop research and 29 percent in forestry research; 13 percent conducted research on natural resources and 9 percent on livestock (Figure 7). The category "other" includes the number of FTE researchers concentrating on food security and conducting socioeconomic research. The marked decrease of the share of livestock research since the turn of the millennium is due to INRAN ceasing all its research activities in this area. The share of forestry research, on the other hand, has grown.

Commodity Focus

Groundnut and cowpea are the most researched crops in Niger, representing 24 and 22 percent, respectively, of the FTE researchers involved in crop and livestock research in 2008. Other important crops included millet (13 percent), sorghum (12 percent) and sesame (9 percent) (Table 2, page 6). The main livestock commodity was cattle (7 percent).

CONCLUSION

Niger is one of the African countries with the lowest rate of investment in agricultural research: only 0.25 percent of its AgGDP in 2008. The country's agricultural R&D expenditure in 2008 showed an 80 percent drop compared with the level recorded in 1998, the year in which the World Bank loan-financed PNRA reached completion. Niger's agricultural research (particularly INRAN) has had to face a most difficult financial situation ever since. INRAN's research program is entirely donor funded and the government's annual allocation does not even cover all of the salary costs. As a result, the institute has to generate resources in-house in order to make ends meet. Niger's agricultural R&D investment levels are, however, expected to start increasing again in the near future, with the national launching of WAAPP, funded through a World Bank loan, as well as with the implementation of several large AGRA-funded research projects. An upgrade of INRAN's official status to that of a "public institution of a cultural, scientific, and technical nature" is also expected to have a positive effect on the institute's future investment levels.

The crisis has left a negative mark on Niger's agricultural research capacity levels. During 2005–08, INRAN's contingent of researchers holding PhD degrees decreased from 26 to 17 FTEs, partly due to the departure of several highly qualified researchers, who left the institute for better-paid jobs with nongovernmental or international research organizations. In addition, a public-sector recruitment freeze is causing the average researcher age to soar. As dozens of the government-agency researchers will be retiring in the next fifteen years, attracting and training young researchers is a matter of crucial importance if Niger is to maintain a critical mass of agricultural scientists. With the recent establishment of a national advisory board, CNRA, there is hope that sustainable funding and recruitment and training of agricultural R&D staff will be given a more prominent place on Niger's political agenda in the years to come.

NOTES

[1] Financial data are also available in current local currencies or constant 2005 US dollars in the ASTI data tool (www.asti.cgiar.org).

[2] Italy closely collaborated with UAM to set up a laboratory for artificial insemination in Toukounous. Belgium financed a large-scale program on improving Niger's azawak cattle herd, by breeding and disseminating genetically improved sires. Belgian development aid also funded a project to genetically improve the red-coated Maradi goat and share results with the general population.

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IFPRI is one of 15 agricultural research centers that receive their principal funding from governments, private foundations, and international and regional organizations, most of which are members of the Consultative Group on International Agricultural Research (www.cgiar.org).

INRAN is Niger's principal agricultural R&D institute. The institute was established in 1975 and falls under the administrative coordination of the country's Ministry of Agriculture and Livestock. The institute holds a broad mandate covering crop, livestock, forestry, fisheries, socioeconomic, and environmental research. To learn more about INRAN visit http://inran.refer.ne.

The Agricultural Science and Technology Indicators (ASTI) initiative compiles, analyzes, and publishes data on institutional developments, investments, and human resources in agricultural R&D in low- and middle-income countries. The ASTI initiative is managed by the International Food Policy Research Institute (IFPRI) and involves collaborative alliances with many national and regional R&D agencies, as well as international institutions. The initiative, which is funded by the Bill & Melinda Gates Foundation with additional support from IFPRI, is widely recognized as the most authoritative source of information on the support for and structure of agricultural R&D worldwide. To learn more about the ASTI initiative visit www.asti.cgiar.org.

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