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Statistical Brief

No. 2

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Statistical Brief on the National Agricultural Research System

of

NIGER

Valentina Mazzucato
Samba Ly

ISNAR INDICATOR SERIES PROJECT: PHASE II

International Service for National Agricultural Research

with support from

the Government of Italy

and

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ISNAR INDICATOR SERIES PROJECT PHASE II

Decision making in the agricultural research policy area in either domestic, regional, or international fora can only be aided by access to reliable and comprehensive data on these systems. It is for this reason that ISNAR initiated its Indicator Series Project in 1986. The major objective of this project is to collect, process, and analyze reliable and comprehensive time-series data on national agricultural research systems (NARSs) throughout the world in order to identify and report on major trends and emerging policy issues with regard to the development of NARSs. To this end a database has been developed that contains time-series data on agricultural research expenditures and personnel for more than 150 developing and developed countries. These data provide a quantitative basis for more in-depth research policy studies by ISNAR and others.

During the first phase of the project (1986-91), the Indicator Series project team produced two major publications published by Cambridge University Press, namely:

Pardey, P.G., and J. Roseboom. (1989) *ISNAR Agricultural Research Indicator Series: A Global Data Base on National Agricultural Research Systems*, 547 pp.; and

Pardey, P.G., J. Roseboom, and J.R. Anderson, eds. (1991) *Agricultural Research Policy: International Quantitative Perspectives*, 462 pp..

The first publication is a statistical reference volume that provides system-level data on agricultural research personnel and expenditures for 154 countries. The second publication draws on the database to report on the major policy dimensions of agricultural research, with a primary focus on less-developed countries.

Phase II of the Indicator Series Project was initiated in 1992 and seeks to update the database and the policy analyses that accompany it. New ISNAR survey data are being used in conjunction with a large variety of published and "informal" reports in order to produce reliable as well as up-to-date information and statistics about the NARSs.

The country-level data are being published in a series of NARS Statistical Briefs. These briefs include more detailed descriptive information about the institutional structure of the NARS as well as a more comprehensive set of statistics than were reported in the 1989 Indicator Series volume. It is envisaged the country-level data will be assembled and analyzed in a series of regional research reports.

These statistical briefs are not official ISNAR publications; they are not edited or formally reviewed by ISNAR. The information and data presented have been collected and compiled with due care and all reasonable efforts have been made to ensure their accuracy. Comments, corrections, and additions to the material reported in this brief are welcomed. These briefs may be cited with due acknowledgment.

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Acronyms

AgGDP	Agricultural gross domestic product	IEMVT	Institut d'Élevage et de Médecine Vétérinaire Tropicale
AGRHYMET	Regional Centre for Training and Application in Agrometeorology and Operational Hydrology	IFAC	Institut Français pour les Agrumes Coloniaux
CERRA	Centre Régional de la Recherche Agronomique	IFDC	International Fertilizer Development Center
CES	Centre d'Enseignement Supérieur	IITA	International Institute for Tropical Agriculture
CFA	Franc de la Communauté Financière Africaine	INSAH	Institut du Sahel
CILSS	Comité Permanent Inter-états de Lutte Contre la Sécheresse dans le Sahel	INTSORMIL	International Sorghum/Millet Research
CIRAD	Centre de Coopération Internationale en Recherche Agronomique pour le Développement	INRAN	Institut National de la Recherche Agronomique du Niger, formerly Institut National de Recherches Agronomiques du Niger
CLRV	Cellule Liaison Recherche Vulgarisation	IRAT	Institut de Recherches Agronomiques Tropicales et des Cultures Vivrières
CMB/SE	Centres de Multiplication du Bétail et Stations d'Élevage	IRI	Institut de Radio-Isotopes
CNRA	Comité National de la Recherche Agronomique	IRSH	Institut de Recherche en Sciences Humaines
CNRST	Conseil National de la Recherche Scientifique et Technique	ISNAR	International Service for National Agricultural Research
CRESA	Centre Régional d'Enseignement Spécialisé en Agriculture	MAG/EL	Ministère de l'Agriculture et de l'Élevage
CTFT	Centre Technique Forestier Tropical	NARS	National Agricultural Research System
DECOR	Département de Recherches en Economie Rurale	OECD	Organization of Economic Cooperation and Development
DEP	Division des Etudes et Programmes	PNRA	Projet National de Recherche Agronomique
DEF	Division de l'Enseignement et de la Formation	SAFGRAD	Semi-Arid Food Grain Research and Development
DRA	Département de Recherches Agricoles	SPAAR	Special Program for African Agricultural Research
DRE	Département de Recherches Ecologiques	TROPISOILS	Tropical Soils Collaborative Research
DRF	Département de Recherches Forestières	USAID	United States Agency for International Development
DRVZ	Département de Recherches Vétérinaires et Zootechniques	WARDA	West-African Rice Development Association
DSI	Département de la Statistique et de l'Informatique		
ESA	Ecole Supérieure d'Agronomie		
FAO	Food and Agriculture Organization		
FTE	Full-time equivalent		
GDP	Gross domestic product		
ICRISAT	International Crop Research Institute for the Semi-Arid Tropics		

1. Introduction

The primary purpose of this brief is to provide various statistical and institutional details on the development and current status of the public agricultural research system in Niger. This information has been collected and presented in a systematic way in order to inform and thereby improve research policy formulation with regard to the Nigerien NARS. Most importantly, these data are assembled and reported in a way that makes them directly comparable with the data presented in the other country briefs in this series. And because institutions take time to develop and there are often considerable lags in the agricultural research process, it is necessary for many analytical and policy purposes to have access to longer-run series of data.

NARSs vary markedly in their institutional structure and these institutional aspects can have a substantial and direct effect on their research performance. To provide a basis for analysis and cross-country, over-time comparisons, the various research agencies in a country have been grouped into five general categories; government, semi-public, private, academic, and supranational. A description of these categories is provided in table 1.

Table 1: *Institutional Categories*

Category	Description	Examples
Government	Agencies directly administered by government.	Research department within a ministry
Semi-public	Agencies not directly controlled by government and with no explicit profit making objective.	Research institute under a commodity board
Private	Agencies whose primary activity is the production of goods and services for profit.	Agricultural machinery or chemical company
Academic	Agencies that combine university-level education with research.	Faculty of agriculture
Supranational	Agencies whose mandate covers more than one country.	CGIAR institutes

Note: Adapted from OECD (1981).

The concept of a NARS used throughout this report includes only those institutes that can be classified as government, semi-public, and academic agencies. Where it is useful to do so, private and supranational research agencies have been discussed, but for reasons of comparability they are not included in the NARS data reported here. More detailed information on the definitions and concepts used in this brief is provided in appendix 2.

Section 2 provides a brief description of the institutional development and current structure of the NARS. Section 3 presents a statistical overview of the longer-run investment trends in agricultural research along with a more detailed look at contemporary investment orientations. The appendices provide further descriptive details and present the basic research personnel and expenditure data in disaggregated fashion. For general background information and statistics on Niger we refer to appendix 1.

2. Agricultural Research Institutions

2.1 Historical Evolution¹

The first agricultural research institution in Niger dates from 1928 when the French established the Ferme Ecole de Tarna (or farm school) near Maradi. By 1931, the school was upgraded to an experiment station and the Centre de Colonisation de Kolo was also created. These research structures acted as sub-stations of the main French, regional research station located at Bambey, Senegal.

Niger became independent in 1960, after 54 years of colonial rule. That same year, the new government created the Comité National de la Recherche Agronomique (CNRA) to set national, agricultural research priorities and propose levels of funding. This committee, administered by the ministry in charge of agriculture, exists to this day and performs the same functions. In 1961, the Nigerien government signed an agreement to have France continue to manage and conduct agricultural research through its agricultural and veterinary research institutes located in the country at the time. It was further agreed that Kolo and Tarna, would be upgraded from sub-stations to agricultural research stations and be managed by the Institut de Recherches Agronomiques Tropicales (IRAT). IRAT was one of the eight French institutes that continued to conduct research in France's former colonies and it focussed primarily on millet, sorghum, and cowpea research. The other French institutes in Niger that were permanently staffed included the Institut d'Élevage et de Médecine Vétérinaire des Pays Tropicaux (zootechnology and veterinary medicine), the Institut de Recherche pour les Huiles et Oléagineux (oil crops), the Institut de Recherche sur les Fruits et Agrumes (horticulture), and the Centre Technique Forestier Tropical (forestry). The Institut Français de Recherches Fruitières d'Outre-Mer (fruit) and the Institut de Recherche du Cotton et des Textiles Exotiques (cotton) occasionally sent missions to Niger. The Institut de Recherche du Café et du Cacao et autres plantes stimulantes (coffee, cocoa, tea) did not conduct research in Niger.

The level of collaboration among the French institutes themselves and between the institutes and the Nigerien government was limited. In 1968 the Conseil National de la Recherche Scientifique et Technique (CNRST) was created. It was responsible directly to the Président de la République for coordinating all of the country's scientific research. It was charged with setting national scientific policy, determining research programs to carry out for the economic and social development of the country, coordinating special committees and research organizations, and distributing research funds between public and private research organizations. It was abolished in 1974.

In 1975 all agricultural research structures in Niger were nationalized. The Institut National de Recherches Agronomiques du Niger (INRAN) was created and absorbed the activities of the five French institutes which had permanent structures in the country. During the period 1975-84 the French withdrew from Niger, reducing their commitment from 12 to 4 researchers. They were quickly replaced by a significant United States presence both in terms of financial and personnel support. INRAN continues to be the main institution conducting agricultural research. It is a public institution operating under the jurisdiction of the Ministry of Agriculture and Livestock (MAG/EL). However, unlike other institutions or departments of the ministry, it is man-

1. This section draws largely from material in Fournier (1986), IRAT (1962), Mazzucato and Ly (1993), and Soumana (1987).

aged independently and has the authority to spend its allotted funds without the prior authorization of the ministry (établissement public à caractère administratif).

INRAN has been under various ministries since its creation. In 1975, it was under the Ministry of Rural Economics and Climate, which became the Ministry of Rural Development in 1978. Between 1979 to 1985 it was under the Ministry of Higher Education. Since then it has remained under the ministry in charge of agriculture. But the name of this ministry has changed four times, namely, the Ministry of Rural Development, Ministry of Agriculture, Ministry of Agriculture and Environment, and finally, in December 1989 the MAG/EL. INRAN's activities are supervised by an administrative council (conseil d'administration) composed of representatives from various ministries. The council reviews proposed research activities, approves the yearly government contribution to the institute's budget, and reviews if established objectives have been met.

Since its creation until 1991 INRAN has had the same organizational structure (appendix 3). In 1991 a new statute was designed for INRAN under the World Bank-funded *Projet National de Recherche Agronomique (PNRA)* with a new, regionalized structure.² Five regional research centers (CERRA) were created by ministerial decree in April 1991 to provide research services to each of the five administrative departments in Niger where agriculture is practiced. Full implementation of the reorganization was not yet complete in 1992. Under the new structure, all research is to be conducted within the context of the research programs of each of the five regional centers.

Other research institutions have been progressively created since the nationalization of the research system, although agricultural research is not their main mandate as is the case for INRAN. The *Direction des Centres de Multiplication du Bétail et Stations d'Élevage (CMB/SE)* under the MAG/EL conducts livestock research. It was created in 1974 as the *Programme Reconstitution du Cheptel* and in 1980 obtained its present name. The *Direction* oversees six centers and one station that were created between 1975-80 in each of the administrative regions of Niger. Since 1987 it is a self-managing structure, raising most of its own funds, other than those to pay salaries, from milk, cheese, and livestock sales.

The University of Niamey, created in 1971, is the only academic institution in Niger that does research related to agriculture. It conducts agricultural research through its faculties of agronomy and science. The *Faculté d'Agronomie* was called *Ecole Supérieure d'Agronomie (ESA)* when it was founded in 1973 and then changed to its current name in 1984. Since 1992 the *Faculté d'Agronomie* has served as one of West Africa's *Centre Régional d'Enseignement Spécialisé en Agriculture (CRESA)*. The *Département de Biologie* of the *Faculté des Sciences* was created in 1971 and called the *Centre d'Enseignement Supérieur (CES)*. CES became the *Ecole des Sciences* in 1976 and the *Faculté des Sciences* in 1984. Additionally there are two institutes which are affiliated with the university that conduct agricultural research. The *Institut de Recherche en Sciences Humaines (IRSH)* inherited the Niamey office of the *Institut Français d'Afrique Noire*, created by the French in Dakar in 1944. Between 1964 and 1974 it was called *Centre National de Recherche en Sciences Humaines* and was located under the Ministry of Education and Research. The other institute affiliated with the university is the *Institut de Radio-Isotopes (IRI)*. It is a bilateral organization created in 1984 in which salaries are paid by the

2. At this time INRAN changed its name from *Institute de Recherches Agronomiques du Niger* to *Institut National de la Recherche Agronomique du Niger*.

Nigerien government, while all other expenses are paid by the French-based Commissariat Français à l'Énergie Atomique.

Development projects have proliferated since the 1970s and some of these projects include an applied research component. These efforts, however, are usually decentralized and done in a way that is largely independent of the national research system. Two large international research centers are located in the country and situated within a 45km radius of the capital. The International Crop Research Institute for the Semi-Arid Tropics (ICRISAT) Sahelian Center was created in 1981. It is located at Sadoré and does research on millet, sorghum, and cowpeas. AGRHYMET was created by the Comité Permanent Inter-états de la Lutte Contre la Sécheresse dans le Sahel (CILSS) in 1977 as a regional center to train and conduct research on agrometeorology.

2.2 Present Structure³

Table 2 presents an overview of the present structure of the national agricultural research system of Niger. Two institutional categories can be identified, namely, government and academic. Most agricultural research is conducted by Niger's government sector and, in particular, by INRAN under the Ministry of Agriculture and Livestock. About 70% of the full-time equivalent researchers in Niger work for INRAN (for a definition of f.t.e. see appendix 2).

INRAN's mandate is to conduct research on the agroecological environment, agricultural production and cropping systems, agronomy, animal science, forestry, and fisheries. It is organized into an administrative and financial unit, a division of studies and programs (DEP), a division of statistics and computers (DSI), a training division (DEF), a research-extension linkage unit (CLR), a documentation center, and five research departments: agronomy (DRA), soil science and cartography (DRE), rural economics (DECOR), forestry (DRF), and veterinary science and zootechnology (DRVZ).

INRAN's main research focus has been on three rainfed crops, millet, sorghum, and cowpeas, given the country's goal to achieve food self-sufficiency following the 1972-74 drought. A heavy emphasis was placed on breeding work for varieties to be grown in areas receiving 300mm to 800mm of rain annually. Since the mid-1980s more emphasis has been given to agronomic work to devise recommendations for the millet, sorghum, and cowpea intercropping systems, which are the most common farming systems in the country. These recommendations focus on fertilizer application, planting density, and time of planting for the different microclimates and production conditions that exist throughout Niger. The recommendations were made based largely on DECOR's socio-economic surveys and the series of on-farm trials it has conducted since the mid-1980s in conjunction with the agronomy department. INRAN also conducts livestock research. Its veterinary science department, however, remained small through to the mid-1980s, averaging four researchers during the 1981-85 period. In 1991 it attained nine researchers although none had higher than a BSc-level degree. The forestry department is even smaller. Until 1990, it had only one researcher. The largest forestry research project was conducted between 1983-88 with World Bank support. Although INRAN has the mandate to conduct fisheries research, it has not been equipped to do so. Fisheries research in Niger has been conducted in the context of a World Bank project but this project was not affiliated with INRAN.

3. This section draws largely from Mazzucato and Ly (1993).

Table 2: Overview of Present Structure of NARS (1991)

Institutional category	Supervising agency			Executing agency			Staffed research sites ^a	Number of researchers				
	Name	Acronym	Research focus	National	Expats	Total		FTEs				
Government	Ministère de l' Agriculture et de l' Elevage	Institut National de Recherches Agronomiques du Niger	INRAN	crops, livestock, soils, socio-economics, forestry	63	9	72	72.0				
		Direction des Centres de Multiplication du Bétail et Stations d' Elevage	CMB/SE	livestock	8	1	9	7.2				
Academic	Université de Niamey	Faculté d' Agronomie		agronomy	13	14	27	10.8				
		Faculté des Sciences, Département de Biologie		biology	10	4	14	5.6				
		Institut de Radio-Isotopes	IRI	nuclear research, millet, cowpeas	3	1	4	4.0				
		Institut de Recherches en Sciences Humaines	IRSH	sociology, anthropology	10	0	10	2.0				
<i>Total</i>								30(14)	107	29	136	101.6

Source: 0999; INRAN 0990; appendix 5.

^a Staffed with researchers and/or technicians. Bracketed figures represent sites staffed with researchers.

INRAN has three main research structures in the southern part of the country where researchers are permanently located. The Tarna national agricultural research center is the largest research station and conducts varietal and plant protection trials, mostly on rainfed crops, laboratory analyses and socio-economic surveys, as well as some seed multiplication activities. The research station at Kolo, as well as conducting similar activities as at Tarna, carries out experimental trials on rice and maize and zootechnology research on poultry. This station grew rapidly since the formation of its plant-improvement department in 1979 and became equivalent in importance to the Tarna research center. In Niamey, where the headquarters of INRAN are located, there are three laboratories that specialize in soils, cartography, and cereal quality. Under INRAN's new statute introduced in 1991, the three research structures at Tarna, Kolo, and Niamey will become three of the five new regional centers. Two additional centers are planned for Tahoua and Zinder.

On-station trials are conducted throughout southern Niger at five stations and four sub-stations. Additionally, four support stations are used to verify the results obtained in the stations and sub-stations. These support stations are INRAN's smallest structural unit. None of them have permanent research personnel with the exception of the Agadez station which has one full-time researcher. Stations and sub-stations are staffed with two laboratory technicians while support stations have only one technician each.

INRAN collaborates with other research institutions at the national, regional, and international level. Collaboration with the international centers ICRISAT and IITA, is primarily through their millet, sorghum, and cowpea networks. These networks allow researchers from western Africa to meet periodically and exchange ideas and research results. In the USAID-funded TROP SOIL and INTSORMIL research projects, INRAN researchers are teamed up with professors from universities in the United States. The latter are given funds to visit Niger and INRAN researchers are provided additional resources for operations. The French research institutes established in Niger during colonial times are now grouped under the Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD), and continue to be present in the country although their activities have been considerably reduced from their pre-1975 levels.

The other public institution conducting agricultural research is the Direction des CMB/SE. It consists of seven stations, one in each administrative region, which conduct research on livestock breeding and mass-selection, and methods of cheese conservation. They also monitor market prices for livestock products. There are other departments under the MAG/EL that work on livestock issues (Direction de l'Élevage et des Industries Animales, Labo-Élevage), but their work is oriented towards extension, dissemination of information, and disease prevention activities and they do not conduct research.

Academic institutions also carry out some limited, applied agricultural research. The Faculté d'Agronomie conducts agronomy work. The biology department of the Faculté des Sciences is currently researching post-harvest cowpea problems. IRSH concentrates on socio-economic aspects of rural life in Niger. IRI conducts nuclear research primarily on millet although in 1991 they added cowpea to their program.

3. NARS Statistics

Data regarding the six institutions appearing in table 2 were obtained from questionnaires sent to and filled out by the various institutes for the period 1985-91. For prior years, secondary sources were used which are referenced at the end of this report. Additionally, data on INRAN was available for the period 1975-91 from a survey completed in 1992 on INRAN's research program (Mazzucato and Ly 1993). Nonetheless, some gaps remain in the data. IRI did not respond to the questionnaire and IRSH did not submit any financial figures. Financial data were also not available for the Département de Biologie in the Faculté des Sciences.

USAID salaries for expatriate researchers were used to estimate the costs of all expatriate researchers when these were not reported in the questionnaires or secondary sources. On the basis of a detailed assessment of relevant project documents in USAID's Niamey office, expatriate researchers working in Niger's agricultural research system were estimated to cost US\$ 170,000 per person, per year in 1985 PPP dollars (Mazzucato and Ly 1993).

3.1 Long-term Development

The number of researchers in the system has grown at an annual rate of 9.3% over the period 1961-90 (table 3). The increase in researchers has outpaced the increase in Niger's farming population thus the ratio of researchers per million farmer has grown at an annual rate of 6.9% for the same period. Expenditures as a percentage of AgGDP have grown at 9.4%. This shows increasing support for agricultural research but from a very small base.

Table 3: *NARS Researcher and Expenditure Series, 1961-91*

	1961-65 ^a	1966-70	1971-75	1976-80	1981-85	1986-90	1991	annual growth rate ^b
								%
Researchers (FTEs ^c)	11.7	11.8	16.6	44.2	62.1	83.8	101.6	9.3
Expenditures (millions 1985 CFA)	371	564	566	1,463	1,590	2,171	1,459	7.1
Expenditures (millions 1985 PPP dollars)	2.294	3.482	3.496	9.034	9.815	13.404	9.011	7.1
Expenditures per researcher (millions 1985 PPP dollars)	0.197	0.296	0.223	0.206	0.159	0.161	0.089	-2.0
Number of farmers (millions)	1.9	2.1	2.3	2.6	2.9	3.3	3.5	2.3
Researchers per million farmers	6.3	5.6	7.1	16.8	21.0	25.5	29.1	6.9
AgGDP (millions 1985 PPP dollars)	1,552	1,812	1,449	1,220	1,351	1,546	1,536	-0.5
Expenditures as a % of AgGDP	0.09	0.13	0.16	0.45	0.56	0.86	0.58	9.4

Source: Appendices 5, and 6.

Note: Faculté des Sciences, IRSH and IRI are not included in these data.

^a Five-year averages.

^b Least squares growth rate for the period 1961-91.

^c Full-time equivalent.

In general, the Nigerien NARS has been growing at a more rapid pace than the average African NARS. Pardey, Roseboom, and Anderson (1991) calculated that agricultural researcher numbers grew at an average annual rate of 6.8% between 1961 and 1985 in sub-Saharan Africa

which is below Niger's average of 9.6% growth for that period. The same is true for agricultural research expenditures where Africa averaged 4.7%, and Niger averaged 7.9%.

While the Nigerien system has outpaced the average growth in sub-Saharan Africa, it has received below-average financial support. Niger's expenditures as a percentage of AgGDP have always been lower than the sub-Saharan African average. During 1961-65, Niger's agricultural research expenditures as a percentage of AgGDP were only one quarter that of sub-Saharan Africa. By 1981-85, Niger spent about 0.56% of its AgGDP on research and sub-Saharan Africa 1.06%. Furthermore, research expenditures as a percent of AgGDP have been declining since 1990.

3.2 Human Resources

Degree and Nationality Status of Researchers

Before 1975 agricultural research was managed and largely conducted by the French, while Nigerien staff usually occupied posts at the technician level. When agricultural research came under Nigerien management, French researchers gradually left the country, and emphasis was placed on training Nigerien staff. The United States became heavily involved in agricultural research with the French withdrawal, and, until the mid-1980s, there was in fact an increase in expatriate researchers working in Niger. Since then, expatriate researchers have been declining as Nigerien scientists returned from training and began to fill posts within the government-sector. The numbers of Nigerien scientist grew by 12.5% over the 1976-90 period (table 4). Most of this increase was at the MSc- and BSc-level. In academic institutions, the overall increase in agricultural researchers was a little slower but still substantial at 10.7% per annum. Most of these researchers hold a PhD-level degree.

Gender

In 1991 there were four female researchers in the government research institutions (three MScs and one BScs) and four in the academic institutions (all PhDs). All of them joined the NARS during the period 1985-88.

Staff Composition

The ratio of technicians to researchers averaged 1.2 over the 1981-91 period for INRAN and 5.1 for CMB/SE (table 5). The higher ratio for CMB/SE may be explained by the fact that CMB/SE staff are involved in activities other than research. They also conduct some extension as well as disease prevention work, both being activities that require technicians rather than research staff.

CMB/SE also has a large number of staff in the "other support" category. This category consists of agricultural laborers, watchmen, drivers, etc.. CMB/SE is aiming to reduce this category of staff to 200 in the near future.

Table 4: *Educational and Nationality Status of Researchers, 1971-1991*

Institutional category	Researcher status	1971-75	1976-80	1981-85	1986-90	1991
		<i>(full-time equivalent)</i>				
Government ^a	Nationals					
	PhD	0.2	2.5	2.0	3.0	4.0
	MSc	0.2	6.9	17.8	23.0	38.0
	BSc	0.6	5.0	7.8	15.8	21.0
	Subtotal	1.0	14.4	27.6	41.8	63.0
	Expatriates	12.3	18.1	20.6	17.2	9.0
	<i>Total</i>	<i>13.3</i>	<i>32.5</i>	<i>48.2</i>	<i>59.0</i>	<i>72.0</i>
Academic ^b	Nationals					
	PhD	-	-	-	7.7	8.6
	MSc	-	-	-	2.3	2.6
	BSc	-	-	-	0.0	0.0
	Subtotal	-	-	-	10.0	11.2
	Expatriates	-	-	-	5.5	7.2
	<i>Total</i>	<i>3.7</i>	<i>6.6</i>	<i>11.0</i>	<i>15.5</i>	<i>18.4</i>
Total	Nationals					
	PhD	-	-	-	10.7	12.6
	MSc	-	-	-	25.3	40.6
	BSc	-	-	-	15.8	21.0
	Subtotal	-	-	-	51.8	74.2
	Expatriates	-	-	-	22.7	16.2
	<i>Total</i>	<i>17.0</i>	<i>39.1</i>	<i>59.2</i>	<i>74.5</i>	<i>90.4</i>

Source: See appendix 6.

^a Data differ from table 2 because the government category includes INRAN only. Time-series data for CMB/SE are presently unavailable.

^b Data differ from table 2 because the academic category includes Faculté d'Agronomie, Département de Biologie, and IRSH while it excludes IRI.

Table 5: *Staffing Structure, 1979-1991*

Staff category	1979	1981-85 ^b	1986	1987	1988	1989	1990	1991
	<i>(actual personnel)</i>							
INRAN ^a								
Research	44	48	59	55	55	59	67	72
Support								
Technical	31	58	72	80	68	69	78	77
Other ^c	385	390	375	377	319	358	353	368
Total	460	496	506	512	442	486	498	517
CMB/SE								
Research	-	5	5	7	8	9	9	9
Support								
Technical	-	31	32	27	27	32	34	38
Administrative	-	5	5	5	5	5	5	5
Other	-	340	277	280	274	270	268	251
Total	-	381	319	319	314	316	316	303

Source: 0990 for INRAN; 0999 for CMB/SE.

^a Actual personnel numbers are equal to f.t.e. numbers for INRAN because INRAN's mandate is exclusively agricultural research.

^b CMB/SE data are only for the year 1985.

^c Administrative and other support staff categories are combined.

3.3 Financial Resources

Expenditures

Agricultural research expenditures increased steadily between 1985 and 1991 at an annual rate of 11.3% for academic institutions while for government institutions expenditures declined at a rate of 2.8% per annum (table 6). The substantial increase in government expenditures for the 1988-89 period reflects a particularly large increase in capital expenditures by CMB/SE, while the drop in expenditures for 1991 is due largely to the premature termination of USAID's Niger Applied Agricultural Research project that constituted one of INRAN's largest source of funds. Since 1992, the World Bank's PNRA.

Average spending per scientist over the period 1985-90 was higher for government than for academic institutions. Taking INRAN as indicative of the public-sector institutions, the average spending per scientist was US\$ 162,747. The corresponding figure for the academic sector was about 30% less at US\$ 113,459 per scientist.

Table 6: *Agricultural research expenditures by institutional category, 1985-1991*

Institutional category	1985	1986	1987	1988	1989	1990	1991	annual growth rate ^a
	<i>(millions 1985 CFA)</i>							%
Government	1,504	1,742	1,697	2,065	2,359	1,535	1,127	-2.8
Academic ^b	112	126	119	133	180	185	205	11.3
Total	1,616	1,867	1,816	2,198	2,539	1,720	1,332	-1.5
	<i>(millions 1985 PPP dollars)</i>							
Total	9.979	11.531	11.215	13.572	15.678	10.620	8.222	-1.5

Source: See appendix 5.

^a Least squares growth rate for the 1985-91 period.

^b Does not include Faculté des Sciences, IRI, and IRSH.

Factor Mix

Personnel costs have always constituted the largest share of total expenditures for INRAN (table 7). This, in part, reflects the large share of relatively expensive expatriate personnel working within the institute. Prior to 1989 capital investments have been the second largest expenditure category. Thereafter, INRAN spent more on operating than on capital expenses. During the 1980s, INRAN invested heavily in training its researchers. Virtually all funds for training came from USAID's projects focusing on millet, sorghum, and cowpeas. In 1987, when it dedicated the largest percent of its total expenditures to training, it had 15 (i.e. over 20%) of its researchers away on training, all in United States universities.

Table 7: *Expenditure Cost Categories, 1976-1991*

Cost category	1976-80	1981-85	1986	1987	1988	1989	1990	1991
INRAN	<i>(percentages)</i>							
Personnel	68.1	75.6	73.8	69.9	70.4	68.4	74.6	90.2
Operating ^a	8.9	3.9	7.9	8.8	12.0	11.4	11.8	2.7
Training	2.2	5.5	7.3	8.5	8.4	7.7	5.0	4.5
Capital	20.8	14.9	11.0	12.7	9.2	12.5	8.6	2.5
Total	100	100	100	100	100	100	100	100
CMB/SE								
Personnel	-	-	63.4	56.6	13.5	15.9	75.9	79.3
Operating	-	-	12.4	13.7	2.1	1.7	9.7	11.6
Maintenance	-	-	10.9	9.7	3.1	2.3	14.3	9.1
Training	-	-	1.3	0.0	0.0	0.0	0.0	0.0
Capital	-	-	11.9	20.1	81.2	80.2	0.0	0.0
Total	-	-	100	100	100	100	100	100

Source: 0999; INRAN 0990.

^a Maintenance costs are included in this category.

For CMB/SE a large share of expenditures went for capital investments, but this is due to a one-time donor contribution. In 1991, a year when no capital investments were made, 79% of CMB/SE's expenditures were used to pay for personnel. INRAN committed an average of 7% of total expenditures for training between 1986-91 whereas CMB/SE averaged 0.2%. These differences in funds allocated to training activities are largely due to the fact that INRAN has received donor funds specifically targeted for this purpose while CMB/SE has not. In fact, all training at INRAN was funded by foreign donors.

Source of Funds

Since INRAN's creation, USAID has been a major source of support for agricultural research in Niger. Over the period 1976-91 USAID funded three projects totalling US \$22 million in nominal terms. These projects increasingly focussed on millet, sorghum, and cowpea research. By the late 1980s, over 60% of INRAN's total research expenditures came from foreign donors (table 8). After USAID's projects, the largest project was financed by FAO to build and equip a soils and cartography laboratory. INRAN has also received bilateral aid from the United States, France, Canada, Japan and Arab nations. Smaller contributions from international and regional organizations have come from IFDC, ICRISAT, WARDA, SAFGRAD, INSAH, FAO/CILSS.

In the case of CMB/SE, most foreign funding went for capital expenses. Since 1987, the institute financed most of its operational activities from sales of the meat, cheese, and milk products it produces. It is currently undergoing procedures to be enable it to manage and spend its funds without prior authorization from the Ministry of Agriculture and Livestock by becoming an *établissement public à caractère administratif*. INRAN is currently one of the few institution/agencies under the Ministry to have such a statute.

Table 8: *Source of Funding, 1976-91*

Source of funding	1976-80	1981-85	1986	1987	1988	1989	1990	1991	
INRAN	<i>(percentages)</i>								
Government	42.1	33.1	37.5	34.2	35.2	32.3	45.1	45.1	
Donor ^a	57.9	66.9	62.5	65.8	64.8	67.7	54.9	54.9	
<i>Total</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	
CMB/SE									
Government	-	-	46.3	4.8	34.1	21.7	42.5	11.3	
Sale of products	-	-	53.7	5.7	65.9	45.9	57.5	18.9	
Donor ^a	-	-	0.0	89.5	0.0	32.4	0.0	69.8	
<i>Total</i>	-	-	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	

Source: CMB/SE 0999; INRAN 0990.

^a Includes expatriate salaries.

3.4 Research Focus

INRAN is principally concerned with breeding and agronomic research on millet, sorghum and cowpeas. Between 1986-90 about 68% of its research expenditures went for research on those three crops (Mazzucato and Ly 1993). It also conducts research on livestock, forestry, fisheries, natural resources, and socio-economic issues. CMB/SE is concerned solely with livestock research. In particular, it conducts most of its research efforts on beef and dairy cattle, pastures

and forage, and veterinary medicine. It also does research on dual purpose cattle, sheep, goats, and traditional methods of cheese-making. IRI conducts nuclear research principally on millet breeding and has included cowpea in its program of work since 1991. Between 1988-92, 70% of the research conducted at IRI concentrated on millet. IRSH conducts most of its research on the socio-economic conditions of rural society as well as on human geography.

Table 9: *Research Focus, 1991.*

	INRAN	CMB/SE	Faculté d'Agronomie	Faculté des Sciences	IRSH	IRI	TOTAL	
							FTE	Share
	%	%	%	%	%	%		%
Crops	65	0	100	100	0	100	67.4	66
Livestock	13	100	0	0	0	0	16.2	16
Forestry	3	0	0	0	0	0	2.0	2
Fisheries	0	0	0	0	0	0	0	0
Natural resources	19	0	0	0	0	0	14.0	14
Other	0	0	0	0	100	0	2.0	2
<i>Total</i>	100	100	100	100	100	100	101.6	100

Source: 0990; 0999.

Note: The "natural resources" and "other" categories include research that could not otherwise be allocated to a specific commodity or commodity group. The natural resource category refers to non-allocatable soils, land use, and water research.

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Appendix 1: Country background information



Geography

Area: 126.7 million ha

Location: Land-locked country in the middle part of West Africa, bordered by Algeria and Libya to the North, by Benin and Nigeria to the South, by Chad to the East and by Mali and Burkina Faso to the West.

Agroecological features: the northern part of the country is rock desert with extremely irregular rainfall below 100 mm annually; the Southern Sahelian zone receives up till 700 mm of rain annually. The Sudan climate in the extreme southwest with more rainfall brings an increasing variety of savanna vegetation to the banks of the Niger. Along the southern border a low plateau marked by a few isolated hills stretches from the southwest to lake Chad in the southeast/southwest.

Population

Total (1991): 8.9 million
Annual growth rate (1981-90)^a: 3.3%
Literacy (1990): 28.4%
Life expectancy (1991): 46 years

Economy (values reported in 1985 PPP dollars)

Gross Domestic Product (1987): 4,149 million dollars
Per capita GDP (1987): 593 dollars
Agricultural GDP (1987): 1,372 million dollars
Share of agriculture in GDP (1987): 33.1%

Annual growth rates (1981-87)^a

GDP: -3.0
GDP per capita: -6.1
AgGDP: 2.2

Trade (values reported in current dollars)

Net surplus total trade (1991): -172 million dollars
Net surplus agricultural trade (1991): -64 million dollars
Percentage of agricultural imports in total imports: 26.3%
Percentage of agricultural exports in total exports: 19.8%
Major import commodities (1991)^b: rice (19%), palm oil (15%), refined sugar (14%), and wheat flour (11%)
Major export commodities (1991)^b: bovine cattle (57%), sheep & goats (21%), and onions (11%)

Agriculture

Agricultural land (1990): 12.5 million ha
Annual growth rate (1981-90)^a: -0.3%
Percentage arable: 28.9%
Percentage permanent crop: 0.0%
Percentage permanent pastures: 71.1%
Percentage of arable and permanent cropland that is irrigated: 1.1%

Economically active agricultural population (1991): 3.5 million
Annual growth rate (1981-90)^a: 2.2%
Percentage in total economically active population: 86.9%

Fertilizer use per ha arable land (1990): 0.3 kg
Annual growth rate (1981-90)^a: -8.9%

Major crops in order of production value (1990): millet, sorghum, groundnuts, dry onions, cassava, rice.

Sources: Europa Publications (1992), FAO (1993), and World Bank (1992).

^a Least squares growth rate.

^b Bracketed percentages represent value share of the respective total.

Appendix 2: Definitions and concepts

NARS

The construction of quantitative and internationally comparable expenditure, personnel, and related measures of a national agricultural research system (NARS) requires a precise idea of what, in fact, is being measured. Since the term NARS is subject to a variety of interpretations, it is necessary to define rather precisely the NARS concept used here. Our approach adheres, wherever possible, to the internationally accepted statistical procedures and definitions developed by the OECD and UNESCO for compiling R&D statistics (OECD 1981 and UNESCO 1984). For statistical purposes a NARS is defined in terms of the following characteristics:

(a) *National*. The concept of a “national” system used in this report refers to domestically targeted research activities funded and/or executed by the *public* sector of a particular country. A relatively broad concept of the public sector is taken to include government, semi-public, and academic research institutes. However, private, for-profit research as well as the research activities of supranational research agencies that are not executed through national institutes are excluded. Also excluded is research undertaken by short-term development projects.

(b) *Agricultural*. Agricultural research, as defined here, includes crop, livestock, forestry, and fisheries research, as well as research on agricultural inputs, the natural resource base, and socio-economic aspects of primary agricultural production. It excludes, where possible, research concerning the off-farm storage and processing of agricultural products, commonly referred to as post-harvest research and food-processing research. This delineation corresponds with the national accounts definition of the agricultural sector.

(c) *Research*. Research is often performed in conjunction with other activities such as extension, education, and production. To the extent possible, research activities (in terms of expenditures and staff) are differentiated from these other activities. However, if non-research activities were an integral part of an institute’s research activities and accounted for less than 20% of the resources of the institute, it was expedient to classify all the activities of the institute as being research-related.

Full-Time Equivalent (FTE)

A full-time equivalent researcher year is taken to be a person who holds a full-time position as a researcher during the whole year. Adjustments to full-time equivalents have only been made when: (a) a research position was part-time; (b) a research position was not

filled for the whole year; and (c) if the position explicitly involved tasks other than agricultural research. In the latter case an estimate was made of the time spent on agricultural research. No adjustments were made, however, for vacation or sick leave nor for time spent on administration, meetings, travel or other activities that form part of the normal duties required to support a research endeavor. Following this line of reasoning, professional staff in management positions were classified as researchers.

The degree status of researchers is determined on the following basis: 3-4 years full-time university education (BSc), 5-6 years (MSc), and more than 6 years plus doctorate thesis (PhD).

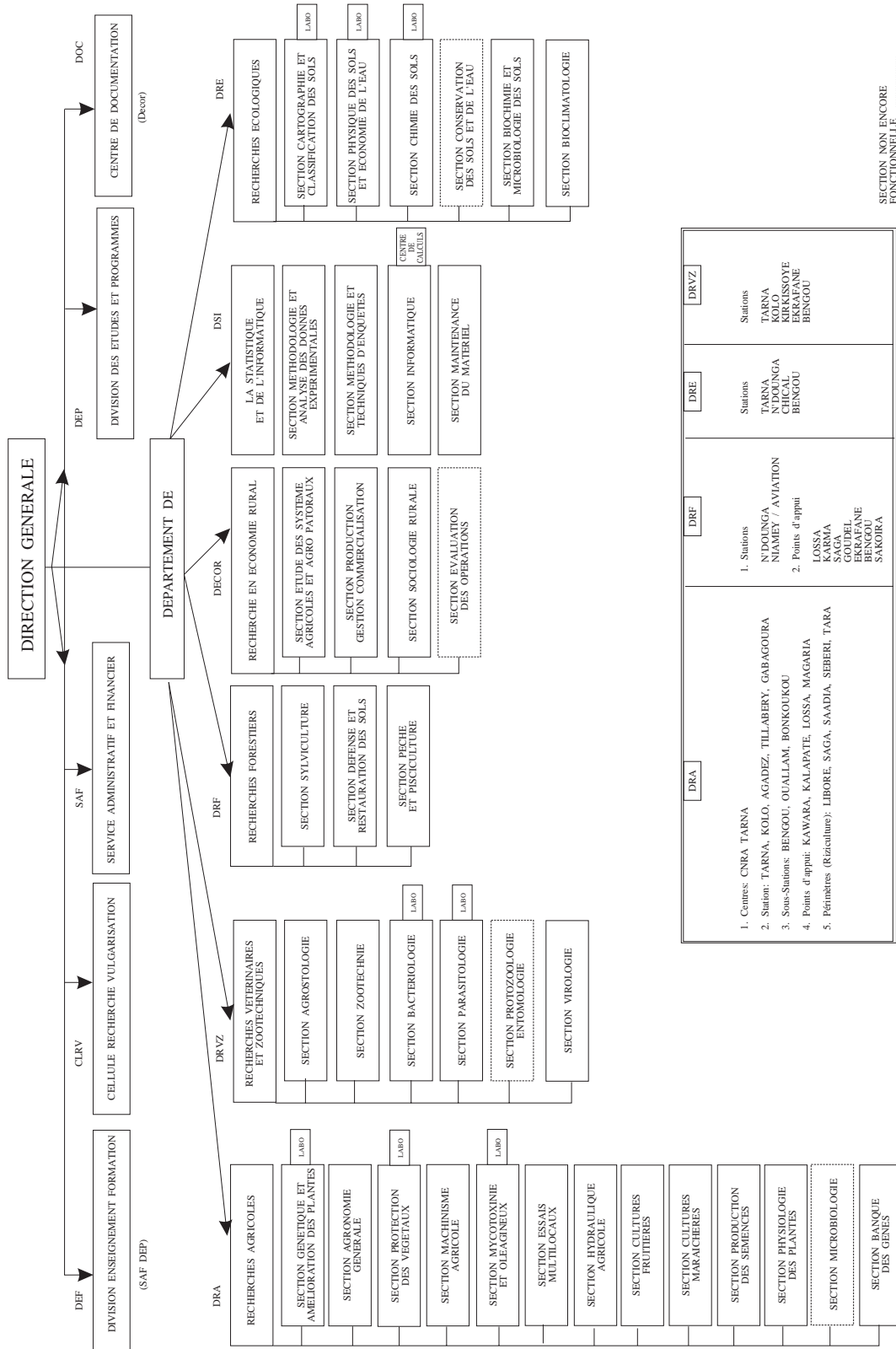
Deflators and Exchange Rates

All expenditure figures were first compiled in current local currency units (appendix V). In order to facilitate comparisons over time and across countries these figures are deflated with a local GDP deflator to base year 1985, and then converted to a common currency (US dollars) using the 1985 Purchasing Power Parity (PPP) over GDP. PPPs are synthetic exchange rates that attempt to reflect the purchasing power of a country’s currency. The PPPs used here are derived from the Penn World Table (Mark 5), which is based on the benchmark studies of the International Comparison Project (Summers and Heston 1991). For additional information on currency conversion methods in this context see Pardey, Roseboom, and Craig (1992).

In the text we note any marked deviations from these data compilation norms and include points of clarification if warranted.

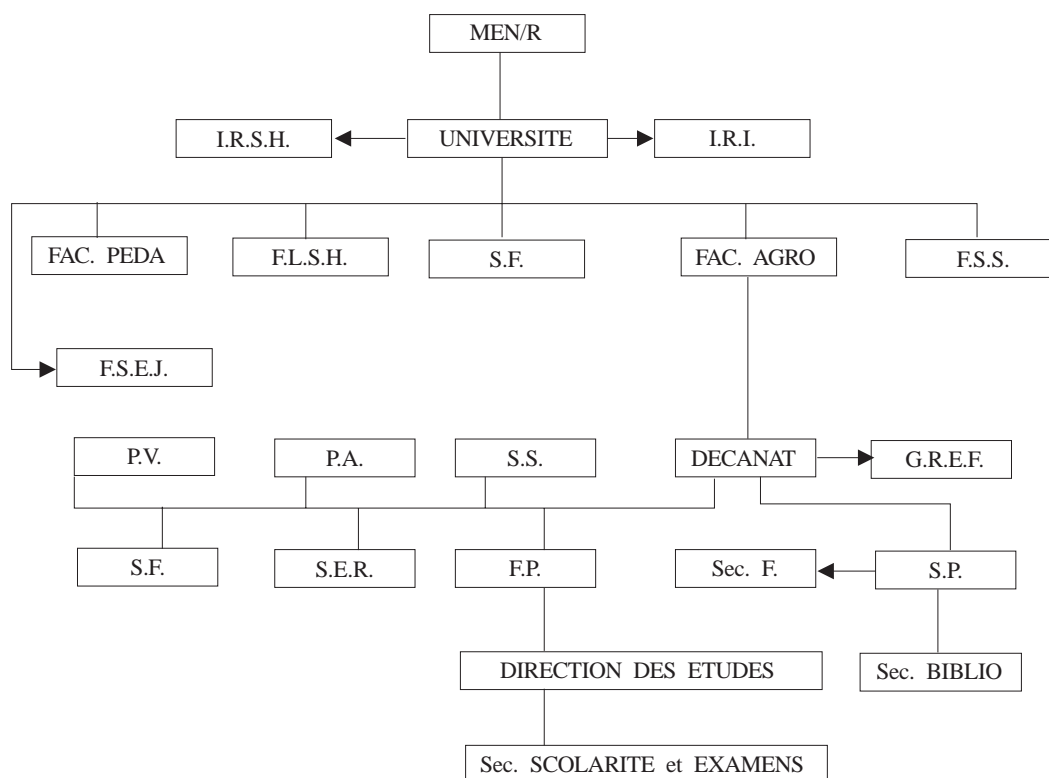
Appendix 3: Organizational charts of the agricultural research institutes

Institut National de la Recherche Agronomique du Niger (1992)



Appendix 3 (contd): Organizational charts of the agricultural research institutes

Faculté d'Agronomie (1992)



1) Université de Niamey

MEN/R	: Ministère de l'Education National et de la Recherche
I.R.S.H.	: Institut de Recherches en Sciences Humaines
I.R.I.	: Institut des Radio-Isotopes
FAC. PEDA	: Faculté de Pédagogie
F.L.S.H.	: Faculté des Lettres et Sciences Humaines
FAC. AGRO	: Faculté d'Agronomie
F.S.S.	: Faculté des Sciences de la Santé
F.S.E.J.	: Faculté des Sciences Economiques et Juridiques
F.S.	: Faculté des Sciences

2) Decanat

a) Départements

P.V.	: Productions Végétales
P.A.	: Productions Animales
S.S.	: Sciences du Sol
G.R.E.F.	: Génie Rural-Eaux et Forêts
S.F.	: Sciences Fondamentales
S.E.R.	: Sociologie et Economie Rurales
F.P.	: Formation Pratique

b) Direction ou Services

DIRECTION DES ETUDES	
SERVICE DE LA SCOLARITE ET DES EXAMENS	
S.P.	: Secrétariat Principal
Sec. F.	: Service Financier
S.B.	: Service de la Bibliothèque

Appendix 4: Names and addresses of the agricultural research institutes

Directeur Général
Institut National de Recherches Agronomiques du
Niger (INRAN)
B.P. 429
Niamey
NIGER

Doyen
Faculté des Sciences
Université de Niamey
B.P. 10662
Niamey
NIGER

Directeur
Direction des Centres de Multiplication du Bétail et
Stations d'Élevage (CMB/SE)
B.P. 827
Niamey
NIGER

Directeur
Institut de Recherches en Sciences Humaines (IRSH)
B.P. 318
Niamey
NIGER

Doyen
Faculté d'Agronomie
Université de Niamey
B.P. 10960
Niamey
NIGER

Directeur
Institut des Radioisotopes
B.P. 10727
Niamey
NIGER

Appendix 5a: Researcher and research expenditures totals, 1961-91

Total Number of Researchers		Units: full-time equivalents															
Category	Name institute	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Government	INRAN*	11	11	11	11	11	11	11	11	11	10	13	11	11	11	18	26
	CMB/SE														0	0	1
Academic	Faculté d'Agronomie										0	1	1	2	2.4	2.8	3.2
	Faculté des Sciences	0	0	0	0	0	0	1	1	1	1	1	1	1	1	2	2
	IRSH																1
	IRI	12	12	12	12	12	12	12	12	12	11	14	14	15	16	24	32
TOTAL											532,888	589	589	888		990	888,990
Sources:																	

Category	Name institute	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Government	INRAN	29	40	44	43	40	43	49	52	57	59	55	55	59	67	72
	CMB/SE	1	1	1	1	1	2	2	2	2	2	4.2	6.4	7.2	7.2	7.2
Academic	Faculté d'Agronomie	3.2	3.2	3.6	3.6	3.6	6.4	6.4	6	5.6	6.4	6.8	8	10	10	10.8
	Faculté des Sciences	2	2	3	3	3	3	4	4	4.8	4.8	4.4	4.8	5.2	5.6	5.6
	IRSH	1	1	1	1	1	1	2	2	2	3	2	2	2	1	2
	IRI								3	3	4	5	5	4	4	4
TOTAL		36	48	53	52	50	56	62	68	74	79	77	81	86	95	102
Sources:		990	990	888,990	990	889,990	888,990	979,990	990	990,999	990,999	990,999	990,999	990,999	990,999	990,999

Note: Italicized figures represent institute-level data that are either constructed or interpolated.

The following percentages were used to translate count data into f.i.e. units: INRAN = 100%; CMB/SE = 40% for 1974-86, 60% for 1987, 80% for 1988-91; Fac. d'Agronomie = 40%; Fac. des Sciences = 40%; IRSH = 20%; IRI = 100%; CIRAD = 100%.

* Pre-1975 data for INRAN represent an aggregation of the French institutes it replaced.

Appendix 5b: Researcher and research expenditures totals, 1961-91

Total Research Expenditures		Units: millions of current CFA																	
Category	Name institute	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976		
Government	INRAN*	70.559	79.124	89.520	97.666	115.478	130.840	131.455	136.578	155.541	177.757	176.498	218.052	167.000	179.782	174.417	410.352		
	CMB/SE														1.881	3.522	5.939		
Academic	Faculté d'Agronomie												2.440	3.314	7.724	11.122	16.877		
	Faculté des Sciences										1.666	2.471	3.375	5.700	7.337	7.993	10.249		
	IRSH	1.237	1.369	1.532	1.657	1.944	2.155	2.188	2.262	2.566	2.921	3.104	3.379	4.821	5.440	5.326	6.249		
	IRI																		
Total		71.796	80.493	91.052	99.323	117.423	132.995	133.642	138.841	158.107	182.344	182.072	227.246	180.835	202.164	202.379	449.667		
Deflator		24.3	24.1	24.5	24.3	26.2	27.0	25.5	24.7	26.4	28.4	28.5	29.5	40.0	43.1	40.4	45.4		
Constant 1985 LCU		295.582	333.533	371.485	409.437	447.389	492.923	523.292	561.244	599.196	643.023	638.267	770.685	451.548	468.917	501.454	991.119		
Constant 1985 PPP dollars		1.825	2.059	2.294	2.528	2.762	3.044	3.231	3.465	3.700	3.970	3.941	4.759	2.788	2.895	3.096	6.120		
Source:							589					589	431,589			990	990		
Category	Name institute	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991			
Government	INRAN	706.651	841.626	974.626	990.381	860.814	957.917	1,416.204	1,515.160	1,451.725	1,559.700	1,527.893	1,441.287	1,596.507	1,363.707	968.219			
	CMB/SE	9.167	12.743	15.993	21.269	26.427	32.930	39.106	48.809	52.365	67.547	113.864	590.800	663.468	139.551	131.426			
Academic	Faculté d'Agronomie	24.599	32.986	40.390	52.752	64.653	79.694	93.816	116.253	112.049	117.417	115.106	130.943	172.428	180.898	199.738			
	Faculté des Sciences	13.326	16.447	18.904	23.487	27.645	32.956	37.719	45.631	49.993	47.097	57.714	59.381	68.492	50.565	50.414			
	IRSH	7.538	8.721	9.475	11.203	12.618	14.461	15.975	18.714	28.742	37.845	20.278	18.444	8.819	11.126	18.973			
	IRI								49.966	56.268	63.560	67.181	63.975	52.826	60.330	55.318			
Total		761.282	912.522	1,059.387	1,099.092	992.157	1,117.958	1,602.820	1,794.534	1,751.142	1,893.167	1,902.036	2,304.830	2,562.540	1,806.177	1,424.087			
Deflator		52.5	58.4	61.1	69.6	75.7	83.8	89.6	101.7	100.0	93.4	96.7	98.4	95.8	97.9	97.6			
Constant 1985 LCU		1,449.587	1,562.482	1,734.314	1,578.519	1,310.614	1,333.312	1,788.536	1,764.812	1,751.142	2,026.439	1,966.399	2,342.191	2,675.039	1,844.553	1,459.450			
Constant 1985 PPP dollars		8.950	9.647	10.708	9.746	8.092	8.232	11.043	10.897	10.812	12.512	12.141	14.462	16.517	11.389	9.011			
Source:		990	990	990	990	889;990	990	990	990	990;999	990;999	990;999	990;999	990;999	990;999	990;999			

Note: To estimate the share of each institution's total expenditures going to research, we applied the percentages used to convert personnel counts to f.t.e.s given in the note to appendix 5a.

Italicized figures represent institute-level data that are estimated by linear interpolation.

*Pre-1975 data for INRAN represent an aggregation of the French institutes it replaced.

Appendix 6: Long-term research staff development

INRAN	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Nationals																
PhD															1	2
MSc															1	3
BSc															3	4
Subtotal															5	9
Expatriates															13	17
Total															18	26
Sources:															990	990
	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Nationals																
PhD	2	3	4	3	2	2	2	2	2	3	3	3	3	3	4	
MSc	6	10	12	15	16	17	18	17	21	20	17	21	25	32	38	
BSc	4	7	7	6	7	8	8	8	8	10	13	17	18	21	21	
Subtotal	12	20	23	24	25	27	28	27	31	33	33	41	46	56	63	
Expatriates	17	20	21	19	15	16	21	25	26	26	22	14	13	11	9	
Total	29	40	44	43	40	43	49	52	57	59	55	55	59	67	72	
Sources:	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	

CMB/ISE	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974*	1975	1976
Nationals																
PhD																
MSc																
BSc																
Subtotal													0.0	0.4	0.8	1.3
Expatriates													0.0	0.0	0.0	0.0
Total													0.0	0.4	0.8	1.3
FTE research													0.0	0.2	0.3	0.5
Sources:																
	1977	1978	1979	1980#	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Nationals																
PhD									0							
MSc									4	4	5	5	5	6	6	
BSc									1	1	2	3	3	2	2	
Subtotal	2	2	3	3	3	4	4	5	5	5	7	8	8	8	8	
Expatriates	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	
Total	2	2	3	3	3	4	4	5	5	5	7	8	8	9	9	
FTE research	0.7	0.8	1.0	1.2	1.3	1.5	1.7	1.8	2.0	2.0	4.2	6.4	7.2	7.2	7.2	
Sources:									999	999	999	999	999	999	999	

Appendix 6: Long-term research staff development (contd.)

Faculté d'Agromomie	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972*	1973	1974	1975	1976
Nationals																
PhD																
MSc																
BSc																
Subtotal																
Expatriates																
Total											0	2.5	5	6	7	8
FTE research										0.0	0.0	1.0	2.0	2.4	2.8	3.2
Sources:												888	888			888
	1977	1978	1979	1980	1981	1982	1983	1984#	1985	1986	1987	1988	1989	1990	1991	1992
Nationals																
PhD					0		3		4	7	8	9	9	9	9	
MSc					2		7		4	2	2	3	4	5	4	
BSc					0		0		0	0	0	0	0	0	0	
Subtotal					2	10	10	9	8	9	10	12	13	14	13	
Expatriates					7	6	6	6	6	7	7	8	12	11	14	
Total	8	8	9	9	9	16	16	15	14	16	17	20	25	25	27	
FTE research	3.2	3.2	3.6	3.6	3.6	6.4	6.4	6.0	5.6	6.4	6.8	8.0	10.0	10.0	10.8	
Sources:			888		889	888	979		999	999	999	999	999	999	999	

Notes: * creation of the faculty; # current name

Faculté des Sciences, Département de Biologie	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970*	1971	1972	1973	1974	1975	1976#
Nationals																
PhD																
MSc																
BSc																
Subtotal																
Expatriates																
Total										1.0	1.6	2.2	2.9	3.5	4.2	4.8
FTE research										0.4	0.6	0.9	1.2	1.4	1.7	1.9
Sources:																
	1977	1978	1979	1980	1981	1982	1983	1984+	1985	1986	1987	1988	1989	1990	1991	1992
Nationals																
PhD									8	8	6	7	7	10	10	
MSc									0	0	0	0	0	0	0	
BSc									0	0	0	0	0	0	0	
Subtotal									8	8	6	7	7	10	10	
Expatriates									4	4	5	5	6	4	4	
Total	5	6	7	7	8	9	9	10	12	12	11	12	13	14	14	
FTE research	2.2	2.4	2.7	3.0	3.2	3.5	3.7	4.0	4.8	4.8	4.4	4.8	5.2	5.6	5.6	
Sources:									999	999	999	999	999	999	999	

Appendix 6: Long-term research staff development (contd.)

IRSH	1961+	1962	1963	1964*	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974#	1975	1976
Nationals																
PhD																
MSc																
BSc																
Subtotal	1.0	1.3	1.6	1.9	2.2	2.5	2.8	3.1	3.4	4.0	4.0	4.3	4.6	4.9	5.2	4.0
Expatriates	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	1.0	1.3	1.6	1.9	2.2	2.5	2.8	3.1	3.4	4.0	4.0	4.3	4.6	4.9	5.2	4.0
FTE research	0.2	0.3	0.3	0.4	0.4	0.5	0.6	0.6	0.7	0.8	0.8	0.9	0.9	1.0	1.0	0.8
Sources:										532						888
	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Nationals																
PhD									10	10	5	5	0	0	5	
MSc									0	5	5	5	5	5	5	
BSc									0	0	0	0	0	0	0	
Subtotal	5.7	6.0	6.3	6.6	6.9	7.0	7.5	7.8	10	15	10	10	5	5	10	
Expatriates	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	
Total	5.7	6.0	6.3	6.6	6.9	7.0	7.5	7.8	10	15	10	10	5	5	10	
FTE research	1.1	1.2	1.3	1.3	1.4	1.4	1.5	1.6	2.0	3.0	2.0	2.0	1.0	1.0	2.0	
Sources:						888			999	999	999	999	999	999	999	

Notes: + creation of the institute; * changed in CNRSH; # present name. 1985-91 were reported in its terms I believe, using 20% therefore I put them in actual number terms. Source 888 reports 7 staff for 1985, 1987.

IRI	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Nationals																
PhD																
MSc																
BSc																
Subtotal																
Expatriates																
Total																
Sources:																
	1977	1978	1979	1980	1981	1982	1983	1984*	1985	1986	1987	1988	1989	1990	1991	1992
Nationals																
PhD																
MSc																
BSc																
Subtotal								2.0	2.0	3.0	4.0	4.0	3.0	3.0	3.0	3.0
Expatriates								1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Total								3.0	3.0	4.0	5.0	5.0	4.0	4.0	4.0	4.0
Sources:								888	888		888					#

Notes: *creation; # personal interviews

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