

Statistical Brief

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Statistical Brief on the National Agricultural Research System
of
TOGO

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ISNAR INDICATOR SERIES PROJECT: PHASE II
International Service for National Agricultural Research
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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 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

CAF	Cellule Administrative et Financière	INTA	Institut National de la Nutrition et de la Technologie Alimentaire
CGIAR	Consultative Group on International Agricultural Research	INZV	Institut National Zootechnique et Vétérinaire
CIRAD	Centre de Coopération Internationale en Recherche Agronomique pour le Développement	IRAT	Institut de Recherches Agronomiques Tropicales
CRA	Comité de la Recherche Agronomique	IRCC	Institut de Recherche du Café et du Cacao
CREAT	Centre de Recherche et d'Élevage d'Avétonou	IRCT	Institut de Recherche du Coton et des Textiles Exotiques
DAF	Direction Administrative et Financière	IRHO	Institut de Recherche pour les Huiles et Oléagineux
DEP	Direction de l'Élevage et des Pêches	IRTO	Institut de Recherche Scientifique de Togo
DEPEG	Direction de la Pédologie et de l'Ecologie Générale	ISNAR	International Service for National Agricultural Research
DGER	Direction Générale de l'Economie Rurale	MAR	Ministère de l'Aménagement Rural
DGDR	Direction Générale du Développement Rural	MCT	Ministère du Commerce et Transports
DMN	Direction de la Météorologie Nationale	MDR	Ministère du Développement Rural
DNATA	Division de la Nutrition Appliquée et de la Technologie Alimentaire	MDRET	Ministère du Développement Rural, de l'Environnement et du Tourisme
DNRA	Direction Nationale de la Recherche Agronomique	MEN	Ministère de l'Education Nationale
DNTA	Direction de la Nutrition et de la Technologie Alimentaire	MENRS	Ministère de l'Education Nationale et de la Recherche Scientifique
DPF	Direction des Productions Forestières	MER	Ministère de l'Economie Rurale
DPV	Direction de la Protection des Végétaux	NARS	National Agricultural Research System
DRA	Direction de Recherche Agronomique	OECD	Organization for Economic Cooperation and Development
DSRA	Direction Scientifique de la Recherche Agronomique	ORSTOM	Office de la Recherche Scientifique et Technique Outre-Mer
ESA	Ecole Supérieure d'Agronomie	PPP	Purchasing Power Parity
FAO	Food and Agriculture Organization	SAF	Service Administrative et Financière
FTE	Full-Time Equivalents	SAFICC	Structure Nationale d'Appui à la Filière Café-Cacao
GDP	Gross Domestic Product	SOTOCO	Société Togolaise du Coton
GTZ	German Agency for Technical Cooperation	SRCC	Société de Rénovation du Café et du Cacao
INCV	Institut National des Cultures Vivrières		
INPT	Institut National des Plantes et Tubercules		
INRS	Institut National de la Recherche Scientifique		
INS	Institut National des Sols		

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 Togo. This information has been collected and presented in a systematic way in order to inform and thereby improve research policy formulation with regard to Togo's 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 Togo we refer to appendix 1.

2. Agricultural Research Institutions

2.1 Historical Evolution¹

During the eighteenth century the area of West Africa now known as Togo was part of the Slave Coast and controlled by Denmark. The first German missionaries arrived around 1847 and by 1884 most of the local coastal chiefs had entered into agreements that placed them under German protection. During World War I, British and French troops defeated the Germans in Africa. Administrative control over the western and eastern parts of Togoland were mandated to Britain and France, respectively, by the League of Nations (the predecessor of the UN) in 1922. In 1956 British Togoland was incorporated into the Gold Coast (today's Ghana), while French Togoland became an autonomous republic within France. In 1960 Togo gained full political independence but maintained close economic relations with France.

Prior to World War II agricultural research was limited to some experiments carried out by French scientists based in Dakar. Formal agricultural research in Togo began in the 1940s with the establishment of subsidiaries of several French agricultural research institutes. In 1942, both the Institut de Recherches pour les Huiles et Oléagineux (IRHO) and the Office de la Recherche Scientifique et Technique Outre-Mer (ORSTOM) initiated local programs of research, while in 1949 the Institut de Recherche du Coton et des Textiles Exotiques (IRCT) established a cotton research station at Kalokopé. In 1952, ORSTOM's activities led to the establishment of the Institut de Recherche Scientifique du Togo (IRTO), which conducted research in areas such as soil science, nutrition and food science, and sociology.

After independence in 1960, most of the French agricultural research activities were continued. In addition, two French research institutes began conducting research in Togo after independence, namely IRAT (Institut de Recherches Agronomiques Tropicales) in 1961 and IRCC (Institut de Recherche du Café et du Cacao) in 1967. This collaboration was based on agreements signed by the French and Togolese governments. From Togo's perspective it made sense to continue this scientific collaboration as the country had few qualified scientists and limited public resources to allocate to agricultural research. This collaboration has continued until the present, but only in recent years have the French research activities been more closely integrated into the Togolese agricultural research structure.

Until their gradual integration into the Direction Nationale de la Recherche Agronomique (DNRA) during the 1991-94 period, the French research institutes had the status of a private or para-public organization. IRCT and IRCC have traditionally maintained a close association with respectively the Société Togolaise du Coton (SOTOCO) and the Société de Rénovation du Café et du Cacao (SRCC) through a series of short-term contracts. Recently SRCC was renamed Structure Nationale d'Appui à la Filière Café-Cacao (SAFICC).

In contrast to the French commodity research institutes, ORSTOM's local subsidiary IRTO was dissolved in 1965. It was replaced by the Institut National de Recherche Scientifique (INRS) which was mandated to coordinate all scientific research conducted in the country, but failed to effectively meet this responsibility (World Bank 1985). INRS was initially placed under the

1 The material presented in this section draws largely from World Bank (1985, 1991), Aithnard and Gninofou (1991), FAO (1993), MDRET (1994), and ISNAR (1995).

direct control of the President, but in 1972 was transferred to the newly established Ministère de Recherche Scientifique.

Parallel to the research conducted by the French institutes, the Ministère de l'Economie Rurale (MER) established several agencies with research responsibilities, namely: the Direction de la Pédologie et de l'Ecologie Générale (DEPEG) in 1964, the Division de la Nutrition Appliquée et de la Technologie Alimentaire (DNATA) in 1968, and the Direction de la Météorologie Nationale (DMN) in 1971. In addition, a Centre d'Essai et d'Agriculture d'Avétonou was established in 1965 with assistance from the German government. In 1972 the Ecole Supérieure d'Agronomie (ESA) was established within the Université du Bénin.

In 1975 MER was reorganized and renamed Ministère du Développement Rural (MDR). In 1976 MDR established the Direction de la Recherche Agronomique (DRA) which developed its own research activities. The French research institutes as well as the Centre d'Essai et d'Agriculture d'Avétonou² continued to operate independently from DRA. In addition, the Institut National des Plantes a Tubercules (INPT) was established in 1977 and also operated independently from DRA. Following the reorganization of MDR in 1975, DNATA was renamed Division de la Nutrition et de la Technologie Alimentaire (DNTA) in 1976. In 1980 the Ministère de l'Aménagement Rurale (MAR) was split off from MDR and DEPEG and the Direction de la Protection des Végétaux (DPV) were transferred to MAR. In 1985 DEPEG was renamed the Institut National des Sols.

By the late 1980s the Togolese NARS was institutionally fragmented with little operational or programmatic coherence and in some areas was unduly duplicative. Agricultural research was conducted by about a dozen institutes within four ministries. DRA, DNTA, INPT, CREAT as well as IRAT, IRCT, and IRCC fell under the responsibility of MDR; DEPEG and DPV under MAR; ORSTOM, INRS, and ESA under the Ministère de Education Nationale et de la Recherche Scientifique; and DMN under the Ministère de Commerce et Transport. Four agencies conducted research on food crops (DRA, DNTA, INPT, and IRAT) and two on export crops (IRCC and IRCT). DRA had a division of animal science, but CREAT was the main animal science institute.

In 1991, following a recommendation of the World Bank, MDR and MAR were merged into the Ministère du Développement Rural, de l'Environnement et du Tourisme (MDRET). In an effort to regroup all agricultural research institutes within a single administrative agency, a new directorate, the Direction Nationale de la Recherche Agronomique (DNRA), was created. DNRA became responsible for the planning and coordination of agricultural research. As part of this reorganization all of the different agencies conducting food crops research (with DRA, INPT, and IRAT being the principal ones) were merged into one institute, the Institut National des Cultures Vivrières (INCV). The livestock research conducted by DRA as well as CREAT and some other small livestock research activities were also regrouped and brought under one agency, the Institut Zootechnique et Vétérinaire (INZV). DNTA was renamed Institut de la Nutrition et de la Technologie Alimentaire (INTA). Also INS and DMN were consolidated under DNRA's administration. Despite of this substantial rationalization of the NARS, the political crisis in Togo during 1992-93 severely curtailed the conduct of agricultural research in the country.

2 Renamed Centre de Recherche et d'Elevage d'Avétonou (CREAT) in 1979.

In November 1994, the operations of IRCC and IRCT in Togo were transferred from the Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD) in France and placed under the administrative responsibility of DNRA.

2.2 Present Structure

By way of background to describing the current structure of Togo's agricultural research system, this section begins with a brief overview of contemporary developments in the country's agricultural sector. Half the country is covered with soils of low fertility, the most fertile soils are to be found in the forested areas in the south. About 45% of the country is classified as potentially suitable for agriculture. Only 27% of the potentially agricultural land is cropped, with 1% of the cropped land under irrigation. The remaining 73% of agricultural acreage is pastured. Over two-thirds of Togo's labor force works in agriculture, but accounts for only one-third of total GDP. Local agricultural production is usually sufficient to satisfy domestic food demand. The agricultural sector also produces cotton, coffee, and cocoa, which together account for about 30% of Togo's total export earnings. Food crops account for about three quarter of the sector's value added and cash crops for the remainder.

Following the restructuring of research in 1991, the newly created Direction Nationale de la Recherche Agronomique (DNRA) within the Ministère du Développement Rural, de l'Environnement et du Tourisme (MDRET) became responsible for most of the country's agricultural research. DNRA reports directly to the Minister of Rural Development and its tasks are to identify research priorities, to develop and manage the operational budget, and to plan and arrange training programs for agricultural research staff. All of the country's agricultural research agencies are placed under DNRA. A technical department within DNRA, the Direction Scientifique de la Recherche Agronomique (DSRA), is responsible for research planning and programming, maintaining the country's research infrastructure, and coordinating all farming system research. The Service Administrative et Financière (SAF), the administrative department of DNRA, is responsible for the formulation and management of the operational budget. SAF also assists the administrative units of DNRA's research institutes/departments, the Cellules Administrative et Financière (CAF). SAF reports to the Direction Administrative et Financière (DAF) which reports directly to the minister.

Each research institute/department under DNRA consists of an administrative unit (CAF) and a technical unit. The technical units are organized into divisions. The largest institute in terms of full-time equivalent researchers is the Institut National des Cultures Vivrières (INCV). INCV was formed out of DRA, INPT, and IRAT and conducts research on food crops. It consists of four divisions: "division des céréales et des légumineuses," "division des tubercules," "division de l'horticulture," and "division des semences."

The Institut National des Sols (INS, formerly DEPEG) conducts research on soils as well as agroforestry and silviculture. INS consists of three divisions: "division des études et de la cartographie des sols," "division de la conservation, de la restauration des sols, et de l'agroforestry," and "division des laboratoires."

The Institut National Zootechnique et Vétérinaire (INZV, formerly CREAT) conducts livestock research including research on animal protection and improvement. INZV consists of two divisions: "division de la recherche zootechnique" and "division de la recherche zoosanitaire."

The Institut de la Nutrition et de la Technologie Alimentaire (INTA, formerly DNTA) conducts research on food technologies and consists of a “division de la nutrition appliquée et de la technologie alimentaire” and a “division de la normalisation, de la légalisation, et du controle.”

The Direction de la Météorologie Nationale (DMN) consists of three divisions: “la climatologie,” “la météorologie synoptique,” and “l’agrométéorologie.” The latter division conducts some research related to agriculture.

As of November 1994, IRCT and IRCC have been placed under the full administrative responsibility of DNRA. Previously the responsibility had been shared between DNRA and CIRAD (France). IRCT consists of four sections: genetics, agronomy, entomology, and agricultural economics, while IRCC is organized around the following five thematic programs: “programme de recherche sur la maladie Swollen-Shoot,” “étude des scolytes de baies de caféiers,” “amélioration qualitative du café,” “amélioration des techniques de multiplication du colatier,” and “expérimentation caféière en zone marginale dans le Yoto.”

In addition to the above mentioned institutes, DNRA has established a regional station in each of the five designated agroecological regions of Togo. These stations are staffed with outposted staff from the various institutes/directorates. One staff member at each regional station is responsible for the coordination of all agricultural research activities at that station. The present organizational structures of DNRA and the various research institutes are presented in diagrammatic form in appendix 3.

In addition to the institutes and directorate that come under DNRA, there are a few other government agencies that conduct some agricultural research, namely the Direction de la Protection des Végétaux (DPV), the Direction des Production Forestières (DPF), and the Direction de l’Élevage et des Pêches (DEP). Each of these directorates spend some of their time on respectively plant protection, forestry and fisheries research. They fall under the responsibility of the Direction Générale du Développement Rurale (DGDR) of MDRET (see appendix 3). For the directorates dealing with forestry and fisheries no detailed information was available and so they are excluded from the data series reported throughout the remainder of this report.

The Ecole Supérieure d’Agronomie (ESA) provides training up to the level of agricultural engineers degree (Ingenieurs d’agriculture). ESA’s staff conduct some research on food crops, livestock, and natural resources.

3. NARS Statistics

Questionnaires responses were received from INTA, INZV, INS, IRCT, and ESA and combined with data and information obtained from the secondary sources cited at the conclusion of this report. Because no detailed information on expenditures and research staff was available for DEP, DPF, and the division l’agrométéorologie of DMN, these three government divisions are not included in the data presented below. Although most of the data in this report refer to the period prior to the reorganization that took place in 1991 the data are presented according to the post-reorganization structure of the Togolese NARS.

The expenditure data presented in this brief are based as much as possible on the actual expenditures as reported by the various institutes. However, institutes systematically underestimate the degree of donor support because they only have information about the donor

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	Name	Acronym	Research focus		National	Expats	Total	FTEs
Public	Ministère du Développement Rural, Direction Nationale de la Recherche Agronomique	Institut National de la Nutrition et de la Technologie Alimentaire	INTA	food technology	Institut National de la Nutrition et de la Technologie Alimentaire	INTA	1 (1)	0	6	3.0	
		Institut National Zootechnique et Vétérinaire	INZV	animal health and production	Institut National Zootechnique et Vétérinaire	INZV	1 (1)	0	6	6.0	
		Institut National des Cultures Vivrières	INCV	crops	Institut National des Cultures Vivrières	INCV	2 (2)	2	33	33.0	
		Institut National des Sols	INS	soils	Institut National des Sols	INS	1 (1)	4	22	15.4	
		Direction de la Météorologie Nationale	DMN	meteorology	Direction de la Météorologie Nationale	DMN	1 (1)	na	na	na	
		Institut de Recherche du Café et du Cacao	IRCC	coffee and tobacco	Institut de Recherche du Café et du Cacao	IRCC	1 (1)	6	3	9	9.0
		Institut de Recherche du Coton et des Textiles Exotiques	IRCT	cotton	Institut de Recherche du Coton et des Textiles Exotiques	IRCT	1 (1)	6	5	11	11.0
		Ministère du Développement Rural, Direction Générale du Développement Rural	Direction de la Protection des Végétaux	DPV	crop protection	Direction de la Protection des Végétaux	DPV	1 (1)	0	12	8.4
			Direction des Productions Forestières	DPF	forestry	Direction des Productions Forestières	DPF	1 (1)	na	na	na
			Direction de l'Élevage et des Pêches	DEP	fisheries	Direction de l'Élevage et des Pêches	DEP	1 (1)	na	na	na
		Academic	Université du Bénin en Togo	ESA	food crops, livestock, natural resources	Ecole Supérieure d'Agronomie	ESA	1 (1)	1	26	1.3
		<i>Total</i>						<i>12 (12)^b</i>	<i>15</i>	<i>125</i>	<i>87.1</i>

Source: 0999, 1270, 1314, and 1350.

^a Staffed with researchers and/or technicians. Bracketed sites are permanently staffed with researchers.

^b In addition DNRA has five regional agricultural research stations that are staffed by researchers from the various institutes and directorates.

support that is channeled through their accounting system. Most importantly they usually fail to report the salaries and supplements paid directly to expatriate researchers by the donors. To correct for this problem in the Togolese data, we constructed an implicit cost series for expatriate researchers (see appendix 2) and, where necessary, added this to the expenditures reported by the various institutes. We have been unsuccessful in our efforts to compile expenditure data for the period prior to 1971.

3.1 Long-Term Development

At independence, Togo had a very small number of agricultural researchers in absolute as well as relative terms. In 1961 Togo employed 8 full-time equivalent (fte) researchers per million economically active agricultural population, which was substantially lower than the regional average at that time, which was about 15.³ Since then, however, the number of agricultural researchers has grown very rapidly (on average 11.5% per annum during the period 1961-91, table 3). As a result, Togo's number of fte researchers per million economically active agricultural population reached 86 in 1991 and is now substantially higher than the regional average, which was about 55 (Pardey, Roseboom, and Beintema 1995).

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

	1961-65	1966-70	1971-75	1976-80	1981-85	1986-90	1991	Annual growth rate
Researchers (FTEs)	4.3	11.4	19.2	30.1	44.5	78.9	87.1	11.5 ^a
Expenditures (millions 1985 CFA)	na	na	868.0	1249.7	1005.7	1216.8	1197.5	1.7 ^b
Expenditures (millions 1985 PPP dollars) ^c	na	na	5.270	7.588	6.107	7.388	7.271	1.7 ^b
Expenditures per researcher (thousands 1985 PPP dollars) ^c	na	na	275	252	137	94	83	-7.1 ^b
Economically active agricultural population (millions)	0.6	0.6	0.7	0.8	0.9	1.0	1.0	2.1 ^a
Researchers per million economically active agricultural population	7.5	17.5	26.1	37.7	50.9	82.3	85.9	9.3 ^a
AgGDP (millions 1985 PPP dollars) ^c	334	408	444	473	579	773	835	3.1 ^a
Expenditures as a % of AgGDP	na	na	1.22	1.43	0.97	0.99	0.96	-1.5 ^b

Source: See appendices 5 and 6.

^a Least squares annual growth rates for the 1961-91 period.

^b Least squares annual growth rates for the 1971-91 period.

^c For information on "PPP dollars" see appendix 2.

In contrast, agricultural research expenditures grew only slowly in real terms, averaging 1.7% per annum during the period 1971-91. As a result real spending per scientist declined dramatically between 1971 and 1991. In 1991 real spending per scientist was only 30% of the

3 Average for Sub-saharan Africa, excluding South Africa.

level that prevailed during the early 1970s. This decline is in part due to the replacement of expensive expatriate researchers by nationals.

During the early 1970s agricultural research expenditures expressed as a percentage of agricultural GDP averaged 1.2% compared with a weighted average for sub-Saharan Africa of 0.4%. After peaking at 1.6% in 1979, the intensity ratio declined to about 1% during the 1980s. A percentage which is slightly higher than the weighted average for sub-Saharan Africa (0.7%). However, in 1991, nine African countries had an intensity ratio lower than Togo and 14 higher.

3.2 Human Resources

Degree and Nationality Status of Researchers

Information on the educational status of Togo's agricultural research staff is presented in table 4. A detailed breakdown of the degree level of the researchers in the government sector was only available for 1991. In this year about 57% of the total national research staff were trained to the MSc level. Only 14% held a PhD degree. For three of the seven government institutes in this table (INTA, INS, and IRCT) detailed information on the qualification levels of national research staff was also available for the late 1980s. For these three institutes researchers with MSc degrees made up half the total while those trained to BSc and PhD levels each accounted for a quarter of all researchers during this period.

A breakdown of the total research staff in terms of their local or expatriate status was only available for the 1980s and 1991. During this period the share of expatriate researchers declined from 28% in 1981 to 15% in 1991. IRCC and IRCT are the two agencies that still have the highest percentage expatriate researchers, namely 33% and 45% in 1991.

The academic sector consists of ESA whose staff spend only a small amount of their time on agricultural research. ESA staff thus account for a very small share of the total national research staff when measured in full-time equivalents.

Gender

Of the five institutes for which information on the share of female research staff were available, four (INZV, INS, IRCT, and ESA) did not employ any female researchers during the period 1985-91. INTA employed one to two female research staff during this period, which was between 11-25% of its total research staff.

Table 4: *Educational and Nationality Status of Researchers*

Institutional category	Researcher status	1961-65	1966-70	1971-75	1976-80	1981-85	1986-90	1991
<i>(full-time equivalents)</i>								
Government	Nationals							
	PhD	na	na	na	na	na	na	10.2
	MSc	na	na	na	na	na	na	42.2
	BSc	na	na	na	na	na	na	20.6
	Subtotal	na	na	na	na	32.3	64.2	73.0
	Expat	na	na	na	na	11.0	13.5	12.8
	<i>Total</i>	<i>4.3</i>	<i>11.4</i>	<i>18.9</i>	<i>29.2</i>	<i>43.4</i>	<i>77.7</i>	<i>85.8</i>
Academic	Nationals							
	PhD	—	—	na	na	0.6	0.9	1.0
	MSc	—	—	na	na	0.1	0.2	0.3
	BSc	—	—	na	na	0.1	0	0
	Subtotal	—	—	na	na	0.9	1.1	1.3
	Expat	—	—	na	na	0.3	0.1	0.1
	<i>Total</i>	—	—	<i>0.3</i>	<i>0.9</i>	<i>1.2</i>	<i>1.3</i>	<i>1.3</i>
Total	Nationals							
	PhD	na	na	na	na	na	na	11.2
	MSc	na	na	na	na	na	na	42.5
	BSc	na	na	na	na	na	na	20.6
	Subtotal	na	na	na	na	33.2	65.3	74.3
	Expat	na	na	na	na	11.3	13.7	12.9
	<i>Total</i>	<i>4.3</i>	<i>11.4</i>	<i>19.2</i>	<i>30.1</i>	<i>44.5</i>	<i>78.9</i>	<i>87.1</i>

Source: See appendices 5 and 6.

Staff Composition

Table 5 provides a detailed breakdown of the total permanent staff of four government-sector institutes. In 1991 the number of technical support staff per researcher ranged from 1.5 for INZV to 3.4 for IRCT. IRCT also had the highest ratio of other support staff (including administrative personnel) per researcher of 5.1. INS had only 2.5 other support staff per researcher.

During the period 1985-91 both the technical and other support staff ratios declined for INS and IRCT, while for INTA and INZV both ratios increased.

Table 5: *Staffing Structure*

Staff category	INTA		INZV		INS		IRCT	
	1985-90	1991	1985-90	1991	1985-90	1991	1985-90	1991
	<i>(number of personnel)</i>							
Research	7	6	9	6	19	22	10	11
Support								
Technical	12 ^a	13 ^a	9	9	45 ^a	44 ^a	37	37
Administrative	6	6	8	8	7	8	5	6
Other	11	14	13	13	48	47	50	50
Subtotal	29	33	31	30	100	99	92	93
<i>Total</i>	<i>36</i>	<i>39</i>	<i>40</i>	<i>36</i>	<i>119</i>	<i>121</i>	<i>102</i>	<i>104</i>

Source: 999

^a Includes other "research" staff with degrees less than a BSc.

3.3 Financial Resources

Expenditures

Table 6 provides a breakdown of agricultural research expenditures by institutional category. No semi-public institutes operate within Togo. The government sector share of total expenditures was around 98-99% during the whole period, which once again underlines the marginal role of ESA (i.e. the academic sector) in the total agricultural research conducted in Togo.

Table 6: *Agricultural Research Expenditures*

Institutional category	1971-75	1976-80	1981-85	1986-90	1991
	<i>(millions 1985 CFA per year)</i>				
Government ^a	861.460	1227.677	988.006	1203.388	1181.545
Semi-public	0	0	0	0	0
Academic	6.509	22.067	17.727	13.392	15.991
<i>Total</i>	<i>867.968</i>	<i>1249.743</i>	<i>1005.733</i>	<i>1216.780</i>	<i>1197.536</i>
	<i>(millions 1985 PPP dollars per year)</i>				
<i>Total</i>	<i>5.270</i>	<i>7.588</i>	<i>6.107</i>	<i>7.388</i>	<i>7.271</i>

Source: See appendix 6.

^a Excludes DEP, DPF, and DMN.

Factor Mix

Table 7 provides a breakdown of total expenditures by cost category for the years 1985-91. Average personnel cost shares ranged from an average of 44% for INZV to 70.4% for IRCT. The share of capital costs ranged from 27% for INTA to 8% for IRCT. For INTA and INS capital costs accounted for a substantial share of total research expenditures, particularly when compared with the average share of 15% for the sub-Saharan African region in 1981-85 (Pardey, Roseboom, and Anderson 1991).

Table 7: Cost Categories

Institute	Cost category	1985	1986	1987	1988	1989	1990	1991
		<i>(percentages)</i>						
INTA	Personnel	65.6	60.3	58.3	58.1	51.0	42.7	56.9
	Operational	11.9	10.9	11.4	11.6	17.5	20.7	20.2
	Maintenance	1.9	0.7	1.5	1.2	1.3	0.7	1.7
	Training	0	0	0	0	0	0	0
	Capital	20.6	28.1	28.8	29.1	30.3	35.9	21.3
	<i>Total</i>		<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>
INZV	Personnel (total)	51.7	51.3	53.5	47.0	50.0	35.6	20.5
	Personnel (local)	13.1	16.6	14.9	20.3	22.6	20.1	20.5
	Personnel (expat)	38.7	34.7	38.7	26.7	27.4	15.6	0
	Operational	29.1	35.7	29.6	42.8	42.2	55.5	67.1
	Maintenance	0.9	1.6	2.7	2.2	4.7	6.2	4.6
	Training	1.8	1.3	2.3	0.7	0	0	0
	Capital	16.4	10.1	11.8	7.3	3.1	2.7	7.8
	<i>Total</i>		<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>
INS	Personnel (total)	70.1	59.4	62.7	71.7	69.9	75.4	83.4
	Personnel (local)	70.1	47.3	51.8	50.1	51.0	53.2	44.8
	Personnel (expat.)	0	12.0	11.0	21.6	18.9	22.2	38.7
	Operational ^a	4.3	4.2	5.3	5.1	4.4	5.0	4.2
	Training	0	0	0	0	0	0	0
	Capital	25.6	36.5	32.0	23.2	25.7	19.6	12.3
	<i>Total</i>		<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>
IRCT	Personnel (total)	67.4	66.1	66.6	63.7	64.1	62.2	70.5
	Personnel (local)	33.4	34.7	34.2	29.0	28.7	30.2	30.2
	Personnel (expat)	34.0	31.4	32.5	34.7	35.5	32.0	40.3
	Operating	21.4	22.2	21.9	17.9	17.7	18.6	19.4
	Maintenance	2.6	2.7	2.7	11.0	10.8	11.4	2.4
	Training	0	0	0	0	0	0	0
	Capital	8.5	8.9	8.8	7.4	7.4	7.8	7.8
	<i>Total</i>		<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>

Source: 999.

^a Operational costs include maintenance costs.

Sources of Funds

An overview of the major sources of funding for the government-sector institutes is presented in table 8. For INTA and INS the most important source of support are the general government funds; donor contributions currently constitute a minor share of the total funds available. INZV generated, on average, about one third of its funds from sales, which is substantially higher than most other research agencies. Donor support, which mainly consisted of contributions from the

German Agency for Technical Cooperation (GTZ), accounted for over one third of total income in 1985, but its share declined rapidly thereafter and in the past few years INZV has received no donor support. IRCT's sources of funds differ from that of the other institutes in that donor funding is somewhat more important. Both the government of Togo and the Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD) in France contributed a similar amount of support to IRCT's operations during the 1985-91 period. The rest of IRCT's income is generated from projects conducted for SOTOCO. Only a minor share (between 2-3%) of its total income is generated through sales.

Table 8: *Sources of Funds*

Institute	Source of Funding	1985	1986	1987	1988	1989	1990	1991
		<i>(percentages)</i>						
INTA	Government	100	100	100	100	87.8	73.7	85.2
	Sales	0	0	0	0	0	0	2.3
	Donors	0	0	0	0	0	11.3	0
	Other	0	0	0	0	12.2	15.0	12.5
	<i>Total</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>
INZV	Government	36.2	46.1	42.2	52.6	57.5	58.2	57.1
	Sales	26.4	33.2	35.8	40.1	42.5	41.8	42.9
	Donors	37.5	20.7	22.1	7.4	0	0	0
	<i>Total</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>
INS	Government	91.4	95.3	99.2	92.3	91.9	89.0	81.8
	Sales	8.6	4.7	0.8	5.8	3.4	3.4	10.8
	Donors	0	0	0	2.0	4.6	7.6	7.5
	<i>Total</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>
IRCT	Government	29.7	31.1	33.3	32.8	33.6	36.2	36.9
	Sales	2.4	2.9	2.3	2.1	3.0	2.8	2.8
	Donors	29.7	31.0	33.3	32.8	33.6	36.2	36.9
	Other	38.1	35.0	31.2	32.3	29.8	24.7	23.4
	<i>Total</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>

Source: 999.

3.4 Research Focus

An overview of the research orientation of Togo's NARS is presented in table 9. In 1991, almost one half of the fte researchers worked on food crops, while almost one quarter focused on cash crops research. Research on natural resources accounted for 15.5%, livestock for 7.1%, and forestry for 2.5% of the total. The remaining 4.0% of total time spent on agricultural research could not be allocated to a particular area of research.

Because the table excludes data for DPF and DEP, for which no personnel data were available, there is no indication of the amount of time spent on fisheries and forestry research. The exception is the 2.2 fte researchers working for INS directed toward agroforestry research.

Table 9: *Research Focus, 1991*

	INTA	INZV	INCV	INS	IRCC	IRCT	DPV	ESA	Total	
									FTE	Share
	<i>(full-time equivalents)</i>									%
Food crops	0	0	33.0	0	0	0	8.4	0.4	41.8	48.0
Cash crops	0	0	0	0	9.0	11.0	0	0	20.0	23.0
Livestock	0	6.0	0	0	0	0	0	0.2	6.2	7.1
Forestry ^a	0	0	0	2.2	0	0	0	0	2.2	2.5
Fisheries ^a	0	0	0	0	0	0	0	0	0	0
Natural resources	0	0	0	13.2	0	0	0	0.3	13.5	15.5
Other	3.0	0	0	0	0	0	0	0.5	3.5	4.0
<i>Total</i>	<i>3.0</i>	<i>6.0</i>	<i>33.0</i>	<i>15.4</i>	<i>9.0</i>	<i>11.0</i>	<i>8.4</i>	<i>1.3</i>	<i>87.1</i>	<i>100</i>

Source: 999.

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 unallocatable soils, land use, and water research.

^a Data for (forestry research) and DEP (fisheries research) were not available and thereby omitted from these figures.

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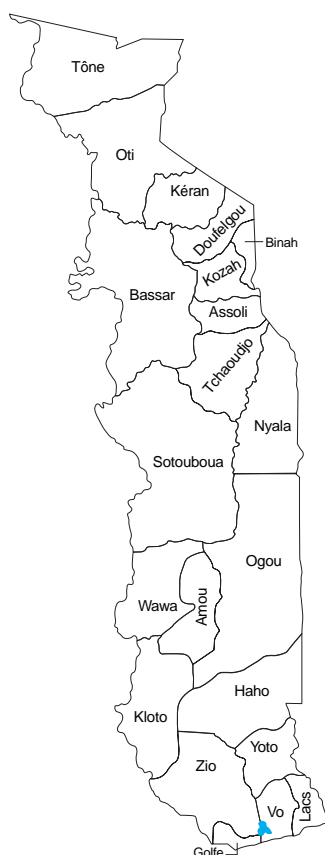
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Appendix 1: Country background information



Geography

Area: 5.7 million ha

Location: a narrow strip bordered by Benin on the east, Burkina Faso on the north and Ghana on the west. It has only a small coastline on its southern edge.

Agroecological features: half of the country is covered with ferruginous soils of little fertility, the most fertile soils occur in the forests.

Togo has a tropical and humid climate in the south. In the north the temperature fluctuations are greater than in the south. The rainy seasons last from mid-April to mid-July in the north and from October to November in the south. The average rainfall varies from 600-900 mm in the dry coastal regions to 1800 mm annually in the south.

The southern region is covered with dense tropical forests. Elsewhere the natural vegetation is chiefly of the savannah-type. Almost one-fourth of the country's land area is arable.

Population

Total (1991): 3.8 million

Annual growth rate (1981-90)^a: 3.4%

Literacy (1990): 43.3%

Life expectancy (1991): 54 years

Economy (values reported in 1985 PPP dollars)

Gross Domestic Product (1991): 2,356 million dollars

Per capita GDP (1991): 625 dollars

Agricultural GDP (1991): 838 million dollars

Share of agriculture in GDP (1991): 35.6%

Annual growth rates (1981-90)^a

GDP: 2.4%

GDP per capita: -1.0%

AgGDP: 6.2%

Trade (values reported in current dollars)

Net surplus total trade (1991): -322 million dollars

Net surplus agricultural trade (1991): -59 million dollars

Percentage of agricultural imports in total imports: 22.9%

Percentage of agricultural exports in total exports: 28.3%

Major import commodities (1992)^b: wheat (24%), fishery products (22%), rice (11%), refined sugar (9%), concentrated milk (7%), and forestry products (6%)

Major export commodities (1992)^b: cotton lint (74%), coffee (13%), and cocoa beans (5%)

Agriculture

Agricultural land (1990): 2.5 million ha

Annual growth rate (1981-90)^a: 0.2%

Percentage arable: 24.4%

Percentage permanent crop: 2.8%

Percentage permanent pastures: 72.8%

Percentage irrigated arable and permanent cropland: 1.0%

Economically active agricultural population (1991): 1.0 million

Annual growth rate (1981-90)^a: 1.8%

Percentage in total economically active population: 69.2%

Fertilizer use per ha arable land (1990): 17.2 kg

Annual growth rate (1981-90)^a: 27.5%

Major crops (in decreasing order of value of production): yams, maize, cotton lint, coffee, cassava, and dry beans

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

^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; or (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).

Expatriate Researcher Costs

Many expatriate researchers working on donor-supported projects in NARSs are paid their salaries and living expenses directly by the donor agency. All (or some substantial fraction) of these costs do not get included in the financial reports of the agricultural research organizations. To calculate these *implicit* costs we took the average cost per researcher in 1985 to be 120,000 “1985 PPP dollars” and backcast 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 makes the assumption that the personnel-cost trend for US researchers is a reasonable proxy of the trend in real costs of internationally recruited staff working in NARSs. Unless otherwise stated, FTE expatriate researchers were costed at \$80,000 “1985 PPP dollars” per researcher for the 1961-65 period, \$85,000 per researcher for 1966-70, \$90,000 per researcher for 1971-75, \$110,000 per researcher for 1976-80, and \$120,000 per researcher for 1981-91.

Deflators and Exchange Rates

All expenditure figures were first compiled in current local currency units (appendix 5). 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).

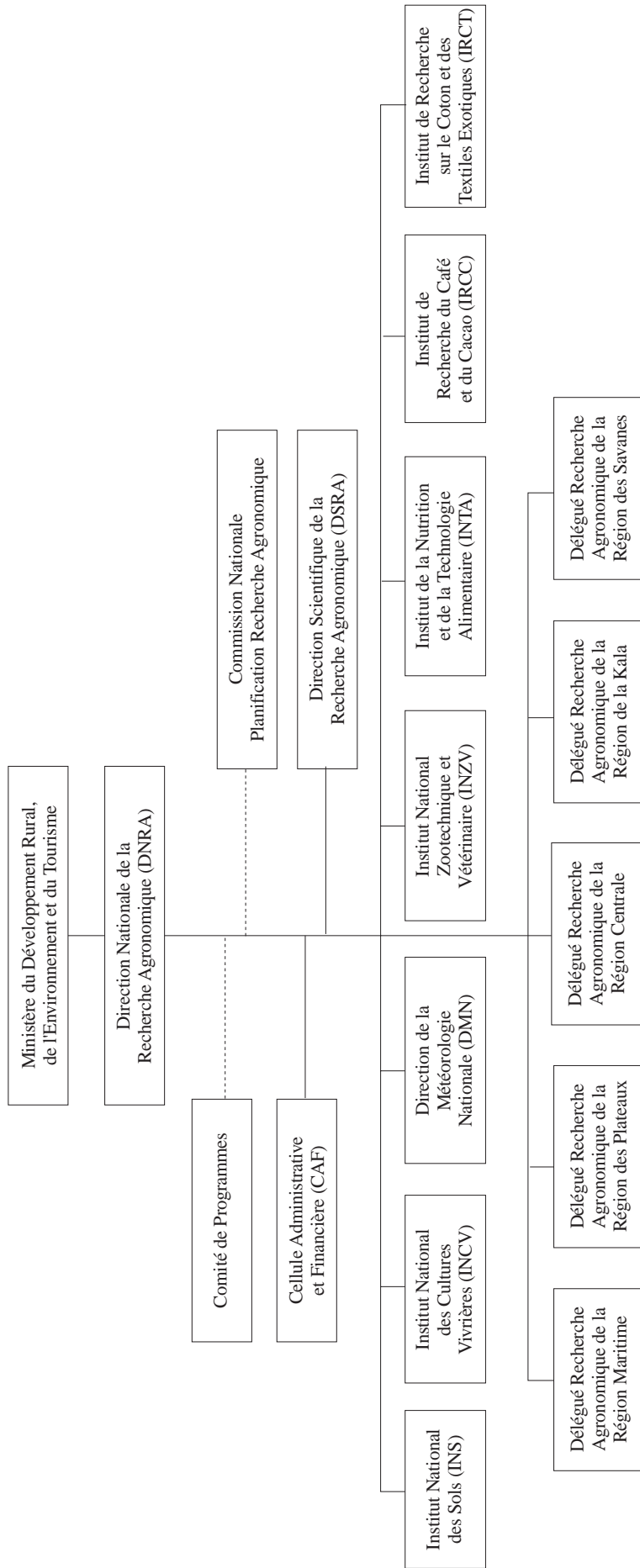
Nomenclature for tables in text

A zero indicates an actual observation of zero, a dash indicates an observation is not relevant (due to institutional mergers, closures, and so on), while “na” indicates an observation that is not available.

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

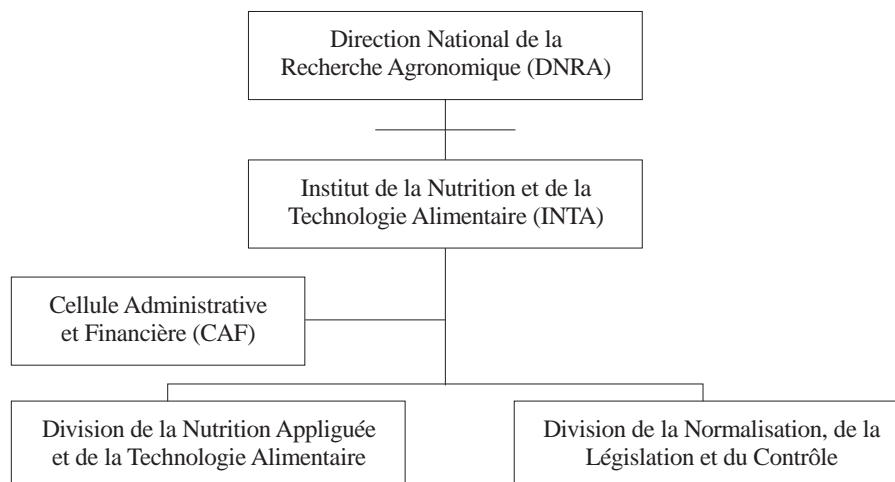
Appendix 3: Organizational charts of the agricultural research institutes

Direction Nationale de la Recherche Agronomique (DNRA) (1994)



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

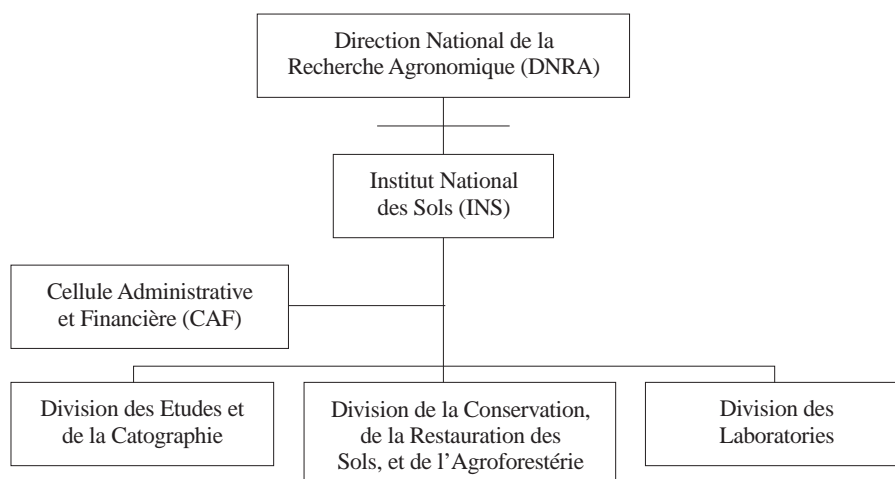
Institut de la Nutrition et de la Technologie Alimentaire (INTA) (1994)



Institut National Zootechnique et Vétérinaire (INZV) (1994)

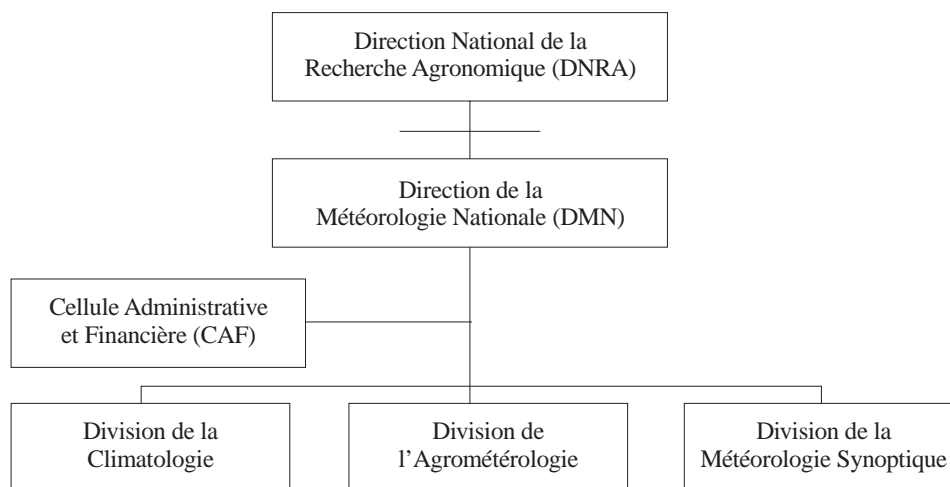


Institut National des Sols (INS) (1994)

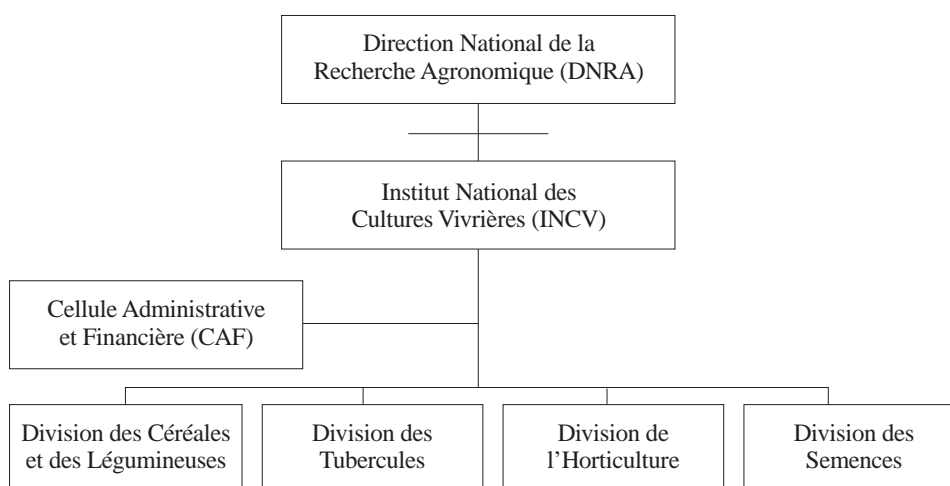


Appendix 3: Organizational charts of the agricultural research institutes (cont.)

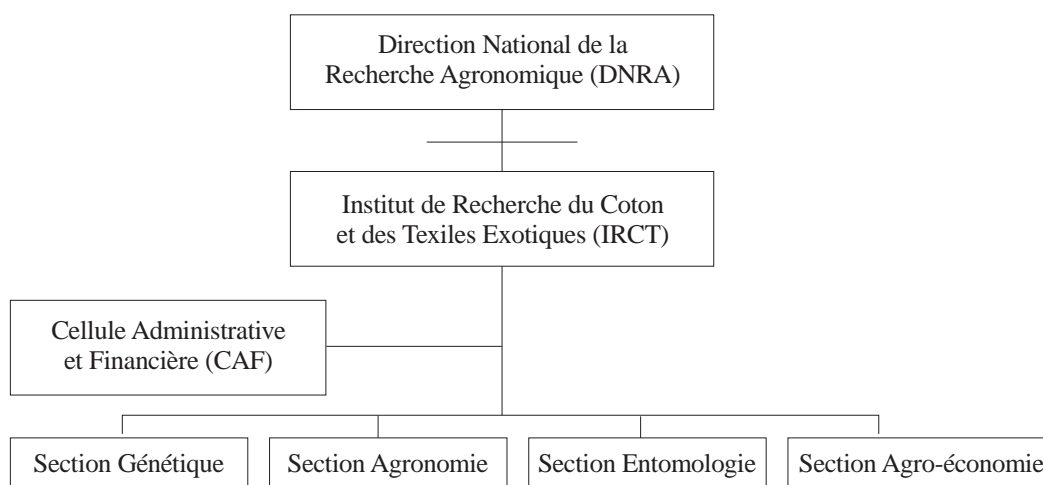
Direction de la Météorologie Nationale (DMN) (1994)



Institut National des Cultures Vivrières (INCV) (1994)

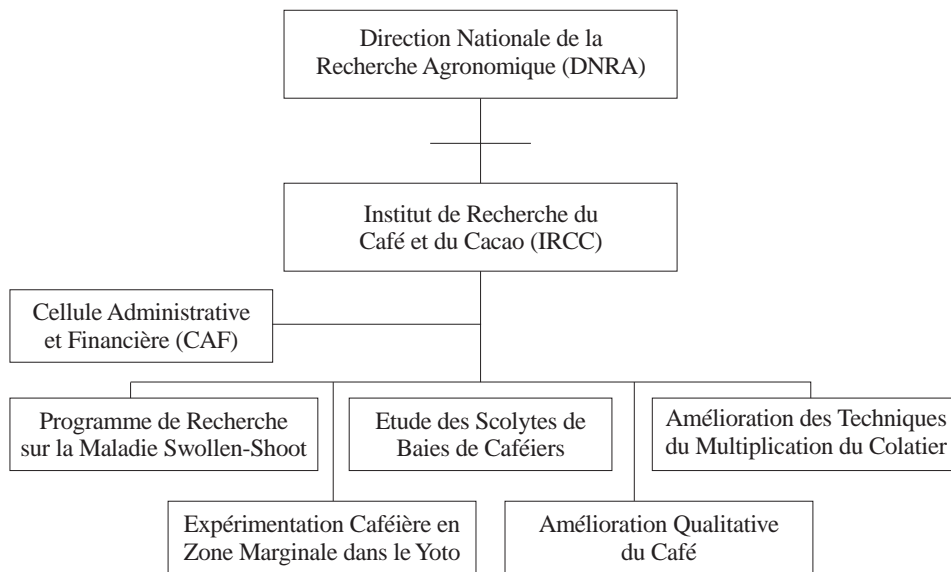


Institut de Recherche du Coton et des Textiles Exotiques (IRCT) (1994)

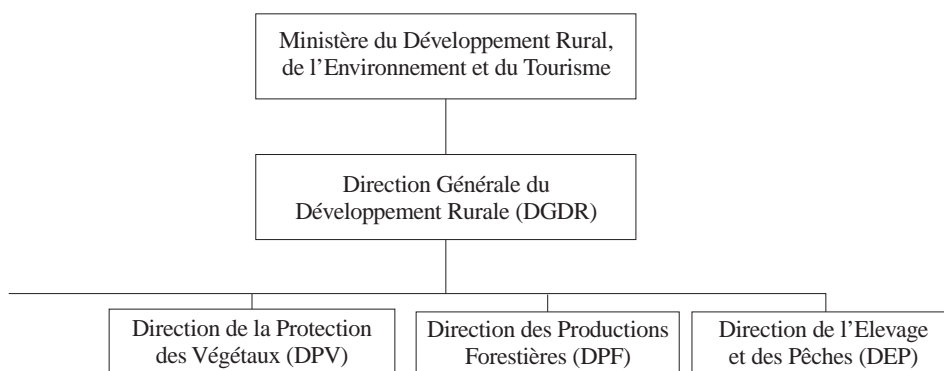


Appendix 3: Organizational charts of the agricultural research institutes (cont.)

Institut de Recherche du Café et du Cacao (IRCC)



Direction Générale du Développement Rural (DGDR) (1991)



Appendix 4: Addresses of the agricultural research institutes

Direction Nationale de la Recherche Agronomique (DNRA) Ministère du Développement Rural, de l'Environnement et du Tourisme B.P. 2318 Lomé TOGO	Institut de Recherche du Coton et des Textiles Exotiques (IRCT) B.P. 3300 Lomé TOGO
Institut de la Nutrition et de la Technologie Alimentaire (INTA) B.P. 1242 Lomé TOGO	Direction de la Protection des Végétaux (DPV) Direction Générale du Développement Rural Ministère du Développement Rural, de l'Environnement et du Tourisme Lomé TOGO
Institut National Zootechnique et Vétérinaire (INZV) B.P. 27 Agou-Gare TOGO	Direction de l'Elevage et des Pêches (DEP) Direction Générale du Développement Rural Ministère du Développement Rural, de l'Environnement et du Tourisme Lomé TOGO
Institut National des Cultures Vivrières (INCV) B.P. 2318 Lomé TOGO	Direction des Productions Forestières (DPF) Direction Générale du Développement Rural Ministère du Développement Rural, de l'Environnement et du Tourisme Lomé TOGO
Institut National des Sols (INS) B.P. 1026 Lomé TOGO	Ecole Supérieure d'Agronomie (ESA) Université du Bénin B.P. 1515 Lomé TOGO
Direction de la Météorologie Nationale (DMN) B.P. 1505 Lomé TOGO	
Institut de Recherche du Café et du Cacao (IRCC) B.P. 90 Kpalime TOGO	

Appendix 5: Researcher and research expenditure totals, 1961-91

Total Number of Researchers																	
Name country: Togo																	
Category	Name Institute	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Government	INTA	—	—	—	—	—	—	—	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4
	INZV	—	—	—	0.1	0.2	0.3	0.4	0.5	0.7	1.0	1.1	1.0	1.1	1.2	1.3	1.4
	INCV	0.3	0.7	1.0	1.3	1.7	2	1.8	1.5	1.3	1	1.6	3.2	3.9	4.7	5.4	6.1
	INS	—	—	—	0.3	0.6	0.9	1.1	1.4	1.7	2	2.2	2.5	2.8	3.0	3.2	3.5
	IRCC	—	—	—	—	—	—	—	2	2.5	3	3	4	4	4	4	4.5
	IRCT	2	3	3	3	3	3	4	4	4	3	4	4	4	3	5	5
	DPV	—	—	—	0.4	0.8	1.2	1.6	2.0	2.4	2.8	2.7	2.7	2.6	2.5	2.5	2.4
Government subtotal		2.3	3.7	4.0	5.1	6.3	7.4	11.0	12.1	13.4	13.0	15.0	18.1	19.2	19.5	22.6	24.3
Academic	ESA	—	—	—	—	—	—	—	—	—	—	—	0.1	0.2	0.4	0.5	0.6
TOTAL		2.3	3.7	4.0	5.1	6.3	7.4	11.0	12.1	13.4	13.0	15.0	18.2	19.5	19.9	23.1	24.9
Sources:		1262	1262	1262	1262	1262	653; 1262	1349; 1262	1262	1349; 1262	532; 1349; 1262	1349; 1262	431; 1349; 1262	1349; 1262	1349; 1262	1349; 1262	1262
Category	Name Institute	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Government	INTA	1.5	1.7	1.8	2	2.0	2.0	2.0	2	4	3.5	3.5	3.5	3.5	3.5	3.0	
	INZV	1.5	1.6	1.7	2	1.9	2.0	2.0	2.1	3	5.5	7	8	8	7	6	
	INCV	6.8	7.6	8.3	9	10.0	11.0	12.0	13.0	16.4	19.8	23.2	26.6	30	33	33	
	INS	3.8	4.0	4.2	4	5.1	5.8	6.4	7	8	9.5	13.3	14.0	14.0	14.0	15.4	
	IRCC	5	6	6	9	8	8	8	8	11	11	12.0	10.0	9.0	9.0	9.0	
	IRCT	7	6	6	6	6.0	6.0	6.0	6	6	11	9	11	11	11	11	
	DPV	2.4	2.3	2.2	2	3.0	3.8	4.7	5.6	6.0	6.4	6.8	7.2	7.6	8.0	8.4	
Government subtotal		27.9	29.2	30.3	34.4	36.0	38.6	41.1	43.7	57.4	64.7	74.8	80.3	83.1	85.5	85.8	
Academic	ESA	0.8	0.9	1.0	1.1	1.2	1.2	1.2	1.2	1.1	1.2	1.3	1.3	1.3	1.2	1.3	
TOTAL		28.7	30.0	31.3	35.5	37.2	39.8	42.3	44.8	58.5	65.8	76.1	81.6	84.4	86.8	87.1	
Sources:		1349; 1262	1349; 1262	1349; 1262	86; 1349	1349	1350; 979	1350	86	999	999	999	999; 1350	999; 1314; 1350	999; 1350	999; 1270; 1350	999; 1270; 1350

Appendix 5: Researcher and research expenditure totals, 1961-91 (contd.)

Total Research Expenditures		Currency: CFA															
Name country: Togo	Name institute	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Government	INTA	—	—	—	—	—	—	—	na	na	na	4,410	5,333	7,005	9,640	12,750	15,242
	INZV	—	—	—	na	na	na	na	na	na	na	15,631	17,012	20,689	26,847	33,892	39,017
	INCV	na	na	na	na	na	na	na	na	na	na	52,791	102,145	136,257	193,710	257,551	309,168
	INS	—	—	—	na	na	na	na	na	na	na	16,500	17,624	19,295	28,992	29,124	34,683
	IRCC	—	—	—	—	—	—	—	na	na	na	45,085	55,563	71,134	115,213	132,695	
	IRCT	na	na	na	na	na	na	na	na	na	na	52,477	52,074	49,938	49,707	74,020	78,868
	DPV	—	—	—	na	na	na	na	na	na	na	23,121	24,437	26,851	32,138	36,242	37,985
Government subtotal		na	na	na	na	na	na	na	—	—	—	210,015	274,188	331,169	416,369	558,791	647,659
Academic	ESA	—	—	—	—	—	—	—	—	—	—	—	1,062	2,391	4,400	6,785	9,124
Total (current CFA)		na	na	na	na	na	na	na	na	na	na	210,015	275,250	333,560	420,769	565,577	656,783
GDP deflator (1985=100)		26.56	24.75	25.83	28.53	28.15	29.67	30.10	30.18	31.61	31.04	34.85	34.59	35.53	50.52	48.35	55.19
Total (constant 1985 CFA)												602,564	795,854	938,785	832,936	1169,702	1190,006
Total (constant 1985 PPP dollars)												3,659	4,832	5,700	5,057	7,102	7,225
Sources:												589;	1351;	1351	1351	1351	
												1351	431				
Government	INTA	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
	INZV	18,662	17,109	18,305	21,235	23,638	25,020	28,143	28,185	28,714	31,158	29,712	29,655	33,316	39,968	32,420	
	INCV	46,302	41,346	43,253	49,212	54,917	58,179	65,402	73,633	76,678	120,214	153,654	163,593	161,152	146,059	144,498	
	INS	379,783	353,762	378,898	439,960	402,185	346,088	313,874	251,690	284,549	315,868	327,710	336,819	334,351	330,000	340,638	
	IRCC	43,623	39,523	43,703	49,470	55,917	59,203	65,826	64,540	58,546	86,667	135,623	141,693	163,312	143,152	170,054	
	IRCT	160,237	151,207	145,685	216,290	194,454	187,008	191,125	221,835	252,818	253,659	341,695	383,346	371,064	382,338	394,662	
	DPV	124,892	87,613	87,855	90,500	113,340	134,967	170,800	112,100	232,712	265,915	261,460	315,087	311,320	355,484	291,552	
Government subtotal		46,010	38,019	36,761	36,400	50,191	60,113	72,559	75,306	29,714	35,127	34,267	34,133	32,363	31,262	30,014	
Academic	ESA	819,510	728,579	754,460	903,067	894,642	870,578	907,730	827,289	963,731	1108,607	1284,121	1404,325	1406,878	1428,262	1403,838	
		13,620	13,495	15,339	18,122	19,203	17,527	16,529	13,626	12,000	12,000	12,000	14,000	18,000	18,000	19,000	
Total (current CFA)		833,130	742,074	769,798	921,189	913,845	888,105	924,259	840,915	975,731	1120,607	1296,121	1418,325	1424,878	1446,262	1422,838	
GDP deflator (1985=100)		66.88	58.64	62.99	69.51	78.39	84.05	95.77	97.17	100.00	105.59	107.36	110.52	111.71	115.10	118.81	
Total (constant 1985 CFA)		1245,756	1265,570	1222,124	1325,261	1165,835	1056,646	965,040	865,413	975,731	1061,321	1207,249	1283,317	1275,523	1256,491	1197,536	
Total (constant 1985 PPP dollars)		7,564	7,684	7,420	8,047	7,079	6,416	5,859	5,255	5,924	6,444	7,330	7,792	7,745	7,629	7,271	
Sources:					86			86; 1352	86; 1352	999;	999;	999;	999;	999;	999;	999;	
										1352	1352	1352	1352	1352	1243	1241	

Appendix 6: Research staff development by institute, 1961-91

Direction de la Protection des Vegetaux (DPV)																
	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Nationals																
PhD																
MSc																
BSc																
Subtotal																
Expatriates																
Total	—	—	—	0.6	1.1	1.7	2.3	2.9	3.4	4	3.9	3.8	3.7	3.6	3.5	3.5
FTE Research	—	—	—	0.4	0.8	1.2	1.6	2.0	2.4	2.8	2.7	2.7	2.6	2.5	2.5	2.4
Source	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Nationals																
PhD																
MSc																
BSc																
Subtotal				3	4.3	5.5	6.8	8	8.6	9.1	9.7	10.3	10.9	11.4	12.0	
Expatriates				0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	3.4	3.3	3.2	3	4.3	5.5	6.8	8	8.6	9.1	9.7	10.3	11.9	11.4	8.4	
FTE Research	2.4	2.3	2.2	2.1	3.0	3.9	4.7	5.8	6.0	6.4	6.8	7.2	7.6	8.0	8.4	
Source				86				86							1314	

Notes: The time spent on research by DPV has been estimated at 70%.

Ecole Supérieure d'Agronomie (ESA), Université du Bénin et Togo																
	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Nationals																
PhD																
MSc																
BSc																
Subtotal																
Expatriates																
Total	—	—	—	—	—	—	—	—	—	—	—	2.5	5.0	7.5	10.0	12.5
FTE Research	—	—	—	—	—	—	—	—	—	—	—	0.1	0.3	0.4	0.5	0.6
Source	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Nationals																
PhD						13	14.3	15.7	17	18	19	19	19	19	20	
MSc						2	2.0	2.0	2	2	4	4	4	5	5	
BSc						3	2.0	1.0	0	0	0	0	0	0	0	
Subtotal						18	18.3	18.7	19	20	23	23	23	24	25	
Expatriates						7	5.7	4.3	3	3	3	3	3	1	1	
Total	15.0	17.5	20.0	22.5	25.0	25	24.0	23.0	22	23	26	26	26	25	26	
FTE Research	0.8	0.9	1.0	1.1	1.3	1.3	1.2	1.2	1.1	1.2	1.3	1.3	1.3	1.3	1.3	
Source						979			999	999	999	999	999	999	999	

Notes: The time spent on research by ESA has been estimated at 5%.

Appendix 6: Research staff development by institute, 1961-91 (contd.)

Institut National des Soils (INS)	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Nationals																
PhD																
MSc																
BSc																
Subtotal																
Expatriates																
Total	—	—	—	0.6	1.1	1.7	2.3	2.9	3.4	4	4.5	5.0	5.5	6.0	6.5	7.0
FTE Research	—	—	—	0.3	0.6	0.9	1.1	1.4	1.7	2.0	2.2	2.5	2.8	3.0	3.2	3.5
Source	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Nationals																
PhD									2	2	2	2	2	2	2	1
MSc									11	12	12	12	12	11	12	
BSc									3	4	4	4	4	5	5	
Subtotal				9	10.2	11.5	12.8	14	16	18	18	18	18	18	18	18
Expatriates				0	0	0	0	0	0	1	1	2	2	2	4	
Total	7.5	8.0	8.5	9	10.2	11.5	12.8	14	16	19	19	20	20	20	22	
Source	3.8	4.0	4.2	4.5	5.1	5.8	6.4	7.0	8.0	9.5	13.3	14.0	14.0	14.0	15.4	

Notes: Former Direction des Etudes Pedologiques et de l'Ecologie Generale (DEPEG). The time spent on agricultural research by INS has been estimated at 50% during 1961-86 and 70% during 1987-91.

Institut de Recherche du Cafe et du Cacao (IRCC)	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Nationals																
PhD																
MSc																
BSc																
Subtotal							1	1.5	2	2	2	3	3	3	3	2.5
Expatriates							1	1	1	1	1	1	1	1	1	2.0
Total	—	—	—	—	—	—	2	2.5	3	3	3	4	4	4	4	4.5
Source	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Nationals																
PhD																
MSc																
BSc																
Subtotal	2	4	3	6	5	5	5	5	7	7	9	7	5	6	6.0	
Expatriates	3	2	3	3	3	3	3	3	4	4	3	3	4	3	3.0	
Total	5	6	6	9	8	8	8	8	11	11	12	10	9	9	9.0	
Source	1349	1349	1349	1349	1349	1350	1350	1350	1350	1350	1350	1350	1350	1350	1350	

Notes: Data include 'Ingenieur Adjoint'.

Appendix 6: Research staff development by institute, 1961-91 (contd.)

Institut de Recherche du Coton et des Textiles Exotiques (IRCT)																
	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Nationals																
PhD																
MSc																
BSc																
Subtotal	0	0	0	0	0	1	0	0	0	1	2	2	2	2	2	2
Expatriates	2	3	3	3	3	2	4	4	4	2	2	2	2	1	3	3
Total	2	3	3	3	3	3	4	4	4	3	4	4	4	3	5	5
Source	1262	1262	1262	1262	1262	1262	1262	1262	1262	1262	1262	1262	1262	1262	1262	1262
	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Nationals																
PhD									4	4	4	3	3	3	3	
MSc									1	1	1	0	3	3	3	
BSc									0	0	0	0	0	0	0	
Subtotal	3	3	3	3	3.0	3.0	3.0	3	5	5	5	6	6	6	6	
Expatriates	4	3	3	3	3.0	3.0	3.0	3	4	4	4	5	5	5	5	
Total	7	6	6	6	6.0	6.0	6.0	6	9	9	9	11	11	11	11	
Source	1262	1262	1262	86				86	999	999	999	999	999	999	999/1270	

Institut National de la Nutrition et de la Technologie Alimentaire (INTA)																
	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Nationals																
PhD																
MSc																
BSc																
Subtotal																
Expatriates																
Total	--	--	--	--	--	--	--	0.3	0.6	0.9	1.2	1.5	1.8	2.2	2.5	2.8
FTE Research	--	--	--	--	--	--	--	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4
Source	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Nationals																
PhD									2	0	0	0	0	0	1	
MSc									2	3	3	3	3	3	3	
BSc									4	4	4	4	4	4	4	
Subtotal				4	4.0	4.0	4.0	4	8	7	7	7	7	7	6	
Expatriates				0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	
Total	3.1	3.4	3.7	4	4.0	4.0	4.0	4	8	7	7	7	7	7	6	
FTE Research	1.5	1.7	1.8	2.0	2.0	2.0	2.0	2.0	4.0	3.5	3.5	3.5	3.5	3.5	3.0	
Source				86				86	999	999	999	999	999	999	999	

Notes: Former Direction Nationale de Technologie Alimentaire (DNITA). The time spent on research by INTA has been estimated at 50%.

Appendix 6: Research staff development by institute, 1961-91 (contd.)

Institut National Zootechnique et Veterinaire (INZV)		1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Nationals																	
PhD																	
MSC																	
BSc																	
Subtotal																	
Expatriates																	
Total					0.4	0.7	1.1	1.4	1.8	2.1	2.5	2.8	3.2	3.5	3.9	4.2	4.6
FTE Research					0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	1.1	1.2	1.3	1.4
Source																	
Nationals	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	
PhD																	
MSC																	
BSc																	
Subtotal					3	3.2	3.5	3.8	4	5	7	6	6	6	6	6	
Expatriates					3	3.0	3.0	3.0	3	5	4	4	2	2	1	0	
Total	4.9	5.3	5.6	6	6.2	6.5	6.8	7	10	10	11	10	8	8	7	6	
FTE Research	1.5	1.6	1.7	1.8	1.9	2.0	2.0	2.0	2.1	3.0	5.5	7.0	8.0	8.0	7.0	6.0	
Source					86	999	999	86	999	999	999	999	999	999	999	999	

Notes: Former Centre de Recherche et d'Elevage d'Avetonou. The time spent on research by INZV has been estimated at 30% for the period 1961-85, 50% for 1986, 70% for 1987, and 100% for the period 1988-91.

Institut National des Cultures Vivrieres (INCV)		1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Nationals																	
PhD																	
MSC																	
BSc																	
Subtotal																	
Expatriates																	
Total																	
Source																	
Nationals	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	
PhD																	
MSC																	
BSc																	
Subtotal					6	6.8	7.5	8.2	9	12.8	16.6	20.4	24.2	28	31	31	
Expatriates					3	3.2	3.5	3.8	4	3.6	3.2	2.8	2.4	2	2	2	
Total	6.8	7.6	8.3	9	10.0	11.0	12.0	13	16.4	19.8	23.2	26.6	30	33	33		
Source					86	999	999	86	999	999	999	999	999	999	999	999	

Notes: In 1991 the Direction de la Recherche Agronomique (DRA), the Institut des Plantes a Tubercules (INPT), and the Institut de Recherches Agronomique Tropicale (INTA) were merged into INCV.

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