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**Statistical Brief on the National Agricultural Research System**

**of**

**COTE D'IVOIRE**

Johannes Roseboom  
Philip G. Pardey

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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# Contents

1.	Introduction	1
2.	Agricultural Research Institutions	2
	2.1 Historical Evolution	2
	2.2 Present Structure	6
3.	NARS Statistics	6
	3.1 Long-Term Development	9
	3.2 Human Resources	10
	3.3 Financial Resources	13
	3.4 Research Focus	16
	Bibliography	18
	Appendix 1: Country background information	22
	Appendix 2: Definitions and concepts	23
	Appendix 3: Organizational charts of the agricultural research institutes	25
	Appendix 4: Addresses of the agricultural research institutes	28
	Appendix 5: Researcher and research expenditure totals, 1961-91	29
	Appendix 6: Research staff development by institute, 1961-91	31

# Acronyms

AOF	Afrique Occidentale Française	IREN	Institut de Recherche sur les Energies Nouvelles
CGIAR	Consultative Group on International Agricultural Research	IRFA	Institut de Recherche sur les Fruits et Agrumes
CIDT	Compagnie Ivoirienne pour le Développement des Textiles	IRHO	Institut de Recherches sur les Huiles de Palme et Oléagineux
CIMA	Centre Ivoirien du Machinisme Agricole	ISNAR	International Service for National Agricultural Research
CIRAD	Centre de Coopération Internationale de Recherche Agronomique pour le Développement	IUET	Institut Universitaire d'Ecologie Tropical
CIRES	Centre Ivoirien de Recherches Economiques et Sociales	LCNA	Laboratoire Central de Nutrition Animale
CIRT	Centre Ivoirien de Recherches Technologiques	LPA	Laboratoire de Pathologie Animale
CNF	Centre National de Floristique	MESRS	Ministère de l'Enseignement Supérieur et Recherche Scientifique
CRO	Centre de Recherches Océanographiques	NARS	National Agricultural Research System
CRZ	Centre de Recherches Zootechniques	OECD	Organization of Economic Coordination and Development
CTFT	Centre Technique Forestier Tropical	ORSTOM	Office de la Recherche Scientifique et Technique Outre-Mer
DBBV	Département de Botanique et Biologie Végétale	PALMIN-	Gestion des Plantations Industrielles
DBIOCH	Département de Biochimie	DUSTRIE	Palmier et Cocotier et Industrialisation des Oléagineux et des Corps Gras
DBPA	Département de Biologie et Physiologie Animale	SATMACI	Société d'Assistance Technique pour la Modernisation de l'Agriculture en Côte d'Ivoire
DST	Département des Sciences de la Terre	SODEFEL	Société d'Etat pour le Développement des Fruits et Légumes
ENSA	Ecole Nationale Supérieure Agronomique	SODEFOR	Société d'Etat pour le Développement des Plantations Forestières
FAO	Food and Agriculture Organization	SODEPALM	Société d'Etat pour le Développement du Palmier à Huile
FAST	Faculté des Sciences et Techniques	SODEPRA	Société d'Etat pour le Développement des Productions Animales
FTE	Full-Time Equivalent	SODESUCRE	Société Etat pour le Développement des Plantations de Canne à Sucre, l'Industrialisation et la Commercialisation du Sucre
GERDAT	Groupement d'Etudes et de Recherches pour le Développement de l'Agronomie Tropicale	SUCRE	Section Technique d'Agronomie Tropicale
IDEFOR	Instituts des Forêts	STAT	West African Rice Development Association
IDESSA	Institut des Savanes	WARDA	
IEMVT	Institut d'Elevage et de Médecine Vétérinaire Tropicale		
IFCC	Institut Français du Café et du Cacao		
IGT	Institut Géographie Tropical		
IIRSDA	Institut International de Recherche Scientifique pour le Développement en Afrique		
INAC	Institut National d'Agronomie Coloniale		
INSE	Institut National des Sciences Ecologiques		
IRAT	Institut de Recherches Agronomiques Tropicales et des Cultures Vivrières		
IRCA	Institut de Recherches sur le Caoutchouc en Afrique		
IRCC	Institut de Recherches sur le Café, le Cacao et Autres Plantes Stimulantes		
IRCPS	Institut de Recherche sur la Canne et les Plantes Sucrières		
IRCT	Institut de Recherches sur le Coton et Textiles Exotiques		

## 1. Introduction

The primary purpose of this brief is to provide statistical and institutional details on the development and current status of the public agricultural research system in Côte d'Ivoire. 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 NARS of Côte d'Ivoire. 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 Côte d'Ivoire we refer to appendix 1.

## 2. Agricultural Research Institutions

### 2.1 Historical Evolution<sup>1</sup>

Following Portuguese discoveries in the second half of the 15th century, the coastal area of West Africa of what now constitutes Côte d'Ivoire was frequented by European ivory and slave traders. Towards the end of the 17th century French trading posts were established on the coast at Assinie and Grand Bassam. After 1870, the French area of influence expanded rapidly and was ratified through a series of treaties signed with local chiefs. In 1893 Côte d'Ivoire became a French colony although it took until 1918 before the French had control over the entire country that at this time also included a part of Burkina Faso. In 1895, a federation of French colonies in West Africa (AOF - Afrique Occidentale Française) was established. A federal government was set up at Dakar in Senegal.

#### *Government Sector*

The first formal agricultural research activities in Côte d'Ivoire date back to the establishment of the “jardins d'essais” (experimental gardens) at Dabou (1893) and Bingerville (1900). An experimental garden with a federation-wide mandate was established at Hann, near Dakar, in 1903. At the turn of the century a Jardin Colonial was also established at Nogent-sur-Marne near Paris as the metropolitan center for the experimental gardens throughout the French colonies. In 1902 the Ecole Supérieure de l'Agriculture Tropicale was established at the same location near Paris. The garden and the school were merged to become the Institut National d'Agronomie Coloniale (INAC) in 1921.

After World War I most of the experimental gardens evolved into experiment stations that, in contrast with the diverse botanical collections of the gardens, often focused their research on only a few crops. The experimental garden at Bingerville, for example, evolved into an experiment station for coffee and cacao, and the one at Dabou into an oilpalm experiment station. In addition, new stations such as an oilpalm experiment station at Lamé were established. What evolved during the 1920s and 1930s was an agricultural research system with a mixture of federal (i.e., AOF) and local experiment stations that were strongly commodity oriented. The work in these stations was backstopped by the Institut National d'Agronomie Coloniale (INAC) and the Institut d'Elevage et de Médecine Vétérinaire des Pays Tropicaux (IEMVT) in France. IEMVT was created in 1928 as a research and training institute based at Alfort, near Paris.

In the aftermath of World War II, this research system changed drastically. Many of the commodity stations were merged into new, metropolitan-based, tropical research institutes, while the stations primarily focusing on food crops and livestock remained under the authority of the AOF and its constituent local governments and were backstopped by STAT,<sup>2</sup> IEMVT, and the Centre Technique Forestier Tropical (CTFT). IRHO (oilpalm and coconut), IRCT

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1 This section draws largely from Angladetie (1988), IRAT (1990), ISNAR (1982 and 1984), UNESCO (1986), D. Etounga-Manguelle (1992), and Ouayogode (1993).

2 In 1940, INAC's research and training activities were administratively separated. The research activities were grouped within the Section Technique d'Agronomie Tropicale (STAT), which in the 1950s was merged with ORSTOM. In 1960, the antecedents of this section formed the basis for the creation of IRAT.

(cotton), and IFAC (fruits) initiated research activities in Côte d'Ivoire in 1946, IRCA (rubber) in 1956, and IFCC (coffee and cacao) in 1957.

In addition, a Comité de Coordination et de Contrôle des Recherches Agronomiques et de la Production Agricole was created by AOF in 1949. This committee was given responsibility for determining the agricultural research priorities of the federation, coordinating and evaluating the federation's research and extension activities, and scrutinizing the budgets for these activities.

As a result of the committee's efforts, the research done throughout the federation, other than that undertaken by the French commodity institutes, was consolidated around four principal research centers: Bambey (Senegal), Bingerville (Côte d'Ivoire), Hann (Senegal), and Sotuba (Mali). Bambey focused on food and cash crops for the Sudan region, Bingerville on food and cash crops for the subtropical and subequatorial zones, Hann on animal health and nutrition, and Sotuba on animal breeding, nutrition, and fodder crops. Attached to these regional centers were experiment stations located throughout the federation.

When the French colonies throughout West Africa gained political independence in the late 1950s, the regional research system collapsed. In Côte d'Ivoire, Bingerville became the central laboratories of IFCC, while most of the experiment stations were integrated into the Service des Etudes et de l'Experimentation Agricoles of the Ministère de l'Agriculture. However, at the time of independence most of the agricultural research facilities in Côte d'Ivoire were managed and staffed by the French tropical research institutes. Since the country did not have the trained staff to take over these research programs, bilateral agreements were signed with France in which the management of the stations and their research programs was delegated to these French institutes. It was agreed that the funding of the stations would be shared. In 1963 the French research institutes were consolidated to form GERDAT (Groupement d'Etudes et de Recherches pour le Développement de l'Agronomie Tropicale), which in 1985 became CIRAD (Centre de Coopération Internationale de Recherche Agronomique pour le Développement).

In 1963, the Paris-based IEMVT assumed the management of the Centre de Recherches Zootechniques (CRZ) at Minankro, which had been established in 1943 as a substation to the regional livestock research centre at Sotuba (Mali). Starting in 1946, several breeding activities were conducted at the Minankro station such as the breeding of hogs, poultry, and N'Dama bovine species. In 1965 IRAT began conducting sugarcane research at the Institut de Recherche sur la Canne et Plantes Sucrières (IRCPS) and eventually (1968) assumed the management of all the research stations under the Service des Etudes et de l'Expérimentation Agricoles of the Ministère de l'Agriculture. Its research focused primarily on food crops.

Forestry research in Côte d'Ivoire began in the early 1950s with the establishment of a research section within the Département des Eaux et Forêts of the Ministère de l'Agriculture. In 1962, this research section was taken over by CTFT under an agreement between the French and the Ivorien governments that was similar to the one struck regarding the other French institutes that continued to operate in the country.

In addition to the CIRAD institutes, ORSTOM, a French overseas research institute covering a wide range of disciplines and with an orientation toward more basic research, also worked in Côte d'Ivoire. In 1946 it established a research center at Adiopodoumé that eventually became one of ORSTOM's major overseas research centers. Besides this center, which focused largely on the agriculturally related sciences, ORSTOM established research facilities for its social

sciences section at Petit Bassam in 1969 and a hydrobiology laboratory at Bouaké in 1975. ORSTOM closely collaborated with the other (French) research institutes operating throughout Côte d'Ivoire and frequently assigned staff to these institutes. ORSTOM's center at Adiopodoumé also maintained a number of collaborative programs with researchers from Switzerland and the Netherlands since the early 1950s. The Dutch research unit is linked to Wageningen Agricultural University and continues to be known in Côte d'Ivoire as the Centre Néerlandais, while the Swiss center is called the Centre Suisse de Recherche Scientifique. Since 1969, the Nestlé Foundation has also conducted some research on post-harvest technologies at Adiopodoumé.

As well as conducting its own research, ORSTOM has at the request of the Ivorien government managed the Centre de Recherches Océanographiques (CRO) at Abidjan since 1966. CRO was preceded by the Service Océanographique, which was established by the Ministère de l'Agriculture in 1960. At that time, two oceanographers from ORSTOM were assigned to this new service, which was renamed CRO in 1961. In 1966 CRO was transferred to the Ministère de la Production Animale and in 1971 to the Ministère de la Recherche Scientifique.

Whereas ORSTOM's research in many other countries had little direct involvement in agriculture, in Côte d'Ivoire 70-80% of ORSTOM's activities have traditionally been agriculturally related. However, ORSTOM is a French public institute that is almost entirely funded by the French government. As a consequence, its research agenda largely reflects French rather than host-country priorities. This contrasts with the CIRAD institutes that conduct their research in consultation and collaboration with the host country and on a cost-sharing basis. From this perspective, ORSTOM does not constitute a "national" institute and is therefore excluded from the NARS statistics reported in this brief.

Following the nationalization of ORSTOM's research facilities in 1984, the governments of France and Côte d'Ivoire, later joined by the government of Canada, agreed to transform ORSTOM's research centre at Adiopodoumé into the Institut International de Recherche Scientifique pour le Développement en Afrique (IIRSDA). This international institute, which after a transitional period became operational in 1992, focuses its research on agriculture (biotechnology) and health.

During the 1960s and 1970s agricultural research in Côte d'Ivoire was heavily reliant upon and coordinated by the French tropical research institutes. While most former French colonies sought to nationalize their agricultural research systems in the late 1960s and early 1970s, Côte d'Ivoire continued to collaborate closely with the French institutes for a much longer period of time. For the French institutes, Côte d'Ivoire was, and still is, one of their principal overseas research sites. In 1990, for example, about 17% of all resources spent by CIRAD institutes on research done overseas went to Côte d'Ivoire. For ORSTOM, the corresponding figure was about 18% in 1985/86.

Institutional changes initiated in the early 1980s represented a distinct break with earlier developments. In 1982 the Institut des Savanes (IDESSA) was formed. This new institute, organized as a semi-autonomous body under the Ministère de l'Enseignement Supérieur et de la Recherche Scientifique (MESRS) and with headquarters at Bouaké, gradually assumed the local research activities and facilities in the savannah zone of IRAT, IRCT, IEMVT, IRCPS, and the inland fisheries research activities of CTFT. For the first time the senior management position for the institute was delegated to a national. Although the collaboration with IRAT,

IRCT, CTFT, and IEMVT continued, their contribution to the country's agricultural research effort gradually declined after 1982.

The idea of a corresponding institute for the forest zone of the country, the Instituts des Forêts (IDEFOR), also dates back to the early 1980s, but this institute was not formed until January 1992. Until then CTFT, IRCA, IRHO, IRCC, and IRFA continued to operate as independent research institutes. Meanwhile, there were several important changes in the relationship between the French institutes and Côte d'Ivoire. In 1984, the property rights of all the research facilities in the country managed by the CIRAD institutes as well as ORSTOM were transferred to the Government of Côte d'Ivoire. And, as of 1988, the five French institutes conducting research in the forest zone were placed under a joint French/Ivoirien management committee. As was the case with IDESSA, collaboration between IDEFOR and CTFT, IRCA, IRCC, IRFA, and IRHO continued but to a lesser degree than before.

In addition to IDESSA, IDEFOR, and CRO, there are several smaller institutes engaged in some agricultural research. One such institute is the Centre Ivoirien de Recherches Technologiques (CIRT), which was created in 1981. It is supervised by MESRS and does research on the processing of agricultural products. CIRT was preceded by the Institut pour la Technologie et l'Industrialisation des Produits Agricoles Tropicaux (ITIPAT), which was established in 1966. There are several entities within the Ministère de l'Agriculture et des Ressources Animales such as the Laboratoire de Pathologie Animale (LPA), the Laboratoire Central de Nutrition Animale (LCNA), and the Centre Ivoirien du Machinisme Agricole (CIMA) that also conduct some agricultural research although it is not their primary task. LCNA was established in 1978 with support from Germany.

A notable feature of the agricultural sector of Côte d'Ivoire has been the presence of so-called Sociétés d'Etat (parastatal bodies). These parastatals were funded in part or in full by the government and assigned the task providing a wide range of services such as extension, development, credit, supply of agricultural inputs, and so on for a particular agricultural commodity (e.g., cotton, rubber, rice, sugar) or group of commodities (e.g., oilpalm and coconut, cacao and coffee, fruits and legumes, forestry, livestock). They also constituted a potentially important link between farmers and research institutes. Most of the parastatal bodies aligned themselves with one of the commodity research institutes and contracted them to conduct research. In this way these parastatal organizations were a significant source of funding for many of the commodity research institutes. However, with the switch from a sectoral to a regional approach to agricultural development in the early 1980s several of the parastatals were closed, while some others assumed regional coordination tasks in addition to their commodity specific activities. It is likely that in the future the remaining parastatals will also undergo major changes or cease their operations.

#### *Academic Sector*

The national university of Côte d'Ivoire was established in 1964 as the Université d'Abidjan. It was preceded by the Centre d'Etudes Supérieures (CES) which was founded in 1958. In the early 1970s the Université d'Abidjan was renamed the Université Nationale de Côte d'Ivoire. The university began offering courses in the agricultural sciences in 1965 with the establishment of the Ecole Nationale Supérieure Agronomique (ENSA) within the university. A year earlier an Ecole des Sciences was established, which in 1966 became the Faculté des Sciences. This faculty has several departments that conduct some research of relevance to agriculture such as the Département de Biologie et Physiologie Animale (DBPA), the

Département des Sciences de la Terre (DST), the Département de Biochimie, and the Département de Botanique et Biologie Végétale (DBBV). This latter department includes a Laboratoire de Botanique, a Laboratoire Génétique, and a Laboratoire de Physiologie Végétale. Other institutes at the university that undertake some agricultural research are the Centre Ivoirien de Recherches Economiques et Sociales (CIRES), the Centre National de Floristique (CNF), the Institut Géographie Tropical (IGT) and the Institut Universitaire d'Ecologie Tropicale (IUET). The latter two institutes, both established in 1966, were recently merged into a new institute, the Institut National des Sciences Ecologiques (INSE). CIRES has been operational since 1974 and plays a leading role in economic research in Côte d'Ivoire.

## **2.2 Present Structure**

The present structure of the national agricultural research system of Côte d'Ivoire is presented in table 2. The two principal institutes are IDESSA and IDEFOR, which together account for 63% of the country's FTE agricultural researchers. IDESSA consists of three research departments dealing with food crops, cash crops, and livestock. IDEFOR comprises five departments dealing with coffee and cacao, fruits and vegetables, rubber, forestry, and oilpalm and coconut.

Other research institutes that report to the Ministry of Education and Scientific Research (MESRS) include CRO, which conducts research on marine fisheries, and CIRT, which does research on post-harvest technologies.

Not included in the present overview are LCNA, LPA, and CIMA because of lack of sufficient information. All three agencies are part of the Ministère de l'Agriculture et des Ressources Animales and do not exclusively do research. They account for a relatively minor share of the country's agricultural research effort.

The academic component of the NARS consists principally of ENSA and several departments within the Faculté des Sciences et Techniques (FAST) of the Université Nationale de Côte d'Ivoire. In addition, several centers and institutes attached to the Université Nationale de Côte d'Ivoire, including CIRES, CNF, and INSE (previously IGT and IUET), conduct some research that is of relevance to agriculture.

Also excluded from these data are the supranational research agencies that are headquartered or have research centers located in Côte d'Ivoire. The two most important such agencies are IIRSDA (previously ORSTOM) and the West African Rice Development Association (WARDA). This latter organization moved its headquarters from Liberia to Côte d'Ivoire in 1988.

The organizational structure of IDESSA, IDEFOR, CRO, CIRT, and ENSA are presented in diagrammatic form in appendix 3.

## **3. NARS Statistics**

Questionnaire responses were received from IDESSA, IDEFOR/IRCA, CIRT, CRO, ENSA, and the Département de Botanique et Biologie Végétale of the Faculté des Sciences et Techniques. The data from the questionnaires were combined with data from other sources cited at the conclusion of this report.

Table 2: Overview of Present Structure of NARS, 1992

Institutional category	Executing agency			Staffed research sites <sup>a</sup>	Number of researchers			
	Supervising agency	Name	Acronym		Research focus	National	Expats	Total
Government	Ministère de l'Enseignement Supérieur et Recherche Scientifique	Institut des Savanes	IDESSA	7 (6)	61	13	74	74.0
		Instituts des Forêts	IDEFOR	na	59	55.5	114.5	114.5
		Centre Ivoirien de Recherches Technologiques	CIRT	1 (1)	19	0	19	19.0
		Centre de Recherches Océanographiques	CRO	3 (1)	20	15	35	35.0
Academic	Ministère de l'Enseignement Supérieur et Recherche Scientifique	Ecole Nationale Supérieure Agronomique	ENSA	1 (1)	44	7	51	15.3
	Université Nationale de Côte d'Ivoire	Centre Ivoirien de Recherche Economique et Sociale	CIRES	1 (1)	18	2	20	8.0
		Institut National des Sciences Ecologiques	INSE	1 (1)	na	na	na	na
		Centre National de Floristique	CNF	1 (1)	na	na	na	na

Table 2: Overview of Present Structure of NARS, 1992 (contd.)

Institutional category	Executing agency			Research focus	Staffed research sites <sup>a</sup>	Number of researchers			
	Supervising agency	Name	Acronym			National	Expats	Total	FTEs
	Université Nationale de Côte d'Ivoire, Faculté des Sciences et Techniques	Département de Botanique et Biologie Végétale	DBBV	crops	1 (1)	22	2	24	8.0
		Département Biologie et Physiologie Animale	DBPA	livestock	1 (1)	34	1	35	11.7
		Département des Sciences de la Terre	DST	soils	1 (1)	16	4	20	6.7
		Département de Biochimie	DBIOCH	biotechnology	1 (1)	14	1	15	5.0
<i>Total</i>						<i>307</i>	<i>100.5</i>	<i>407.5</i>	<i>297.2</i>

Source: 0999.

Note: Several research agencies reported in this table have not been included in the time-series because of lack of data. Therefore the totals reported in this table are somewhat higher than in the tables below reporting time-series data.

<sup>a</sup> Staffed with researchers and/or technicians. Bracketed sites are permanently staffed with researchers.

LPA, LCNA, CIMA, CNF, INSE, DBBV, DBPA, DBIOCH, and DST are excluded from the statistical sections of this brief because the necessary data were unavailable. Taking account of all these agencies would probably inflate the 1992 national researcher totals reported in table 3 by 10-15%. Consequently, our time-series data underestimate Côte d'Ivoire's agricultural research capacity.

The expenditure data presented in this brief are based as much as possible on actual expenditures as reported by the various institutes. However, institutes underestimate the degree of donor support if they only have information about the donor funding that is channeled through their accounting system. Most specifically they often underreport or fail to report the salaries and supplements paid directly to expatriate researchers. To correct for this omission, 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. Since IDESSA and IDEFOR received nearly all their technical assistance from CIRAD, we have included, where possible, the cost of technical assistance as reported by CIRAD.

The expenditure estimates obtained from IRHO caused particular problems. In the past, some 80% to 90% of IRHO's expenditures were financed through the sale of products and services from extensive plantations, several factories, and plant nurseries operated by the institute. IRHO's income-generating activities are so extensive that the institute's overall cost structure and implied expenditure per researcher estimates do not reflect those of IRHO's research activities. For example, in some years the reported total budget per researcher was more than a million US dollars. Since we were not able to identify the expenditures incurred by IRHO's research activities vis-a-vis the rest of its operations, we assumed that IRHO's expenditures per researcher were in line with those of the other CIRAD institutes operating in Côte d'Ivoire. However, unavoidably the share data reported in tables 7 and 8 are based on the cost categories and sources of funding regarding IRHO's total expenditures.

### **3.1 Long-term development**

At independence Côte d'Ivoire inherited a relatively large agricultural research system reflecting the regional (i.e., transnational) character of several of the country's research institutes prior to independence. Significant financial and technical support by France underpinned the country's agricultural research effort directly after independence. As a consequence, Côte d'Ivoire had around 50 researchers per million economically active agricultural population during the early 1960s and spent around 1.2% of AgGDP on agricultural research (table 3). Both figures were well above the corresponding regional average for that period, namely 15 researchers per million economically active agricultural population and 0.3% of AgGDP spent on agricultural research (Pardey, Roseboom, and Anderson 1991).

During the past three decades, however, the country's agricultural research system grew comparatively slowly. The 4.1% and 1.8% annual growth in research personnel and expenditures reported in table 3 are substantially lower than the corresponding regional averages of 6.8% and 4.7% reported for the period 1961-85 for sub-Saharan Africa (Pardey, Roseboom, and Anderson 1991). Research expenditures grew slightly slower than AgGDP. As a result, agricultural research expenditures as a percentage of AgGDP are lower now than they were 30 years ago. In terms of research intensities the country still fares better than the regional average but it certainly has lost ground in this respect since the early 1960s.

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

	1961-65	1966-70	1971-75	1976-80	1981-85	1986-90	1991	1992	Growth rate <sup>a</sup> %
Researchers (FTEs)	86.3	116.0	146.0	178.5	206.0	246.8	266.5	266.8	4.1
Expenditures (million 1985 FCFA per year)	4774	6095	7364	7717	7743	7814	7953	9166	1.8
Expenditures (million 1985 PPP dollars per year) <sup>b</sup>	22.574	28.824	34.824	36.494	36.617	36.953	37.607	43.343	1.8
Expenditures per researcher (1985 PPP dollars per year) <sup>b</sup>	262,000	249,000	239,000	205,000	179,000	150,000	141,000	162,000	-2.2
Number of econ. active agr. population (millions)	1.8	1.9	2.1	2.2	2.3	2.5	2.6	2.6	1.3
Researchers per million econ. act. agr. population	48.9	60.0	69.4	80.5	87.7	99.1	104.0	103.0	2.7
AgGDP (million 1985 PPP dollars) <sup>b</sup>	2476	3032	3634	4159	4384	4266	4098	4106	2.0
Expenditures as a % of AgGDP	1.17	1.18	1.16	0.97	1.02	0.82	0.80	0.94	-1.3

*Source:* See appendices 5 and 6.

*Note:* Includes IDESSA, IDEFOR, CIRT, CRO, ENSA, and CIRES. The 1991 number of FTE researchers reported here is somewhat lower than in tables 2 and 9 because for some institutes no time-series data were available.

<sup>a</sup> Compound annual growth rate 1961-92

<sup>b</sup> For information about "PPP dollars" see appendix 2.

Research expenditures have also grown considerably slower than the number of researchers and this has led to a persistent decline in expenditures per researcher. This is a general trend observed throughout most of Africa. This decline in part is the result of expensive expatriate researchers being replaced by cheaper national researchers, a declining share of overhead costs as institutes grow, as well as a decline in the amount of operational support per researcher.

Particularly during the 1980s, expenditures per researcher declined significantly. Planned increases in agricultural research expenditures did not materialize because of declining world market prices for Côte d'Ivoire's major export commodities. This seriously eroded the government's revenue base as well as the research institutes' own income from the sale of their produce. For the same reason the amount of resources made available to research through contracts with the commodity development parastatals also decreased.

### 3.2 Human Resources

#### *Degree and Nationality Status of Researchers*

The French influence on Côte d'Ivoire's agricultural research system was more intense and persisted longer than in most other former French West-African colonies. Almost all of CIRAD's institutes maintained a presence in Côte d'Ivoire during the past three decades. Several of them based their major overseas research operations in Côte d'Ivoire. Although the collaboration with the CIRAD institutes has been beneficial in many respects, it significantly delayed the move towards nationalizing the country's agricultural research system, including its research staff positions. For example, it took until 1992 before IDEFOR's research stations were placed under Ivoirien management.

In 1981-85, twenty years after political independence, two thirds of the researchers at IDESSA and IDEFOR were French expatriates (table 4). This contrasts markedly with the Kenyan NARS, for example, whose share of expatriate researchers declined from 85% in 1961-65 to 14% in 1981-85. It is noteworthy to compare the rapid nationalization of research staff at IDESSA during the 1980s with the continued heavy reliance on expatriate research staff at IDEFOR. This reflects the fact that IDESSA was established in 1982, while IDEFOR only came into existence some ten years later.

Table 4: *Educational and Nationality Status of Researchers*

	IDESSA				IDEFOR			
	1981-85	1986-90	1991	1992	1981-85	1986-90	1991	1992
	<i>(number of researchers)</i>				<i>(number of researchers)</i>			
National								
PhD	na	na	na	12.8	na	na	na	na
MSc	na	na	na	42.2	na	na	na	na
BSc	na	na	na	5.0	na	na	na	na
Subtotal	17.8	37.3	51.0	61.0	22.0	47.8	55.0	59.0
Expatriates	33.0	23.8	20.0	13.0	70.4	57.4	59.0	55.5
Total	50.8	61.1	71.0	74.0	92.4	105.2	114.0	114.5
	CRO				CIRT			
	1981-85	1986-90	1991	1992	1981-85	1986-90	1991	1992
	<i>(number of researchers)</i>				<i>(number of researchers)</i>			
National								
PhD	na	na	na	7.0	na	5.4	6.0	5.0
MSc	na	na	na	12.0	na	6.8	11.0	11.0
BSc	na	na	na	1.0	na	2.4	4.0	3.0
Subtotal	na	20.7	21.0	20.0	8.1	14.6	21.0	19.0
Expatriates	na	14.0	15.0	15.0	0.0	0.0	0.0	0.0
Total	31.8	34.7	36.0	35.0	8.1	14.6	21.0	19.0
	ENSA				CIRES			
	1981-85	1986-90	1991	1992	1981-85	1986-90	1991	1992
	<i>(number of researchers)</i>				<i>(number of researchers)</i>			
National								
PhD	na	18.8	22.0	24.0	na	na	na	na
MSc	na	16.4	15.0	13.0	na	na	na	na
BSc	na	7.2	9.0	7.0	na	na	na	na
Subtotal	36.7	42.4	46.0	44.0	22.1	19.9	18.0	18.0
Expatriates	10.9	5.8	9.0	7.0	4.7	2.5	2.0	2.0
Total	47.7	48.2	55.0	51.0	26.8	22.4	20.0	20.0

Source: See appendix 6.

Note: The total number of research staff are reported, not full-time equivalent research staff.

CRO's continued reliance on expatriate researchers reflects the technical assistance it receives from ORSTOM. CIRT is the only government research institute that is completely staffed with nationals. ENSA and CIRES have a relatively small number of expatriate faculty.

Although many research staff positions have only recently been nationalized, the educational level of the national researchers is generally high; most of them have a postgraduate degree. The number of researchers with only a BSc degree or equivalent (license, maîtrise, etc.) is relatively low in most research institutes.

### *Staffing Composition*

There is considerable variation in the composition of the permanent staff among the different institutes (table 5). IDEFOR/IRHO, IDEFOR/IRCA, and IDEFOR/IRCC, for example, have considerably more support staff than IDESSA. This in part is because the IDEFOR institutes operate extensive plantations and earn a significant share of their income through the sale of products and services, thereby drawing on a large number of support staff for these income-generating activities.

IDESSA's technical support staff situation has improved significantly in the past few years, while at the same time the number of other support staff declined. CRO has also drastically cut the number of "other" support staff in recent years.

### *Gender*

Female researchers play a relatively minor role in Côte d'Ivoire's NARS. Some institutes, such as IDEFOR/IRCA employ no female researchers, while the first female was appointed to a research position at IDESSA as recently as 1989. In 1992 only five out of a total of 74 national researchers at IDESSA were female. In that same year CIRT and CRO employed one (5%) and three (15%) female researchers, respectively.

A similar situation exists in the academic component of the NARS. Between 1986 and 1992 there were only three females on the academic staff of ENSA. Together they represented a mere 7% of ENSA's academic staff. Females constitute 13% of the academic staff of the four agriculture-related departments of the Faculté des Sciences et Techniques.

The low percentage of female researchers is to a large extent the consequence of the low number of women with degrees in the agricultural sciences. Between 1974 — when women were first admitted to ENSA — and 1989, 43 women were trained as ingénieur agronome compared with 524 men. Less than 8% of the Ivorien alumni were women (Brunet-Perrault and Doss 1992).

Table 5: *Staffing Structure, 1986-92*

Staff category	IDESSA			IDEFOR/IRCA		
	1986-90	1991	1992	1986-90	1991	1992
	<i>(number of personnel)</i>			<i>(number of personnel)</i>		
Researchers	61.1	71.0	74.0	14.6	14.0	14.5
Technical support staff	27.0	47.0	64.0	38.0	35.0	35.0
Administrative support staff	56.6	79.0	81.0	30.8	34.0	24.0
Other support staff	449.6	404.0	369.0	372.0	331.0	316.5
Subtotal support staff	533.2	530.0	514.0	440.8	400.0	375.5
<i>Total</i>	<i>594.3</i>	<i>601.0</i>	<i>588.0</i>	<i>455.4</i>	<i>414.0</i>	<i>390.0</i>

Staff category	IDEFOR/IRCC			IDEFOR/IRHO		
	1986-90	1991	1992	1986-90	1991	1992
	<i>(number of personnel)</i>			<i>(number of personnel)</i>		
Researcher	29.0	26.0	24.0	29.6	35.0	37.0
Technical support staff	na	na	na	na	na	na
Administrative support staff	na	na	na	na	na	na
Other support staff	na	na	na	na	na	na
Subtotal support staff	387.8	342.0	na	na	na	2032.0
<i>Total</i>	<i>416.8</i>	<i>368.0</i>	<i>na</i>	<i>na</i>	<i>na</i>	<i>2069.0</i>

Staff category	CRO			CIRT		
	1986-90 <sup>a</sup>	1991	1992	1986-90 <sup>b</sup>	1991	1992
	<i>(number of personnel)</i>			<i>(number of personnel)</i>		
Researchers	34.0	36.0	35.0	19.0	20.0	19.0
Technical support staff	6.0	na	6.0	17.0	17.0	17.0
Administrative support staff	5.0	na	6.0	5.0	5.0	5.0
Other support staff	68.0	na	27.0	16.0	16.0	16.0
Subtotal support staff	79.0	na	39.0	38.0	38.0	38.0
<i>Total</i>	<i>113.0</i>	<i>na</i>	<i>74.0</i>	<i>57.0</i>	<i>58.0</i>	<i>57.0</i>

Source: 0999.

<sup>a</sup> Based on a 1987 observation.

<sup>b</sup> Based on a 1990 observation.

### 3.3 Financial Resources

#### *Expenditures*

The government institutes account for most of the agricultural research done in Côte d'Ivoire (table 6). The academic component of the research system is represented here by ENSA (established in 1967) and CIRES (established in 1974). Their share in agricultural research expenditures grew from 1.3% in 1971-75 to 4.3% in 1992, still a very modest contribution. The departments of botany, zoology, soil science and biochemistry of the Faculty of Science and Technology are not included in the time-series data and so our data understate the relative share of the academic sector.

Table 6: *Agricultural Research Expenditures*

Institutional category	1961-65	1971-75	1981-85	1986	1987	1988	1989	1990	1991	1992
<i>(millions 1985 CFA francs per year)</i>										
Government	4774	7268	7416	6900	6922	7331	7613	7838	7540	8774
Academic	0	96	328	506	508	511	530	412	413	392
Total	4774	7364	7743	7405	7430	7842	8143	8251	7953	9166
<i>(millions 1985 PPP dollars per year)</i>										
Total	22.574	34.824	36.617	35.019	35.138	37.084	38.508	39.017	37.607	43.343

Source: See appendix 5b.

During the past two decades total agricultural research expenditures stagnated at 7000-8000 million constant 1985 CFA Francs. During this same period the total number of researchers increased by 80%, due mainly to a growth in national researchers.

#### *Factor Mix*

The data in table 7 reveal fairly stable cost shares within institutes over time. This in part is due to the fact that most institutes report amortized rather than actual capital costs. Actual capital expenditures fluctuate significantly more than amortized costs. IDEFOR/IRHO stands out as the institute that spends a relatively small share of its budget on salaries (40%), while CIRT rates very highly in this regard (90%). The salary percentages reported in table 7

include expatriate salaries. CRO, for which we only have a 1993 breakdown, spent 46% on salaries, 44% on operating costs, and 10% on capital.

#### *Source of Funds*

The principal sources of funding for agricultural research in Côte d'Ivoire are (a) government contributions, (b) sales of products and services, (c) contract research, and (d) donor support. Funding through contract research, or so-called "conventions", comes mainly from parastatal bodies such as CIDT, SATMACI, SODEFOR, SODESUCRE, and PALMINDUSTRIE. Donor support consists mainly of technical assistance provided by the CIRAD institutes.

Table 7: Cost Categories

Institute	Cost category	1986	1987	1988	1989	1990	1991
		<i>(percentages)</i>					
IDESSA	Salaries	60.0	58.3	59.5	65.1	68.9	69.5
	Operating	37.4	36.1	36.0	32.7	31.1	30.5
	Capital	2.6	5.7	4.5	2.2	0.0	0.0
	<i>Total</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>
IDEFOR/IRCA	Salaries	67.1	63.6	64.4	59.5	67.6	71.4
	Operating	24.6	29.4	30.8	32.7	27.7	27.0
	Capital	8.2	7.0	4.7	7.8	4.6	1.6
	<i>Total</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>
IDEFOR/IRFA	Salaries	52.2	51.3	51.5	na	na	na
	Operating	37.7	41.2	41.7	na	na	na
	Capital	10.1	7.5	6.8	na	na	na
	<i>Total</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>na</i>	<i>na</i>	<i>na</i>
IDEFOR/CTFT	Salaries	na	72.2	73.2	na	na	na
	Operating	na	22.2	22.9	na	na	na
	Capital	na	5.6	3.9	na	na	na
	<i>Total</i>	<i>na</i>	<i>100</i>	<i>100</i>	<i>na</i>	<i>na</i>	<i>na</i>
IDEFOR/IRCC	Salaries	na	62.0	65.9	na	na	na
	Operating	na	32.4	28.9	na	na	na
	Capital	na	5.6	5.2	na	na	na
IDEFOR/IRHO <sup>a</sup>	Salaries	na	40.6	40.1	na	na	na
	Operating	na	51.4	50.6	na	na	na
	Capital	na	8.0	9.1	na	na	na
	<i>Total</i>	<i>na</i>	<i>100</i>	<i>100</i>	<i>na</i>	<i>na</i>	<i>na</i>
CIRT	Salaries	90.0	83.3	84.0	86.5	92.1	91.8
	Operating	5.4	11.3	11.9	8.1	7.9	7.6
	Capital	4.6	5.3	4.2	5.3	0.0	0.6
	<i>Total</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>
	<i>Total</i>	<i>na</i>	<i>100</i>	<i>100</i>	<i>na</i>	<i>na</i>	<i>na</i>

Source: 0999 and 1242, 1244, and 1376.

Note: In most instances capital cost represent amortized costs, not actual capital expenditures.

<sup>a</sup> This breakdown relates to IRHO's total expenditures, which, as mentioned earlier, include major income generating activities that have little to do with research.

Contract research and the sale of products and services have been important sources of income for IDESSA and IDEFOR (table 8). During the 1980s, however, these sources of funding declined significantly because of lower world market prices for agricultural products.

Although donor support represents a significant source of funding for most institutes, it is heavily tied to technical support provided by CIRAD institutes. Particularly after 1984, CIRAD's contribution went mainly in support of the salaries and related costs of French researchers working in Côte d'Ivoire.

Table 8: *Source of Funding*

Source of funding	IDESSA			IDEFOR/IRCA		
	1981-85	1986-90	1991	1981-85	1986-90	1991
	<i>(percentages)</i>			<i>(percentages)</i>		
Government	41.7	64.2	58.8	25.0	23.4	na
Sales and contracts	15.2	6.0	4.4	42.6	36.0	na
Donors	43.1	29.9	36.8	38.0	40.6	70.1
<i>Total</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>
Source of funding	IDEFOR/CTFT			IDEFOR/IRFA		
	1981-85	1986-90	1991	1981-85	1986-90	1991
	<i>(percentages)</i>			<i>(percentages)</i>		
Government <sup>a</sup>	52.6	51.7	57.6	24.3	37.3	na
Sales and contracts	6.3	5.1	2.0	42.4	39.7	na
Donors	41.1	41.4	40.4	33.3	23.0	27.7
<i>Total</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>
Source of funding	IDEFOR/IRCC			IDEFOR/IRHO		
	1981-85	1986-90	1991	1981-85	1986-90	1991
	<i>(percentages)</i>			<i>(percentages)</i>		
Government	34.9	31.6	29.9	4.3	11.3	na
Sales and contracts	30.0	25.2	9.2	91.0	80.4	na
Donors	35.1	43.2	60.9	4.7	8.3	na
<i>Total</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>na</i>
Source of funding	CIRT			CRO		
	1981-85	1986-90	1991	1981-85	1986-90	1991
	<i>(percentages)</i>			<i>(percentages)</i>		
Government	100	97.0	100	na	41.1	29.6
Donor	0	3.0	0	na	58.9	70.4
<i>Total</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>na</i>	<i>100</i>	<i>100</i>

Source: 0999

<sup>a</sup> Includes subsidies from SODEFOR.

### 3.4 Research Focus

Crops are by far the principal focus of Côte d'Ivoire's agricultural research system (table 9). By contrast livestock receives only minor attention. Fisheries research also receives considerable attention, while research on natural resources appears to be somewhat neglected. This latter

claim must be viewed with some caution. Because of the strong commodity orientation of IDESSA and IDEFOR, nearly all the research done by these institutes, including possibly a good deal of research on natural resources, is classified as commodity oriented research in table 9 given the procedures used to compile these data.

The “other” category reported in table 9 includes primarily post-harvest research (CIRT) and some socio-economic research conducted by CIRES, IDESSA, and ENSA.

Table 9: *Research Focus, 1992*

Institute	Research orientation						Total
	Crops	Livestock	Forestry	Fisheries	Natural resources	Other	
	<i>(full-time equivalents)</i>						
IDESSA	53.3	10.9		6.5		3.3	74.0
IDEFOR	93.5		21.0				114.5
CIRT						19.0	19.0
CRO				35.0			35.0
ENSA	4.9	1.6			1.8	7.0	15.3
CIRES						8.0	8.0
DBBV <sup>a</sup>	8.0						8.0
DBPA <sup>a</sup>		11.7					11.7
DBIOCH <sup>a</sup>						5.0	5.0
DST <sup>a</sup>					6.7		6.7
Total (FTEs)	159.7	24.2	21.0	41.5	8.5	42.3	297.2
Total (%)	53.7	8.1	7.1	14.0	2.8	14.2	100

*Note:* The “natural resources” and “other” categories include research that could not otherwise be allocated to a specific commodity or commodity group. The natural resources category refers to unallocatable soils, land use, and water research.

<sup>a</sup> These entities have not been included in the time-series statistics.

## Bibliography

This bibliography comprises three different sets of references. The “references” section relates to references cited in the text, the “data sources” to references from which data have been extracted to construct the time series (see appendices 5 and 6), and “other references” to references that have been consulted in the process of data collection but not used.

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## Annex 1: Country background information



### Geography

Area: 32.2 million ha

Location: west Africa and it is bordered by Liberia to the southwest, by Guinea to the northwest, by Mali and Burkina Faso to the north, by Ghana to the east and to the south by the Gulf of Guinea.

Agroecological features: the country can be divided into three regions: a narrow coastal region, an equatorial forest region and a savannah region. The forests of the equatorial region have been reduced during the past century, except in the southwest, and have been replaced by plantation crops such as coffee, cocoa, bananas, pine apples and oil palm. The northern savannah consists of a sparsely populated plateau with open ground for stock breeding. Côte d'Ivoire has two distinct climate zones. The northern area is drier, with an average of 1400 mm rain annually and a very dry season from December to February. The southern region of the country has an average rainfall between 1500 and 2000 mm annually with a less pronounced dry season.

### Population

Total (1991): 12.4 million

Annual growth rate (1981-90)<sup>a</sup>: 3.9%

Literacy (1990): 53.8%

Life expectancy (1991): 55 years

### Economy (values reported in 1985 PPP dollars)

Gross Domestic Product (1991): 13,151 million dollars

Per capita GDP (1991): 1,064 dollars

Agricultural GDP (1991): 3,623 million dollars

Share of agriculture in GDP (1991): 27.5%

Annual growth rates (1981-90)<sup>a</sup>

GDP: -1.5%

GDP per capita: -5.1%

AgGDP: -1.5%

### Trade (values reported in current dollars)

Net surplus total trade (1991): 700 million dollars

Net surplus agricultural trade (1991): 1,540 million dollars

Percentage of agricultural imports in total imports: 28.0%

Percentage of agricultural exports in total exports: 75.2%

Major agricultural import commodities (1991)<sup>b</sup>: rice (25%), fishery products (23%), bovine cattle (13%), wheat (6%), and forestry products (5%).

Major agricultural export commodities (1991)<sup>b</sup>: cocoa (44%), forestry products (12%), coffee (12%), cotton lint (7%), fishery products (7%), and pineapples (5%).

### Agriculture

Agricultural land (1990): 16.7 million ha

Annual growth rate (1981-90)<sup>a</sup>: 0.4%

Percentage arable: 14.6%

Percentage permanent crop: 7.5%

Percentage permanent pastures: 77.9%

Percentage irrigated arable and permanent cropland: 1.7%

Economically active agricultural population (1991): 2.6 million

Annual growth rate (1981-90)<sup>a</sup>: 1.2%

Percentage in total economically active population: 54.7%

Fertilizer use per ha arable land (1990): 9.7 kg

Annual growth rate (1981-90)<sup>a</sup>: -3.2%

Major crops (in order of importance): coffee, cocoa, yams, plantains, rice.

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

<sup>a</sup> Least squares growth rate.

<sup>b</sup> 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 and appropriate, 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).

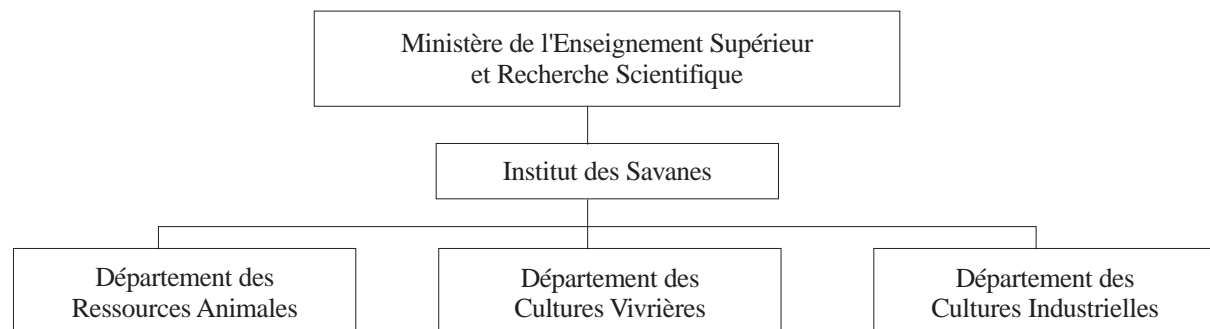
*Nomenclature for tables in text*

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

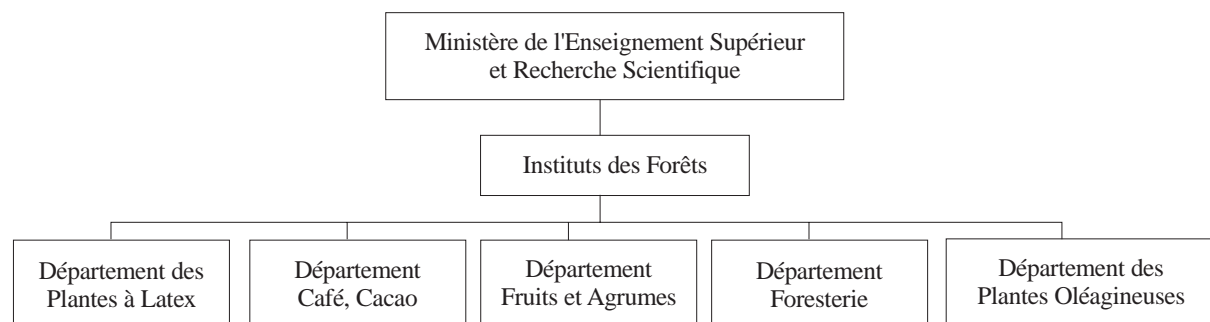
In the text we note any marked deviations from these data compilation norms and include points of clarification if warranted.

### Appendix 3: Organizational charts of the agricultural research institutes

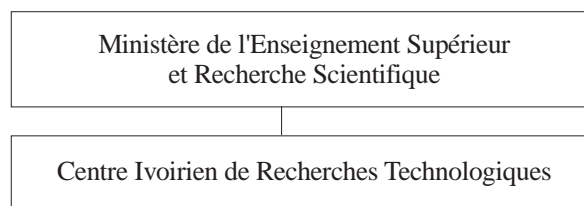
#### *IDESSA (1992)*



#### *IDEFOR (1992)*



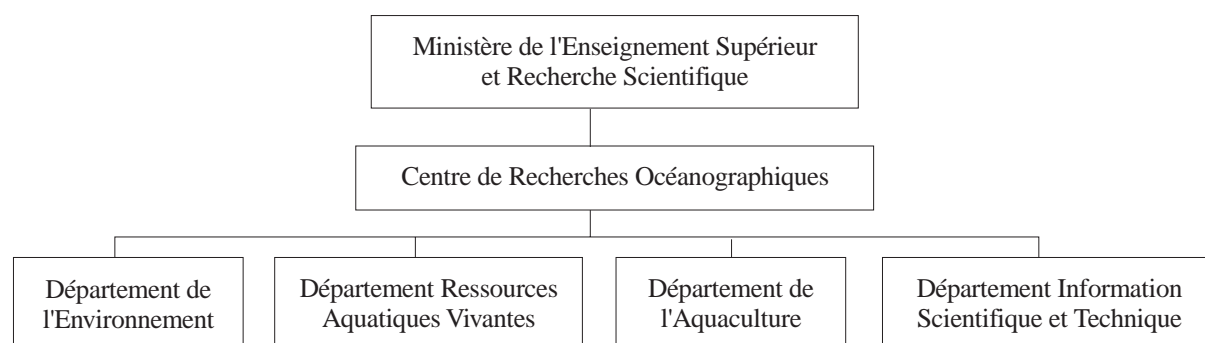
#### *CIRT (1992)*



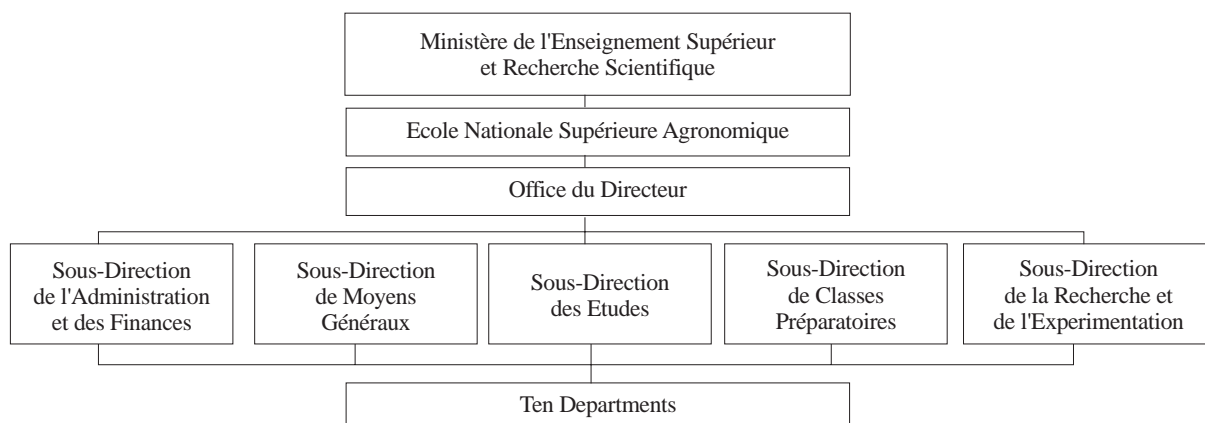
Institut en voie de restructuration;  
pas d'organigramme disponible

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

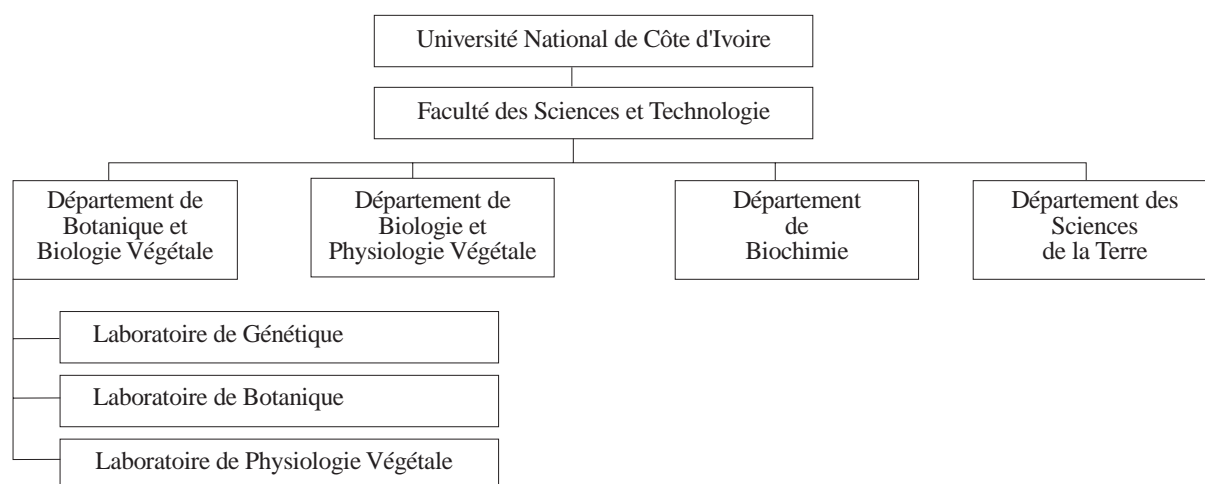
#### *CRO (1992)*



#### *ENSA (1992)*



#### *Faculté des Sciences et Technologie (1992)*



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

*CIRES (1992)*



## Appendix 4: Addresses of the agricultural research institutes

Direction des Programmes de Recherche Ministère de l'Enseignement Supérieur et de la Recherche Scientifique B.P. V 151 ABIDJAN	Institut Universitaire d'Ecologie Tropical (IUET) Université Nationale de Côte d'Ivoire 08 B.P. 109 ABIDJAN 08
Centre Ivoirien de Recherche Technologiques (CIRT) 08 B.P. 881 ABIDJAN	Institut de Recherche sur les Energies Nouvelles (IREN) Université Nationale de Côte d'Ivoire B.P. V 34 ABIDJAN
Institut des Savanes (IDESSA) 01 B.P. 633 BOUAKÉ	Centre Ivoirien de Recherche Economique et Sociale (CIRES) Université Nationale de Côte d'Ivoire 08 B.P. 1295 ABIDJAN 08
Centre de Recherches Océanographiques (CRO) 29, rue des Pêcheurs B.P. V 18 ABIDJAN	Département Foresterie (previously CTFT) 08 B.P. 33 ABIDJAN 08
Laboratoire Central de Nutrition Animale (LCNA) Ministère de et des Ressources Animales B.P. V 84 ABIDJAN	Departement Plantes à Latex (previously IRCA) 01 B.P. 1536 ABIDJAN 01
Laboratoire de Pathologie Animale (LPA) Ministère de et des Ressources Animales B.P. 206 BINGERVILLE	Département Fruites et Agrumes (previously IRFA) B.P. 1740 ABIDJAN
COMACI-CIMA B.P. 9 ABIDJAN	Département Café et Cacao (previously IRCC) IDEFOR 01 B.P. 1827 ABIDJAN 01
Ecole National Superieure Agronomique (ENSA) 08 B.P. 35 ABIDJAN 08	Département des Plantes Oléagineuses (previously IRHO) 01 B.P. 1001 ABIDJAN 01
Faculté des Sciences et Techniques Université Nationale de Côte d'Ivoire B.P. V 34 ABIDJAN	ORSTOM Centre d'Adiopodoume B.P. V 51 ABIDJAN
Institut de Géographie Tropicale (IGT) Université Nationale de Côte d'Ivoire 08 B.P. 863 ABIDJAN 08	
Institut d'Ethno-Sociologie (IES) Université Nationale de Côte d'Ivoire B.P. V 34 ABIDJAN	
Centre National de Floristique (CNF) Université Nationale de Côte d'Ivoire 01 B.P. V 34 ABIDJAN	

**Appendix 5a: Researcher totals, 1961-91**

Total Number of FTE Researchers																			
Category	Name Institute	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	
Government	IDESSA	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	IDEFOR	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	CIRT (ITIPAT)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	CRO	3.7	5.4	7.1	8.8	10.5	12.2	13.9	15.6	17.3	19.0	19.9	20.7	21.6	22.4	23.3	24.1	—	
Subtotal government		3.7	5.4	7.1	8.8	10.5	12.2	13.9	15.6	17.3	19.0	19.9	20.7	21.6	22.4	23.3	24.1	—	
Academic	ENSA	—	—	—	—	—	—	0.6	1.0	1.4	2.0	2.6	3.2	4.0	4.8	5.7	6.7	—	
	CIRES	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Subtotal academic		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Bilateral	IRAT	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.0	1.4	2.0	2.6	3.2	4.0	4.8	5.7	6.7	—	
	IRCT	7.0	8.0	8.0	9.0	9.0	10.0	9.5	9.0	8.5	8.0	11.0	14.0	14.3	14.7	15.0	17.5	—	
	IEMVT	5.0	5.0	5.0	7.0	8.0	10.0	10.0	9.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	—	
	CTFT	1.0	1.0	2.0	2.0	2.5	3.0	2.0	2.0	1.0	2.0	4.0	5.0	3.0	5.0	4.0	10.0	—	
	IRCA	4.0	4.9	5.8	6.7	7.6	8.5	8.9	9.3	9.6	10.0	11.0	12.0	10.0	11.0	10.0	9.0	—	
	IRHO	6.0	6.0	6.0	6.0	6.0	6.0	7.0	8.0	9.0	10.0	10.0	10.0	10.0	10.0	12.0	11.0	—	
	IRCC	16.0	18.0	22.0	24.0	27.0	27.0	25.0	24.0	22.0	20.0	22.0	19.0	24.0	23.7	23.4	23.7	—	
	IRFA	15.0	19.0	20.0	19.0	19.0	19.0	20.0	23.0	24.0	29.0	26.0	26.0	25.0	27.0	28.0	27.5	—	
Subtotal bilateral		63.0	73.9	81.3	86.7	91.1	95.5	94.4	96.3	95.1	101.5	107.0	110.0	111.3	115.7	116.1	121.1	—	
TOTAL		1078; 1349	1078; 1262	1262; 1349; 1363	1078; 1262; 1349; 1363	1078; 1262; 1349; 1363	1078; 1262; 1349; 1363	1078; 1262; 1349; 1363	1078; 1262; 1349; 1363	1078; 1262; 1349; 1363	1078; 1262; 1349; 1363	1078; 1262; 1349; 1363	1078; 1262; 1349; 1363	1078; 1262; 1349; 1363	1078; 1262; 1349; 1363	1078; 1262; 1349; 1363	1078; 1262; 1349; 1363	1078; 1262; 1349; 1363	1078; 1262; 1349; 1363
Source		1078; 1349	1078; 1262	1262; 1349; 1363	1078; 1262; 1349; 1363	1078; 1262; 1349; 1363	1078; 1262; 1349; 1363	1078; 1262; 1349; 1363	1078; 1262; 1349; 1363	1078; 1262; 1349; 1363	1078; 1262; 1349; 1363	1078; 1262; 1349; 1363	1078; 1262; 1349; 1363	1078; 1262; 1349; 1363	1078; 1262; 1349; 1363	1078; 1262; 1349; 1363	1078; 1262; 1349; 1363	1078; 1262; 1349; 1363	
Government	IDESSA	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	IDEFOR	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	CIRT (ITIPAT)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	CRO	5.3	5.0	4.7	4.3	4	6	8.5	11	11	12	12	12	19	20	21	20	—	
	ENSA	25.0	29.3	32.0	33.3	28.8	29.6	35.1	33.9	31.4	28.5	34.0	36.0	38.0	37.0	36.0	35.0	—	
Subtotal government		30.3	34.3	36.7	37.7	31.8	38.6	43.6	44.9	42.4	40.5	46.0	48.0	51.0	51.0	51.0	51.0	—	
Academic	ENSA	7.8	8.4	9.4	9.7	10.0	11.2	11.2	11.0	11.0	17.1	23.0	23.0	23.0	24.0	16.5	15.3	—	
	CIRES	4.8	4.0	5.7	7.3	9.0	10.1	11.3	12.4	11.2	10.4	9.6	8.8	8.0	8.0	8.0	8.0	—	
Subtotal academic		12.6	12.5	15.1	17.0	19.0	21.4	22.5	23.4	22.2	33.4	32.6	31.8	32.0	24.5	24.5	23.3	—	
Bilateral	IRAT	20.0	22.5	25.0	27.5	—	—	—	—	—	—	—	—	—	—	—	—	—	
	IRCT	10.0	9.0	8.0	7.5	—	—	—	—	—	—	—	—	—	—	—	—	—	
	IEMVT	10.0	10.2	10.5	10.8	—	—	—	—	—	—	—	—	—	—	—	—	—	
	CTFT	8.0	12.0	10.3	8.7	7.0	9.0	9.0	8.0	13.0	11.0	19.0	18.0	21.0	21.0	21.0	—	—	
	IRCA	11.0	13.0	14.0	13.0	16.0	17.0	17.0	16.0	19.0	13.5	14.0	15.0	16.0	15.0	14.0	—	—	
	IRHO	22.8	22.5	22.2	22.0	22.0	23.0	23.0	24.0	25.0	26.5	28.0	29.5	31.0	33.0	35.0	—	—	
	IRCC	27.0	31.0	32.0	33.0	30.0	28.0	26.0	26.0	26.0	27.0	28.0	30.0	32.0	28.0	26.0	—	—	
	IRFA	15.0	14.0	15.0	16.0	16.0	13.0	15.0	16.6	16.8	13.4	10.0	10.0	18.0	18.0	18.0	—	—	
Subtotal bilateral		123.8	134.3	137.1	138.4	91.0	90.0	90.8	90.6	99.8	91.4	99.0	102.5	118.0	115.0	114.0	0	—	
TOTAL		166.7	181.1	188.8	193.1	191.8	200.0	207.9	208.9	221.6	217.8	231.6	241.3	277.0	266.5	266.5	266.8	—	
Source		999; 1078	999; 1078	889; 999	68; 999	12; 68	86; 169	86; 999	86; 774	86; 774	86; 774	999	999	999; 1243	999	999	999	—	
		1251; 1262	1251; 1262	1078; 1262	1349	86; 999	979; 999	1361	999; 1251	890; 999	999	1244	1244	1248	1243	1376	1376	—	
		1349; 1362	1349; 1364	1349	1365	1349	1365	1365	1361; 1365	1361; 1365	1376	1376	1376	1376	1376	1376	1376	—	
		1364; 1365	1365	1365	1365	1365	1376	1376	1376	1376	1376	1376	1376	1376	1376	1376	1376	—	

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

**Appendix 5b: Expenditure totals, 1961-91**

Total Research Expenditures		Units: million current FCFA															
Category	Name institute	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Government	IDESSA	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	IDEFOR	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal government	CIRT (ITIPAT)	0.000	0.000	0.000	0.000	0.000	0.000	4.702	7.242	10.012	13.219	15.534	18.521	20.123	23.824	23.446	26.299
	CRO	14.665	21.274	28.219	35.787	43.107	51.219	59.038	68.038	78.239	90.760	92.884	99.022	117.643	117.643	152.437	164.404
Academic	ENSA	14.665	21.274	28.219	35.787	43.107	51.219	63.740	75.280	88.251	103.980	108.418	117.543	137.767	176.261	187.850	228.744
	CIRES	—	—	—	—	—	—	2.039	3.411	5.174	7.481	9.580	12.381	17.408	22.947	32.308	45.086
Subtotal academic	IRAT	0.000	0.000	0.000	0.000	0.000	0.000	2.039	3.411	5.174	7.481	9.580	12.381	17.408	49.141	54.500	76.263
	IRCT	93.406	106.108	107.045	123.219	124.393	141.340	135.842	132.148	129.416	128.655	173.224	225.312	243.447	285.302	276.395	382.976
Subtotal bilateral	IRCT	66.726	66.325	66.911	95.848	110.585	141.357	143.008	132.164	137.045	160.837	157.495	160.956	177.626	213.887	214.421	245.437
	IRCA	85.043	84.532	85.279	87.257	88.088	90.080	106.321	124.773	145.554	170.824	167.274	170.950	185.837	223.611	268.792	281.796
Subtotal bilateral	IRHO	177.844	195.609	239.638	289.777	304.347	318.497	297.874	280.656	291.332	285.087	309.371	272.871	378.505	424.178	447.717	502.108
	IRCC	150.063	188.936	200.637	195.026	190.129	212.097	214.120	220.576	304.381	346.197	398.097	442.787	425.128	492.613	563.565	686.211
Subtotal bilateral	IRFA	87.014	115.321	121.187	128.958	120.173	122.890	124.325	127.665	132.379	145.651	148.330	172.696	188.000	218.673	211.436	233.041
	IRCC	803.125	885.659	885.659	974.704	1027.068	1126.771	1124.653	1125.664	1259.744	1345.316	1504.667	1579.778	1755.843	2069.783	2218.565	2628.317
GDP Deflator	TOTAL	714.926	824.400	913.878	1010.491	1070.175	1177.990	1190.431	1204.355	1353.169	1456.777	1622.665	1709.702	1911.018	2295.185	2460.915	2933.323
	GDP Deflator	18.7	18.6	18.8	19.2	19.4	19.9	20.1	20.6	21.4	22.6	22.1	22.6	25.8	32.1	33.4	39.7
Total (constant 1985 FCFA)	TOTAL	3814.341	4425.030	4862.364	5254.515	5512.324	5933.504	5926.928	5839.419	6327.287	6449.001	7335.793	7563.083	7409.995	7141.209	7370.824	7397.492
	Total (constant 1985 PPP dollars)	18.038	20.925	22.994	24.848	26.067	28.059	28.028	27.614	29.921	30.497	34.690	35.765	35.041	33.770	34.856	34.982
Source	Source	1351	1351	1351	1351	1351	1351	1351	1351	1351	1351	1351	1351	1351	1351	1351	1351
	Source	1362	1362	1362	1362	1362	1362	1362	1362	1362	1362	1362	1362	1362	1362	1362	1362
Government	IDESSA	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	IDEFOR	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal government	CIRT (ITIPAT)	31.774	30.789	30.477	35.565	33.721	54.929	70.000	236.000	122.000	175.381	112.910	119.254	169.690	154.504	155.825	146.152
	CRO	286.270	407.620	476.100	419.800	420.800	533.444	661.900	699.450	650.766	742.950	626.450	631.329	635.139	552.064	632.991	595.265
Academic	ENSA	318.044	438.409	506.577	455.365	2059.221	2198.773	2500.600	2714.450	2558.766	2424.196	2072.840	2230.861	2369.315	2309.083	2417.881	2797.208
	CIRES	67.167	75.209	89.004	115.240	121.851	148.681	160.460	178.752	289.886	389.198	380.093	381.563	391.728	246.905	246.590	230.021
Subtotal academic	IRAT	38.495	39.490	45.567	72.384	89.865	106.925	97.689	117.049	114.153	116.632	116.295	119.146	119.586	117.957	117.934	116.041
	IRCT	105.663	114.699	134.571	187.625	211.715	255.606	258.149	295.801	404.038	505.830	496.388	500.707	511.314	364.862	364.524	348.061
Bilateral	IRAT	561.848	663.317	769.892	1064.273	—	—	—	—	—	—	—	—	—	—	—	—
	IRCT	303.221	271.055	245.152	276.593	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal bilateral	IEWVT	234.886	258.216	290.720	387.141	—	—	—	—	—	—	—	—	—	—	—	—
	CTFT	137.779	220.273	260.177	271.117	306.435	341.400	379.000	376.210	372.290	420.000	483.562	559.100	619.217	701.233	727.100	—
Subtotal government	IRCA	341.960	397.873	431.641	477.172	569.700	647.800	789.500	876.700	780.400	855.207	866.798	910.044	999.030	794.813	698.938	—
	IRHO	604.115	606.415	636.850	768.402	901.375	1024.007	998.833	1008.706	1008.706	1298.114	1326.260	1427.288	1310.095	1345.795	1323.057	—
Subtotal academic	IRCC	758.210	891.033	940.277	1133.33	1176.80	1179.88	940.83	830.478	1051.358	1065.98	1150.524	1211.088	1160.572	927.850	633.241	—
	IRFA	336.543	376.337	350.009	456.500	774.100	813.900	835.057	789.400	814.000	838.067	862.133	851.700	887.092	854.544	860.623	—
TOTAL	IRFA	3278.560	3614.458	3924.719	4834.531	3728.413	4006.982	3943.218	3908.026	4026.753	4477.270	4689.277	4959.219	4976.005	4624.236	4242.959	0.000
	TOTAL	3702.267	4167.566	4565.868	5477.521	5999.349	6461.361	6701.966	6918.278	6989.558	7407.296	7258.505	7690.090	7856.634	7298.161	7025.364	8145.269
GDP Deflator	GDP Deflator	50.9	52.6	55.8	70.1	72.0	78.2	84.5	96.1	100.0	100.0	97.7	98.1	96.5	88.5	88.3	88.9
	Total (constant 1985 FCFA)	7273.399	7921.350	8182.611	7811.276	8329.303	8260.578	7934.439	7202.302	6989.558	7405.400	7430.483	7842.005	8143.201	8250.888	7962.606	9165.629
Source	Total (constant 1985 PPP dollars)	34.395	37.459	38.695	36.939	39.388	39.063	37.521	34.059	33.053	35.019	35.138	37.084	38.508	39.017	37.607	43.343
	Source	999	68; 999	68; 999	12; 68	68; 999	68; 86	68; 86	68; 86	68; 86	999	976	999	999	999	999	999
Source	Source	1251	1251	1351	1351	1351	1351	1351	1351	1351	1351	1351	1351	1351	1243	1241	1241
	Source	1362	1362	1362	1362	1362	1362	1362	1362	1362	1362	1362	1362	1362	1376	1376	1376

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

### Appendix 6: Research staff development by institute

Institut des Savanes (IDESSA)	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Nationals																
PhD																
MSc																
BSc																
Subtotal					12	18	19	20	20	25.5	31	36	47	47	51	61
Expatriates					37	35	32	30	31	27.0	23	23	23	23	20	13
Total					49	53	51	50	51	52.5	54	59	70	70	71	74
Source					86	86	86	86	86		999	999	999	999	999	999

Note: Established in 1982.

Instituts des Forêts (IDEFOR)	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Nationals																
PhD																
MSc																
BSc																
Subtotal									35	35.4	47	50.5	52	54	55	
Expatriates									60	56	52	66	66	61	59	
Total									95	91.4	99	102.5	118	115	114	
Source									446	(a)	(a)	(a)	(a)	(a)	(a)	(a)

(a) Sum of the respective institutes.

Centre Ivoirien de Recherches Technologiques (CIRT)	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Nationals																
PhD																
MSc																
BSc																
Subtotal																
Expatriates																
Total	0	0	0	0	0	0	2.0	3.0	4.0	5	6.0	7	6.7	6.3	6.0	5.7
Source										532		431				
Nationals																
PhD																
MSc																
BSc																
Subtotal					4	6	8.5	11	11	12	12	12	18	19	20	19
Expatriates					0	0	0	0	0	0	0	0	0	0	0	0
Total	5.3	5.0	4.7	4.3	4	6	8.5	11	11	12	12	12	18	19	20	19
Source					12	169		774	774	999	999	999	999	999	999	999

**Appendix 6: Research staff development by institute (contd.)**

	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Centre de Recherches Océanographiques (CRO)																
Nationals																
PhD																
MSC																
BSc																
Subtotal																
Expatriates	3.7	5.4	7.1	8.8	10.5	12.2	13.9	15.6	17.3	19	19.9	20.7	21.6	22.4	23.3	24.1
Total										532						
Source																
Nationals	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
PhD																7
MSC																12
BSc																1
Subtotal										16.8	20	21.5	23	22.0	21.0	20
Expatriates										11.7	14	14.5	15	15.0	15.0	15
Total	25.0	29.3	32.0	33.3	28.8	29.6	35.1	33.9	31.4	28.5	34	36.0	38	37.0	36.0	35
Source	999	999	999	999	999	999	999	999	999	999	999	999	1248			999

	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Ecole National Supérieure Agronomique (ENSA)																
Nationals																
PhD																
MSC																
BSc																
Subtotal																
Expatriates																
Total	0	0	0	0	0	0	6.0	8.5	11.0	13.5	16.0	18.5	21.0	23.5	26	27.8
FTE							0.6	1.0	1.4	2.0	2.6	3.2	4.0	4.8	5.7	6.7
Source															95	
Nationals	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
PhD										17	17	18	21	21	22	24
MSC										18	17	16	16	15	15	13
BSc										6	7	7	6	10	9	7
Subtotal			15	22.3	29.7	37	38.0	39.0	40.0	41	41	41	43	46	46	44
Expatriates			18	16.3	14.7	13	11.0	9.0	7.0	5	5	5	5	9	9	7
Total	29.5	31.2	33	38.7	44.3	50	49.0	48.0	47.0	46	46	46	48	55	55	51
FTE	7.8	8.4	9.4	9.7	10	11.2	11.2	11	17.1	23	23	23	24	16.5	16.5	15.3
Source			889		68	979		86		999	999	999	999	999	999	999



**Appendix 6: Research staff development by institute (contd.)**

IRCT	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Nationals																
PhD																
MSC																
BSc																
Subtotal																
Expatriates																
Total	5.0	5	5	7	8	10	10	9	9	10	10	10	10	10	10	10
Source		1262	1262	1262	1262	1262	1262	1262	1262	1262	1262	431	1262	1262	1262	1262
	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Nationals																
PhD																
MSC																
BSc																
Subtotal					1											
Expatriates					6											
Total	10	9	8	7.5	7											
Source	1262	1262	1262		12											

IEMVT	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	1.0	2.0	2.0	2.5	3	2	2	1	2	4	5	3	5	4	10
Source						653	1362	1362	1362	532		431	1362	1362	1362	1362
	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Nationals																
PhD																
MSC																
BSc																
Subtotal				2.8	4											
Expatriates				8	7											
Total	10	10.2	10.5	10.8	11											
Source	1362				12											

**Appendix 6: Research staff development by institute (contd.)**

CTFT	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Nationals																
PhD																
MSC																
BSc																
Subtotal																
Expatriates																
Total	4.0	4.9	5.8	6.7	7.6	8.5	8.9	9.3	9.6	10	11	12	10	11	10.0	9.0
Source										532	1364	1364	1364	1364		
Nationals	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
PhD																
MSC																
BSc																
Subtotal	2				2	1	3	2	4	4	12	12	8	8	8	8.0
Expatriates	6				5	8	6	6	9	7	7	6	13	13	13.0	
Total	8	12	10.3	8.7	7	9	9	8	13	11	19	18	21	21	21.0	
Source	1364	1364			12	86	86	86	86	976	1244	1244	1243	1243		

Département des Plantes à Latex - IDEFOR (previously IRCA)	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	0.0	0.0	0.0	0										
Expatriates	6.0	6.0	6.0	6.0	6.0	6										
Total	6.0	6.0	6.0	6.0	6.0	6	7.0	8.0	9.0	10	10.0	10	10.0	10	12	11
Source						653				532		68		1365	1365	1365
Nationals	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
PhD										1	1	1	1	1	1	3
MSC										1.5	4	4	5	5	5	5
BSc										0	0	0	0	0	0	0
Subtotal					2	2	2	3	4	2.5	5	5	6	6	6	8
Expatriates					14	15	15	13	15	11	9	10	10	9	8	6.5
Total	11	13	14	13	16	17	17	16	19	13.5	14	15	16	15	14	14.5
Source	1365	1365	1365	1365	1365	1365	1365	1365	1365	999	999	999	999	999	999	999

**Appendix 6: Research staff development by institute (contd.)**

Département des Plantesoléagineux / IDEFOR (formerly IRHO)																
	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Nationals																
PhD																
MSc																
BSc																
Subtotal																
Expatriates																
Total	16	18	22	24	27	27	25	24	22	20	22	19	24	23.7	23.4	23.1
Source	1363	1363	1363	1363	1363	1363	1363	1363	1363	532	1363	431	1363			
	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Nationals																
PhD																
MSc																
BSc																
Subtotal					2	3	2	6	10	11.5	13	14.5	16	16.0	20.0	22
Expatriates					20	20	21	18	15	15	15	15	15	15.0	15.0	15
Total	22.8	22.5	22.2	22	22	23	23	24	25	26.5	28	29.5	31	33.0	35.0	37
Source				68	86	86	86	86	86			1270				1376

Département Café Cacao / IDEFOR (formerly RCC)																
	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Nationals																
PhD																
MSc																
BSc																
Subtotal	0	2	2	3	2	2	3	2	2	2	2	3	2	3	3	3.5
Expatriates	15	17	18	16	17	17	17	21	22	27	24	23	23	24	25	24.0
Total	15	19	20	19	19	19	20	23	24	29	26	26	25	27	28	27.5
Source	1349	1349	1349	1349	1349	1349	1349	1349	1349	1349	1349	1349	1349	1349	1349	1349
	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Nationals																
PhD																
MSc																
BSc																
Subtotal	4	4	4	3	4	4	5	9	9	10	11	13	15	15	14	
Expatriates	23	27	28	30	26	24	21	17	17	17	17	17	17	13	12	
Total	27	31	32	33	30	28	26	26	26	27	28	30	32	28	26	
Source	1349	1349	1349	1376	1376	1376	1376	1376	1376	1376	1376	1376	1376	1376	1376	1376

**Appendix 6: Research staff development by institute (contd.)**

	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Département Fruits et Agrumes / IDEFOR (formerly IRFA)																
Nationals																
PhD																
MSc																
BSc																
Subtotal																
Expatriates																
Total	9	12	12.5	13	12	12.0	12	12.0	12	12.5	13	14.0	15	14.3	13.7	13
Source	1078	1078		1078	1078		1078		1078		1078		1078			1078
	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Nationals																
PhD																
MSc																
BSc																
Subtotal					4	4	6.5	7.8	8.8	w	6	6	7	7	7	7.0
Expatriates					12	9	9.3	8.8	8.0	6.0	4	4	11	11	11	11.0
Total	15	14	15	16	16	13	15.8	16.6	16.8	13.4	10	10	18	18	18	18.0
Source	1078	1078	1078	68	86	86	1361	1361	1361		1244	1244	1243	1243		



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