

Statistical Brief

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Statistical Brief on the National Agricultural Research System

of

CAPE VERDE

Nienke M. Beintema
Philip G. Pardey
Johannes Roseboom

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.

ISNAR • P.O. Box 93375 • 2509 AJ The Hague, The Netherlands.

Tel: (31) (70) 349-6100 • Fax: (31) (70) 381-9677

Email: Internet: ISNAR@CGIAR.ORG

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Acronyms

CDP	Centro de Desenvolvimento Pecuário	INIA	Instituto Nacional de Investigação Agrária
CEA	Centro de Estudos Agrários	INIDA	Instituto Nacional de Investigação e Desenvolvimento Agrária
CVE	Cape Verdean Escudos	INIP	Instituto Nacional de Investigação Pescária
CGIAR	Consultative Group on International Agricultural Research	ISNAR	International Service for National Agricultural Research
DGASP	Direção Geral de Agricultura, Silvicultura e Pecuária	MDRP	Ministério de Desenvolvimento Rural e Pescas
DGCSAFER	Direção Geral de Conservação de Solos e Água, Florestas, e Engenharia Rural	MPAAR	Ministério das Pescas, Agricultura e Animação Rural
FAO	Food and Agricultural Organization	NARS	National Agricultural Research System
FTE	Full-Time Equivalent	OECD	Organization for Economic Co-operation and Development
GDP	Gross Domestic Product	UNDP	United Nations Development Program
COVC	Government of Cape Verde	USAID	United States Agency for International Development
IDEPE	Instituto de Promoção e Desenvolvimento da Pesca Artesanal		
INDP	Instituto Nacional de Desenvolvimento das Pescas		
INERF	Instituto Nacional de Engenharia Rural e Florestas		
INFA	Instituto Nacional de Fomento Agro-Pecuário		

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 Cape Verde. 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 Cape Verdean 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 Cape Verde we refer to appendix 1.

2. Agricultural Research Institutions

2.1 Historical Evolution¹

Until 1975, Cape Verde was a colony of Portugal. Prior to independence the country had various research stations, built by the Portuguese, that were permanently staffed with Portuguese and Cape Verdean scientists. These research stations were part of the Portuguese Overseas Scientific Research Service. Following independence the Government of Cape Verde restructured and reformed the research infrastructure assumed from the Portuguese in an effort to address the food security and resource management priorities of the new administration.

The Government of Cape Verde established a national agricultural research agency, the “Centro de Estudos Agrários” (CEA, the Center of Agrarian Studies), in 1978 with financial support from various donors (e.g., USAID, FAO, and the Governments of Germany, Netherlands, and United Kingdom). CEA was under the administrative and financial responsibility of the “Ministério de Desenvolvimento Rural e Pescas” (MDRP, the Ministry of Agricultural Development and Fisheries). In 1985 CEA was renamed the “Instituto Nacional de Investigação Agrária” (INIA, the National Institute for Agricultural Research). The institute became a semi-autonomous body under the supervision of MDRP but had financial and administrative autonomy.

In its initial years CEA undertook some research on animal production, but in 1982 the “Centro de Desenvolvimento Pecuário” (CDP, the Center for Animal Development) was established as a semi-autonomous body under the supervision of MDRP and assumed responsibility for livestock research. The institute began operations using only expatriate scientists, who were gradually replaced by Cape Verdean scientists as they returned from training abroad. CDP conducted some research on the production and health of swine, rabbits, poultry, and goats, as well as on pasture development and was also heavily engaged in extension activities regarding animal production. In 1990 the center had 20 extension agents located at various stations throughout the country.

Although fisheries production is the most important source of export earnings for Cape Verde, and in value terms fish products are also the largest component of the food and agricultural sector, fisheries research was only recently initiated with the establishment of the “Instituto Nacional de Investigação Pescária” (INIP, the National Institute for Fisheries Research) in 1985. The institute became operational in 1988.

An overview of the structure of the Cape Verdean NARS prior to 1992 is presented in table 2.

In late 1992 those public agencies concerned with agriculture, including the national research institutes, were reorganized in an attempt to achieve a more efficient use of the country’s modest research resources. MDRP became the “Ministério das Pescas, Agricultura e Animação Rural” (MPAAR, the Ministry of Fisheries, Agriculture, and Livestock). The research activities of CDP were integrated into INIA which was renamed the “Instituto Nacional de Investigação e Desenvolvimento Agrária” (INIDA, the National Institute of Agricultural Research and Development). The extension activities of CDP were merged into the newly created “Instituto Nacional de Fomento Agro-Pecuário” (INFA, National Institute for the Promotion of Agriculture and Animal Husbandry).

¹ The material presented in this section draws largely from Institut du Sahel and DEVRES (1984), FAO (1990), Sabino (1992), and USDAL/WARD (1994).

Table 2: Overview of the Structure of NARS, 1991^a

Institutional category	Supervising agency		Executing agency			Staffed research sites ^b	Number of researchers		
	Name	Acronym	Research focus	National	Expats		Total	FTEs	
Government	Ministério de Desenvolvimento Rural e Pescas, Direção Geral de Agricultura, Silvicultura e Pecuária	INIA	crops, livestock forestry, natural resources, wildlife socioeconomics	20	8	28	28	28	
	Centro de Desenvolvimento Pecuário	CDP	animal production	na	na	4	4	4	
	Ministério de Desenvolvimento Rural e Pescas	Direção Geral de Conservação de Solos e Água, Florestas, e Engenharia Rural	forestry, conservation	na	na	na	na	na	
	Instituto Nacional de Investigação Pescária	INIP	fisheries	na	na	6	6	6	
<i>Total</i>				<i>na</i>	<i>na</i>	<i>na</i>	<i>na</i>	<i>na</i>	

Source: 0999 and 1214.

Note: The information refers to 1991 for INIA and to 1990 for CDP and INIP.

^a Structure of NARS of Cape Verde before the reorganization in 1992.

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

Prior to the reorganization in 1992 the “Direção Geral de Conservação de Solos e Água, Florestas e Engenharia Rural” (DGCSAFER, the Directorate General for the Conservation of Soils and Water, Forestry, and Rural Engineering) of MDRP conducted environmental research and conservation works. In 1992 DGCSAFER’s research and conservation activities were transferred to a newly established, semi-autonomous institute, the “Instituto Nacional de Engenharia Rural e Florestas” (INERF, the National Institute of Rural Engineering and Forestry).

In 1993, INIP and the “Instituto de Promoção e Desenvolvimento da Pesca Artesanal” (IDEPE, Institute for Fisheries Promotion and Development) were merged into the “Instituto Nacional de Desenvolvimento das Pescas” (INDP, Institute for Fisheries Development) thereby consolidating fisheries research and extension in one institute. Most of INDP’s staff were transferred from Praia to Mindelo, São Vicente.

2.2 Present Structure

By way of background to describing the current structure of the Cape Verdean agricultural research system this section begins with a brief overview of contemporary developments in the country’s agricultural sector. Cape Verde consists of a group of ten islands 500 km off the coast of West Africa. Although the soils are of volcanic origin, vegetation is sparse because of the erratic rainfall, adverse topography, and prior degradation of the country’s natural resource base. The major constraints to agricultural production are water and arable land. Only 16% of the country’s land is classified as potentially suitable for agriculture. About 61% of the potentially agricultural land is cropped, with 5% of the cropped land under irrigation. The remaining 39% of agricultural land is pastureland. Around one half of the country’s labor force works in agriculture, but in 1991 agricultural GDP accounted for only 14% of total GDP. Local agricultural production is insufficient to satisfy the domestic demand for food. In good rainfall years Cape Verde produces 30-35% of its total food demand, but in drought years this figure can fall to less than 10%. For these reasons the country has been particularly dependent on food aid.

The fisheries subsector is an important component of Cape Verde’s economy and accounted for almost one-half of agricultural GDP and over two-thirds of the country’s export earnings in 1991. Since 1992, however, fisheries exports dropped markedly which resulted in a drastic decline in the country’s export earnings. Livestock and crop production are equally important and each account for one-quarter of agricultural GDP.

The main agricultural research institute in Cape Verde is the “Instituto Nacional de Investigação e Desenvolvimento Agrária” (INIDA). INIDA is headquartered in São Jorge, Santiago and has five substations, three on the island of Santiago, one on São Nicolau, and one on Santo Antão. INIDA’s research focuses mainly on crop and animal production, as well as forestry, natural resources, and, recently, farming systems. INIDA is organized into five departments, namely agriculture and livestock, environmental sciences, social sciences, training, and finance and administration (see appendix 3). The Department of Agriculture and Livestock conducts research on corn, legumes, roots, tubers, horticultural crops, banana, sugarcane, irrigation, water harvesting, integrated pest management, biotechnology, industrial crops, food technologies, animal health, and forestry. The Department of Environmental Sciences conducts research on vegetation, wildlife, soil science, agroclimatology, and hydrology. The Department of Social Sciences conducts farming systems research and research related to socioeconomic issues. In addition, the Department of Training provides training for extension workers. The training is conducted by INIDA staff.

Fisheries research is carried out by the “Instituto Nacional de Desenvolvimento das Pescas” (INDP, Institute for Fisheries Development), a semi-autonomous body under the responsibility of the “Ministério das Pescas, Agricultura e Animação Rural” (MPAAR). INDP conducts applied and development research on lobster, tuna, other small ocean fish, and aquaculture, as well as testing fisheries technologies. INDP’s organizational structure in diagrammatic form is presented in appendix 3.

The “Instituto Nacional de Engenharia Rural e Florestas” (INERF) was created as part of the restructuring that took place in 1992 by combining sections that were formally administered by the “Direção Geral de Conservação de Solos e Agua, Florestas e Engenharia Rural” (DGCSAFER) and INIA. INERF conducts research on soil and water conservation, forestry, and rural engineering and is divided into five divisions; rural engineering, renewable energy, soil and forest conservation, studies and plan, and administration. INERF’s organizational structure is presented in diagrammatic form in appendix 3.

INIDA, INERF, INFA, INDP, and INC are semi-autonomous bodies with administrative and some financial autonomy under the overall responsibility of MPAAR. The institutes have their own statutes, budgets, and personnel (i.e., their personnel are no longer government employees). They engage in fee-for-service activities although their chief client remains the government.

No university level training facilities are available in Cape Verde. All national scientists received their university education outside the country, which was often undertaken with substantial donor support. The country’s first tertiary level education program began in 1993. The program consists of a three year agroforestry diploma course offered by INIDA with students from Cape Verde and other countries and financial support from the Governments of Cape Verde, Portugal, and FAO.

3. NARS Statistics

The data in this report refer to the period prior to 1992. This is the year in which the Cape Verdean NARS underwent a major structural reorganization that resulted in the formation of INIDA. INIDA’s predecessor, INIA, was the only Cape Verdean research agency to respond to the ISNAR survey. The information provided by INIA was combined with the data and information obtained from the secondary sources cited at the conclusion of this report .

The expenditure data presented in this brief are based on the actual expenditures as reported by INIA. However, institutes systematically underestimate the degree of donor support because they only have information about the donor support that is channeled through their accounting system. Most importantly they often underreport or fail to report the salaries and supplements paid directly to expatriate researchers by the donors. To correct for this problem in the estimate provided by INIA, 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.

3.1 Long-Term Development

Although locally executed research began in 1978 expenditure data were only available for INIA for the period 1985-91 (table 3). Although the number of full-time equivalent researchers is quite small in absolute terms they represent around 400-500 researchers per million economically active agricultural population. This ratio is ten times higher than the corresponding sub-Saharan African weighted average of 42 researchers per million economically active agricultural population for the period 1981-85 (see Pardey, Roseboom and Anderson 1991). If CDP, DGCSAFER, and INIP were included in the 1990 researcher totals for Cape Verde the country's researchers per million economically active agricultural population ratio would have been at least 27% higher than that reported in table 3 and 14 fold higher than the corresponding sub-Saharan African average.

Agricultural research spending expressed as a percent of agricultural GDP averaged 6.3% for the 1985-91 period, nearly 13-times higher than the average for sub-Saharan Africa that prevailed in the mid-1980s. However as Pardey, Roseboom and Anderson (1991) note, it is not unusual for countries with small populations, especially in sub-Saharan Africa, to have higher than average research intensity ratios. This highlights the real difficulties for small countries such as Cape Verde of maintaining even a very modest agricultural research capacity based only on local sources of support.

Total expenditures fluctuated markedly during the period 1985-91 and so the corresponding expenditures per researcher estimates ranged from \$108,000 in 1989 to \$277,000 in 1986, with the period average being \$172,000.

Table 3: *NARS Researcher and Expenditure Series, 1985-91*

	1985	1986	1987	1988	1989	1990	1991	Annual growth rate ^a
								%
Researchers (FTEs)	23	18	26	27	31	26	28	5.5
Expenditures (millions 1985 Cape Verde an Escudos per year)	111.332	113.672	72.633	111.023	76.527	81.526	106.117	-2.7
Expenditures (millions 1985 PPP dollars per year)	4.876	4.979	3.181	4.863	3.352	3.571	4.648	-2.7
Expenditures per researcher (1985 PPP dollars per year)	212,000	277,000	122,000	180,000	108,000	137,000	167,000	-2.7
Number of econ. active agr. population (millions)	0.05	0.05	0.05	0.05	0.06	0.06	0.06	0.4
Researchers per million econ. act. agr. population	425.9	333.3	481.5	500.0	563.6	472.7	500.0	6.3
AgGDP (million 1985 PPP dollars)	49.668	53.091	68.532	75.225	74.997	72.182	78.876	7.8
Expenditures as a % of AgGDP	9.82	9.71	4.76	6.71	4.90	4.91	6.30	-9.1

Source: See appendices 5 and 6.

Note: Includes data for INIA only.

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

3.2 Human Resources

Degree and Nationality Status of Researchers

A detailed breakdown of the educational status of INIA's staff is provided in table 4. INIA is staffed mainly with researchers holding an MSc (or equivalent) degree. In 1984 the only national researcher with a PhD degree left the institute and for the subsequent four years INIA had no national researchers with a PhD degree. The number of expatriate researchers working at INIA increased from three researchers in 1983 to eight researchers in 1991.

Table 4: *Educational and Nationality Status of Researchers of INIA*

Institutional category	Researcher status	1983	1985	1986	1987	1988	1989	1990	1991
		<i>(full-time equivalents)</i>							
Government	PhD	1	0	0	0	0	0	1	2
	MSc	10	18	13	20	21	24	18	18
	BSc	6	0	0	1	0	0	0	0
	Subtotal	17	18	13	21	21	24	19	20
	Expat	3	5	5	5	6	7	7	8
	<i>Total</i>	<i>20</i>	<i>23</i>	<i>18</i>	<i>26</i>	<i>27</i>	<i>31</i>	<i>26</i>	<i>28</i>

Sources: See appendices 5 and 6.

Gender

INIA employs a high proportion of female researchers compared with most other African NARSs. From 1985 to 1991 around 40% of INIA's scientific staff were female. For each of the years 1987 to 1989 the female share was 38% and in 1986 it was 46%. No information on the gender status of expatriate staff was available.

Staff Composition

INIA's total research staff has tended to fluctuate around a post-1985 average of 26. Likewise the number of administrative and "other" support personnel has remained fairly stable since the mid-1980s while the number of technical support staff has more than doubled (table 5). As a consequence the institute's technical support per researcher ratio grew from 0.30 in 1985 to 0.64 in 1991.

In 1990 CDP had four researchers supported by five other staff, while INIP employed six researchers and 15 support staff (FAO 1990).

Table 5: *Staffing Structure INIA*

Staff category	1985	1986	1987	1988	1989	1990	1991
	<i>(number of personnel)</i>						
Research	23	18	26	27	31	26	28
Support							
Technical	7	7	13	15	18	13	18
Administrative	2	2	2	2	2	3	2
Other	2	2	3	3	3	4	3
Subtotal	11	11	18	20	23	20	23
<i>Total</i>	<i>34</i>	<i>29</i>	<i>44</i>	<i>47</i>	<i>54</i>	<i>46</i>	<i>51</i>

Source: 0999.

3.3 Financial Resources

Expenditures

A number of cost categories related to INIA's expenditures are given in table 6. Personnel costs have accounted for around 50 to 70% of the institute's total expenditures during the late 1980s. The share of capital costs has been especially low, particularly by African standards, accounting for around 2-3% of total expenditures during this period.

Table 6: *Breakdown of Expenditures by Cost Category*

Institute	Cost category	1985	1988	1991
		<i>(percentages)</i>		
INIA	Personnel	70.0	57.4	52.9
	Operating	15.0	21.3	23.5
	Maintenance	10.0	14.2	15.7
	Training	3.0	4.3	4.7
	Capital	2.0	2.8	3.1
	<i>Total</i>	<i>100</i>	<i>100</i>	<i>100</i>

Source: 0999.

Sources of Funds

INIA, and its predecessor, CEA, have been particularly dependant on donor funding. In 1990, more than 70% of the total budget was received from donor sources, but no information was available on the amounts provided by specific donors. The remaining 30% of INIA's budget was received from the general revenues of the Government of Cape Verde (GOVC). About 46% of the GOVC funds went directly to salaries and operational costs while the remaining 54% was GOVC's matching contributions to donor-supported bilateral and multilateral projects (Silva 1993).

3.4 Research Focus

An overview of the research focus of INIA, INIP, and CDP is presented in table 7. In 1990/91, 26% of the full-time equivalent researchers worked on crop-related issues, 16% on fisheries, 10% on livestock, 7% on forestry, and 7% on natural resources. The remaining one third of total research time was spent on research that could not be readily allocated to a particular commodity.

Table 7: *Research Focus*^a

	INIA ^b	CDP	INIP	Total	
				FTE	Share
					(full-time equivalents)
					%
Crop	9.8	0	0	9.8	25.8
Livestock	0	4.0	0	4.0	10.5
Forestry	2.8	0	0	2.8	7.4
Fisheries	0	0	6.0	6.0	15.8
Natural resources	2.8	0	0	2.8	7.4
Other	12.6	0	0	12.6	33.2
<i>Total</i>	28	4.0	6.0	38.0	100

Source: 0999 and 1214.

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 The information refers to 1991 for INIA and to 1990 for CDP and INIP.

^b Expatriate researchers were allocated to commodity groups in the same proportion as the 20 national research staff for which commodity specific data were available.

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 explicitly.

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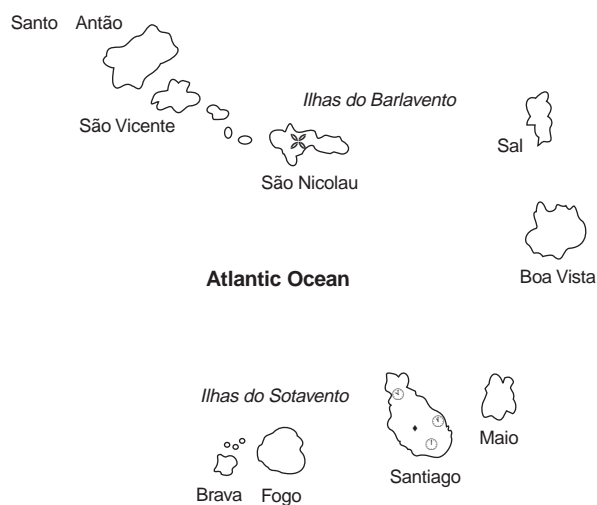
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Appendix 1: Country Background Information

Cape Verde Islands



Geography

Area: 0.4 million ha

Location: Cape Verde consists of 10 islands and 5 islets. It lies about 500 km from the west coast of Senegal.

Agroecological features: The mountainous Windward islands are craggy and deeply furrowed by erosion, the Leeward islands are largely plains and lowlands. The islands are volcanic in origin. The combination of rugged relief and inadequate rainfall result in a predominance of lithosols and immature soils. There are no permanent streams on the mountainous islands and water flows only during the rainy seasons. Moderate stable temperatures and extreme aridity characterize the climate of Cape Verde. The rainfall is irregular.

Population

Total (1991): 0.4 million

Annual growth rate (1981-90)^a: 2.7%

Literacy (1990): 67%

Life expectancy (1991): 66 years

Economy (values reported in 1985 PPP dollars)

Gross Domestic Product (1991): 560 million dollars

Per capita GDP (1991): 1,473 dollars

Agricultural GDP (1991): 79 million dollars

Share of agriculture in GDP (1991): 14.1%

Annual growth rates (1981-90)^a

GDP: 5.8%

GDP per capita: 3.0%

AgGDP: 9.7%

Trade (values reported in current dollars)

Net surplus total trade (1991): -127 million dollars

Net surplus agricultural trade (1991): -41 million dollars

Percentage of agricultural imports in total imports: 35.6%

Percentage of agricultural exports in total exports: 93.0%

Major agricultural import commodities (1991)^b: dry milk (16%), refined sugar (14%), maize (13%), rice (12%) and wine (6%)

Major agricultural export commodities (1991)^b: fishery products (68%) and bananas (32%)

Agriculture

Agricultural land (1990): 0.1 million ha

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

Percentage arable: 57.8%

Percentage permanent crop: 3.1%

Percentage permanent pastures: 39.1%

Percentage irrigated arable and permanent cropland: 5.1%

Economically active agricultural population (1991): 0.1 million

Annual growth rate (1981-90)^a: 0.6%

Percentage in total economically active population: 42.8%

Fertilizer use per ha arable land (year):

Annual growth rate (1981-90)^a:

Major crops (in decreasing order of value of production): coconuts (24%), bananas (18%), dates (13%), maize (14%) and tomatoes (7%)

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).

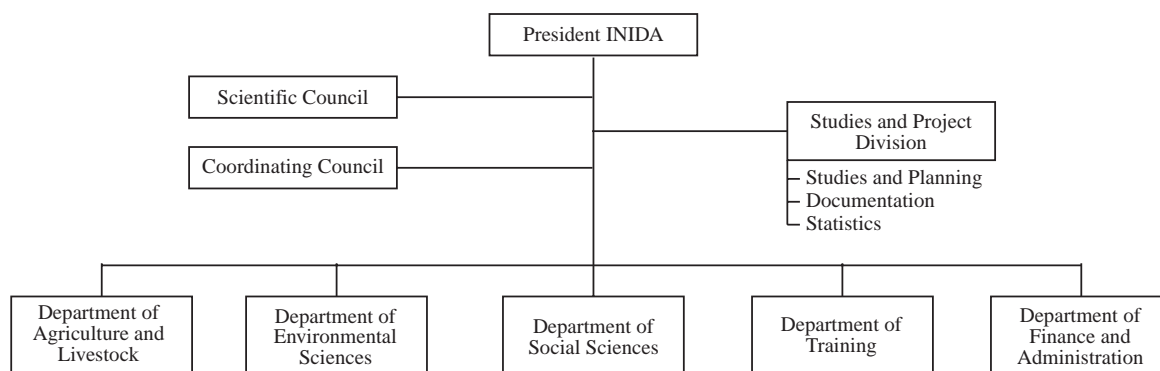
Nomenclature for tables in text

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.

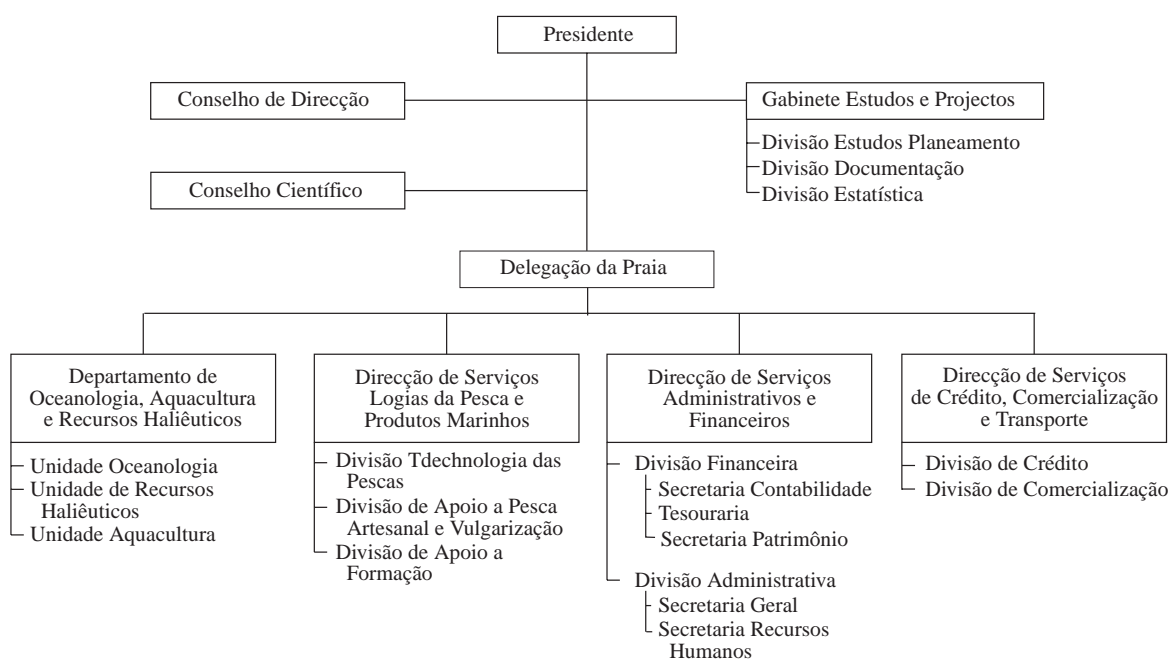
In the text we note any marked deviations from these data compilation norms and include points of clarification if warranted.

Appendix 3: Organizational charts of the agricultural research institutes

Instituto Nacional de Investigação e Desenvolvimento Agrária (INIDA), 1994

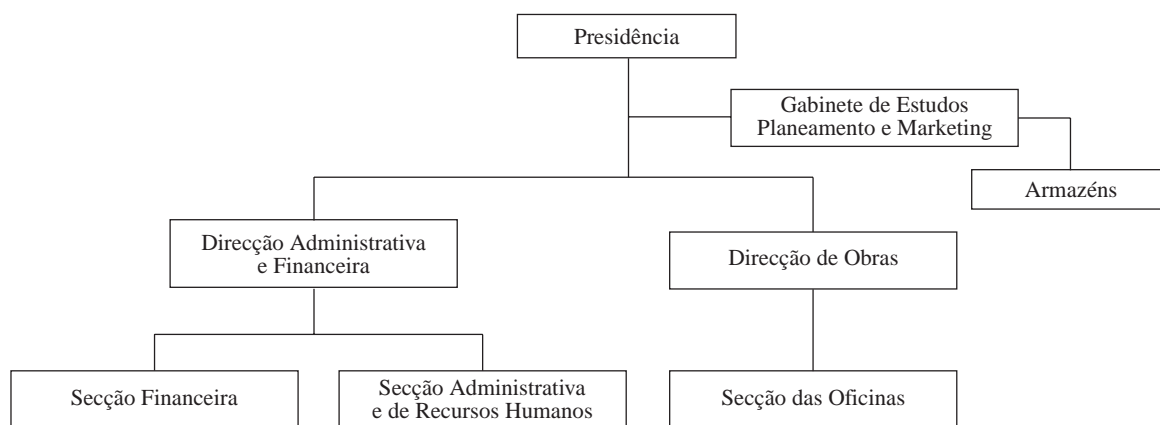


Instituto Nacional de Desenvolvimento das Pescas (INDP), 1994



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

Instituto Nacional de Engenharia Rural e Florestas (INERF), 1994



Appendix 4: Addresses of the agricultural research institutes

Instituto Nacional de Investigação e Desenvolvimento Agrária (INIDA) C.P. 84 São Jorge Praia CAPE VERDE	Instituto Nacional de Desenvolvimento das Pescas (INDP) (Praia) C.P. 545 Praia CAPE VERDE
Instituto Nacional de Engenharia Rural e Florestas (INERF) C.P. 115 Praia CAPE VERDE	Instituto Nacional de Fomento Agro-Pecuário (INFA) C.P. 115 Praia CAPE VERDE
Nacional de Desenvolvimento das Pescas (INDP) (São Vicente) C.P. 132 São Vicente CAPE VERDE	Nacional das Cooperativas (INC) C.P. 218 Praia CAPE VERDE

Appendix 5: Researcher and research expenditure totals, 1978-91

Total Number of FTE Researchers

Category	Name institute	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Government:	INIDA	—	—	—	—	20	21.5	23	18	26	27	31	26	28	—	—
	CDP*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	INIP	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	INERF	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total:									999	999	999	999	999	999	999	999
Sources:																

Note: Italicized figures represent data that are interpolated.

* CDP was merged into INIDA in 1992.

Total Research Expenditures

Category	Name institute	Currency: million Cape Verdean Escudos (CVE)														
		1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Government:	INIDA	—	—	—	—	—	—	—	111.332	132.360	90.632	148.364	110.853	126.681	180.211	—
	CDP*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	INIP	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	INERF	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total (current LCU)									111.332	132.360	90.632	148.364	110.853	126.681	180.211	—
GDP deflator (1985=100)		52.57	56.11	61.62	68.94	79.51	87.14	96.01	100.00	116.44	124.78	133.63	144.86	155.39	169.82	182.47
Total (constant maloti)									111.332	113.672	72.633	111.023	76.527	81.526	106.117	—
Total (constant 1985 PPP dollars)									4.876	4.979	3.181	4.863	3.352	3.571	4.648	—
Sources:									999	999	999	999	999	999	999	999

* CDP was merged into INIDA in 1992.

Appendix 6: Research staff development by institute, 1978-91

Instituto Nacional de Investigacao Agraria (INIA)

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Nationals															
PhD						1	0.5	0	0	0	0	0	1	2	
MSc						10	17.0	18	13	20	21	24	18	18	
BSc						6	0	0	0	1	0	0	0	0	
Subtotal						17	17.5	18	13	21	21	24	19	20	
Expatriates						3	4.0	5	5	5	6	7	7	8	
Total						20	21.5	23	18	26	27	31	26	28	
Sources:						46		999	999	999	999	999	999	999	

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

Instituto Nacional de Investigacao Pesceria (INIP)

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Nationals															
PhD															
MSc															
BSc															
Subtotal															
Expatriates															
Total													6		
Sources:													1214		

Note: INIP is established in 1985, but became operational in 1988.

Centro de Desenvolvimento Pecuario (CDP)

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Nationals															
PhD															
MSc															
BSc															
Subtotal															
Expatriates															
Total													4		
Sources:													1214		

Note: CDP was merged into INIDA in 1992.

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