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UPDATE
AGRICULTURAL SECTOR ASSESSMENT
CAPE VERDE



1985 UPDATE
AGRICULTURAL SECTOR ASSESSMENT
CAPE VERDE

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I. SUMMARY

This Report is an up-date of the Cape Verde Agricultural Assessment Report performed for the U.S. Agency for International Development (USAID) in August, 1978. Data for the current report was obtained in September—October, 1985 by a two-person team of an Agriculturalist and a Social Scientist. The Report was edited by the home office of Multinational Agribusiness Systems Incorporated (MASI) in Arlington, Virginia under a contract with AID.

The MASI Team noted that Ministry of Rural Development has undergone a reorganization which appears to reflect an expansion of functions. To support its many activities, the Ministry has a budget from the Republic of about US \$1,400,000 for 1985 converted at the current exchange rate. Although the Ministry's budget as a fraction of the national budget has tended to decrease, the amount budgeted, expressed in dollars, has remained constant. In addition to support from the Government of Cape Verde, the Ministry also receives from foreign donors a substantial but unknown sum which exceeds the amount provided by the Government.

The agricultural extension service is presently being expanded. When fully staffed, there will be 18 extension agents plus administrative and professional support staff. It is, therefore, in a period of transition.

The Basic Agrarian Reform law was passed in 1982. It went into effect on January 1, 1983, and an operating framework was decided

upon in July 1, 1983. Implementation of the provisions of the law is now beginning with particular attention being paid to designated sections of Santiago and Fogo Islands.

The Studies and Planning Office of the Ministry is, likewise, in the process of expansion of functions. Its purpose is to coordinate activities of the Ministry.

The Cape Verdean population is overwhelmingly rural. The islands of Santiago, Santo Antão, São Nicolau, Fogo and Brava contain nearly all of the agricultural land. One-quarter of the rural families are headed by females, and probably no more than 35 percent of rural family heads are literate.

More than two-fifths of rural family heads are landless and only four percent of the land that is cultivated is irrigated. Parcels of land are very small, but it is common for a person to own more than one parcel. The distribution of land holdings by size is not given in the agricultural census. Forty percent of the land areas cultivated is owned by the farmer that cultivates it, 31 percent rented and 30 percent sharecropped.

Population growth is highly variable due to drought and emigration. The population grew by 37 percent from 1960 to 1970 but only by nine percent from 1970 to 1980. The three most populous islands, Santiago, São Vicente and Santo Antão, are the place of residence of 78 percent of the population. The population has tended to concentrate in these islands. Cape Verde has a high rate of natural increase, the excess

of births over deaths. The birth rate is estimated at 36 per thousand inhabitants and the death rate at 9, yielding a rate of natural increase of 27 per thousand inhabitants per year.

Thirty-nine percent of the population 6 or more years old was literate in 1980. More than two percent of the population had completed a secondary or post-secondary education.

Emigration, predominantly of males, has resulted in a low number (90) of males per 100 females, and probably is responsible, in good measure, for the large percentage of rural families headed by women.

During the past 10 years the country has suffered from prolonged periods of drought which damaged natural resources and reduced agricultural production and progress. Dry land desiccation and water shortages have reached alarming levels.

Massive food and technical support from outside could prevent famine and the collapsing of rural development.

With the end of the drought in sight, infrastructural and production development in the agricultural sector is being reactivated, but numerous problems relating to resource protection, productivity, research, extension and training need to be solved. The principal institutions to implement the program include the Rural Engineering Service, the National Institute for Agricultural Research, the Livestock Research Center and the National Extension Service.

The Rural Engineering Service's mission to develop land and water resources needs a better scientific research foundation, especially soil surveys that include classification, correlation, and detailed interpretation prior to planning, designing and implementing soil conservation facilities construction and reforestation. Water supply improvements are unchanged from the 1978 Report.

Detailed recommendations for the National Institute for Agricultural Research are in Appendices 2 and 3. Broadly speaking, we recommend the same attention to scientifically-produced data in research that was mentioned for the Rural Engineering Service, especially aimed at applying the research results throughout the country. Thorough quantification on erosion losses and soil characteristics and interdisciplinary studies on farming systems and agro-forestry are examples of research programs that are important for all islands.

The Livestock Research Center has a very small research staff and conducts extension primarily on small animals and goats. Other donors expect to assist the Center. It is recommended that research on pasture and forage plus cattle for meat and milk be incorporated in the program as it expands.

Organizationally, it is suggested the National Extension Service emphasize crop and animal production and protection, soil fertility maintenance and erosion control, controlled irrigation, production economics and farmer training. The target of the Service should be to win farmers over to adopt innovative, economically sound practices for their individual farm level conditions.

Development interventions suggested for AID to consider include, in order of priority, (1) support to agricultural research management, (2) small farm, including farming systems research, (3) improved efficiency in the use of irrigation water and (4) agro-forestry for firewood/forage production and soil conservation.

II. INTRODUCTION

In 1978, three years after independence from Portugal in 1975, an assessment of the Republic of Cape Verde agricultural sector was published (Report CR-A-219A). At the request of USAID/Cape Verde, Mr. August Hartman, Agricultural Development Officer, and of Mr. Horacio Soares of the Cape Verde Ministry of Rural Development, the present update was undertaken by a team from Multinational Agribusiness Systems Incorporated, Arlington, Virginia consisting of Dr. John Saunders, rural sociologist and Dr. Heinz Graetz, agronomist.

The following areas were selected for priority consideration by the experts who were in country for 12 and 20 days respectively including weekends.

- The Ministry for Rural Development
- Agrarian reform, land tenure and distribution, population characteristics, and recommendations for agricultural development.
- Agricultural production, natural resource protection, water management, research, extension and training.

Meetings were held with officials of the Ministry for Rural Development and field trips included a reconnaissance of the island of Santiago and visits to the several offices of the government. Time did not permit visits to other islands of the Republic.

III. THE MINISTRY FOR RURAL DEVELOPMENT

A. Organization

A current organizational chart of the Ministry for Rural Development is attached as Figure 1. The Ministry for Rural Development embraces the activities normally carried out by a Ministry of Agriculture (there is no ministry with this title in Cape Verde). It also has responsibility for the social and economic development of rural areas.

The internal organization of the Ministry has undergone changes since its inception and this appears to be an ongoing process as experience in program development and execution is gained. The current organization of the Ministry is considerably more complex than it was in 1978. Also, the organizational chart has experienced some modifications since the 1985 budget was approved.

Consequently, the 1985 budget categories presented in Table 1, 2 and 3 do not correspond exactly to the present organizational chart (Figure 1). The most notable difference is the absence of the General Secretariat to which 21 percent of the 1985 budget was allocated and which apparently, has been renamed the Directorate General of the Central Administration.

B. Budget

The Ministry's total budget for 1985 is on the order of US\$1,397,000. This compares with \$1,416,000 in 1978, an amount which excluded expenditures of an emergency nature generated by drought conditions.

TABLE 1
 BUDGET OF MINISTRY OF RURAL DEVELOPMENT, IN 000's OF ESCUDOS
 REPUBLIC OF CAPE VERDE, 1985

Category	Salaries and wages	Commodities and services	Machinery and equipment	Subsidy ^a	Total
Office of the Minister	4,220	595	300		5,115
Office of Studies and Planning	3,457	122	100		3,579
Office of Agrarian Reform	2,537	475	300	6,415	9,727
General Secretariat ..	15,496	9,736	400		25,633
Inspector General	475	80	-		555
Directorate-General for Agriculture and Livestock	16,640	-	-		16,640
Directorate-General for Natural Resource Use and Conservation...	13,826	-	-		13,826
National Institute for Agricultural Research..	9,692	2,886	300		12,878
Center for Equipment and Shop Maintenance...	17,710	3,635	75		21,420
Office of Rural Extension Services	1,129	30	40		1,199
Regional Rural Development Services	4,961	540	-		5,501
Family bonuses	800	-	-		800
Center for Livestock Development	-	-	-	4,000	4,000
Office for the Integrated Development Plan of Fogo and Brava	-	-	-	2,340	3,340
Totals	90,963	18,080	1,515	13,755	124,313

^aPart of budget of the Office of the Minister.

Source: República de Cabo Verde, Orçamento Geral do Estado para o Ano de 1985. Praia. Ministério da Economia e das Finanças.

TABLE 2

MINISTRY OF RURAL DEVELOPMENT
BUDGETED EXPENDITURES IN ESCUDOS AND DOLLARS
BY ADMINISTRATIVE UNITS AND AS A PERCENT OF THE TOTAL
REPUBLICA DE CAPE VERDE, 1985

Unit	Amount (000's)		Percent of total
	In Escudos	In Dollars ^a	
Office of the Minister	5,115	58	4.2
Office of Studies and Planning	3,679	41	2.9
Office of Agrarian Reform	9,727	109	7.8
General Secretariat	25,683	289	20.7
Inspector General	555	6	0.4
Directorate General for Agriculture and Livestock	16,640	187	13.4
Directorate General for Natural Resource Use and Conservation	13,826	155	11.1
National Institute for Agricultural Research	12,878	145	10.4
Center for Equipment and Shop Maintenance	21,420	241	17.3
Office of Rural Extension Service	1,199	13	0.9
Regional Rural Develop- ment Service	5,501	62	4.4
Family Bonuses	800	9	0.6
Center for Livestock Development	4,000	45	3.2
Office for the Integrated Development of Fogo and Brava	3,340	37	2.6
Totals	124,313	1,397	100.0

^aAt US1.00 : CV 89.00

Source: República de Cabo Verde, Orcamento Geral do Estado para o Ano de 1985. Praia. Ministerio da Economia e Finanças.

TABLE 3
 MINISTRY OF RURAL DEVELOPMENT
 BUDGETED EXPENDITURES IN ESCUDOS AND DOLLARS
 BY CATEGORY OF EXPENDITURE AND AS OF A PERCENT OF THE TOTAL

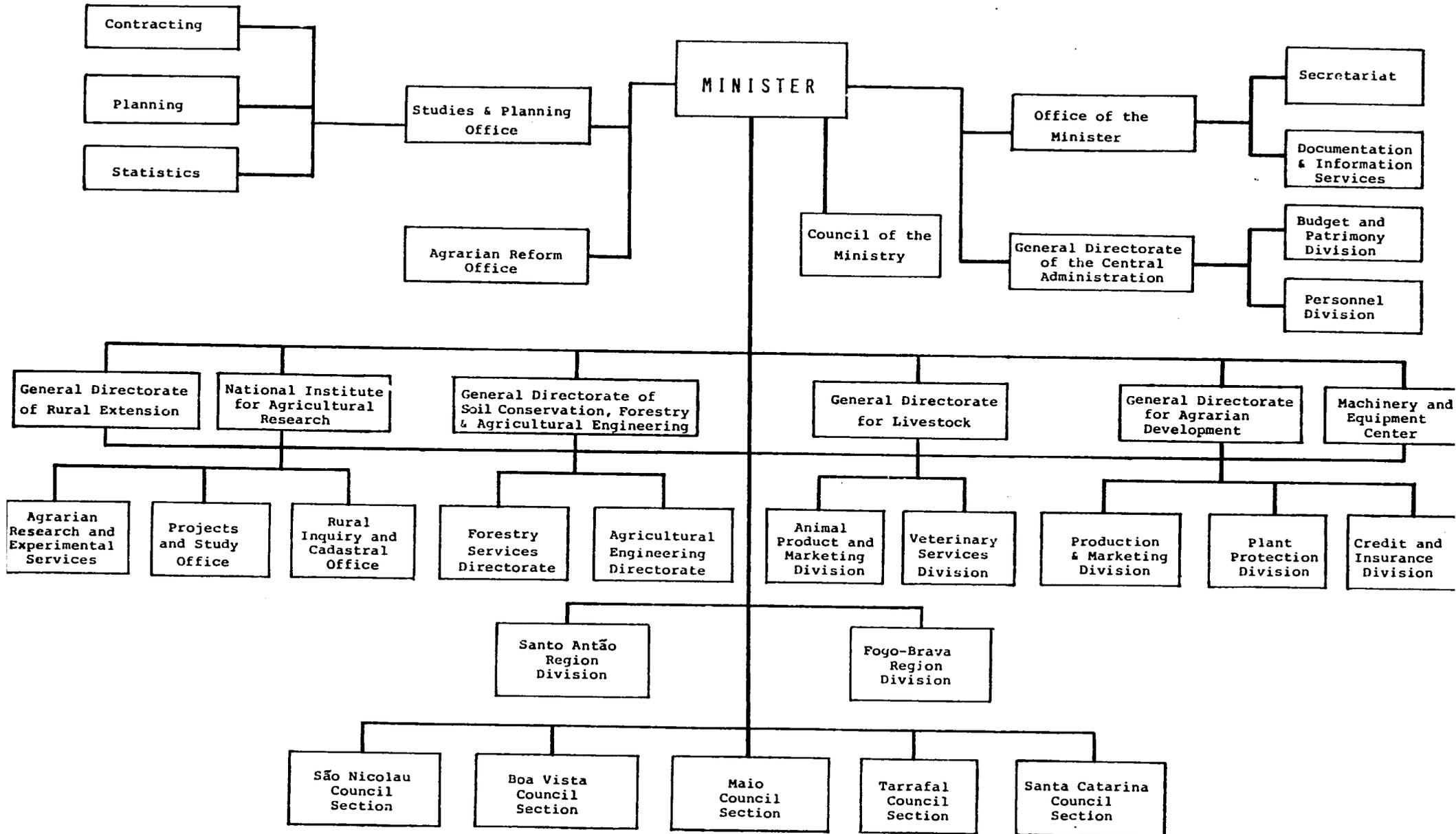
Category	Amount (000's)		Percent of total
	In Escudos	In Dollars ^a	
Salaries and wages	90,943	1,022	73.2
Commodities and Services	18,080	203	14.5
Machinery and equipment	1,515	17	1.2
Subsidies	<u>13,755</u>	<u>155</u>	<u>11.1</u>
Total	124,313	1,397	100.0

^aAt US \$1.00: CVE 89.00

Source: República de Cabo Verde, Orçamento Geral do Estado para o Ano Económico de 1985. Praia. Ministério da Economia e Finanças.

Figure 1

RURAL DEVELOPMENT MINISTRY ORGANIZATION CHART



However, the Ministry's share of the national budget declined from 7.4 percent in 1978 (again excluding emergency expenditures) to 5.7 percent in 1984 and 5.3 percent in 1985. The number of escudos allotted to the Ministry of Rural Development increased by 3 percent from 1984 to 1985*.

A detailed budget summary is presented in Table 1, and expenditures in escudos and in dollars by units within the ministry and by categories of expenditure in Tables 2 and 3. Specially designated amounts termed subsidies are included in the budget of the office of the minister for the support of programs dealing with agrarian reform, livestock development and development of Fogo and Brava islands. The total budget of the Ministry comes to CVE 124,313,000 the equivalent of US\$1,397,000 at the current exchange rate of 89 escudos to one U.S. dollar. The largest single category of expenditure is for the General Secretariat (21 percent of total) followed by equipment and shop maintenance (17 percent), agriculture and livestock (13 percent), natural resource use and conservation (11 percent) and the Center for Agrarian Studies a research station (10 percent). The Center is now known as the Instituto Nacional de Investigacao Agraria (INIA) which AID translates as the National Institute for Agricultural Research. The other nine units or

*1978 data from Peter H. Freeman, et al, Cape Verde: Assessment of the Agricultural Sector. 1984 and 1985 data from República de Cabo Verde, Orçamento Geral do Estado para o Ano de 1985. Praia: Ministério da Economia e Finanças.

categories of expenditure share the remaining 28 percent. Particularly worthy of note is the extremely small share (1 percent or US \$13,000) allotted to rural extension services. This category of expenditure is presently being increased. In evaluating the significance of expenditures it should be kept in mind that salary scales are modest. The President of Cape Verde earns US \$4,854.00, the Prime Minister \$4,045.00, cabinet ministers \$3,573.00, top level technicians \$2,474.00, and top level secretaries \$876.00, all per annum. Consequently, an annual budget of US \$1,022,000.00 in salaries and wages pays for the services of a substantial number of employees. It should also be remembered that the budget does not include inputs from foreign sources. These amounts are substantial. They are usually related to specific projects, however, and do not represent permanent commitments.

C. Agricultural Extension Service

The Direcção-Geral de Extensão Rural is headquartered in São Domingos, about 15 miles from Praia. It was formerly known as Direcção dos Serviços de Extensão Rural. Its new status as a General Directorate reflects the expansion of its activities that is presently underway. The director is immediately under the minister for rural development as reflected in the organizational chart of the ministry. The agricultural extension service was created in its present form in July of 1985. Its activities and personnel are being expanded considerably.

When fully staffed the service will consist of a general director, a chief of extension services (Director de Vulgarização Agrícola),

a rural sociologist and an agro-meteorologist, all of whom will hold university degrees. There will be, in addition, a promoter (Assistente Social) with responsibility for organizing meetings and for motivation; 3 auxiliary technicians, one each in fructiculture, horticulture and information; and 18 field agents at the professional technician level (técnicos profissionais) who are presently being trained. The extension service will work with fructiculture, horticulture, rainfed crops, soil and water conservation, and credit and cooperatives. There will be a section or division for farm management (administração rural).

Thus, the extension service is in a period of transition. Many employees are being assigned to it by transfer from other units of the Ministry. Even so, it is thought that additional staff are needed. There are plans to expand the number of agents from 18 at present to 35 within 3 or 4 years. Twelve of the 18 agents presently envisaged will be on Santiago Island and the remaining 6 on the other islands. The islands of Santiago and São Antão have been designated as priority areas for agrarian reform and will be the object of special attention on behalf of both the extension service and the agrarian reform office.

The extension service has 6 cars, 12 motorcycles, one truck and one bus. This is judged to be adequate. The service will have demonstration plots on each island.

Cooperation between research and extension is official policy. The director of the extension service will participate in the

planning sessions of the National Institute for Agricultural Research. Field agents from the extension service, the research station and the National Institute of Cooperatives (a semi-autonomous agency) are to work together as a team.

At present there are two externally funded projects. One, funded by Italy, is concerned with training, organization and infrastructure meaning equipment and buildings. A Swiss project is also concerned with developing the infrastructure and is closely coordinated with the Italian project.

D. Agrarian Reform Office

Following independence a number of "decree-laws" and executive orders were issued that dealt with some fundamental aspects of man-land relations. Among these were decree-laws nationalizing certain holdings (No. 6/75), prohibiting the sub-leasing of agricultural land, abolishing sharecropping (No. 7/75), placing under the "tutelage" of the government real estate owned by persons who reside abroad (Executive order of 15/12/75) and nationalizing subterranean waters (No. 18/75). The institution of these decrees during the first months following independence on July 5, 1975 was followed by the adoption in March of 1982 of an agrarian reform law by the National Popular Assembly. This law took effect on January 1, 1983. It establishes size limits of one hectare for irrigated farms and of five hectares for rainfed land but allows for exceptions to be made to conform to the exigencies of the Social and Economic Development Plan (Article 7). The law also incorporates the main provisions of the prior decrees: the prohibition of

sharecropping and the expropriation of holdings that exceed size limits or belong to absentee land owners. It provides for the indemnification of losses suffered by landowners.

Finally, the law entrusts the execution of its provisions to the National Agrarian Reform Council and to Agrarian Reform Commissions. The Agrarian Reform Office (Gabinete de Reforma Agrária) is the executive arm of this program. The regulations governing its operation were approved in July of 1983. Thus, with regard to implementation, the agrarian reform law is 27 months old. Agrarian Reform Commissions are still being set up. The requirement that the president of any Commission be a full time employee is causing delays. Priority areas for action by the Agrarian Reform Office are the Concelhos (Districts) of Santa Catarina and Santa Cruz on Santiago Island, and of Ribeira Grande on the Island of Santo Antão.

Experience gained in these areas will be used as the basis for requesting appropriate modifications of the law by the National Popular Assembly, the national legislative body. Changes in man-land relations are frequently resisted and difficult to achieve. The considerable prevalence of sharecropping in Cape Verde despite its abolition in 1975 testifies to this fact.

E. Studies and Planning Office

This office was created to serve a coordinating function. It has three divisions. The division entrusted with cooperation is devoted primarily to dealing with and providing administrative support to Cape Verdean missions going abroad and to missions coming to Cape

Verde from abroad. It coordinates training of Cape Verdeans going abroad to study in conjunction with the National Institute for Agricultural Research. There are at present trainees in Belgium, France, Brazil and the United States.

The Planning and Statistics Division is presently being developed. A Cape Verdean trainee who will work with this section is currently in Belgium. This division will organize and simplify collection, storage and retrieval of agricultural data for Cape Verde. Financing from FAO is expected to aid in the development of this program. Finally, there is an administrative division.

IV. THE RURAL POPULATION AND MAN-LAND RELATIONS

A. Introduction

Censuses of agriculture were taken between 1919 and 1981 on five islands which together contained 81 percent of the national population in 1980.

The rural population is not defined in the censuses but, appears to consist, for census purposes of the open country population as contrasted with that living in towns. Likewise, the term parcela (parcel of land) is not defined. Farm size cannot be known because a farmer may own more than one parcel and the area owned is not reported. Because of this uncertainty, data on land area in liters is used in preference to data on the number of parcels. A liter is the unit of land area in most common use on Cape Verde and the unit in which farmers account for their land. A liter of land corresponds to the area that can be sown with a given quantity (perhaps one liter) of corn or beans. The Ministry of Rural Development considers 1,000 square meters as being the area that can be sown with one liter of corn and 1,000 square meters as the area than can be sown with one-half liter of beans. One thousand square meters is one tenth of a hectare or .2471 acres.

While this is a folk measure and not exact, it probably reflects a common understanding about land area and is reliable as an indicator of relative amounts.

B. The Rural Population

The five islands on which the agricultural census was completed

contain 193 thousand rural inhabitants, equivalent to 80 percent of the total population (Table 4). The remaining islands contain only about 4 percent of the nation's agricultural land. Thus, virtually all of the land and all the farm population are accounted for in the agricultural census. A comparison of the agricultural and population censuses (Tables 4 and 6) suggests that Santo Antão is 100 percent rural, São Nicolau 55 percent rural, Fogo 96 percent rural, Brava 95 percent rural and Santiago 71 percent rural. Although there may be some error in these data, there can be no doubt of the preponderantly rural nature of the Cape Verdean population.

The islands included in the agricultural census contain 35,481 rural family heads of whom 26 percent are female (Table 5). Of even greater interest is the prevalence of literacy. On the three islands for which data on literacy of family heads were available, the percent literate ranged from 19 to 26 percent. The mean size of rural families ranged from 4.9 to 5.8 persons (Table 4).

The number of rural family heads on the agricultural census islands (Table 5) exceeds the number of farmers (Table 6). Although farms and farmers are not defined by the census it would appear that about 30 percent of rural families do not farm. It is probable that many farmers derive a significant fraction of their incomes from non-farm sources consisting mainly of work on publicly supported projects.

TABLE 4
 SIZE OF RURAL POPULATION AND MEAN SIZE OF RURAL FAMILIES
 SELECTED ISLANDS, REPUBLIC OF CAPE VERDE
 CIRCA 1980

Island	Rural Population	Mean Size of Family
Santo Antão	45,004	5.8
São Nicolau	7,452	4.9
Fogo	29,880	5.0
Brava	6,660	5.0
Santiago	<u>103,611</u>	<u>5.6</u>
Total	192,607	-

Source: República de Cabo Verde, Recenseamento Agrícola das Ilhas de Santo Antão e São Nicolau (1980-81); das ilhas de Fogo e Brava (1979-1980), and Santiago (1978-79). Ministério do Desenvolvimento Rural, Gabinete de Inquéritos Rurais.

TABLE 5
 CHARACTERISTICS OF RURAL FAMILY HEADS,
 SELECTED ISLANDS, REPUBLIC OF CAPE VERDE
 CIRCA 1980

Island	Both sexes	Female		Literate	
		Number	Percent	Number	Percent
Santo Antão ...	7,762	1,744	22.5	450	25.8
São Nicolau ...	1,525	465	30.5	571	37.4
Fogo	5,815	1,177	20.2	1,098	13.9
Brava	1,332	449	33.7	*	*
Santiago	<u>19,047</u>	<u>5,547</u>	<u>29.1</u>	*	*
Total	35,481	9,382	26.4	-	-

*Data not provided.

Source: República de Cabo Verde, Recenseamento Agrícola das ilhas de Santo Antão e São Nicolau (1980-81); das ilhas do Fogo e Brava (1979-1980); and Santiago (1978-79). Ministério do Desenvolvimento Rural, Gabinete de Inquéritos Rurais.

TABLE 6
 NUMBER OF FARMERS AND PERCENT LANDLESS
 REPUBLIC OF CAPE VERDE
 CIRCA 1980

Island	Number of farmers	Number of Landless Farmers	Percent Landless
Santo Antão	4,192	1,332	31.8
São Nicolau	1,071	216	20.2
Fogo	3,893	1,405	36.1
Brava	1,111	193	17.4
Santiago	<u>14,814</u>	<u>7,504</u>	<u>50.7</u>
Total	25,081	10,650	42.5

Source: República de Cabo Verde, Recenseamento Agrícola das ilhas de Santo Antão e São Nicolau (1980-81); das Ilhas de Fogo e Brava (1979-1980), and Santiago (1978-79). Ministério do Desenvolvimento Rural, Gabinete de Inquéritos Rurais.

C. Land Tenure and Size of Holdings

The proportion of landless farmers is high, being 42.5 percent in the agricultural census islands (Table 6). Among these islands the highest proportion of landlessness among farmers (51 percent) is found on Santiago and the lowest (17 percent) on Brava.

On the agricultural census islands only about 4 percent of farmland was irrigated. This fraction was highest for Santo Antão (14 percent) and lowest for Fogo (0 percent). The mean size of irrigated parcels varied from zero liters on Fogo to 2.4 on Brava while rainfed parcels varied in average size from 3.6 liters on Brava to 6.4 liters on Santiago (Table 7). Although the data probably mask the existence of much larger land holdings, the small mean size reflects the extreme fragmentation of land holdings which has occurred in Cape Verde through successive divisions by inheritance.

Between 28 and 61 percent of land cultivated on the agricultural islands is cultivated by the owner. Sharecropping accounts for between 22 and 46 percent of land cultivated and rental for the balance (Table 8). There is no common pattern. Each island has a unique mix of lands that are cultivated by owners, renters and sharecroppers. Santiago has the lowest proportion of owner cultivated lands (28 percent) and the highest of renter cultivated lands (50 percent), while in Santo Antão virtually no land is rented. Overall, only 39 percent of the area cultivated is owner cultivated. The proportion cultivated by owners on Santo Antão, São Nicolau, Fogo and Brava are all above 50 percent. The overall figure is depressed by the low percentage of owner cultivated land on Santiago (28) and the large fraction (42 percent) of all cultivated lands located on it.

TABLE 7
 CHARACTERISTICS OF AREA^a CULTIVATED BY FAMILY HEADS INTERVIEWED^b.
 SELECTED ISLANDS, REPUBLIC OF CAPE VERDE
 CIRCA 1980

Island	Area cultivated			Percent irrigated	Mean size of parcel	
	Total	Irrigated	Rainfed		Irrigated	Rainfed
Santo Antão ...	58,496	8,256	50,240	14.1	0.2	5.4
São Nicolau ...	16,982	539	16,443	3.2	2.0	4.2
Fogo	54,234	-	54,234	0.0	0.0	6.0
Brava	20,472	344	20,128	1.7	2.4	3.6
Santiago	217,140	5,233	211,907	2.4	1.0	6.4
Total	367,324	14,372	352,952	3.9	-	-

^aIn liters. See text.

^bThe census estimates, based on the percentage of farmers interviewed that the total area under cultivation is 89,108 liters on Fogo and 24,371 liters on Brava. Estimates are not provided for the remaining islands.

Source: República de Cabo Verde, Recenseamento Agrícola das Ilhas de Santo Antão e São Nicolau (1980-81); das Ilhas de Fogo e Brava (1979-1980), and Santiago (1978-79). Ministério do Desenvolvimento Rural, Gabinete de Inquéritos Rurais.

TABLE 8
 LAND AREA^a OWNED, RENTED AND SHARECROPPED, NUMBER AND PERCENT,
 FOR SELECTED ISLANDS, CAPE VERDE, CIRCA 1980

Island	Owned		Rented		Sharecropped	
	Number	Percent	Number	Percent	Number	Percent
Santo Antão	32,927	56	620	1	24,949	43
São Nicolau	10,430	61	37	-	6,515	39
Fogo	27,438	51	1,553	3	25,263	46
Brava	12,508	61	2,841	14	5,123	25
Santiago	60,169	28	109,693	50	47,278	22
Total	143,472	39	114,784	31	109,128	30

^a In liters. See text.

Source: República de Cabo Verde, Recenseamento Agrícola das Ilhas de Santo Antão e São Nicolau (1980-81); das Ilhas de Fogo e Brava (1979-80) and Santiago (1978-79). Ministério do Desenvolvimento Rural, Gabinete de Inquéritos Rurais.

V. DEMOGRAPHIC CHARACTERISTICS

A. Population Distribution and Change

One of the most salient characteristics of the demography of Cape Verde is the variability of population growth rates which have been strongly influenced over the decades by drought, famine and migration both into and out of the nation. A net loss, due to migration has occurred in most years. The size of this loss varies considerably, however, and can have a significant impact on population size. The magnitude of the impact of net migration gains or losses varies greatly from island to island due largely to differing environmental conditions.

Basic data on population size and change for Cape Verde and for each island for 1960-1970-1980 are presented in Table 9.

The 1960-1970 decade was one of rapid population growth, 36.7 percent, followed by an increase of only 8.5 percent from 1970-1980. The nation's population grew by 48.4 percent during the 1960-1980 period. Several islands, Boa Vista, Brava, Santo Antão and São Nicolau suffered population declines between 1970 and 1980. The population of the latter shrank by 17 percent. These are among the islands most severely affected by the drought occurred during that decade. Brava experienced a decline in its population during the decade of the sixties and of the seventies losing nearly one-fifth of its population.

TABLE 9

POPULATION, 1960, 1970 AND 1980 AND PERCENT CHANGE 1960-1970,
1970-1980 AND 1960-1980, REPUBLIC OF CAPE VERDE, BY ISLANDS

Island	Population			Percent change		
	1960	1970	1980	1960-1970	1970-1980	1960-1980
Total	199,268	272,571	295,703	36.7	8.5	48.4
Boa Vista	3,218	3,463	3,372	7.6	-2.6	4.7
Brava	8,539	7,858	6,985	-8.0	-11.1	-18.2
Fogo	25,571	29,692	30,978	15.6	4.3	21.1
Maio	2,632	3,451	4,098	31.1	18.7	55.7
Sal	2,584	5,642	5,826	45.8	3.2	25.5
Santiago	88,344	129,508	145,957	46.6	12.7	65.2
Santo Antão	33,753	45,051	43,321	33.5	-3.8	28.3
São Nicolau	13,772	16,320	13,572	18.5	-16.8	-1.5
São Vicente	20,855	31,586	41,594	51.5	31.7	99.4

Source: Data for 1960 and 1970 from Direcção-Geral de Estatística, Boletim Trimestral de Estatística, 1977, cited in Peter H. Freeman et al, Cape Verde: Assessment of the Agricultural Sector. Data for 1980 from República de Cabo Verde, 1º Recenseamento Geral da População e Habitação, 1980, vol. I, Table 1. Praia: Direcção de Recenseamento e Inquéritos, 1983.

The greatest population increases occurred on São Vicente, Santiago and Maio from 1960 to 1980, 99.4, 65.2 and 55.7 percent, respectively. Maio accounts, however, for a small share of the national total.

The populations of Santiago, Santo Antão and São Vicente combined included 72 percent of the total population in 1960, 76 percent in 1970 and 78 percent in 1980. Santiago, the largest island in area and in number of inhabitants, held 44 percent of all Cape Verdeans in 1960. By 1970 this share had increased to 48 percent and in 1980 to 50 percent. There has been a 20-year long trend toward the concentration of the national population on Santiago and São Vicente which will probably continue. The latter grew nearly 100 percent between 1960 and 1980.

When change in absolute numbers is analyzed (Table 10) the importance of Santiago, Santo Antão and São Vicente again becomes evident. Santiago accounted for well in excess of one-half of the population growth which occurred during each of the decades discussed. When Santo Antão and São Vicente are included, the proportion rises to more than 85 percent even though Santo Antão experienced a population decline from 1970 to 1980.

Because future population growth in Cape Verde is essentially unpredictable and subject to the influence of too many imponderables, population projections are meaningless. Suffice it to say that if from 1980 to 1990 the growth rate which occurred during 1960-1970 prevails, the 1990 population will be 404,226. If the 1970-1980 growth rate prevails, it will be 320,837.

TABLE 10

POPULATION CHANGE 1960-70, 1970-1980 AND 1960-1980, BY ISLANDS,
AND CHANGE OF EACH ISLAND AS A PERCENT OF TOTAL, CAPE VERDE

Island	Increase or decrease			Percent of total		
	1960-1970	1970-1980	1960-1980	1960-1970	1970-1980	1960-1980
Total	73,375	23,132	96,407	100.0	100.0	100.0
Boa Vista	245	-91	154	0.3	-0.4	0.2
Brava	-681	-873	-1,554	-0.9	-3.8	-1.6
Fogo	4,121	1,286	5,407	5.6	5.6	5.6
Maio	819	647	1,466	1.1	2.8	1.5
Sal	3,058	184	3,242	4.2	0.8	3.4
Santiago	41,164	16,449	57,613	56.2	71.1	59.8
Santo Antão ...	11,298	-1,730	9,568	15.4	-7.5	9.9
São Nicolau ...	2,548	-2,748	- 200	3.5	-11.9	-0.2
São Vicente ...	10,731	10,008	20,739	14.6	43.3	21.5

Source: Data for 1960 and 1970 from Direcção-Geral de Estatística, Boletim Trimestral de Estatística, 1977. Cited in Peter Freeman et al, Cape Verde: Assessment of the Agricultural Sector, August 1978.
Data for 1980 from República de Cabo Verde, 1º Recenseamento Geral da População e Habitação, 1980, vol. I, Table 1.
Praia: Direcção-Geral de Recenseamento e Inquéritos, 1983.

The crude birth or the number of live births per 1,000 inhabitants during a year averaged 33.2 from 1976 to 1980 ⁽¹⁾ and was 36 in 1984. ⁽²⁾ Although this rate is low in relation to the crude birth rate for West Africa which is 48 it is, nonetheless, very high in comparison with the rates which prevail in the developed nations of the world where birth rates of 15 or less are the norm. ⁽³⁾ A birth rate of 36 in combination with a death rate of 9 implies a rapid expansion of population size which will place added strains on the limited natural and economic resources of the Republic of Cape Verde.

B. Literacy and Education

Few, if any, factors have a more profound influence on national development than the educational attainment of its population. Literacy by age and sex of the population 6 or more years old is the subject of Table 11. The highest degree of literacy (59.9 percent) is found among males 15-34 years old and the lowest (18.1 percent) among females 65 or more years old. Male literacy is higher at all ages than female literacy but the discrepancy is greatest among the elderly population and decreases with decreasing

- (1) Custodio Conim, Aspects Généraux de la Démographie au Cap Vert. Sixième Réunion sur le Programme de la Recherche Démographique pour le Sahel. Praia: 1983. Cited in Peter H. Freeman et al, Cape Verde: Assessment of the Agricultural Sector, Report CR-A-219A, August, 1978.
- (2) Population Reference Bureau, World Population Data Sheet, 1985. Washington, D.C., 1985.
- (3) Population Reference Bureau, World Population Data Sheet, 1985. Washington, D.C., 1985.

TABLE 11
LITERACY BY AGE AND SEX,
REPUBLIC OF CAPE VERDE, 1980

Age	Total	Males	Females
All ages 6 and older	38.5	49.2	32.1
6-14	43.5	46.5	40.4
15-34	47.5	59.9	36.4
35-64	32.3	46.4	20.7
65+	27.0	41.7	18.1

Source: República de Cabo Verde, 1º Recenseamento Geral da População e Habitação, 1980, vol. 5, Table 9. Praia: Direcção de Recenseamentos e Inquéritos, 1983.

age, probably reflecting the expansion of primary education in the recent past and more nearly equal access to education by both girls and boys. Of the total population 6 or more years old 38.5 percent were literate in 1980.

Data on educational attainment in Cape Verde as reflected by the completion of a course of study and award of a diploma is found in volume 5 of the 1980 census, Table 10. Of the population 10 or more years old, 11.2 percent have a primary school diploma (diploma basico elementar), 0.4 percent a middle school diploma and 1.7 percent a secondary school or higher diploma.

The structure of primary and secondary education instituted by Portugal followed an elitist pattern oriented toward preparation for university entrance. Discussions are now underway that may lead to the expansion of compulsory primary education from four to six years and to the institution of courses at the post-primary level that will emphasize technical skills.

C. The Balance Between the Sexes

Cape Verde has a small proportion of men in relation to women, expressed as number of men per 100 women, or the sex ratio.

Normally, this proportion approximates 100. However, migration which is selective of the members of one sex over those of the other can cause the sex ratio to vary substantially from 100.

Such is the case in Cape Verde where there are only 90 males for every 100 females (Table 12). The variations among the islands

TABLE 12
SEX RATIOS FOR POPULATION AGED 20-29,
BY ISLAND, CAPE VERDE, 1980

Island	Sex Ratio (Males per 100 females)
Total	90.0
Boa Vista	89.6
Brava	75.5
Fogo	85.4
Maió	88.7
Sal	127.3
Santiago	88.2
Santo Antão	94.7
São Nicolau	90.7
São Vicente	85.7

Source: República de Cabo Verde, 1º Recenseamento Geral da População e Habitação, 1980, vol. 5, Table 9. Praia: Direcção de Recenseamentos e Inquéritos, 1983.

are even greater. Sal Island which has attracted a large number of young male migrants has an exceptionally high sex ratio of 127.3 while the other islands with the exception of Santo Antão have sex ratios of 90 or less. The exodus of males, who are predominantly between the ages of 15 and 35 is a reflection of limited opportunities for employment in the Republic and of the operation of other "push" factors such as low wages and, during the colonial period, hunger.

VI. THE AGRICULTURAL PRODUCTION SECTOR, 1978-1985

A. General Description

During the 1978-1985 period the situation and performance of the agricultural sector of Cape Verde was still characterized by extreme drought as well as yield and production fluctuations. In rainfed agriculture especially, the total output of corn and beans grown on approximately 35,000 ha varied between 1,000 and 9,000 tons per annum compared to 20,000-25,000 tons in an average year. Cropping under irrigation, although less affected overall, suffered from a diminishing availability of water because underground flows and wells were not replenished during the prolonged drought. The following yield estimates per hectare are indicative of the calamitous production levels:

Vegetables	10 to 12 t.	Sugarcane	12 t.
Potatoes	10 to 15 t.	Bananas	28 t.

Major livestock production was hit equally hard. Numbers of cattle and goats dropped from 17,000 to 8,000 and 73,000 to 65,000 respectively while pigs as omnivorous non-ruminants compensated for this loss by increasing from 25,000 to 50,000. In addition, severe and partially irreparable damage has been done to the country's land resource mainly located on the slopes of the mountains. Reduction of the natural and artificial vegetation, as result of soil desiccation and extensive removal of plants by men, exposed productive mountain soils to the erosive forces of wind and water, leading to rapidly progressing degradation and depletion of fertility. Improvement in precipitation, although generally welcome for the restoration of the vegetative cover, crop growth and regeneration of the water

resources in the beginning aggravated soil damage where run-off erosion was uninhibited. Despite such devastating climatic setbacks, GOCV efforts to carry on with agricultural development and to locate substantial foreign assistance for related operations in key sectors did not diminish. Their objective is to aim at a tangibly improved capability to increase productivity of the 58,000 ha rainfed and 1800 ha irrigated land when precipitation normalizes. Main activities in the agricultural sector continued to concentrate on crop and livestock production; natural resources development, protection and use; and technical assistance support for institution building, equipment supply, training and education.

After the prolonged drought in 1984 there was enough rain again to raise hopes that the years of hardship had come to an end. Yet, the precipitation was poorly distributed, often occurring as torrential downpours that caused heavy damage to bridges, dams and other waterway construction. For example, in Trindade the average annual rainfall was a bare 89 mm. in 1984; at two other locations on the Santiago island over 320 mm. were registered.

Until August 1985 heavy but more favorably distributed rains (475 mm.) had fallen in this area.

B. Natural Resources

Development for protection and use of the soil and water resources has been negatively affected by the lengthy dry spell. Since 1976 GOCV has tried to alleviate rural unemployment in the rural areas by reforestation and construction work related to natural resources protection.

With assistance from FAO the GOCV has conducted a rather extensive reforestation program in high altitude as well as lower arid areas. From 1978 to 1983 the number of forest trees at high altitudes declined from 295,000 to 132,000 but had reached 383,000 again in 1984 after planting had been resumed due to better rainfall. In the lower arid zones where planting operations had continued without interruption but at a reduced pace, the number of trees planted increased by approximately 1.0 million from 479,000 in 1978 to 1.6 million in 1984.

The reorganized ministerial service for Rural Engineering, responsible for the country's natural resources, now encompasses soil and water conservation as well as reforestation. Field work planned and initiated within the last 7 years puts emphasis on:

- rockwall bench terracing
- construction of small dams for terrace watering
- run-off control with contour furrows
- selection of representative catchment areas to initiate watershed management
- demarcation, preparation and reforestation of erosion endangered mountain slopes
- surface water-flow control
- identification of new water resources

There has been little soil conservation and crop irrigation extension in the past. An extension program will be necessary for the success of the activities listed in the paragraph above. Similarly,

scientific soil surveys to evaluate land for rural use are needed more than they have been utilized in the past. Proper selection of soils suitable for agricultural production and rural construction will promote a more effective, more rapid development of natural resources.

C. Crop Production

The pattern of the culture of crops has not changed appreciably since the last assessment. However, according to MDR estimates the drought had caused a 40% decline of the rainfed area usually under food crops. The GOCV's seed distribution program has been severely impaired as well. On the Santo Antão island e.g. the quantities of corn and bean seed delivered to farmers from 1979 to 1980 to 1983 declined as follows:

	<u>Corn Seed</u> (Kg)	<u>Bean Seed</u> (Kg)
1979	19,500	3,500
1980	10,000	4,000
1983	15,000	800

Latest ministerial statistics show a fluctuation of corn production during 1972, 1973 and 1977 from 0 to 724 to 100 tons and for beans from 1,100 to 144 to 240 tons while in the 1984 growing season 2,500 tons of corn and 5,400 tons of beans had been produced again.

The irrigable cropping area declined 25% from 2,500 to 1,850 ha. On the hardly affected banana and sugarcane lands production, in spite of the better rainfall, has dropped to disturbingly low levels of

3,000 tons of bananas and 8,500 tons of sugarcane. This can probably be attributed to shortcomings in soil and crop management conditions still unidentified.

Overall, in the farm areas cultivation and planting practices on rainfed and irrigated lands had remained practically unchanged.

D. Livestock Production

The enduring drought has resulted in a large decrease in the numbers of animals, even to the point that part of the breeding stock has been slaughtered for consumption. Liveweight production of ruminants had dropped from 1472 to 907 tons between 1981 and 1983. Lack of forage and feed is still severe and the rangelands are degraded from progressing desiccation especially since any remaining herbs and grasses providing cover against erosion are being pulled up by the roots and taken to the penned animals.

The relatively large herds of cattle that formerly grazed the semi-arid ranges of the archipelago have been unable to stand the long drought. Remaining animals are now living on cut browse, residues of harvested crops and concentrates donated as part of emergency feed supply programs. Goats with their known ability to survive on scant vegetation were much less affected.

That losses in livestock, especially cattle, cannot be halted quickly is obvious. Since recovery of the forage base will determine the pace of regeneration of stock, MDR authorities were urging farmers to keep the lowered livestock populations off the range so

that natural recuperation could occur. It is also being recognized that new ways of raising livestock e.g. with cut forage (fresh or dry), silage or browse instead of grazing must be developed.

The anticipated 15% increase in production of meat and milk obtained under normal conditions will only be attainable through quantitative and qualitative upgrading of the existing animal population. Cooperative research including pasture, forage crops, animal husbandry and breeding, forcefully supported by field extension will play a key role in the hoped for restoration and progress in animal production.

In addition to the improvements made in the MDR veterinary service sector, GOCV is now in process to mobilize domestic and foreign forces for intensifying developments.

E. Agricultural Development

As a consequence to the limited growth in agricultural production and the sharp declines and great annual variation in production during the prolonged drought, priorities for agricultural development have remained practically unchanged. GOCV continues to focus on:

- inventorying, development and considerate use of the natural resources
- improvement of quantity, quality and stability of the production of crops
- multiplication and upgrading of farm animals to increase the output of meat, milk and poultry products

creation and/or strengthening of the necessary technical support services and their capability to remove constraints affecting agricultural development.

To bring about progress in the different sectors a number of important prerequisites have been generated, such as the reorganization and strengthening of MDR, the creation of the National Institute for Agriculture Research, including the Training Directorate, and the National Water Resource Development Service. Organization of a centralized agricultural extension service, improvement of the government's veterinary service, and continuation of water catchment, irrigation and soil conservation construction, including reforestation, are achievements during the report period.

In the second 5-year plan a financial allocation of approximately 7 to 8 million CVE will again be for ongoing and new agricultural development activities.

F. Government and Foreign Support

For the purpose of overcoming the constraints hampering agricultural development of Cape Verde and of achieving the objectives of the national plan, a number of supporting actions have been undertaken by the authorities.

In particular this endeavor led to the creation of a planning system as well as institutions determined to carry out research, production promotion and training. While these organizations are

in different stages of development, they have taken responsibility for the preparation and operation of sector-specific projects and programs. Although still drought-influenced, soil and water conservation plus livestock research and operation programs are gradually being reactivated. Crop production, soil fertility and plant protection research have reached an operational stage in their organization and pilot programs. Applied research has also been initiated.

Ground work has been laid for a national extension service which when completed will cover all islands of the republic. First activities to acquaint available personnel with farming areas and conditions of production are underway. This effort especially is forcefully supported by the activities of the national training unit organized as part of the National Institute for Agriculture Research. In regard to improvement of the country's water resources, steps have been taken to unite the various more or less independently operating institutions dealing with different aspects of water development and distribution under the forthcoming National Service for Water Development and Management. If working effectively, in about 10 years time the additional amounts of water to become available could permit an expansion of the irrigable land by 600-800 ha.

Through altogether 96 projects and programs costing CVE 293 million*, assistance to almost all agricultural sectors is provided.

* (equivalent to US \$3.4 million)

There is one project in Santa Catarina which is fully financed (CVE 75.3 million), organized and operated by the GOCV. The other 95 projects were planned and initiated with massive foreign support given in form of capital, equipment and materials and technical expertise.

VII. DEVELOPMENT ISSUES OF SPECIAL IMPORTANCE

For years to come the fulcrum of all development efforts in the island republic will remain (1) the chronic food shortage problem and (2) the stabilization and considerate use of the vulnerable land and water resource base.

Although it has been possible during the last 7 years to prevent famine by supplementing fluctuating domestic production with purchased imports and massive food assistance from outside, government is aware that intensified efforts to diminish the most harmful influences of the two major constraints will be required.

In recognition of the persistent nature of food deficiency, GOCV has been successful in securing multi-year food aid through respective contracts with certain donors. Such arrangements logically are and will be more specifically tied to how the GOCV strives to improve local food output.

Increasing the production of food, however, will remain closely linked with the ability to make the fullest possible but protective use of the productive land surface and the water resources available for irrigation. Development of possibilities for mobilizing additional, unexploited surface and ground water resources will be of particular importance. Final success or failure of all ongoing and anticipated efforts of improvement to a great extent will depend upon the effective modernization of soil and crop cultivation practices on dryland and irrigable small holdings through government and foreign technical and/or financial support. Openmindedness of

the small farmers (male and female) plus their willingness to change traditional practices and to try out and accept innovations remain the decisive factors in the whole production development endeavor.

A. Protective Land and Water Use

For development of the natural production base, a balance between demand and the capability of the resources to supply is essential. Achieving this balance will require a search for long term solutions to environmental problems, an approach that must be based upon ecology. In this context scientific surveys of the resources, understanding of their dynamics, good management, legislation and regulation of use are major needs in the ecological approach toward thoughtful investigation and exploitation. Communication programs aimed at making urban and rural people more aware of the fragility of natural resources will have to be initiated. Solutions have been found to preserve fragile natural resources in several countries. Serious damage has been prevented, minimized or repaired in many production systems.

Scientifically based surveys of land (soil) and water are essential to sound planning of natural resources development and management. Rapid assessment techniques such as remote sensing and other space and computer technology are known and in use, although research must still provide methods which are better adapted to specific local conditions.

Good resource management must take into account the interdependence of adjoining ecosystems and their economic and non-economic values. In agricultural areas it should direct evolution of man-nature-farming system relationships and be regulated by an operable method of monitoring and feedback. Where existing resource deterioration has to be corrected, the same principles must apply. When one-sided curative action is taken to correct single factor problems such as soil erosion, water pollution, salinization, et cetera, sometimes new and often larger problems result.

Legislation for resource management, although not always of priority concern, must have an objective scientific base and must be a clear expression of national policies. It must realistically define the constraints within which natural resources may be used. It should outline management measures most appropriate to specific zones and for different purposes. Types of harmful effects to be prevented, types of human activities to be controlled and regulations to be issued must be specified.

National and local institutions with clearly defined responsibilities for action must interpret and administer the legislation, appraise resources, plan and implement suitable management and provide research, advisory and regulatory services. Environment legislation aiming at effective protection of land and water must not ignore the need to support agricultural development, growth of production and the employment of rural people.

Land occupancy and fragmentation quite often represents a serious obstacle to resource conservation programs. In such cases land use legislation that supports agrarian reform measures will be extremely important.

B. Productivity Problems

1. Crops

One constraint to productivity and production improvement in dry-land and irrigation farming is the food and forage crop growing practices still in use. Shortcomings in the utilization of land and water available for production can be held responsible for the still dissatisfying yields of crops. Soil preparation of dry land before planting, even where not curtailed by rocks and stones is a rare practice, and post-emergence activity is mostly restricted to hand-weeding. Disregarding existing soil conservation structures, agricultural use of soils up to now does not include erosion reducing and fertility improving soil management and crop cultivation methods. Effective soil stabilizing practices such as regular recycling of organic waste (manure) and/or agro-forestation may be partially known but only sporadically applied.

Planting practices are characterized by empirically determined plant densities and populations. Investigation on the corn-bean association per planting hole and per ha seem to be appropriate to generate information for more efficient use of soil surface space, nutrients and moisture.

Soil inputs other than labor, seed and a bit of manure, if available, so far have not been applied in dryland farming. Chemical fertilizers in view of procurement, distribution, price and product suitability uncertainties as well as lack of technical promotion did not find the necessary acceptance by farmers even in years of good rainfall. Therefore yields obtained on farmers fields have remained low fluctuating between 300 and 800 kg/ha for corn and beans according to precipitation. Utilization of corn and bean seed of local origin year after year is the usual practice. Recognition of the importance of genetic properties of drought resistance, especially the imponderables concerning genetic yield potential and quality, call for early attention and improvement by local research and seed supply institutions.

In irrigated farming, yields also have remained far below the existing production potential. Applied inputs (fertilizer, pesticides) are not fully effective due to existing shortcomings in watering and other cultivation practices.

Use of antiquated varieties planted and cultivated according to old entrenched methods and arbitrary, uncontrolled application of water are the main factors responsible for the still unsatisfactory results obtained in irrigated crop production.

2. Livestock

At the present time livestock production including research is under direct leadership of the MDR. There are two organizations existing

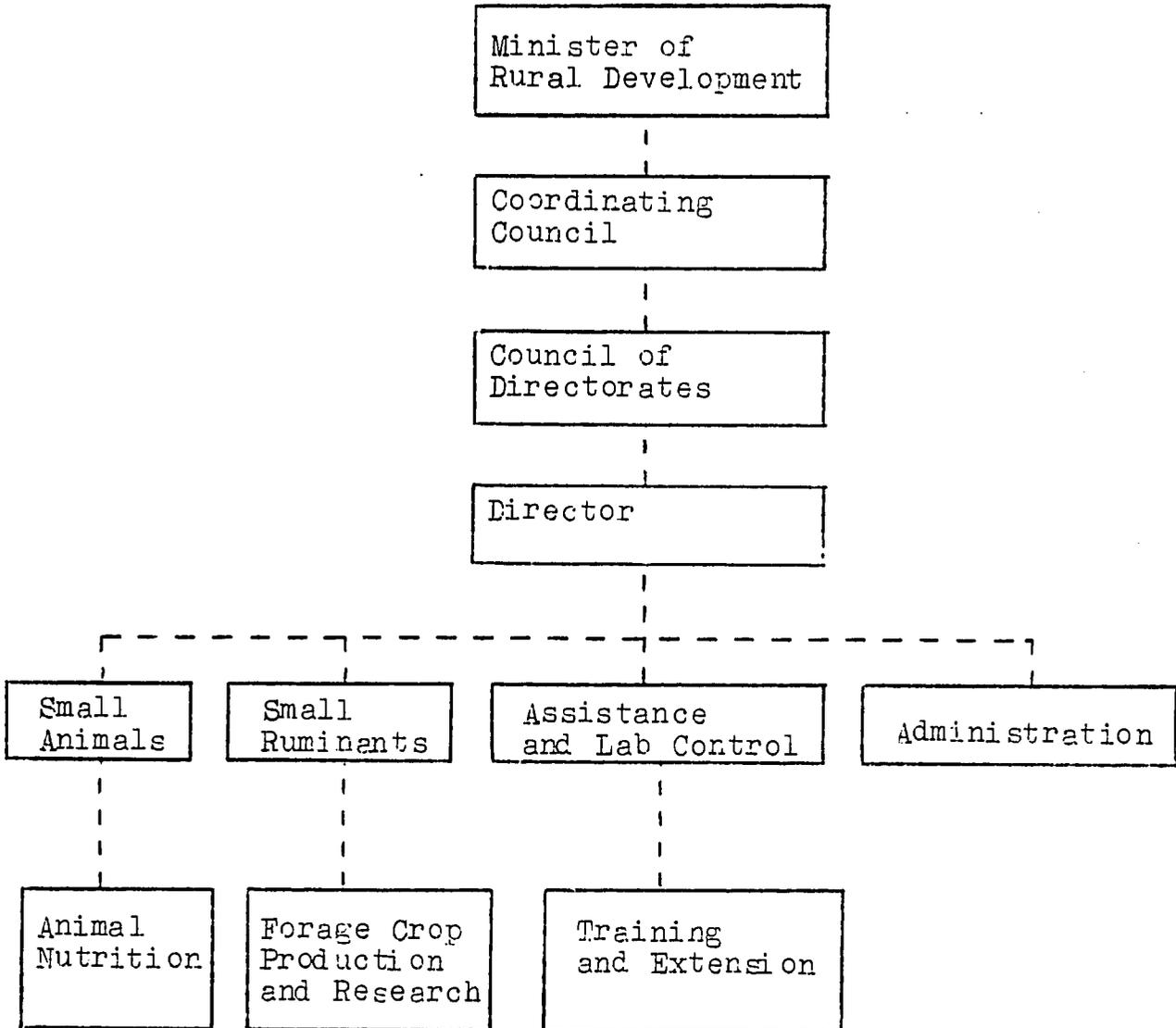
more or less side by side, one responsible for planning, monitoring, protection and administration of the country's animal production, the other for conceptualization and execution of all related research.

In the Ministry the main sections handling small animals (poultry, pigs, rabbits), small ruminants (primarily goats), administration and laboratory service are located. Important sub-sections include animal nutrition, pasture and forage production as well as (basic) training and extension. The organization of these services integrated in the ministerial office seems rather unusual (see Figure 2) with only eight professionals (3 with academic, 5 with technical education) available for all livestock activities at national level. Livestock (cattle) production so far is not represented despite the development needs that exist in this sector. Sub-sectors do not seem clearly positioned, and placing pasture and forage under livestock instead of under plant production is probably not the best possible solution.

Concerning the training and extension aspects, it would certainly be worthwhile to explore alternative ways of technical education and promotion that could be offered by specially equipped and organized units with MDR and research staff members acting as instructors and advisers.

To attain the planned 15% increase in meat production, reestablishment of the pasture and forage base and regeneration especially of the diminished cattle population will be the priority objective for

Figure 2

MDR - LIVESTOCK PRODUCTION DIRECTORATE

livestock development. This will not be an easy task. During times of recovery of the indigenous pasture, even in years of normal or above normal rainfall, cattle must be kept penned so that the process of range restoration will not be endangered. Production of planted fodder will have to be substantially expanded to attain sufficiency in nutrition of the gradually increasing number of ruminants. To cope with this problem, new approaches must be explored and techniques developed which will promise the fastest possible acceptance and application at the farm level.

Modification of the planting practices of corn and beans so far produced for human consumption; introduction of corn, sorghum, millet and legumes, especially bred for fresh forage and silage; and types and varieties that can be grown in association with forest or fruit trees could be means to expedite forage crop research and practical production.

C. Supporting Technical Services

Agricultural technical services planned in the late seventies became operational in the early eighties. Created to assist government and farm communities in the handling of problems and constraints of special importance related to productivity and production, they likewise are confronted with difficulties concerning their own development. Still in the first organizational phase they have to cope with numerous problems, such as slowness of construction work, equipment and utility supply, procurement and maintenance of instruments, supply of chemicals, integration of outside assistance projects,

allocation of personnel and funds, et cetera. All services, however, are determined to become fully operational as soon as possible to support national agriculture development. Disregarding resource protection, major technical services now in existence are concerned with

Research - Extension - Training.

Recognition of the close inter-relationship of all three should decisively influence their organization and orientation, especially during the initial stages of establishment. Individual policies existing or anticipated, defining objectives, working regulations and operational procedures will have to achieve continuity of coordination and cooperation between the institutions at explicitly determined levels. They will also have to relate activities to overall development goals.

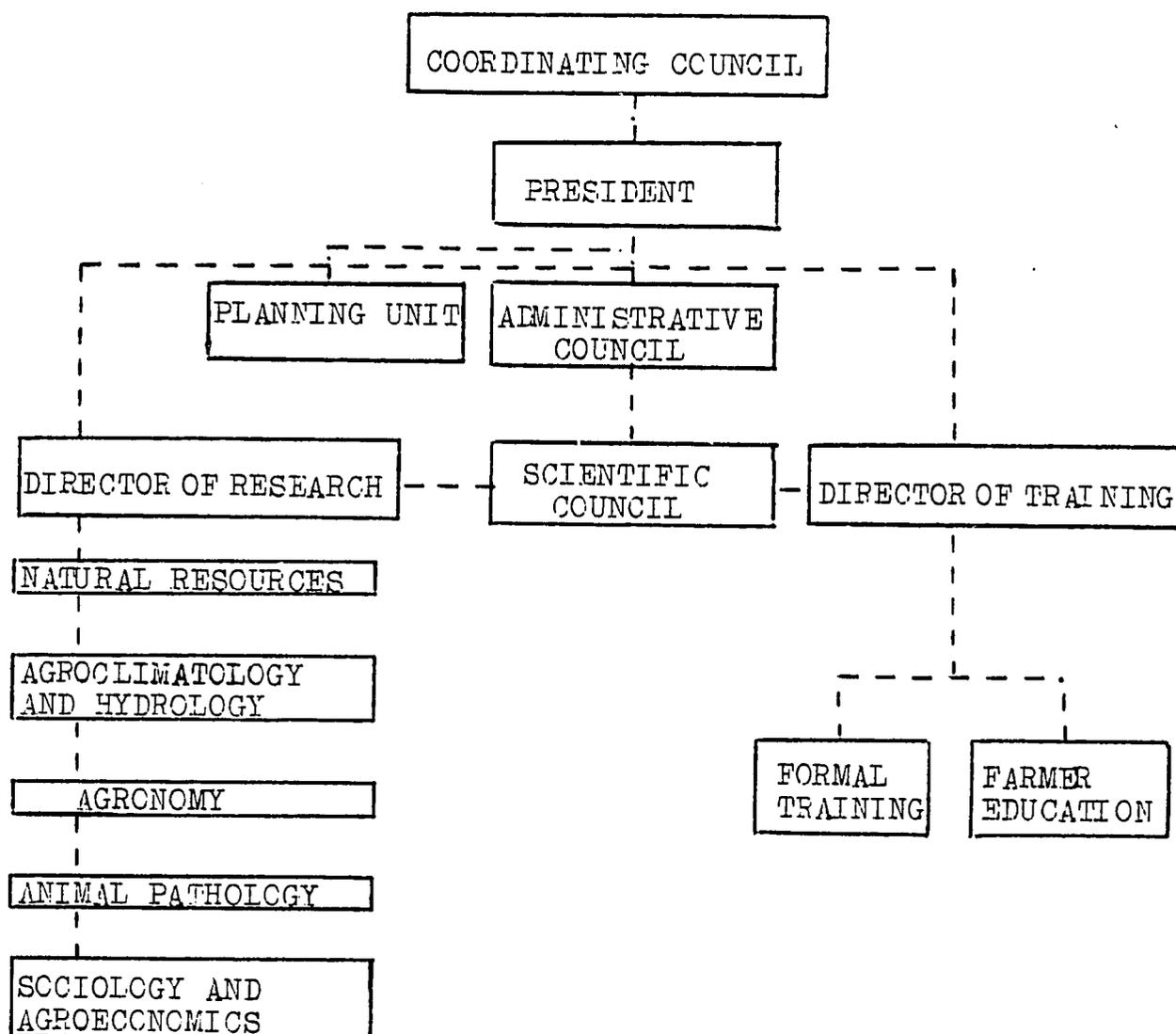
1. Research

Agricultural research work started in 1982 under the Ministry of Rural Development (MDR). Since the middle of the year (1985) the unit began to operate as an independent entity named the National Institute for Agricultural Research.

Rather than waiting for all equipment to be installed or the organization to be fully staffed, the institute started activities at a simple level. In the meantime a substantial expansion has taken place, unifying research and training functions under the same organization (see Figure 3). This is advantageous in directly

Figure 3

ORGANIZATION, NATIONAL INSTITUTE FOR AGRICULTURAL RESEARCH

LOCAL SCIENTISTS EMPLOYED 1985

	(M.Sc. level)
Crop Science	2
Horticulture	1
Nematodolgy	1
Hydrology	1
Irrigation	1
Socio-Economics	1
Computer Science	1
<u>Technicians</u>	13
<u>Foreign experts on site:</u>	
Pest control	3
Food Crops	1
Hydrology	3

ANTICIPATED FOR 1986

	(Ph. D. level)
Soil Science	1
Crop Protection	1
Satellite technology	1
Eight of the eleven scientists obtain or will obtain outside training.	

acquainting all kinds of trainees with the role and importance of research and bureaucratically simplifies the availability of scientists as trainers and of experimental fields for demonstration purposes. However, the possible disturbances in living quarters, canteen and recreation facilities, arrivals and departures, et cetera and the probable distractions of scientists from their work by excessive training engagements are disadvantages that must be considered. Another unusual arrangement is the placing of animal pathology research under the agricultural umbrella. The separation of animal health from livestock production research can be counter-productive; it will certainly prevent the close coordination and cooperation required between these two complementary disciplines.

As another issue of major importance, sectoral orientation and planning of research has to be mentioned. With consideration of the development and production goals established, decisions about specific research needs for the small farm sector in the mountains, resource protective improvements in production, and for regeneration and nutrition of livestock have to be taken. Approaches and practices concerning employment of individuals or team work, experimental designs, observation procedures and evaluation for further follow up and transfer of research results to extension also need to be determined.

2. Extension

The service organization in existence was started about one year ago. Its administrative and technical infrastructure is still incomplete and changes have to be expected.

Field work is getting organized with just fragmentary staff since the first 18 extension agents appointed are undergoing basic training at São Jorge. First phase development efforts are concentrating on institution building and initiation of activities in agronomic and fruit/vegetable production extension as well as farmer motivation.

No clear information could be obtained what role the 4 sections and their heads would have to play in either extension administration or field promotional work or both.

Responsibilities of the sociologists versus those of the field promotion officers have not been fully understood. It is also unclear whether an academically trained agro-meteorologist appointment is necessary at the extension level.

Livestock, soil and water conservation, irrigation and economics extension so far have not become a reality which raises the question whether present positions coincide with priority field extension needs. It is hoped that the Director General of the service, with assistance from the recently-initiated, Italian-financed support project, will consider appropriate steps to eliminate current uncertainties and redefine sectoral and individual administrative and field operation responsibilities. In this context, the necessity for maintaining steady contacts and consultations between extension and research must be repeated. They are the key to final success or failure of the activities of both institutions.

3. Training

Agricultural and fellowship training is becoming more and more centralized at São Jorge. The facilities can accommodate 80 trainees and began to operate in 1983. Initially 45 participants started with the basic course which now encompasses 8½ months of elementary sciences and agriculture. That course is followed by one month of practical development work in a project. Finally, ½ year of classroom instruction in soil conservation plus crop and livestock production is given.

Medium-level, technical training that is more scientifically presented is organized in the same way.

The curricula used in both types of courses seem quite detailed; a possible simplification, at least at the basic level, could probably favor better mental receptivity and assimilation. (See Appendix 1.)

At the technical level the omission of production economics research as a teaching subject is a deficiency that needs to be corrected. Management and field staff of this category also have to be familiarized with the purpose, planning, execution and use of agricultural research and the cost/return aspects of productive agriculture.

In addition to formal training, separate courses for extensionists are being held. Preparations for cooperative education and special seminars are also underway.

VIII. ANALYSIS OF INSTITUTIONS

A. Actions Required

Actions considered essential to meet generally accepted sectoral objectives are described in the subsequent paragraphs. Naturally they must coincide with the type of development goals already defined on page 228 of the previous Agriculture Sector Assessment Report of AID.

In view of the prevailing conditions it seemed appropriate, however, to present the most important of the listed goals in the following modified form:

- Inventory of the Land and Water Resources
- Land evaluation including capability classification
- Maximum development and protective use of the land and water resource
- Highest possible increase of the production of food and feed.

To realize every goal, both the production and service sectors must plan to execute certain key activities. These activities must be initiated, intensified or expanded in line with existing development priorities and accordingly formulated policies. Institutions with developed or developing capabilities now permitting the successful organization and execution of investigation and service programs of importance are as follows:

- The Rural Engineering Service
- The National Institute for Agricultural Research
(including the training Directorate)
- The Livestock Research Center
- The National (MDR) Extension Service

To justify their existence, these institutions must meaningfully contribute to a concerted effort of considerate and forceful development of resources for increased production of food and feed. The following institution-specific operations and activities are recommended as required to reach effectiveness within a reasonable period of time.

B. Rural Engineering Service

The main purpose of the Rural Engineering Service is the planning, organization and implementation of programs to develop and protect Cape Verde's land and water resources. Soil conservation for erosion control represents a major undertaking carried out thus far on a semi-scientific basis, accompanied by complementary reforestation. Both activities need to have a better scientific foundation regarding location and practicability of soil protecting construction, forest tree plantings and evaluations of program effectiveness. Natural resources research should produce the data required for improvements. Rural Engineering at present is not in a position to do meaningful land evaluations. Capabilities to conduct soil surveys that include classification and correlation as well as semi-detailed/or detailed interpretation for special land use purposes are lacking and need to be created. There must also be an entity able and determined to use such information for appropriate land selection and allocation.

Implementation of strategies and measures for water supply improvement and management is the other major concern of the Rural Engineering Service. As far as the actions required for water supply development are concerned, little can be added to what had

been suggested in the first AID assessment report. The overall importance of water availability, especially for irrigation, in agricultural production is also reflected in the organization of a special section for national resource research at São Jorge. Intensification and expansion of work in this discipline will require increased technical assistance with special emphasis on training, planning and management.

C. The National Institute for Agricultural Research (including the training Directorate)

An overview of the organization of this key institute is shown in Figure 3. Actions suggested concern the animal health section and have been mentioned earlier. Further recommendations for action include operations falling under Agro-Climatology & Hydrology, Natural Resources, Agronomy, and Agricultural Economics & Rural Sociology.

Agro-climatological research will have to take up work involving the characterization of micro-climatic conditions in crop fields on dryland and under irrigation. It should investigate interactions between bio-climatic environments and pest/disease infestation; help to determine irrigation needs of crops; and try out methods and measures to reduce unproductive evapotranspiration.

The unit should participate in inter-disciplinary, cooperative research programs, such as farming systems, agro-forestry, or mixed and intercropping.

The Natural Resources research unit should adopt or develop approaches and methods aiming at quantifying erosion loss through measuring techniques and theoretical calculations (Universal Soil Loss Equation). Studies of physical soil characteristics should extend to the determination of coarseness, porespace, crumb stability, water retention capacity and speed of percolation. To promote progress in soil conservation and irrigation, salinity conditions, dynamics of salinization and the suitability of soil stabilizing measures under varying topographic conditions would also require closer study. Development of catchment models* for selected watersheds deserves specific attention under the soil protection category. Valuation of plant species for rapid vegetative growth and proliferation to be utilized for slope protection and range restoration should not be forgotten. Recommendations for research activities in agronomy and related fields are listed in Appendix 2. A concerted effort and impact will require subject-specific, careful planning and consistent monitoring of direction and progress of all field, greenhouse and laboratory operations. In Appendix 3 a model for an efficient approach to the planning of agricultural research is presented.

Successful national production improvement will largely depend upon applying on other islands the research done in São Jorge and its sub-stations.

D. Livestock Research Center

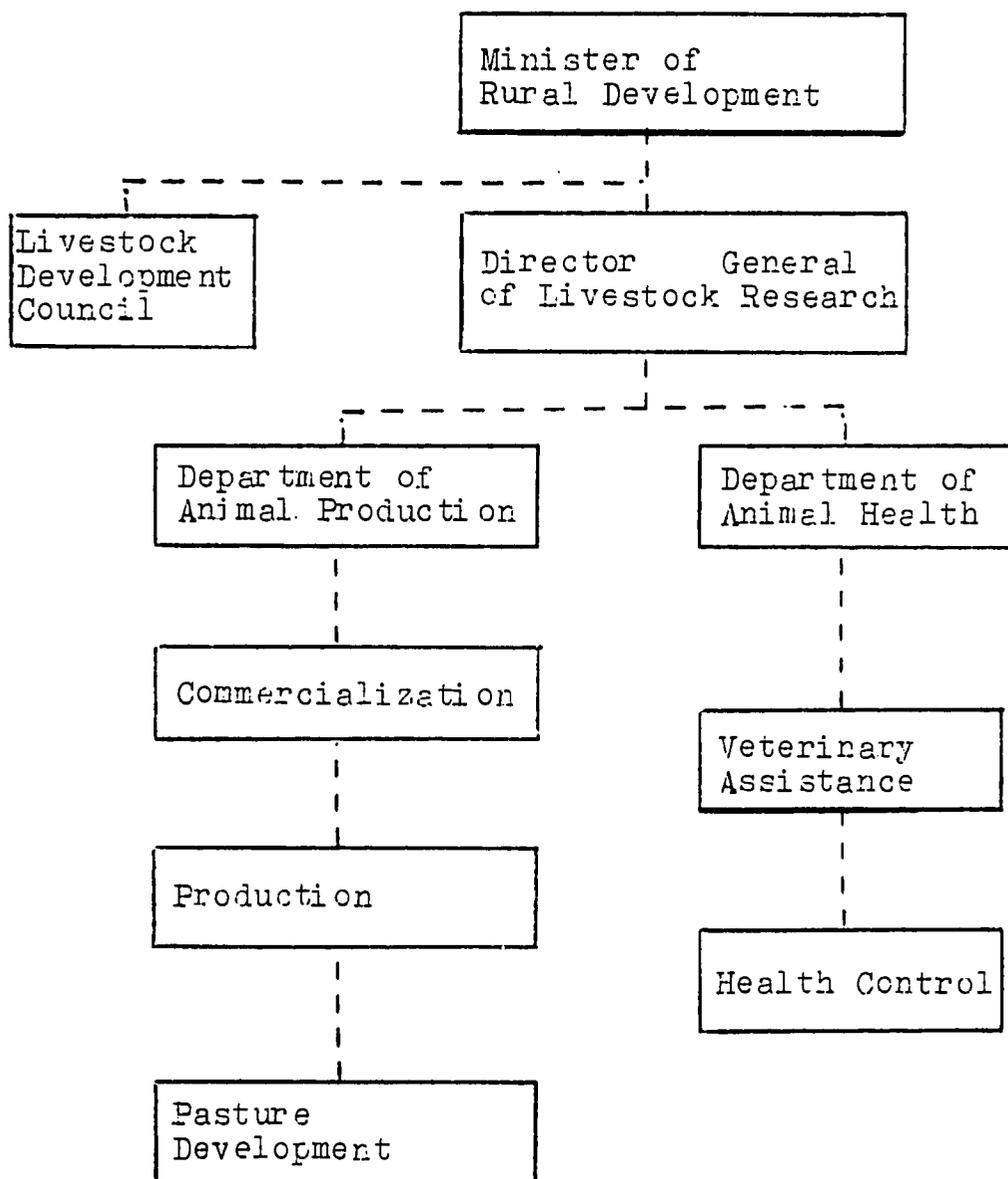
In 1981 the Livestock Research Center began operations, at first with foreign experts who were gradually replaced by Cape

* See Appendix 4.

Verdeans after their return from specialized overseas training. However, little progress in organization and practical research has been made. Organization of the center is shown in Figure 4. The center has only two qualified professionals to do experimental work in fields relating to husbandry, production and health of swine, rabbits, poultry and goats as well as pasture development. There is no research done on cattle. Only a small herd seems to exist in the country. According to the information obtained, the center also is engaged in animal production field extension with 20 agents stationed at different locations. The agents concentrate on small animals and goats. GOCV has recognized the rudimentary institutional and operational capability of the center and has requested foreign assistance for renewing the infrastructure and strengthening the research capacity. FAO has offered to provide the required support. When fully staffed and equipped, the research center should concentrate on expediting animal production development through

- Upgrading of domestic herds by cross-breeding with better performing races of comparable size and frame
- Promotion of improved husbandry, nutrition and hygiene to increase more rapidly the number of animals plus milk and meat production
- Establishment of close cooperation with agronomic research for the restoration of natural pasture and increase in forage production
- Initiation of research on animal production and marketing economics.

Figure 4

ORGANIZATION, LIVESTOCK RESEARCH CENTER

E. National Extension Service

Organization and operation of the center have already been described in detail. Therefore in this paragraph attention needs to be directed only to actions required to provide appropriate assistance to farmers and local authorities aimed at the most rapid increase of food and feed production. Organizationally, emphasis should be on crop and animal production and protection, soil fertility maintenance and erosion control, controlled irrigation, economics of production and practical farmer education. It will then be possible to make full use of technical results obtained from research for fast and economic improvement of land and water and protective plant and animal production. Major preparatory and field activities should occur in this sequence:

- Area and product specific planning of field work
- Arranging regular meetings with research
- Preparation and execution of farmer meetings to provide information on input, soil cultivation and planting practices
- Selection of farmers as cooperators in field demonstration work
- Demonstration of modified land preparation, planting and cultivation practices to groups of farmers and their wives
- Regular visits to farms and demonstration plots (if possible with a scientist) to observe and record progress and symptoms in animal and/or plant growth
- Reporting abnormalities requiring interpretation and follow up assistance to superiors as well as research

- Organization of field days on farms with successful demonstrations including discussions on methods and input results
- Arranging harvesting operations on demonstration fields with groups of farmers present; weighing/measuring of results (yields) and economic returns
- Processing of yield data and reporting to research
- Follow up visits to farmers to compare results of old versus new practices; motivation for the adoption of the new techniques
- Registration of farmers willing to accept advice and adopt recommended practices
- Repeated visits to progressive farmers
- Planning and preparation for the next season

IX. RECOMMENDATIONS

There are three major underlying constraints to the development of Cape Verde. These are environmental-sparse and irregular rain; educational-exceedingly low levels of schooling; and demographic-high rates of natural increase.

Because the population and economy of Cape Verde is overwhelmingly rural and agricultural, the environmental constraint is of major importance. Not only must maximum use of water resources for irrigation be attained, but the highest possible value of crops grown on irrigated lands must be achieved. Cape Verde should consider crop specialization for export. Crops such as cut flowers, spices and melons could be grown and might mature at times when supplies are short and prices high in foreign markets. To grow crops on irrigated land may be uneconomical when the price of the same imported crop is lower than the value of alternate crops which might be grown on the same land and exported. A study to examine the agronomic and economic feasibility of different specialty crops or mix of crops is desirable. Irrigated land is mentioned because reliability of supply is important in marketing any product.

The Ministry of Rural Development is expanding the extension service in recognition of the need for communication to farmers of practices that enhance productivity. The task of the extension service will, however, be arduous principally because of the low educational level of farmers. The temptation, here as elsewhere, will be to work with the more educated who are more receptive to

innovations and often are owners of the larger farms, thus enhancing economic inequality in rural areas.

Training in extension techniques is needed, for instance, methods for identifying opinion leaders in farm communities so that they may be selected for training in improved agricultural methods. Care must be taken to make recommendations to farmers that are compatible with the farming systems they use and with their resources.

Strenuous efforts need to be made to provide a large majority of the farm population with a primary school education. Until this is done development projects will meet with frustration more often than with success. This will be a long term and costly undertaking. Rural education should be viewed as a prime component of agricultural development.

Censuses are among the most important planning tools available to governments. Plans should soon be underway for 1990 censuses of population, housing and agriculture. The 1979-81 census of agriculture should be expanded in scope so as to obtain data on the size of holdings, tenure classes, characteristics of farm families such as age, education, number of dependents, source and amount of income; characteristics of land owned - ecological zone, irrigation or rainfed - amount and kind of livestock and others. Published reports should include cross-tabulations of major variables. Raw data should be stored in a format that will permit special tabulations to be made in response to specific needs for information. The

term "farm" should be operationally defined. These data are of particular importance to agrarian reform.

The possibility of extending the tabulations of the 1979-81 agricultural census should be investigated. At present the amount of data presented is limited, and there are no cross-tabulations. A complete analysis of the 1980 census of population and housing should also be undertaken. The 1990 census of population should present separate tabulations for both urban and rural populations, and the meaning of these terms should be carefully specified. This appears to be all the more important in light of what appears to be the very rapid growth of the city of Praia and, probably, of some other urban centers as well.

Concern with population growth was expressed in the first national development plan which acknowledged the long term consequences of continued high rates of population increase*. This concern has been translated into maternal and child health programs which while protecting the health of mothers and their children offer the opportunity for the practice of family limitation. Existing maternal, child health and family planning programs should be supported and expanded as an integral and fundamental part of the rural development effort. Continued high rates of natural increase contribute to unemployment, the massive concentration of people in cities and to

*República de Cabo Verde, Primeiro Plano Nacional de Desenvolvimento. 1982/85, Vol. 1, Relatório Geral. Secretaria de Estado da Cooperação e Planeamento. Praia: 1983, pp. 71, 133-134.

emigration. A national level of living survey, possibly done at the same time as the 1990 census would provide a base line against which to measure progress in improving the well-being of the population and would identify areas of the nation in greatest need and, therefore, serve as a tool for establishing policy

Following are recommendations that relate to the amelioration of agricultural development and production concentrate on organizational and operational improvements of resource management and protection, crop-livestock-soil fertility and irrigation research as well as extension and training. The organizational structures of all institutions involved need to be strengthened, their organizational uncertainties eliminated, responsibilities and competences clearly defined, and qualified professionals added to the staff.

Land and water development efforts must put soil conservation, hydrologic exploration and management on a more scientific basis and create a capability to undertake soil surveys for land evaluation and allocation.

Crop and livestock production must be forcefully supported by research and extension, with particular sensitivity to soil stabilization, fertility maintenance and rangeland improvement.

**For the application of the Belcher level of living index in a less developed country see John Saunders, J. Michael Davis, James E. Ross and Galen Moses, Rural Electrification and Development: Social and Economic Impact in Colombia and Costa Rica. Boulder: Westview Press, 1978.

Special attention must be given to the effective use of irrigation water, the most valuable input to a more productive bottom land agriculture. Research and extension to be able to provide the necessary scientific and technical assistance must be put in a position to do so. At present crop irrigation is characterized by an empirical and uneconomic application of the precious, productivity improving element.

Extension in general must be up-graded to the extent that the Service can act as mediator and catalyst between research and the farm producer. Training of extension staff of all levels and organization and management of the service have to be tied to the objective of making the majority of food and feed producers willing to try out and eventually adopt site-specific combinations of modern crop and livestock production practices. In this context it will be of utter importance to offer and demonstrate only techniques of sufficient economic soundness. Training, while very detailed in technical subjects, is generally weak in economics. This has to be changed without too much delay.

Considering the views expressed on actions that are required in GOCV institutions and the recommendations made, the following suggestions for AID support in the form of development interventions are presented in order of priority:

Intervention 1: SUPPORT TO AGRICULTURAL RESEARCH MANAGEMENT

Purpose: Strengthening of infrastructure, institutional and managerial capability to plan, initiate, monitor and evaluate agricultural research technically, economically and administratively.

Activities: Provide special research management expertise and consultant advice. Analyze and recommend improved infrastructure and organization for achieving optimum inter-sectoral communication and cooperation. Maintain especially close liaison with extension.

Intervention 2: SMALL FARM INCLUDING FARMING SYSTEMS RESEARCH

Purpose: To develop a functioning multi-disciplinary research operation tailored to the small farm sector in the mountains capable to characterize and evaluate existing farming systems and to bring about improvements through experimentation and appropriate modification.

Activities: Provide technical expertise, consultant advice, equipment, materials, local and scholarship training. Organize a research team of specialists representing agronomy, soil science, animal production, soil conservation, irrigation and socio-economics. Use existing small holdings and simulated small farm units as natural laboratory for the investigations required.

Intervention 3: IMPROVED EFFICIENCY IN THE USE OF IRRIGATION WATER

Recommendation complies with the earlier proposal made on page 248 of the 1978 AID Assessment Report.

Intervention 4: AGRO-FORESTRY FOR FIREWOOD/FORAGE PRODUCTION
AND SOIL CONSERVATION

Purpose: To help overcome rural fuel shortage, and restore the forage base for ruminants as well as the vegetative cover on mountain slopes damaged by the past drought.

Activities: Provide expert assistance, equipment, material and training in consultation with ICRAF (International Council for Research in Agroforestry). Test, select and import suitable tree and forage crops and varieties. Develop drought-tolerant and productive multi-purpose plant systems.

Desenvolvimento Rural
Centro de Estudos Agrários

Projecto Polivalente de Formação



Ano de 1984

Processo n.º 1

ASSUNTO

ANEXO

ESTRUTURAÇÃO DOS CURSOS

PARA TÉCNICOS DO DESENVOLVIMENTO RURAL

LEGENDA

ÁRIAS	CODIGO	NO MÓDULOS	H. SEMANAIS	HORAS TOTAIS
<u>Formação de Base</u>				
Comunicação Humana	H	1	10	30
Psicologia Social	Ps	3	10	90
Matemática	M	4	10	120
Gest/Contabilidade	G	2	10	60
Estatística	S	4	10	90
Topografia	T	4	10	120
Hidráulica	I	4	10	120
Química de Solos	Q	3	10	90
Português	P	4	10	120
Francês/Inglês	E	4	4	120
Física Química	F	2	10	60
Nutrição	N	1	10	30
Des. Rural	D	1	10	30
Geodinâmica				30

ÁREA DE CONSERVAÇÃO SOLOS E ÁGUAS

Des. Rural	D	1	10	30
Psicologia Social	Ps	2	10	60
Cooperativismo	C	1	10	30
Vulgarização	V	1	10	30
Conservação das Bacias	Cb	3	10	90
Conservação dos Solos	Cs	2	10	60
Florestação	F	2	10	60
Legislação	L	1	10	30

ÁREA DE PRODUÇÃO E PROTECÇÃO VEGETAL

Des. Rural	D	1	10	30
Psicologia Social	Ps	2	10	60
Cooperativismo	C	1	10	30
Vulgarização	V	1	30	30
Culturas Secas	Cs	2	30	60
Culturas Regadas	Cr	2	30	60
Hortifruticultura	H	2	30	60
Protecção Vegetal	P	2	30	60
Legislação	L	1	30	60

....

C O N T I N U A Ç Ã O .

ÁREA DE PRODUÇÃO E SANIDADE ANIMAL

MATÉRIAS	CÓDIGO	Nº MÓDULOS	H. SEMANAIS	H. TOTAIS
Des. Rural	D	1	30	30
Psicologia Social	Ps	2	30	60
Cooperativismo	C	1	30	30
Vulgarização	V	1	30	30
Zootecnia	Z	1	30	60
Genética e Melhoramento Animal	G	2	30	60
Clinica e Enfermaria	Ce	1	30	30
Higiene Alimentar	H	1	30	30
Pastagem	P	1	30	30
Tecnologia Alimentar	T	1	30	30
Nutrição	N	1	30	30
Legislação	L	1	30	30

APPENDIX 2

RECOMMENDATIONS FOR AGRICULTURAL RESEARCH WITH IMMEDIATE IMPACT ON PRODUCTION

FOOD AND FORAGE CROPS

- Test yield potential of local plant species and varieties.
- Introduce and adapt new plant species and varieties.
- Try out various plant densities in mixed, inter-row and pure cultivation also under irrigation.
- Investigate suitability of used and new promising plant associations.
- Determine water and nutrient requirements.
- Develop methods of fertilizer placement to reduce losses of plant nutrients in grain, leaf, tuber and fruit crops.
- Investigate inter-actions between different kinds of production inputs and measures.
- Develop packages of low cost, low risk crop production recommendations for use in small farm food crop extension.
- Assist in the improvement of forage and pasture restoration.
- Assist in seed-potato production on suitable soils at higher altitudes.

SOIL AND WATER

- Establish an operable soil, water and plant testing service.
- Investigate contents of macro and micro elements of major soil types of areas available for production.
- Determine nutrient fixation and leaching capacities.
- Investigate possibilities and results of recycling of OM including animal manure with and without chemical fertilizer.
- Test inter-row cultivation after rains under the aspect of soil moisture conservation.
- Evaluate newer methods of soil conservation and soil loss determination; try out agro-forestation and crop banding (see Appendix 4).
- Develop water saving distribution and irrigation procedures for rural extension that are acceptable to farmers.
- Identify highland soils for seed potato production and possible planting of tea.

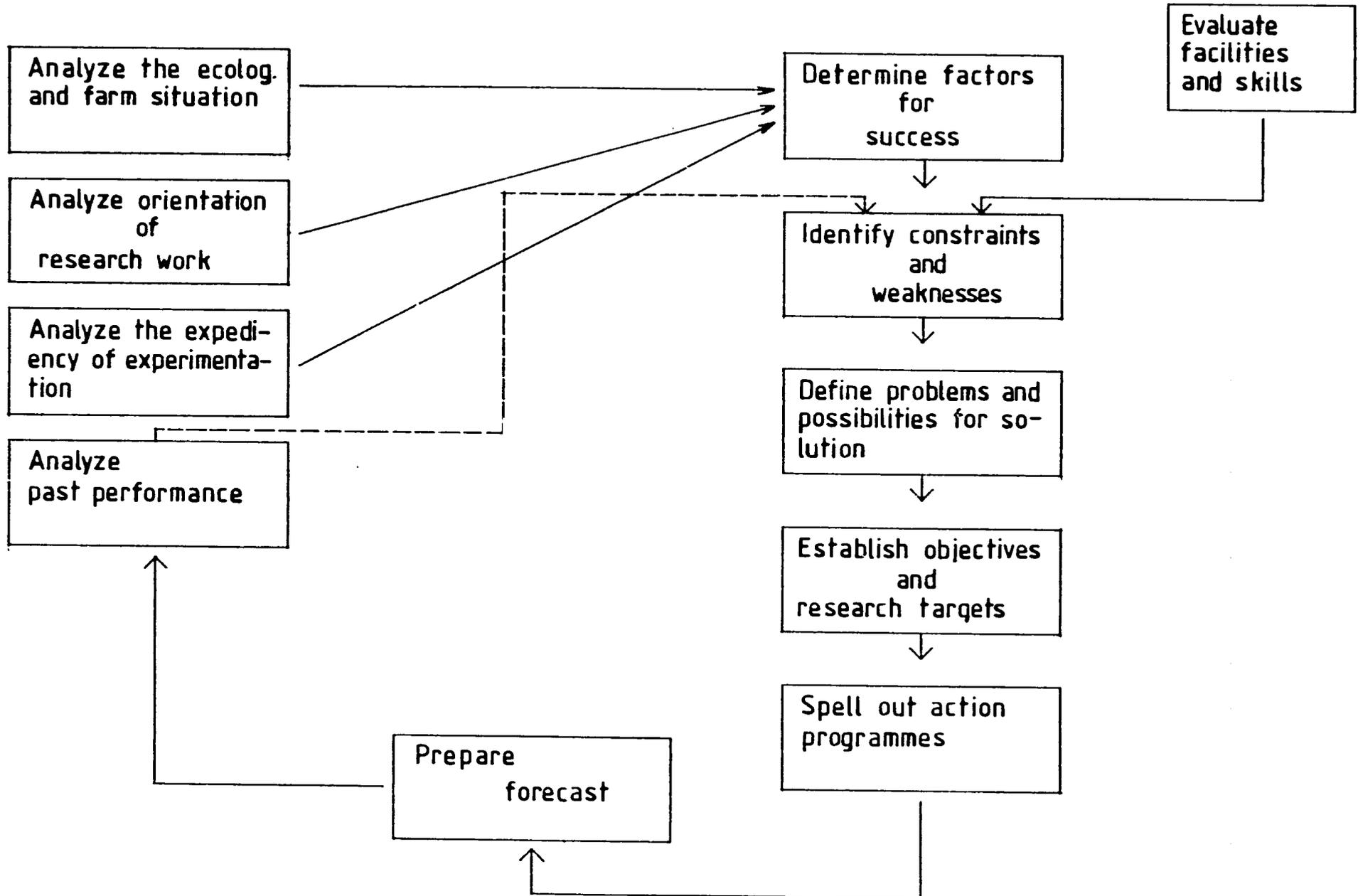
AGRO-CLIMATOLOGY

- Based on comprehensive data collection, study bio-climate/crop yield interrelationships.
- Develop methods or formulas permitting sufficiently reliable yield and production forecasts.
- Investigate possibilities to compute water requirements of irrigated crops using combinations of critical soil climatical data as basis.

AGRO-ECONOMY/SOCIOLOGY

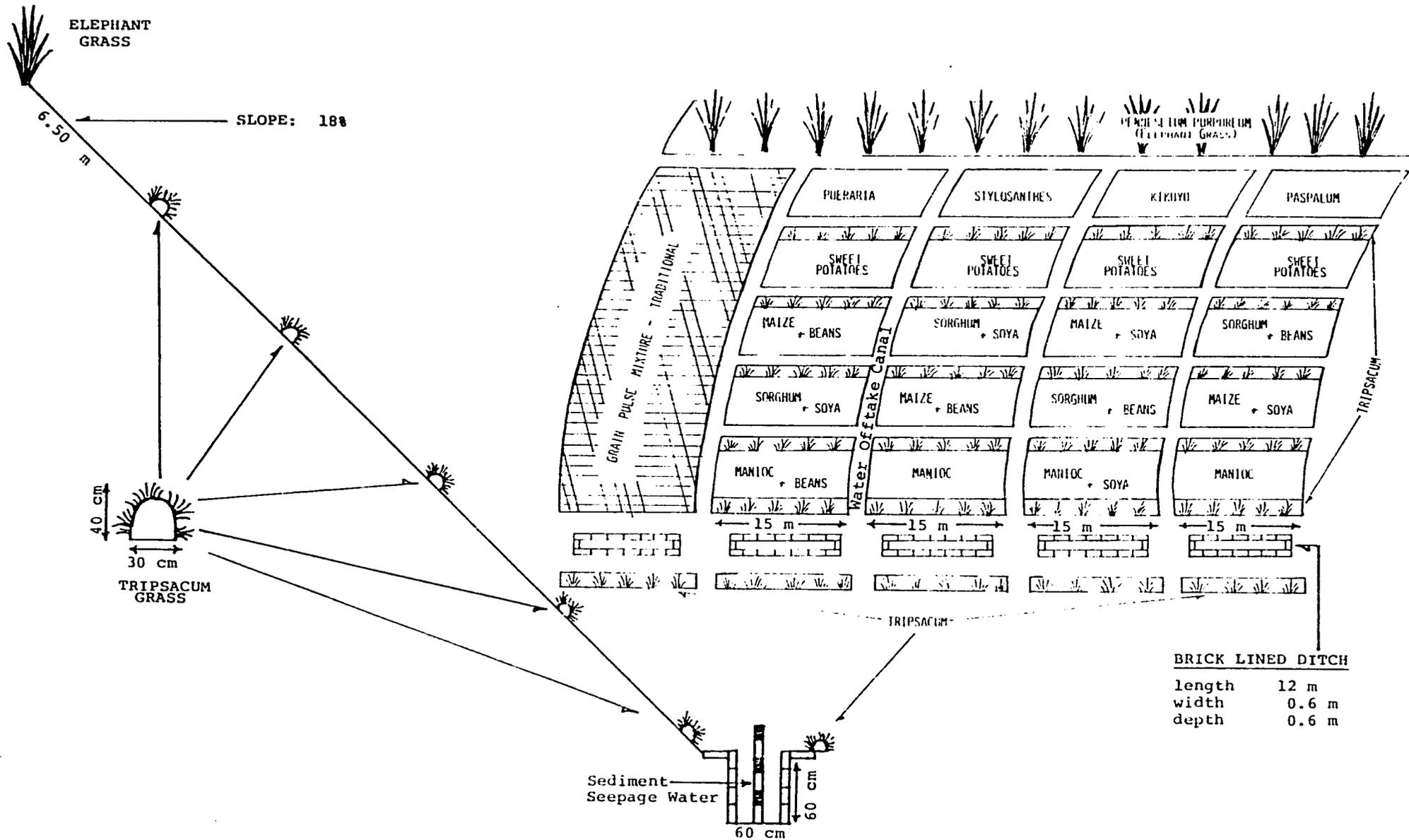
- Investigate productivity, resource protection and sociological suitability of traditional and modified farming systems through special, interdisciplinary small farm research.

APPROACH - AGR. RESEARCH PLANNING



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APPENDIX 4



BRICK LINED DITCH	
length	12 m
width	0.6 m
depth	0.6 m

FD

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