

UNCLASSIFIED

PROJECT PAPER
FOOD CROP RESEARCH
655-0011

AUTHORIZED: August 31, 1982
AMOUNT: \$ 3,688,000

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AGENCY FOR INTERNATIONAL DEVELOPMENT
PROJECT DATA SHEET

1. TRANSACTION CODE
 A = Add
 C = Change
 D = Delete

2. DOCUMENT CODE
 3

3. COUNTRY/ENTITY

4. PROJECT NUMBER
 655-0011

5. BUREAU/OFFICE
 AFR 06

6. PROJECT TITLE (maximum 40 characters)
 FOOD CROP RESEARCH

7. PROJECT ASSISTANCE COMPLETION DATE (AAC)
 MM DD YY
 01 01 71

8. ESTIMATED DATE OF OBLIGATION (Under Budget, enter 1, 2, 3, or 4)
 A. Start FY 81 2
 B. Rate 1 4
 C. Final FY 81 7

9. COSTS \$1000 OR EQUIVALENT \$: =

A. FUNDING SOURCE	FIRST FY			LIFE OF PROJECT		
	B. FX	C. L/C	D. Total	E. FX	F. L/C	G. Total
AID Appropriate Total	1089		1089	3583	105	3688
(Grant)	1089	()	(1089)	()	(105)	(3688)
(Loan)	()	()	()	()	()	()
Other						
U.S.						
Other Countries					1421	1421
(Other Donor)						
TOTALS	1089		1089			5109

9. SCHEDULE OF AID FUNDING \$1000

A. AID VOUCHER TYPE	B. PRIMARY TECH CODE	C. PRIMARY TECH CODE	D. OBLIGATIONS TO DATE		E. AMOUNT APPROVED THIS ACTION		F. LIFE OF PROJECT	
			1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan
SH	141	968						
TOTALS								

10. LINEARY TECHNICAL CODES (maximum 2 codes of 3 positions each)
 721 876

11. SECONDARY PURPOSE CODE
 661

12. IDENTIFICATION CODES (maximum 4 codes of 4 positions each)
 A Code R/AG XII

The purpose of the Project is to increase agricultural productivity, with first priority to areas under irrigation.

13. DATE OF REPORT (MM YY) 03 81

14. DATE OF REVIEW (MM YY) 01 81

15. REVIEWER'S NAME (Last, First, Middle Initial) [Signature]

16. REVIEWER'S TITLE (Maximum 40 characters)

17. APPROVED BY [Signature]

18. DATE OF APPROVAL (MM YY) 03 81

19. DATE OF REVIEW (MM YY) 01 81

PROJECT AUTHORIZATION

Name of Country: Cape Verde
Name of Project: Food Crop Research
Number of Project: 655-0011

Pursuant to Section 121 of the Foreign Assistance Act of 1961, as amended, I hereby authorize Grant Financing in Fiscal Year 1982 not to exceed one million eighty nine thousand dollars (\$1,089,000). Planned obligations over a five-year period are not to exceed \$3,688,000 in grant funds to assist in certain foreign exchange and local currency costs for goods and services required for the project.

The project inputs are oriented towards building the institutional capability of the Center of Agrarian Studies to do valid adaptive research in agriculture. To this end the project will provide training of Center personnel to create a cadre of qualified staff. Also provided is technical assistance support in administration, management and those agriculture disciplines assessed appropriate. From this basis a viable, active research institute will be created.

I hereby authorize the initiation and execution of the project agreement by the officers to whom such authority has been delegated in accordance with A.I.D. regulations and delegation of authority subject to the following essential terms and covenants and major conditions; together with such other terms and conditions as A.I.D. may deem appropriate.

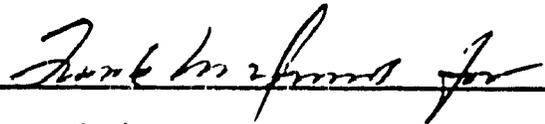
a. Source and Origin of Goods and Services:

Goods and services financed by AID shall have their source and origin in the cooperating country or in the United States except as A.I.D. may otherwise agree in writing.

b. Conditions precedent:

Prior to the first disbursement of funds under the project the GOCV will furnish to AID the name of the person nominated to be the Deputy Director-General of the Institute for Agricultural Research for Cape Verde.

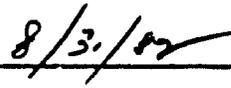
c. The GOCV covenants to conduct a joint evaluation of the project with A.I.D. and to assure that participants trained under the project return to work on the staff of the Institute.



James Anderson

Country Development Officer

Guinea-Bissau/Cape Verde

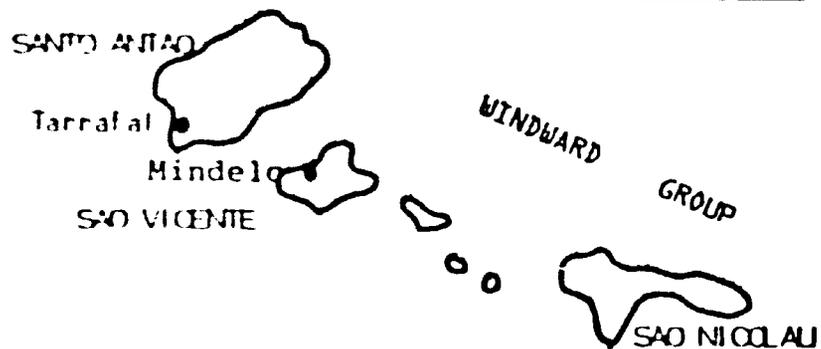


Date

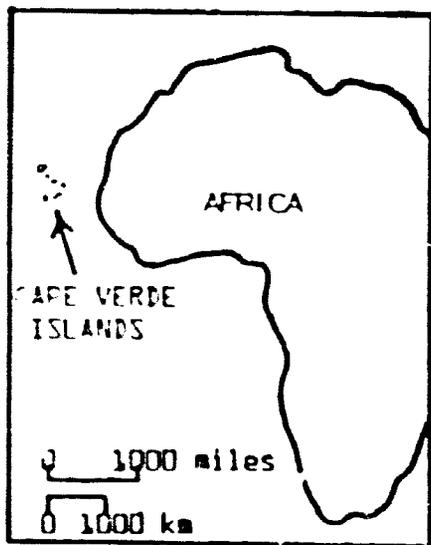
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CAPE VERDE ISLANDS

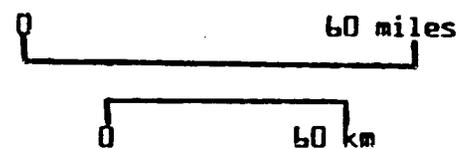
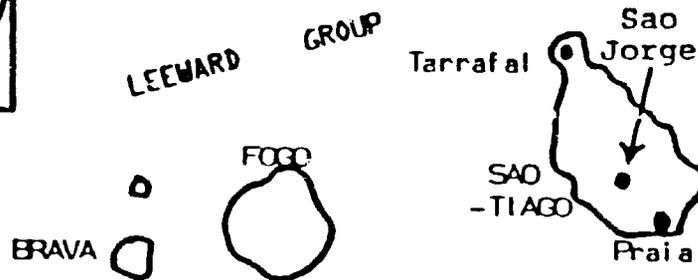


BOA VISTA

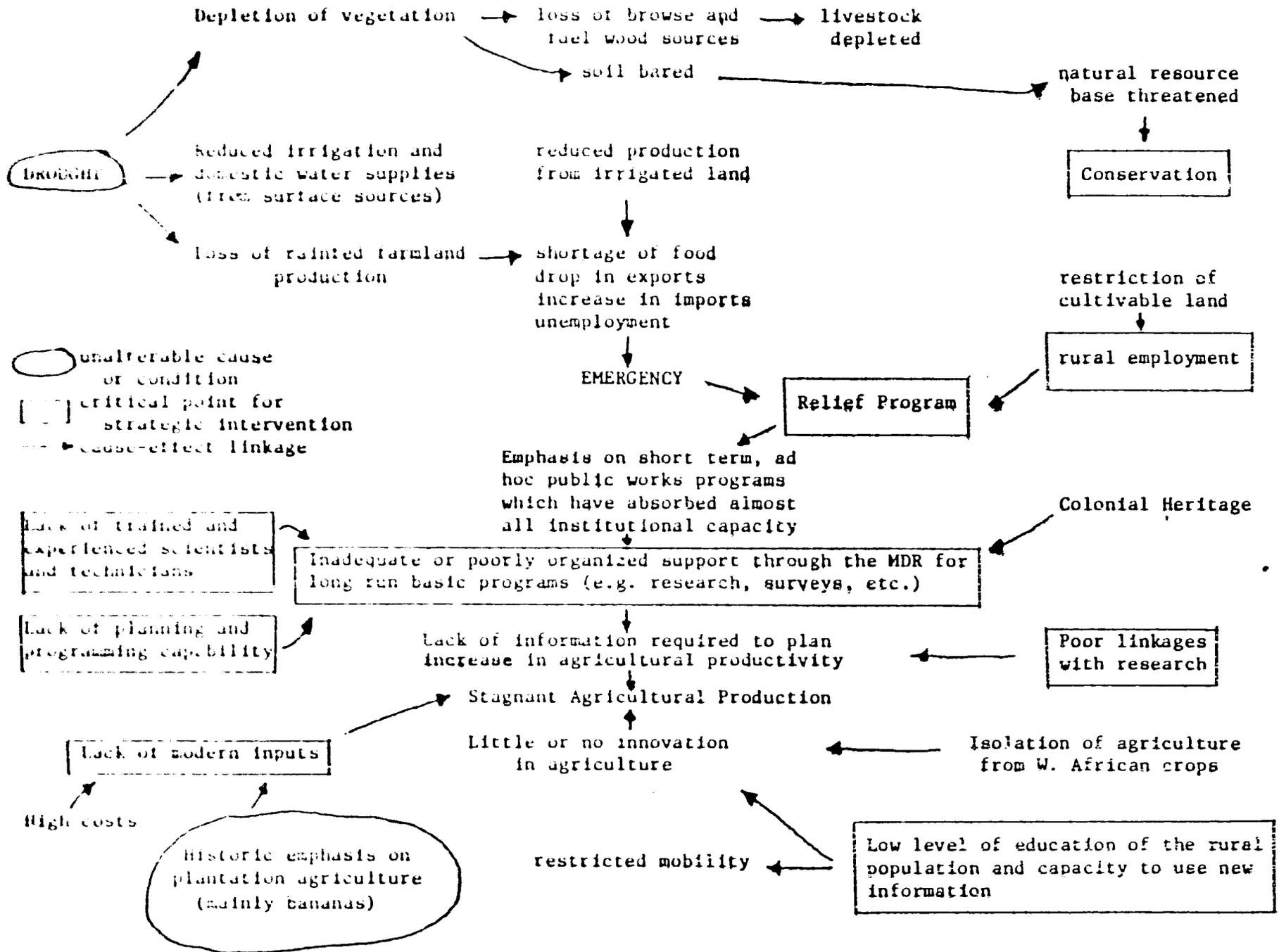


A T L A N T I C O C E A N

LEEWARD GROUP



INTEGRATED ANALYSIS and MODEL of CAPE VERDE'S AGRICULTURAL SITUATION



I. PROJECT RATIONALE AND DESCRIPTION

A. RATIONALE OF THE PROJECT

1. BACKGROUND

The Republic of Cape Verde gained independence from Portugal in 1975, having been a colony for 515 years. The country consists of a group of nine inhabited islands of volcanic origin some 400 miles off the West African coast. The total resident population reaches nearly 300,000 (of which 70% classified as rural). Even more people of Cape Verdean birth or descent live overseas.

Despite the proportionately large rural population, agriculture contributes only 20 percent to the G.D.P., reflecting the very serious water constraint. Four of the islands of the archipelago currently have the bulk of Cape Verde's agricultural potential- Santiago, Fogo, Santo Antão and São Nicolau. The other islands are either too small or lack supplies of fresh water.

The topography of the islands with agricultural potential features steep hills and arid rock plains. The erratic rainfall, often concentrated in torrential storms, erodes the land severely. A small extent of irrigated agriculture lies along the valley bottoms and lower slopes of the hills, while much larger areas on steeper slopes are planted annually, mainly to corn, in the often frustrated hope of obtaining a crop.

The total area of Cape Verde is some 429,000 ha of which about 60,000 ha (14%) is assessed as farm land. Of this just over 1,800 ha is subject to water control.

Rainfall has never been adequate either in quantity or in seasonal distribution. The islands have a history of recurrent droughts of variable duration and such rains as there are, fall during a very short season. The drought from 1969 to date has been exceptionally severe, the annual rainfall at Praia having exceeded the one hundred year average of 250 mm (9.8 in.) only twice in 1976 and 1980.

Given this situation the Government of Cape Verde has undertaken a program of water entrapment which aims

to minimize the amount of rainfall escaping to the sea. Check dams, dikes and terracing are constructed to improve ground water recharge, reduce soil erosion and flooding and thus increase the area of arable land available.

The means by which this is being achieved is through the use of the pool of unemployed who are paid for their labors from funds generated by sale of donated food staples, rather than establishing a dole.

2. DEVELOPMENT STRATEGY

The Government of Cape Verde has just published its first 4-year plan for the period 1982-85. National priorities in rural development are:

1. To implement agrarian reform by generating the basic data required for decision making and then by planning and implementing well-coordinated projects.

2. To establish agricultural institutions, including one dedicated to agricultural research.

3. To establish support programs for farmers including an extension program.

4. To increase the area devoted to irrigated agriculture, and to emphasize food crop production on irrigated lands.

5. To implement ambitious programs of soil conservation and reforestation designed to upgrade the ecosystem and gradually increase water resources.

While concentrating its efforts on increasing the agricultural output of present irrigated areas, it is also attempting to increase the areas on which irrigation can be practiced. This is being done with full realization that this is the most promising source of agricultural products, the only area that can produce year-round, and the area where productivity increases are most feasible. Rainfed food production is also the focus of some research activity as many farm families still rely on it for at least part of their livelihood. The GOV expects the increased production to improve rural income, help stabilize rural development and contribute to better nutrition for all Cape Verdeans.

At the same time the GOCV hopes to reclaim much of the land currently devoted to rainfed agriculture through terracing, reforestation, and runoff control, displacing some of the rural population from these areas towards sites where irrigation may be practiced.

The recognition by the GOCV of the need for investment of scarce resources in agricultural research and education coincides with USAID's identification of the need to reinforce the agricultural research and extension capacity of the country.

The 1978 Agricultural Sector Assessment (AID/afr-C-1142 W.O.NO. 62, 1978) identified eight critical points for strategic intervention to solve Cape Verde's agricultural dilemma. Six of the eight critical interventions will be addressed by the proposed Food Crop Research Project : a) improve the capacity of Cape Verdeans to generate research for increased productivity; b) improve the quality of inputs into agricultural production by efficiency-oriented research; c) improve the linkage between research and production/conservation; d) improve planning and programming capability; e) improve the critical mass of experienced research scientists and technicians; f) improve the support for basic needs in the form of better linkages between farmers and research organizations.

3. RELATIONSHIP TO MISSION SMALL PROGRAM STRATEGY STATEMENT (SPSS)

The Mission's latest SPSS states that AID's goals in the agricultural sector are to help the country increase its food production, stabilize the deteriorating natural resource base, and improve income and nutritional levels of rural families. AID's specific interventions are designed to set in place selected elements of infrastructural and institutional framework necessary for development of a self-sustaining agriculture. It further states that irrigated agriculture must be developed because it yields the only dependable production.

Given these goals the proposed GOCV Project coincides perfectly with the AID strategy. Clearly these goals will not be achieved overnight but a start will have been made and the start is in line with the GOCV's policy strategies in the same direction.

4. RELATIONSHIP TO CURRENT MISSION PROGRAMS

On the island of Santiago AID has two principal projects which focus on the development of irrigated agriculture and water management at field level - the Cape Verde Watershed Management Project (655-0006) and the Tarrafal Water Resources Project (655-0003). Experience on both of these projects has led to identifying the need for research back-stopping, and both have funded inputs to the Center for Agrarian Studies. Furthermore, PL-480 Title II funds are being used for construction of facilities at São Jorge. In addition to these direct inputs AID has a funding interest in the regional AGRHYMET and Food Crop Protection/Integrated Pest Management programs.

5. OTHER DONOR INPUTS

Cape Verde has allocated individual islands to the various donors: Fogo and Brava receive German funding, São Nicolau is funded by French aid, Santo Antão by the Dutch and Maio by the Swiss. Most or all of these programs have an irrigation component, thus the existence of a central research focus can facilitate a two-way exchange of knowledge and a means of recording experiences for the future use.

Donor assistance is vital to Cape Verde at the present stage, and the GOCV is reluctant to criticize donor activities. Nevertheless, it can be said that a number of donor projects operate without optimal GOCV control or participation; and this is even more the case with some of the advisory personnel.

Coordination of donor activity has been weak at best; the separate islands contributing somewhat to isolation and fragmented efforts. There is scarcely any evidence of pooling of resources, learning collectively from experience, or complementing individual efforts.

6. THE RESEARCH INSTITUTION

São Jorge dos Açores is the location of the Center for Agrarian Studies, founded in 1978. The site originally served as a Portuguese experimental station cum boarding vocational school. The school served to train capatazes agrícolas (foremen) for work in Portuguese owned estates. The research at the experimental station focussed on coffee and bananas, the two crops of export interest to Portugal. Following independence in 1975, São Jorge found itself without the Portuguese administrative staff that had been responsible for operating the station, and the new Cape Verdean government found the goals of the school inappropriate to the new social and political order.

Remaining in 1978 plans for a research center began

at the Ministry of Rural Development. In its first four years the Center has successfully attracted funds from various donors for establishing the infrastructure for future research:

- a) a water and soil laboratory;
- b) AGRHYMET funded agro-meteorological monitoring;
- c) German funded laboratory for Integrated Pest Management;
- d) plant pathology laboratory;
- e) chemical lab; and
- f) veterinary lab.

Housing is being built for the Director-General and some of the Cape Verdean staff. Funding has been obtained to build a vocational agricultural high school for training basic-level and middle level agricultural technicians and extension agents. Adaptive research is already functioning in three of the Center's five proposed divisions.

The most deeply-felt and fundamental gap in the Center's ability to serve as a Research Center is the absence of personnel with a level of training and experience for conceptualizing and implementing research. There are currently no Cape Verdeans with training at the master's and doctoral level in the agricultural sciences. The physical facilities and laboratories at São Jorge are already under-utilized due to the absence of a clearly formulated research strategy and the absence of systematic research and experimentation. The most sustainable impact on the agricultural sector is likely to come from the development of Cape Verdean capacity to carry out adaptive research. This will reduce Cape Verde's dependence on donors for both human and commodity resources. Associated with an agricultural vocational school, it will enhance the nation's research capability.

The CACV plans to raise the status of the CAS to that of a semi-autonomous Institute of Agricultural research for Cape Verde. This will give the institution greater freedom to pay the salaries needed to attract and hold qualified research personnel. The draft of a decree to establish the Institute is presented in the Technical Analysis, Annex III, page 12-14.

B. DESCRIPTION OF THE PROJECT

This project will provide 3.7 million dollars to help build the adaptive research capacity of the proposed Institute of Agricultural Research for Cape Verde, at São Jorge, Santiago Island.

The GOCV will provide the existing facilities at the proposed Institute, the existing management and support staff, research sites off-station and some logistic support.

USAID project inputs are oriented towards providing training to Institute personnel to create a cadre of sufficiently qualified people to give the institution long term viability. Also provided are institutional support in management, administrative technical assistance and library technical assistance. Technical assistance will also be provided in those disciplines appropriate to carry out a comprehensive survey of Cape Verdean rural economy and to begin a research program in irrigated and rainfed agriculture. Housing, vehicles, library stock and research equipment will also be supplied.

1. PROJECT GOAL

The goal of the AID grant assistance project is to assist the GOCV to meet its development goals in terms of relative food self-sufficiency, farmer income, rural employment, and improved nutrition status.

2. PROJECT PURPOSE

The purpose of the project is to increase agricultural productivity, in both irrigated and rainfed farming.

3. PROJECT OUTPUTS

The outputs of the Research Institute project will involve the increased capacity of the Institute to undertake interdisciplinary adaptive research on the model of Farming Systems Research. Specifically, the outputs will be:

- a) 7 master degree equivalents earned in:
 - Irrigation Engineering
 - Agronomy - Field crops
 - Agronomy - Vegetable crops
 - Crop improvement - plant breeding
 - Economic/Agricultural Anthropology
 - Business/Public Administration

- b) 2 Ph.D.'s earned in
- Soils physics/science, emphasis on irrigation
 - Crop science/whole plant physiology

c) Research program planned and actions outlined for undertaking integrated, interdisciplinary activities based on the model of Farming Systems Research.

d) Preliminary research projects carried out: 1) as part of the studies program of each of the masters and Ph.D. students; and 2) as part of the work of the 2 long-term Technical Assistance Research Co-Directors.

e) A comprehensive survey and analysis of the Cape Verdean Rural Economy carried out by the Institute in cooperation with the Economic Anthropologist and Agricultural Economist who are part of Technical Assistance team. The survey will be the basis of a research program for adaptive on-farm systems. The research will examine 1) existing cropping and livestock raising activities particularly labor allocation, techniques, cultivars and beliefs about these activities; 2) consumption, distribution, and marketing of these products; 3) land tenure and income distribution; 4) non-farm economic activities, especially for their implications for increasing labor requirements in cropping or infrastructure building; and 5) the policy framework for agricultural production particularly in relation to pricing, credit, input, supply, infrastructure provision, and extension.

f) Management, administrative, and financial systems established for the Institute through the cooperation of Institute personnel with the Business/Administrative expert who is part of the Technical Assistance team.

g) Information and communication center established and functioning at Institute through the cooperation of Institute personnel with the Information Systems expert who is part of the Technical Assistance team.

h) 2 houses and one duplex built for: 1) housing for TA of six months and longer; 2) temporary quarters for TA of less than six months; 3) housing for GOCV, AID, and other donor personnel who will work at the Institute in the future, meeting a long-term commitment to the Institute.

4. PROJECT INPUTS

a. GOCV Inputs

The GOCV is providing the following inputs to the project:

- A charter for the Institute to conduct research, coordinate research, and approve research applications throughout Cape Verde.
- The existing and proposed land and facilities at the Research Institute site in São Jorge (see list in Table II-3 and the plan of the proposed site development).
- Access to research and demonstration sites in various parts of Cape Verde that will be representative of the country's various climatic conditions, and also conveniently located for farmer participation and observation.
- The staff of the Institute, currently CAS, as indicated in Table FI-2, from which the GOCV will select candidates for proposed training.
- Competent management personnel for the Institute.
- Funding sufficient for salaries and operating expenses of the Institute.

In addition the GOCV will coordinate inputs from other projects so as to serve not only the respective project purpose but also the institutional development of the Institute, which is a prerequisite.

b. AID Inputs

The AID inputs are in three main categories:

1. Participant training

The proposed participant training program has **four** principal elements:

a/ Funding for short-term visits to the United States by the Director-General.

The Project aims to involve the Cape Verdeans very closely at all stages in the establishment of a relationship with a U. S. institution which can offer long-term support to the Institute for Agrarian Studies, to their mutual advantage. The visits to the U. S. by the Director-General would be initially at assisting AID/W in the selection of a suitable university (see Administrative Analysis).

Subsequent visits would be aimed at establishing a personal relationship between the Director-General (and perhaps a colleague) and the staff of the selected institution.

b/ Two persons would be selected to pursue the PhD degree. One would specialize in soil physics/irrigation. The second would specialize in crop science/whole-plant physiology. These two persons would give the research organization the capacity to create a team to research irrigated and rainfed crop production and carry on an adaptive research program. They would have the breadth of knowledge to lead such a team and maintain the international links needed to bring the appropriate worldwide agricultural research results to the service of Cape Verdean agriculture.

c/ Seven master degree equivalents in the following disciplines:

- Irrigation Engineering
- Agronomy-field crops
- Agronomy-vegetable crops
- Agronomy-fruit crops
- Crop improvement-plant breeding
- Agricultural/Economic Anthropologist
- Business/Public Administration

d/ Funding for the two Ph.D. students and seven master degree equivalents to return to Cape Verde and the institute after completion of course work in order for each one to carry out preliminary research in their respective fields. The research projects will be the basis of their Masters thesis equivalents or their Ph.D. dissertations.

e/ Funding for short-term training mainly for lower level staff. It is envisaged that these training programs would be undertaken in appropriate Third World countries and/or at international research institutions. The objective would be to sensitize local staff to specific research methods and field/laboratory operations. It is envisaged that the courses would be of the order of one to six person-months. The choice of training programs and participants will be made by the project technical assistants and the institute directors.

2. TECHNICAL ASSISTANCE.

(for detailed work scopes - see the Technical Analysis, Annex F1). The following technical assistance is hereby proposed:

a/ Counterpart to the Director-General. This person, as a senior administrator in the chosen sister-institution, would visit Cape Verde to assist the Director-General in establishing the institutional framework of the research center. This would include the Research Institute's relations with the other organs of development within the country and with international organizations as well as the internal organization of the Institute itself.

Further, the counterpart to the Director-General will work to establish and update a work plan for the project and to establish the general lines of research of the Institute, in cooperation with the Director-General and the USAID Project Officer.

Funding has been budgeted for three-person months. It is expected that two or three short term visits would be more valuable than one long one.

b/ Two counterparts to the Research Director/Sub-Director-General for 36 person months each with two R+R trips. One will arrive in the second year of the project and will be a soil scientist. The second will arrive at the end of the second year of the project and will be a crops scientist. These people will 1) develop and initiate a national applied agricultural research plan through a review of all past and current activities, analysis of needs of the Institute and planning and supervision of research activities of the long-term trainees which will be aimed at the principal aspects of the Institute research program in their respective fields; 2) determine the needs of the Institute's information center in order to establish a work plan for the short term information specialist; 3) assist in the selection and training (or selection of training centers) for institute personnel; 4) work with the Agricultural Economist and Economic Anthropologist on designing and conducting a Rural Economy Survey and 5) initiate pilot research activities as feasible in their own technical disciplines.

c/ Agricultural economist for 18 person months to design, supervise, coordinate training and data collection, and analyze data from the rural economy survey, working in close coordination with the economic anthropologist and Cape Verdean Institute staff.

d/ Economic Anthropologist for 10 person months to be divided between the first 3 months of the Agricultural Economist's tour, the middle four and the last three to work with him/her and the Institute staff on the design, enumerator training and supervision, data collection, and analysis of the rural economy survey.

e/ Administrative Technical Advisor for six person-months: This person will organize, develop and operate the business, personnel and public affairs responsibilities of the Institute.

The Institute will have several inputs - AID alone contributing to the AGRHYMET, Tarrafal, Watershed Management and Food for Development inputs; as well as the German assisted Integrated Pest Management project and other potential donors.

The Institute staff, their transport and welfare will constitute a considerable organizational aspect.

Finally the person will have to devise procurement procedures for consumable stores as well as parts for machines from a considerable number of sources.

f/ Librarian/Information System's Specialist for six person-months:

An experienced library documentation specialist will be provided to assist the person currently being trained in Dakar to identify the English-language publications, both ~~text~~ books and periodicals, necessary for an agricultural research institution. He will also assist in creating a unified catalogue with the Ministry of Rural Development library in Praia and in making materials accessible to researchers and school students at the Institute.

g) Short-term Technical Assistance Specialists (three person-months) :

The need of the research program for assistance in certain disciplines cannot be exactly identified at this time, nor can the time-frame of their need be specified. However, the budget permits the employment of such specialists as and when determined by the director of research and his counterpart to be necessary.

3. OTHER COSTS

a) Housing (\$200,000)

The project will construct two houses for the long-term Research Co-Director and one duplex for medium and short-term researchers and specialists. These will be constructed at São Jorge through a direct AID contract with a local building company approved and monitored by REDSO/Engineering. Several competent design and building contractors are active on Santiago Island. A number of suitable housing sites and ample building materials are available at São Jorge. Water and electricity will be furnished by the GOCV (see Conditions Precedent). Basic furnishings will be provided by the project.

The long-term USAID commitment to the Research Institute justifies this investment in housing construction.

b) Vehicles

Four four-wheel drive pick-ups will be purchased by the project to enable the research teams to travel from São Jorge and to carry research equipment. All of these will be bought at the beginning of the project.

c) Equipment

Funding will be provided under the project for some laboratory equipment, laboratory chemicals, stationery and other expendable supplies. The existing laboratory equipment at São Jorge is considerable but certain further needs were identified. (Table Fl-6 for indicative list.)

d) Library Stock

Funding is provided under the project for library stock. A lump sum will be available in the first year to pay for textbooks, reference books, and freight costs on donations of surplus stock (particularly journal back issues) from American institutions and library equipment.

Annual funding is included to buy subscriptions to scientific journals and for other ongoing library requirements.

e) Travel

Funds are provided under the project to enable center staff to travel to other research centers, attend conferences, colloquia, etc. in order to establish and maintain the necessary international contacts. Funds are also specifically provided for all masters degree equivalent and Ph.D. students to return to Cape Verde after their class work to conduct research projects and then to return to their university to analyze their data, write their reports, theses, or dissertations, and graduate.

f) Fuel, oil, etc.

For the life of the project funding is provided for the fuel and oil needs of the vehicles provided under the project.

C. IMPLEMENTING RESPONSIBILITIES

The Institute will be managed by a Director-General and Assistant Director-General, whose provinces will focus respectively on outside contacts including the GOCV, and the research program of the Institute. Thus the Assistant Director-General is to serve as the Research Director. There will also be a person in charge of administration of the Institute, and one in charge of the Library. The long-term technical advisors will be counterparts of these key people on the Institute staff.

It is expected that all four of these appointments will have been made by December 31, 1982 and that none of the four will be candidates for long-term training, although all may profit from short-term training recommended and arranged with the assistance of their respective advisors.

The candidates for long-term training are all, or nearly all, currently on the staff at the Institute. They will be paid while in training. They will all be required to return to Cape Verde after completing class-work to conduct a research project in their respective field, the proceeds of which will be derived from the evolving Institute National Research Plan. They will then return to analyze their data and complete their studies or degrees. They will be required by the GOCV to serve with the Institute after their completion of that training, and this is covenanted in the grant Agreement.

The other AID project inputs will fit into the overall management plan of the Institute which involves coordinating contributions from a number of donors.

The staff of the existing Center is currently assigned according to the plan of organization. Thus the group assigned to each technical division will be on the Institute payroll. Materials and equipment for research come from a variety of sources, including the projects of a number of donors. Another source for these items is the National Development Fund, which is supported financially by the National investment budget. Supervision of research personnel is a current weakness to be strengthened through both technical assistance and long term training.

Research will be funded in three ways by this project: 1) the design and execution of the Rural Economy Survey to provide a base of information for the Institute's Adaptive/Farming Systems Research program; 2) the research projects to be undertaken by the masters degree equivalent and Ph.D. students based on the evolving Institute research program; and 3) the pilot research to be undertaken by the Research Co-Directors. There are also many donor sponsored projects on the main islands with actual or potential research components. In addition, the various operational units of the MDR, and some other GOVC agencies, have interest in specific types of research. The Institute would rely on these other units to carry out field testing and report on results obtained.

Due to the fact that field testing must be negotiated with personnel of other projects and selected farmers, the project does allow for participation in the design of outcomes and related inputs. In fact, for the research results to be used optimally it will be indispensable to achieve a high order of farmer participation, particularly to begin an adaptive farming systems research program to understand the constraints and possibilities of current practices.

II. COST ESTIMATE AND FINANCIAL PLAN

A. Institute Financial Resources

The Research Institute will depend on four categories of financial resources, in the following order of importance.

1. GOCV operating budget
2. Donor contributions
- 3 Compensation for work on projects needing research inputs.
3. Sale of research products.

Once the Institute budget is established during its first year, it will be treated like those of other GOCV agencies. The budget is presented in September of each year for the next calendar year. If not approved by January 1, the agency operates at the level of the preceding year. The GOCV has a standard percentage increase which is sometimes used across-the-board as a yard stick. For 1982 it was 6%.

The Institute will have its budget approved by the Minister of Rural Development, who will in turn present it to the Council of Ministers. In order to maintain the support of the Council of Ministers, the research program will be developed in terms that will have broad appeal throughout the GOCV.

B. Project Cost Estimates

The cost estimates for this project are contained in the following tables. These costs are based on current experiences of AID and GOCV wherever possible. For technical assistance, a reasonable overhead is included in the estimates. A contingency amount of 7.5% was included to allow for additional short term training, international study or unforeseen expenses. Both major categories of cost (technical assistance/and graduate training) require dollar payments, therefore an inflation factor was added to the project cost estimates.

All AID project funds will be disbursed directly by AID.

Detailed descriptions of each technical assistance position and all educational participants are given in the Technical Analysis, Annex F-1.

TABLE II-1

BUDGET SUMMARY

1. <u>TECHNICAL ASSISTANCE</u>	Months	(Cost (000's))	
		AID FX	GOCV LC
A) Director General Counterpart	3	36	1
B) Research Co-Director (soils)	36	360	5
C) Research Co-Director (crops)	36	360	5
D) Agricultural Economist	18	180	4
E) Economic Anthropologist	10	100	3
F) Administrative Specialist	6	60	2
G) Information System Specialist	6	72	2
H) Short-term Specialist (Unspecified)	3	36	1
Subtotal	118	1204	23
2. <u>PARTICIPANT TRAINING</u>			
A) Long-term training	300	775	124
B) Short-term training	18	54	6
Subtotal	318	829	130
3. <u>SUPPORT SERVICES AND COMMODITIES</u>			
A) Housing for Co-Director and other TA		200	
B) Furnishing, Appliances		32	
C) Vehicles, P.O.L, Spares, Maintenance		116	75
D) Land, lab facilities, equipment and utilities		30	1124
E) Library, books and subscriptions		21	
F) Travel		105	
G) Field trial acreage			40
H) Field labor, supervision plus health insurance			22
I) Secretariat and office		50	
J) Evaluation		50	
Subtotal		604	1268
	TOTAL	2637	1421
4. <u>CONTINGENCY</u>			
		198	
5. <u>INFLATION</u>			
		853	
	TOTAL	3688	1421

PROJECT TOTAL 5,109

TABLE II - 2

BUDGET SUMMARY (ANNUAL AND TOTAL) (\$000)

Source	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1. PARTICIPANT TRAINING						
PhD, MS	225	225	225	50	50	775
Short term		27		27		54
Total	225	252	225	77	50	829
2. TECHNICAL ASSISTANCE						
Director General Counterpart	18	18				36
Research Co-Director (Soil Scientist)		120	120	120		360
Research Co-Director (Crops Scientist)			120	120	120	360
Agricultural Economist		80	100			180
Economic Anthropologist		50	50			100
Administration		60				60
Information System Technician		72				72
Short Term (to be identified)			12	12	12	36
Total	18	400	408	252	138	1204
3. COMMODITIES AND SERVICES						
Furnishing & appliances	32					32
Housing	200					200
Vehicles	60					60
Spares	10.5		10.5			21
POL	7	7	7	7	7	35
Lab Equipment			30			30
Library Books		10				10
Library Subscriptions		6	4	1		11
Office	20	10	10	10		50
Travel	15	15	30	30	15	105
Evaluation			25		25	50
Total	344.5	48	116.5	48	47	604
Sub-total	587.5	700	749.5	377	235	2637
Contingency						198
Inflation						853
TOTAL						3688

FACILITIES AT THE SÃO JORGE CENTER FOR AGRARIAN RESEARCH

	<u>Funds</u>	
C	Administrative Center	(FFD, \$122 000 ; 463 m ²)
	Laboratories	
E	Soil Mechanics	UNICEF BRAZIL
E	Soil, Water and Plant Analysis	GDR BDR
E	Biology (Insect control)	FAO UNDP
F	Veterinary Pathology	BRD France
E	Aghrymet building, weather station and earth station	
F	Polivalente (vocational ag) School	GOCV
E	Livestock building	-
E	Power station (2 x 100 Kw diesel)	BRD
	Housing	
E	2 Apartments	GOCV
E	2 Houses	GOCV
C, F	3 Houses	IPM
C	1 House	Watershed Management
F	10 Room visitor Housing + Restaurant (Sahel - IPM)	
E	Architect's office	-
E, C	Water system (2 galerias, 3 boreholes)	GOCV
E	Irrigated test plots	GOCV

E - Facilities in existence

C - Facilities under construction

F - Facilities for which funding has been obtained

TABLE II-4

GOCV INPUTS

	\$ (000)
1. Participant Training Personnel.....	130
2. Administrative personnel (Counterparts)...	2
3. Other T.A. counterparts (BS training costs)	21
4. Land and water for field trials.....	40
5. Land and Utilities for Office/lab/storage	1,124
6. Field labor for research trials.....	19
7. Health.....	3
8. Vehicle and equipment maintenance.....	75
9. MDR library and librarian.....	<u>7</u>
US\$	1,421

III. IMPLEMENTATION PLAN

This project proposes to strengthen an institution by carrying out two activities simultaneously:

- a) Training of staff for research functions (this is primarily long-term masters and doctors degree training in the U.S.).
- b) Starting a research program using technical assistance and a small contingent of semi-trained personnel.

The only major constraint for both activities is the available Cape Verdean personnel, therefore staff availability on the Cape Verdean side requires careful programming through the 5-year LOP. Some of the staffing gaps can be filled temporarily by expatriate personnel provided by this project as well as several other projects sponsored by a variety of donors. However, to effectively orchestrate the available human resources, both Cape Verdean and expatriate, good management of support services of the Institute including research programming is crucial.

The attached 5-year staffing plan of the Institute indicates on a year to year basis how the twin objectives are to be met within anticipated staff availabilities (Table III-1). The 10-year staffing plan indicates where Institute staffing is now, will be in 5 years (EOP), and should be in ten years time, when it is expected that the institutional development aspect will reach maturity (Table III-2).

In order to guarantee the role of the Institute in directing and coordinating agricultural research in Cape Verde, the Institute will have a Technical Secretariat, which will review every rural development project and approve it from a research point of view. This will assure that research contributions are obtained from every activity. Also detailed work plans will be reviewed for compliance with project objectives. The Minister of Rural Development has repeatedly asserted the principle of Institute authority over research, and donors will be required to respect this authority.

The training program is laid out in the description of AID inputs, and in greater detail in the Technical Analysis. The proposed research program for LOP is based upon forward progress from the existing base.

Four of the proposed five divisions of the Insti-

tute are partially staffed now or will be by the first year of project implementation. These are Natural Resources, Agriculture, Hydrology and Agroclimatology, and Sociology and Agroecconomics. Animal Pathology, the fifth division, is expected to come into being in year 2. No further divisions are foreseen during LOP.

TABLE III-1

5-YEAR STAFFING PLAN OF THE INSTITUTION

PROPOSED POSITIONS INCLUDING TRAINING SLOTS	YR 1	YR 2	YR 3	YR 4	YR 5
I) <u>General Direction</u>					
Director General	1	1	1	1	1
Deputy D.G.	1*	1	1	1	1
Secretary	1	2	2	2	2
II) <u>Administration</u>					
Head of Administration	1*	1	1	1	1
Accountant	1	1	1	1	1
Administrative Officers	1	2	2	3	3
Accountant Aid	1	1	1	2	2
Typist	1	2	2	2	2
Purchase Officer	1	1	1	1	1
III) <u>Library</u>					
Librarian	1	1	1	1	1
Librarian Aid	1	1	1	2	2
Secretary	1	1	1	2	2
IV) <u>Nat. Resources Division</u>					
Taxonomist	1	1	1	1	1
Botanist	1	1	1	1	2
Ecologist	-	-	1	1	1
Soil Scientist	1	1	1	1	1
Geographer	-	-	-	1	1
Physicist	1	1	1	1	1
Chemist	1	1	1	1	1
Cartographer	1	1	1	1	1
V) <u>Agriculture</u>					
Agronomist	1*	2*	2	2	2
Soil Scientist	-	3*	3	3	3
Food Processing	1	1	1	1	1
Entomologist	1*	1	2	2	2
Plant Pathologist	1	1	1	1	1
Irrigation Engineer	3	3*	3	3	3
VI) <u>Livestock</u>					
Veterinary	1	1	1	1	1
Pasture Specialist	0	1	1	1	1
Lab. Technician	1	2	3	3	3
VII) <u>Agroclimatology and Hydrology</u>					
Agroclimatologist	3	5	5	5	6
Hydrologist	1	2	2	4	4
Equipment Maintenance	1	2	3	3	3
Computer Science	-	-	-	-	1
VIII) <u>Agroecology and Sociology</u>					
Agroecologist	1	1	1	2	2
Sociologist	-	-	-	-	1
Surveying People	4	4	4	6	6
Technical Sociology	1	1	1	1	1

* Training departures

TABLE III-2

10 - YEAR STAFFING PLAN OF THE INSTITUTION
 (NOS. OF EMPLOYEES ACCORDING TO ORGANIZATIONAL UNITS)

	YR 0	YR 5 (EOP)	YR 10
General Direction	1	2	2
Administration	3	5	5
Library	1	2	2
Natural Resources Division	2+2*	8	8
Agriculture Division	5	12	16
Agro-Climatology and Hydrology Division	4	14	16
Agro-Economics and Sociology Division	2	4	4
Livestock Division	2	5	7
TOTAL	22	52	60

*Soil lab.

This table does not include auxiliary personnel such as clerks, typists, laboratory technicians and survey personnel.

A. Proposed Research Program

Irrigated agriculture is the most productive kind of farming but it is expensive and capital costs are large. It is essential then that in this system, each unit of water must be spread efficiently and water losses must be minimized. To maintain high yields all factors of production, soil fertility, pest control, improved varieties, effective farming practices and labor allocation must be used to advantage. Crop research priorities on irrigated Cape Verdean land must address the following considerations:

1. Intensification of production under irrigation which involves improved varieties, farming methods, irrigation and water-use efficiency. Research efforts initially should be concerned with improved varieties, method of planting, spacing and plant population, number of plantings made, seedbed preparation, intercropping and relay cropping practices, frequency and time of weeding, use of fertilizers, turn-around time in planting, use of pest control practices for insects, disease and pest control.
2. Creating more economic cropping systems to optimize land use, water-use efficiency, marketing, resource crop production, crop utilization, labor inputs and farm economics.
3. Specific research problems centered around site-specific situations, including soils, water, specific crop production constraints, and varietal factors affecting crop production.
4. Baseline studies of farm management and other aspects of Cape Verdean rural economy in order to identify constraints particularly in terms of techniques, cultivars, consumption preferences, marketing institutions, and non-agricultural economic activities, all of which must be understood as the initial step in adaptive research.

The proposed research program is described in detail in the Technical Analysis, Annex F-1, in terms of research methods and utility of the results, according to each research area.

B. Contracting for Technical Services

The alternative modes for contracting of technical services and training were discussed with the director of the future Institute. The advantages of a close relationship which might be formed between the Institute and the associated U.S. institution were recognized. It was acknowledged that the Institute would benefit considerably in its formative stage and before administrative technical assistance under the project had been provided, by having contracting of technical assistance handled by AID. It would appear on balance, therefore, that the first phase of the Project should be performed under an AID contract.

The contract specifications to be used in contacting a suitable United States institution are discussed in detail in the Administrative Analysis, Annex F-4. These considerations should be used as a guide to institutional choice.

C. The Implementation Schedule

The General Implementation Plan is based on the assumption that the Project Agreement will be executed before the 30th September, 1982. A detailed implementation plan acceptable to both AID and GOCV will have to be prepared in the light of the institutional identification and contract negotiation processes. It is hoped that the attached schedule (Table III-3) can be observed due to the urgency of institutional support at the transitional stage. Particularly important will be Implementation Letter No. 1, to be in draft at the time of preparation of the first PIO(s).

D. Procurement

Table II-2 schedules the list of commodities and services which will be required during the course of the project.

Housing for the project technicians will begin year one. Local contracting will be used because the magnitude is insufficient to attract U.S. contractors. Plans are being developed and the Ministry of Rural Development will present them for USAID approval. Subsequent to the approval of the architectural plans the MDR will publish an invitation for bids (IFB) and with USAID concurrence will make an accord to the successful bidder. The contractor will be responsible for the procurement of building materials and the construction element. Construction materials will be purchased locally as shelf items. In certain cases some items may need to be obtained directly from 899 sources for which waivers will be requested from architectural REDSO/WCA. Periodic site inspections will be done during construction by representative of MDR, USAID engineers and project manager. GOCV contribution to the construction will be the donation site(s). The completion of the housing is scheduled to be completed in year one.

Procurement of all other commodities except as the MDR may from time to time procure under AID's shelf item authorization will be from U.S. sources. Commodities will be purchased by the MDR through its selected procurement services agent (PSA). An exception may be made for project vehicles/spare parts, library books and library subscriptions for which the MDR may alternatively opt to procure directly from U.S. supplier with AID/Brain acting as agent in behalf of the MDR. The MDR does not currently have, nor will have within

the foreseeable future a sub-component which is capable of effecting US and other offshore procurement in accordance with AID regulations. PIO/CS will be issued for all procurement made under the project. When a PSA is used an AID/W direct letter of commitment procedure will be designated. In the event procurement is effected by AID/Praia individual purchase orders will be issued with payment by check effected through RAMC/Paris. Identification and procurement requests for Lab. Equipment, Library Books, Library Subscriptions and office equipment/supplies will be made during the first TDY of the counterpart to the Director-General and/or by other project technicians as soon as possible after their arrival in Cape Verde.

Ocean transportation will be arranged by the US PSA when used, or by the individual US supplier if direct purchases are made. All shipments will be made on a CIF basis. Due to the non-availability of direct US flag vessel service to Cape Verde, necessitating costly transshipment costs at European ports, AID/W SER/COM/TR will be requested to determine that US flag vessels are not available at fair and reasonable rates and thereby authorize the use of Cape Verdian (and/or Code 899 vessels, if required) for the transport of project commodities in excess of the 50 % US flag vessel requirement stipulated in the US cargo Preference Act.

Port conditions at Praia are considered adequate both in terms of capability to effect timely discharge and provide security until clearance and withdrawal of commodities. Commodities other than those for construction will be consigned to the MRD who will obtain the necessary exonerations with regard to the payment of duties and taxes, effect port clearance and provide transportation and security for the commodities from the port area to the project site and in addition provide security and adequate storage conditions until such commodities are in place in the project facilities. Arrival and accounting records will be maintained by AID/Praia, however efforts will be made to establish within the MRD parallel capability so that during the course of the project AID's role will become one of monitoring overview.

TABLE III-3

IMPLEMENTATION SCHEDULEELAPSED TIME

(MONTHS)

- September 30, 1982 - Project Agreement executed
- 2 - Acceptability of GOCV building plans for house construction reaffirmed by REDSO
- 2 - Title XII (or other institution) identified by AID/W. BIFAD and GOCV representative (Director of Institute) AID/W and the Director of Institute consider suitable universities for participant trainees.
- 2 - Building construction bid documents completed.
- 2-4 - Draft PIO/Ts, PIO/Cs and PIO/Ps prepared with assistance from REDSO/ WA Supply Management Office and Regional Contracts Office. Draft PIL #1 prepared simultaneously.
- 3-5 - Contractual arrangements between AID/W and selected institution developed and finished.
- 3 - Participant trainees selected By GOCV
- 3 - Order vehicles - all for delivery ASAP. Order one half of budgeted spare parts at the same time.
- 3 - Building construction bid documents circulated.
- 4 - Students requiring English language training before starting course of study depart.
- 4 - Verify that office accomodation and necessary support (equipment and personnel) are available in anticipation of visit of director general's counterpart.

- 5 - Return of construction bids and selection.
- 5 - Order furnishings and appliances.
- 5 - Director of Institute visits U.S. university and agricultural research establishments.

Identification of technical assistance.
- 6 - Start building.
- 8-9 - Counterpart to Institute Director in-country
- 8 - Departure of participant trainees who do not require English language training.
- 15 - Housing completed
- 16 - Arrival of Research Co-Director (Soils Scientist), Agricultural Economist, Economic Anthropologist, Business Administration Expert, and Information Systems Technician. 6 week return by Counterpart of Director General.
- 16-19 - Design and pre-test of Rural Economic Survey Instrument, Development of Survey Implementation Plan, Selection of Enumerators. Train Enumerators.
- 17 - Identification of lab and library equipment, books, and subscriptions by TA team.
- 17-18 - Procurement of identified needs by AID/Praia
- 17 - Institute junior and support staff training needs identified and training starts/overseas visits planned.
- 17 - Regular seminars commenced (at Institute using services of Institute staff and technical assistance experts from other programs as well as MDR staff from other divisions).
- 18-63 - Short term technical assistance visits according to needs.

- 23 - End of tour of Information Systems and administrative T.A.
- 26-36 - Return of Masters and Ph.D. students to conduct research for theses on dissertations - Followed by return to the U.S. for analysis and write-up.
- 30 - Arrival of second research Co-Director (Crops Science) for 36 months.
- 31 - Mid-term evaluation
- 31-34 - Return of Economic Anthropologist for analysis of Rural Economic Survey data and assistance in Mid-term Evaluation.
- 36-42 - Return of Masters and Ph.D. students after graduation.
- 43 - Review of returned graduates to determine what or if short-term training/exposure at other research institutes is needed.
- 52 - Departure of first Research Co-Director (Soils Scientist).
- 55 - End of Project Evaluation
- 60 - Departure of second Research Co-Director (Crops Scientist)
- 60 - End of Project

IV. MONITORING AND EVALUATION PLAN

a) Monitoring Plan

USAID/Praia will assign the project monitoring responsibility to the Agricultural Development Officer, a position it now has in its staffing pattern and expects to keep. He will be responsible for timely procurement, monitoring of GOCV inputs and performance, and monitoring of project personnel. He or she will be assisted by the senior contract technical advisor in residence. USAID will hold quarterly project reviews to assess implementation progress. There will normally be bilateral meetings to which key personnel will be invited.

From the point of view of the Institute, the primary monitoring problem is the assignment and reassignment of personnel so as to accomplish the training objectives while at the same time permitting the Institute to get the research program underway.

From a bilateral viewpoint, monitoring must focus on the delivery of GOCV inputs, mainly staffing requirements; the delivery of U.S. inputs, mainly training and technical resources, and construction, and the delivery of related inputs from other donors.

The efficient integration of these inputs, particularly as regards strengthening of Institute services and initiation of a research program, would be monitored carefully. Short-term technical assistance would be programmed to assist the Institute in addressing problem areas identified in the project review process.

During project implementation the USAID Mission and the Institute will deal with each other directly on a day to day basis. The technical assistance contract personnel will work under the supervision of a senior advisor in residence. The senior contract advisor will be responsible for submitting monthly reports to the Institute and quarterly reports to USAID. However, the latter will come to USAID with the indication that they have been viewed by the Institute's Director-General. The timing of quarterly reports will be related to USAID's quarterly progress review schedule.

The Institute proposes to hold both administrative and technical staff meetings on a monthly basis. A general meeting of the Institute will be held once a year, which will allow for full in-country participation and also some outside participation.

In response to any conflict or dissatisfaction by either the contractor or the Institute regarding each other's performance that may be called to USAID's attention, a three-party meeting will be called to table issues and resolve them on the spot.

b) Evaluation Arrangements

A project graded to institution building and human resource

development presents a considerable challenge to an evaluation team. The evaluation team should consist of a person familiar with how an institution such as the one being created ought to work. Someone familiar with the initial conditions present when the project began, and representation of relevant fields (agronomy, agricultural science, agricultural anthropology, library science, agricultural institutional administration). First preference for Evaluation Team recruitment will be AID USDH's from REDSO/WA or AID/W. Only in the absence of available team members from these sources will other modes of providing members be considered. At the end of two and a half years, the Food Crop Research Project should be evaluated to determine the degree to which:

- a) progress has been made towards training Cape Verdean researchers;
- b) the institution has begun to manifest a research orientation;
- c) a comprehensive rural economic survey has been carried out;
- d) a National Agricultural Strategy has been formulated;
- e) progress has been made in organizing a research library;
- f) B.S. level staff has gained skills in setting up research plots;
- g) the provision of personnel and equipment has been provided in a timely fashion; and
- h) the relationship of the technical assistants to Cape Verdean personnel has been productive.

a) Progress in Training

The Institute and the Research Director should maintain a correspondence with the academic advisors of the trainees abroad as to progress in coursework, appropriate choice of study areas, and application of lessons to Cape Verdean reality. This correspondence and annual reports from each trainee will need to be audited and evaluated. Such an evaluation will help determine who goes for the Ph.D. and which for the Master's level training in year 4 and 5.

b) Institution's Research Orientation

A research orientation is, perhaps, the most significant aspect of institution building. Among the indicators of the development of a research orientation that may be used in evaluation are:

- 1) Plan of work detailing utilization of personnel and assimilation of staff support activities into research activities.
- 2) Research reports, manifesting clear and explicit research methods, rigorous analysis and an awareness of the value of the research undertaken within the existing literature.
- 3) The list of weekly technical seminars indicative of a level of research dialogue existing within the Institute. The list should include announcements of each seminar, a brief summary of the topics to be presented and the basis of the research.
- 4) Execution of the Annual Agricultural Research Meeting bringing together all islands' research groups working throughout the islands. The meeting should include a gathering of all research reports from the various experimental work undertaken, problems encountered and potential application to other sites in Cape Verde.

c) Rural Economy Survey

One of the first tasks of the Food Crop Research Project is to collect and analyze baseline data which will help to identify the directions in which the Institute's applied research program should go. The team of an economic anthropologist, working with the Institute personnel, will have the responsibility to design survey methodology and procedures, to pre-test and adapt a survey instrument, to select, train, and supervise enumerators who will collect data, and to analyze the data. In addition, data will be collected on marketing, inputs, infrastructure, credit, and national policies to provide a larger picture within which the survey of current farming and livestock production, consumption and marketing at the micro-level will be viewed. An important complementary area in the survey will be investigation of non-farm economic activities by rural households to provide indications of the opportunity costs for those households, of production improvements which might call for shifting of current labor allocation. All of this information will be collected and analyzed in coordination with Institute personnel and the T.A. Research Co-Directors. The evaluation team will look at the quality and quantity of the findings of the Rural Economy Survey and recommend changes if necessary.

d) National Agricultural Research Strategy

The institution building process will have failed if the research center staff is unable to formulate a national agricultural research strategy and to gain the support of political leaders to carry it out. The research staff should involve Cape Verdean leaders in the tasks of the Institute, inform them of progress made, and engage their cooperation in the formulation of research priorities. By the time of the mid-term evaluation it is hoped that such a National Plan has been formulated and approved.

e) Research Library

A research institute will be unsustainable if a research library is not well on its way to being built up. The evaluation team will look at the effort undertaken to build up the library, the trend in funds committed by GOCV in library acquisitions, the ease of access of library resources to the staff, the hours kept by the library, and recommendations of the research staff about how to maximize the usefulness of the library. The library should be positively evaluated if it has enhanced its service and informational services, and negatively if it has been more concerned with library acquisitions for storage. As a research library, the materials must be accessible yet secure. Furthermore, the polyvalente school students should be encouraged to use this resource base and the evaluation team should seek evidence of their having done so.

f) Skills Gained

The staff at the Center currently has solid background in agriculture but little research capability. Through the direction of the research staff and short-courses abroad and in situ, the staff is expected to gain confidence in its ability to carry out clearly outlined experimental tasks. These should be available in writing and performance by each staff member evaluated by the research director or someone he designates. Progress should be evaluated at the mid-term evaluation and recommendations made as to whether the

person should receive graduate level training, be transferred out of the Institute or some other result emerging from the evaluation.

g) Personnel and Equipment

The evaluation team should assess whether the delivery of personnel and equipment has accurately followed the implementation schedule suggested for the project. In addition, the team should determine the impact that the final implementation may have had on the achievement of project goals or explaining the problems that emerged.

b) Technical Assistants/Cape Verdean Relations

It is very important to understand the success/failure of projects in the light of the interaction and social/professional relations developed between foreign assistants and local staff. The evaluation team should interview both groups to try to determine their respective perception of each other, of the purpose of the Institute, of the research tasks undertaken and how to proceed in the time remaining for the project.

i) Final Evaluation

The final evaluation in the fifth year, should consider the following in addition to the items included at mid-term :

- (1) Evaluation of institutional capability
- (2) Identification of specific research results, application of measurements and estimate of impacts
- (3) Review of adequacy of GOV rural development activities in support of the research program
- (4) Success of program in coordinating activities on main islands
- (5) Consideration of need for a second phase.

j) Conduct of Evaluations

The criteria for conduct of the evaluations are the following :

- (1) Host government participation is critical, and probably that of other donors is desirable
- (2) This II provides baseline information on the institution. Baseline data on the status of agricultural and rural economic development will be generated during the first two years
- (3) First priority will be given to conduct of evaluations by AID officials
- (4) It is likely that a second phase will be required to reach project purpose and goal

- (5) Mission and Institute management people have experience with joint evaluations, and it will be Mission policy to continue participatory management of projects to enhance this experience .

V. METHODS AND CONCLUSIONS OF ANALYSIS

The following analyses are included as annexes to this paper :

Technical Analysis
 Economic Analysis
 Social Soundness Analysis
 Administrative Analysis
 Environmental Analysis

A. Technical Analysis

The Technical Analysis attempts to rationalize the establishment of a food crop research program in Cape Verde. The Introduction (1) describes the proposal and then sets down a list of 5 criteria for analyzing the proposal :

- 1/ The need for and potential benefits of an agricultural research and extension program in Cape Verde;
- 2/ The existing national institutions in agriculture, the supporting infrastructure, and the organizational mechanisms linking a coordinated research program;
- 3/ Availability of persons trained in appropriate research management, scientific and technical skills and in self-sustaining mechanisms that develop future human resource capabilities;
- 4/ Potential local capacity and time-frame to assure broad-based success and sound programs of research for national agricultural development;
- 5/ A final analysis making recommendations for the project, its organization, functional requirements and institutional objectives.

The General Background Section on the Agricultural Sector E1.7 provides general material on the agricultural sector in Cape Verde as it exists today. The conduct of agriculture on the various islands is discussed, and donor roles and projects mentioned. Also the relevant plans of the GOCV, including a proposed extension effort, are discussed. The status of irrigated and rainfed agriculture is placed in proper perspective, and crops currently produced are mentioned.

Annex E1.7 tests the criteria listed above to complete the analysis. Annex E1.8A spells out the GOCV plans for a research institute consisting of 5 divisions. Annex E1.8B provides a brief justification for a strong central institution. Annex E1.8C discusses the availability of staff, including a listing of

present Institute personnel. Annex Fl.3D outlines the constraints on development of a research program, and the probability of a considerable delay in seeing results.

Annex Fl.4 provides the recommendations for implementing project assistance including recommended types of technical assistance, major suggested components of research, types of trained personnel needed, and potential types of short-term assistance. Related tables list international and regional research institutions and research specializations in terms of specific crops.

Annex Fl.5 addresses the requirements of the Library and Documentation Center. Annex Fl.6 takes up procurement, while providing a purely illustrative list of required equipment. Annex Fl.7 provides job descriptions for the proposed technical advisers. Annex Fl.8 provides information on required training. Annex Fl.9 presents a draft of the proposed Decree for the creation of the Institute of Agricultural Research of Cape Verde.

B. Economic Analysis

A cost-effective approach was used in the economic assessment of the project due to the nature of project outputs and the lack of accurate statistical data. The key to an economic analysis lies not only in the presentation of numbers and financial calculations, but in the examination of alternative projects and trade-offs within a project.

In this case, it was determined that Cape Verde has few project alternatives in the areas of light industry, cottage industry, tourism, trade, and public services. With the possible exception of fishing, agriculture is a means to reduce food dependency.

The trade-off in project selection appears when the \$5.1 million is "spread out" over GOCV's potential farmland. This area totals no more than 60,000 arable hectares, of which only 3000 hectares or less will be irrigated by 1995. Eighteen hundred hectares is now irrigated. The cost of the project is equal to a land investment of \$32/acre. If the increased crops yields from agricultural research can be raised to add a mere \$6/acre per season in net returns, the project could potentially pay for itself in 5 seasons (discounting is not applied here) if all 60,000 hectares were cultivated. Currently some 36,000 hectares are in cultivation. Limited agricultural research from Cape Verde shows that there is potential for achieving greater yields than are now being realized. The value of this investment is to be traded off with the gross need of reducing the food imports of the 300,000 inhabitants of Cape Verde who now rely on the outside world for 90% of their needs.

Finally, institution building is currently a major emphasis in AID agricultural policy. Pay offs to agricultural research have been demonstrated in the past with such examples as IRRI rice, CYMMYT wheat in Mexico, and imported wheat varieties in India. Greater detail of the economic analysis is found in Annex F 2.

C. Social Soundness Analysis

Annex Fl.1 of the Social Soundness Analysis discusses the history of the country, and presents a detailed history of recurrent droughts, their effects and outside assistance rendered. The relationship of the land tenure system to the country's capacity to confront food emergencies is then discussed. Annex Fl.2 deals with a variety of social indicators. The long-term tendency of Cape Verdeans to emigrate, as a way out of their dilemma, is presented as a part of presentation of demographic characteristics and identification of islands where agriculture is important.

The nutritional status of the population is discussed in some detail, and specific deficiencies identified, particularly among women and children. The related aspects of health status are dealt with briefly.

The educational picture receives a fairly thorough analysis demonstrating statistically the relatively small proportion, amounting to less than one per cent, which makes it through to finish high school. The unavailability of postsecondary education in Cape Verde is considered in relation to the training plans of the Institute project.

Annex F3.3 deals with the potential impact of the project. The target population is identified and described. Plans for rural extension services to the target group are described as well as the expected impact of the proposed Land Reform Law on them. A section on the role of women stresses the effects of predominantly male emigration in adding to women's responsibilities in rural areas. Burdens of the project are seen as few, but a considerable number of benefits are listed. Finally the probability of diffusion of research results is presented in a very general way.

D. Administrative Analysis

The Administrative Analysis describes the functions of the present Center for Agrarian Studies, and the proposed decree for changing it to an Institute. The analysis points out that the Institute will have an Advisory Committee to formulate broad policies and help assure coordination of GOCV activities affecting research extension. The proposals for creating and strengthening the research program's links with the farmers are discussed.

The alternative ways of handling technical services for the project are laid out, the principal conclusion being that Institute management have a significant role in the selection process of the institution to be contracted. USAID capacity to manage the project is outlined, including available backstopping from REDES and other missions.

E. Environmental Analysis

The original IEE, resulted in a negative determination threshold decision by the CEA on May 31, 1971. This document was submitted with the IEE. Concurrence with this decision was not received because the IEE review committee questioned the possible use of pesticides. Therefore a revised IEE has been drafted and is presented as Annex F5.

The GOCV has a department within its Ministry of Rural Development which deals with both food crop protection and integrated pest

management, using the spectrum of chemical and biological methods. In view of the fragile ecosystem, the GOCV has adopted a policy of giving priority to biological control methods over chemical methods. A competent research program will help protect the country against use of any chemical or biological methods that pose a threat to the environment, by demonstrating the actual or potential effects of such use.

The project as designed does not encourage the use of pesticides in any way, although proposed baseline studies would document current use of pesticides, and future research would undoubtedly consider carefully monitored use of pesticides as an adjunct to crop research. It could hardly do otherwise.

Based on this rationale, a recommendation is made that the negative determination be upheld.

F. Summary of Findings

The Technical Analysis concludes that adaptive agricultural research oriented towards irrigated and rainfed food crop production is appropriate and feasible. The analysis further identifies the existing Center of Agrarian Studies as the appropriate center for national agricultural research provided that its institutional capacity is reinforced. However, further education of the staff is needed to provide a cadre of agricultural researchers. To bridge the gap between the present situation and the return of the post-graduate trainees, technical assistance is required to establish baseline data and to initiate appropriate research. The Economic Analysis confirms the cost effectiveness of the Project and the benefits which can be expected to flow from appropriate research to the population as a whole and the Cape Verdean economy. The Social Soundness Analysis indicates that the benefits will eventually accrue to the rural population of Cape Verde whose present situation is precarious and heavily dependent on food aid donations.

The Administrative Analysis concludes that an AID contract should be used for procurement of technical assistance, and that Institute management should participate actively in selection of the contractor. The training and community components of the project are fairly routine and can be managed jointly by the Institute and USAID.

The Environmental Analysis recommends that the negative determination be upheld.

VI. CONDITIONS AND CONVENANTS

The GOCV shall satisfy AID prior to first disbursement that a Deputy-Director General is nominated for the said Institute.

The GOCV shall covenant that the individuals trained under the Food Crop Research Project will become members of staff of the Institute and will work there unless performance at the Institute proves unsatisfactory to the Director-General.

The GOCV shall covenant that sufficient water, electricity and access will be provided to all the offices and residences occupied by the project during the project's life.

ANNEX A
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ORIGIN AID-35

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ORIGIN OFFICE AFM-PS
INFO AARF-01 AFDP-02 AFDR-06 PPCE-01 PDPR-01 PPPB-03 AAST-01
DIFA-01 STAG-02 STX1-01 AFDA-01 MAST-01 WAR-01
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AID/AFR/SVA: FEGILBERT
AID/AFR/SVA: AGMACARTHUR : DRAFT
AID/AFR/DR/ARD: JHARTMAN: DRAFT
AID/BIFAD: BRUSEMANN: PHONE
AID/AFR/DR/ARD: CSCHERRER: DRAFT
AID/AFR/DP: SHARP: DRAFT
AID/AFR/DR/SDP: JNESTER: SUBS
AID/S&T/AGR/AP: JMYONE: DRAFT
AID/AFR/DP: GACCOT: DRAFT
AID/PPC/PDPH/HR: JMCQUIRE: DRAFT
AID/AFR/SVA: BUWOODS: DRAFT
AID/BIFAD: JOVEIS: PHONE
AID/AFR/SVAP: GSILOCUN: DRAFT

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AIDAC

E.O. 12958: N/A
TAGS:

SUBJECT: PID REVIEW - FOOD CRP RESEARCH AND EXTENSION
(55-0010)

REF: (A) BISSAU 2183 (B) STATE 30235

1. SUMMARY: THE PID COMMITTEE MET NOVEMBER 25TH AND APPROVED THE SUBJECT PROJECT WITH THE UNDERSTANDING THAT THE PP WILL REDIRECT PRIORITIES, PLACING PRIMARY PROJECT EMPHASIS ON STRENGTHENING AND DEVELOPING THE GOV'S INSTITUTIONAL CAPABILITY IN RESEARCH, WITH THE COMPONENTS OF PRODUCTION AND EXTENSION SECONDARY.

THE FOCUS ON INSTITUTIONAL CAPABILITY MORE ACCURATELY REFLECTS THE PROJECT PURPOSE AS STATED IN THE PID'S SUPPORTING LOGFRAME. THE FOLLOWING PARAGRAPHS 2 THROUGH 8 OUTLINE THE SPECIFIC PID REVIEW COMMITTEE DECISIONS AND RECOMMENDATION. PARAGRAPH 10 LISTS REQUIREMENTS FOR PP PHASE. END SUMMARY.

2. GENERAL COMMENTS:

(A) PID COMMITTEE: REPRESENTATION FROM AFR/SVA, AFR/DR, AFR/DP, S AND T/AGR/AP, PPC/PDPH/HR AND BIFAD ATTENDED SUBJECT PID REVIEW ON NOVEMBER 25TH. DUE TO THE ABSENCE OF AFR/SVAP REPRESENTATION, ENVIRONMENTAL CONCERNS OF THE PROJECT WERE DEFERRED AND ARE INCLUDED UNDER PARA 9.

(B) PROJECT PURPOSE: IT WAS THE CONSENSUS OF THE PID REVIEW COMMITTEE THAT PROJECT ORIENTATION SHOULD BE ON INSTITUTION BUILDING RATHER THAN PRODUCTION. NO EFFORTS SHOULD, THEREFORE, CONCENTRATE ON ASSISTING THE GOV IN

FORMULATING STRATEGY, DEVELOPING PHILOSOPHY AND IN BUILDING AN ORGANIZATIONAL FRAMEWORK FOR AGRICULTURAL RESEARCH. PROJECT FOCUS ON PLANNING, MANAGEMENT, STRUCTURE AND COORDINATION OF AG RESEARCH IS NEEDED. CROP IMPROVEMENT/ PRODUCTION SHOULD SERVE AS A VEHICLE TO HELP EFFECTIVE INSTITUTIONAL DEVELOPMENT OF AG RESEARCH; LIKEWISE WITH THE EXTENSION COMPONENT IN REFERENCE TO THE EXTENSION SERVICES. IN THE PRESENT CONTEXT RESEARCH APPEAR FRAGMENTED ALONG DONOR, CROP AND LOCALITY LINES. THE COMMITTEE FELT STRONGLY THAT, AT THIS STAGE OF DEVELOPMENT, IT IS ESSENTIAL FOR THE GOV TO DEVELOP A FRAMEWORK WITHIN WHICH RESEARCH CAN BE CONDUCTED. (C) THE DOCUMENT IS LACKING IN DESCRIBING THE RELATIONSHIPS AMONG THE VARIOUS GOV MINISTRIES INVOLVED IN RESEARCH AND EXT SERVICES. THE PP SHOULD SPELL OUT THE ROLE OF EACH AGENCY WITH RESPECT TO THE PROJECT. (D) THE DOCUMENT DOES NOT ADDRESS WHAT THE AGRARIAN CENTER IS TRYING TO DO OR WHAT IS GOING ON IN-COUNTRY. (E) FINANCIAL MANAGEMENT: THE COMMITTEE CONSIDERS FINANCIAL MANAGEMENT IMPORTANT. THE ADEQUACY OF GOV'S ACCOUNTING AND FINANCIAL MGT CAPABILITY MUST BE ASSURED. PID COMMITTEE IS ENCOURAGED BY RECENT GOV REQUEST FOR REGIONAL SMDP FUNDS TO CONDUCT SHORT-TERM ACCOUNTING AND MANAGEMENT COURSES FOR MID-LEVEL MINISTRY OFFICIALS NOW ONGOING. PROJECT CAN ALSO BE LINKED WITH THE SAHEL REGIONAL FINANCIAL AND PROGRAM MANAGEMENT WFP/PP PROJECT 625-0048. (F) REQUIRED AID/PRAIA MGT: IT WAS FELT THAT AID/PRAIA'S MANAGEMENT RESPONSIBILITIES WOULD BE MINIMAL UNDER THIS PROJECT.

4. PROJECT TECHNICAL ASSISTANCE: THE REDIRECTION OF PROJECT FOCUS FROM PRODUCTION TO INSTITUTION BUILDING NECESSITATES A CHANGE IN THE TYPE OF TECHNICAL EXPERTISE REQUIRED. A SENIOR TECHNICIAN WITH STRONG BACKGROUND IN ORGANIZATION, MANAGEMENT AND PLANNING WHO COULD ASSIST THE GOV IN DEVELOPING AND IMPLEMENTING POLICY IS NEEDED IN LIEU OF THE PROPOSED PRODUCTION ORIENTED AGRICULTURIST. THE PROJECT TIME FRAME FOR TECHNICAL SERVICES WILL LIKEWISE HAVE TO BE REVISED FROM THE PROPOSED 24 PERSON MONTHS TO AT LEAST 48 PERSON MONTHS IN ORDER TO ASSURE THAT THE PROJECT GOALS ARE ACHIEVED.

5. TRAINING COMPONENT: THE PID COMMITTEE IS IN AGREEMENT THAT THE TRAINING COMPONENT NEEDS TO BE REVISED IN ACCORD WITH THE NEW PROJECT FOCUS. PARTICIPANT TRAINING AT THE BS LEVEL AND POSSIBLY HIGHER IS WARRANTED.

6. LIFE OF PROJECT: THE PID COMMITTEE RECOMMENDS THAT LOP BE REVISED FROM 2 TO 3 YEARS. SUCH A TIME FRAME IS NECESSARY TO ACCOMPLISH STATED PROJECT GOALS AND MAKE A MEANINGFUL CONTRIBUTION TO INSTITUTIONAL CAPABILITY.

7. PROJECT FUNDING: GIVEN THE BUDGET LEVEL AVAILABLE FOR THIS ACTIVITY, THE CHANGE IN PROJECT FOCUS FROM PRODUCTION TO DEVELOPING INSTITUTIONAL CAPABILITY WILL REQUIRE A REASSESSMENT OF LOP FUNDS BY PP DESIGN TEAM. THE PID COMMITTEE RECOGNIZES THAT PROJECT FUNDS OF DOLS 1.1 MILLION MAY OR MAY NOT BE ADEQUATE WITHIN THE EXISTING PID BUDGET. HOWEVER A FUNDING REASSESSMENT IS MANDATORY IN LIGHT OF THE CHANGES IN THE TECHNICAL ASSISTANCE COMPONENT (PARA 4) AND THE CHANGE IN LEVEL OF TRAINING REQUIREMENTS (PARA 5) NEEDED TO EFFECT PROJECT GOALS. IN VIEW OF BUDGET STRINGENCIES, AID/W WILL NEED TO BE ADVISED OF ANY CHANGES IN LOP FUNDING AS A RESULT OF THE PP DESIGN TEAM'S REASSESSMENT.

8. TITLE XII: THE PID COMMITTEE AGREED THAT THE PROJECT MAY OFFER AN OPPORTUNITY FOR A TITLE XII ARRANGEMENT. UNDER TITLE XII, THERE ARE TWO TYPES OF PROGRAMS: (A) COLLABORATIVE ARRANGEMENT WHEREBY THE UNIVERSITY WOULD

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PARTICIPATE IN BOTH THE DESIGN AND IMPLEMENTATION, AND
(M) STANDARD UNIVERSITY CONTRACT FOR IMPLEMENTATION ONLY.
AID/PRAIA SHOULD ADVISE AID/W ACAP ON POSSIBILITY OF
TITLE XII COLLABORATIVE/STANDARD UNIVERSITY ARRANGEMENT.
IF ACCEPTABLE, AID/PRAIA SHOULD INDICATE AT WHAT STAGE
TITLE XII IS THOUGHT FEASIBLE FOR PROJECT I.E. DESIGN
AND/OR IMPLEMENTATION. AID/PRAIA MIGHT ALSO WANT TO
QUERY GOCV TO ASCERTAIN IF THERE ARE ANY OBJECTIONS TO A
POSSIBLE TITLE XII UNIVERSITY ARRANGEMENT.

9. TECHNICAL CONCERNS:

(A) ENVIRONMENTAL ISSUE/PESTICIDE: THE FACT THAT U.S.
FUNDS ARE NOT BEING USED TO DIRECTLY PROCURE PESTICIDES
DOES NOT BELIEVE THE MISSION OR THE REQUIREMENT TO COMPLY
WITH STATED U.S. REGULATIONS ON PESTICIDES. AID/PRAIA
SHOULD REVIEW HANDBOOK 3, REG 16, LATEST REVISION, AND
SUBMIT REQUIRED IEE DOCUMENTATION.

10. PP REQUIREMENTS: IN ADDITION TO THOSE AREAS ALREADY
NOTED UNDER PARAS 2-6, THE PP WILL BE REQUIRED TO PROVIDE
DATA ON THE FOLLOWING: (A) IDENTIFY WHAT RESEARCH IS
PRESENTLY IN-COUNTRY AND WHAT BE INTEND TO ACCOMPLISH IN
3 YEARS FROM THIS PROJECT. INDICATE IF TEAM ENVISIONS THAT
THIS WILL BE THE FIRST PHASE OF CONTINUED U.S. ASSISTANCE
IN THE AREA OF RESEARCH, (B) ECONOMIC AND SOCIAL ANALYSES
WILL BE REQUIRED AND AID/PRAIA WILL ADVISE SEPTEL ON
SCOPE AND KIND OF ANALYSES REQUIRED; (C) EVALUATION OF
WIDE IMPACT OF PROPOSED CROPS MUST BE ADDRESSED, (D)
REFERENCE TO SPOILAGE IN THE DOCUMENT RAISES MAJOR
QUESTIONS AND SHOULD BE ADDRESSED AND CLARIFIED AS TO THE

RISKS SMALL FARMERS COULD UNDERTAKE WITH PROPOSED CROPS;
(E) IDENTIFY WHERE THE DEMAND IS FOR THE PROPOSED CROPS
(CASSAVA/YAMSI); (F) PP SHOULD EXAMINE AND BE KNOWLEDGEABLE
OF POTENTIALS AND CONSTRAINTS IMPOSED BY PARTICIPATING, DIS-
TRIBUTION AND TRANSPORT MEANS. SPECIFIC ATTENTION
SHOULD BE GIVEN TO NEGATIVE AND POSITIVE EFFECTS ON
PARTICIPATING FARMERS IF THESE MECHANISMS ARE LACKING;
(G) DATA ON IMPORTED AGRICULTURAL COMMODITIES, (H) LEAD
BEFORE, CREDIT AND RELATED ISSUES WHICH IMPACT ON
FARMERS SHOULD BE IDENTIFIED, (I) RECURRENT COSTS - OUT-
LINES FOR THE GOCV PROPOSED TO BUDGET THE PROJECT ONCE THE
USL FUNDING ENDS, (J) LEVEL AND TYPE OF TRAINING MUST
BE BE ASSESSED IN VIEW OF PROJECT RESECTION, (K)
PROJECT PHASE-OVER MUST BE ADDRESSED AND INDICATE WHO WILL
TAKE OVER THE PROJECT ONCE U.S. TECHNICAL ASSISTANCE IS
WITHDRAWN

11. PP OF PP AND 8 FUNDS TOTALING OVER 20 THOUSAND HAVE
BEEN TENTATIVELY BARRANDED FOR THE PP DESIGN PHASE. BOTH
AID/PRAIA AND DESIGN/VA MUST FOCUS ON PP REQUIREMENTS
NOTED IN ABOVE PARAGRAPHS AND ADVISE IF PROPOSED FUNDING
LEVEL IS ADEQUATE FOR PP DESIGN. MUST TO IDENTIFY SCARCITY
TYPES OF EXPERTISE REQUIRED IN VIEW OF ABOVE STATED PP -
REQUIREMENTS

12. REQUEST AID/PRAIA OPINION THAT THE REVISED PROJECT
SCHEM AS PROPOSED BEING AS ACCEPTABLE TO THE MISSION
AND THE GOCV. ADVISE.

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PROJECT LOGICAL FRAMEWORK

ANNEX B

Narrative	Verifiable Indicators	Sources of Information	Assumptions
<p>GOAL 1. In the long run the project is expected to support GOCV development goals in: food self-sufficiency rural employment rural income nutrition</p> <p>PURPOSE 1. The Institute demonstrates its capacity to impact on food production, though probably only in a limited way during Phase I.</p> <p>OUTPUTS 1. 2 Masters degree equivalents 2. 2 Ph.D.'s earned 3. Research program established 4. Rural Economic Survey carried out 5. Initial research projects undertaken 6. Management/Administrative/Financial systems set up for Institute 7. Information and Communications Center established 8. 2 Amplex and 1 duplex built for project and future use.</p> <p>INPUTS GOCV (U.S.) 1. Research management (T.A.) 2. Research staff (training) 3. Research facilities (additional) 4. Operating budget</p>	<p>Series of data should be established for measuring progress in each goal.</p> <p>EOPS 1. Have demonstrated results to farmers, and started to develop a grass roots constituency. 2. Have earned the support or project sponsors in Cape Verde so that research is better integrated. 3. Have developed active exchange with counterpart institutions outside Cape Verde.</p> <p>Records should be kept of each potential application according to stages of research, so that progress can be evaluated against baseline conditions.</p> <p>1. Well managed research program 2. Baseline data 3. Adequate staff 4. Connections with counterpart institutions.</p>	<p>National Statistics</p> <p>Project evaluations</p> <p>Research program records</p> <p>AID, Institute Administrative records</p>	<p>Good management of inputs</p> <p>Adherence to project implementation plan</p>

5C(1) - COUNTRY CHECKLIST

Listed below are statutory criteria applicable generally to FAA funds, and criteria applicable to individual fund sources: Development Assistance and Economic Support Fund.

A. GENERAL CRITERIA FOR COUNTRY ELIGIBILITY

1. FAA Sec. 116. Has the Department of State determined that this government has engaged in a consistent pattern of gross violations of internationally recognized human rights? If so, can it be demonstrated that contemplated assistance will directly benefit the needy? NO

2. FAA Sec. 113. Has particular attention been given those programs, projects, and activities which tend to integrate women into the national economies of developing countries, thus improving their status and assisting the total development effort? YES

3. FAA Sec. 481. Has it been determined that the government of the recipient country has failed to take adequate steps to prevent narcotic drugs and other controlled substances (as defined by the Comprehensive Drug Abuse Prevention and Control Act of 1970) produced or processed, in whole or in part, in such country, or transported through such country, from being sold illegally within the jurisdiction of such country to U.S. Government personnel or their dependents, or from entering the U.S. unlawfully? NO

4. FAA Sec. 620(b). If assistance is to a government, has the Secretary of State determined that it is not dominated or controlled by the international Communist movement?

Embassy/Praia has knowledge of a determination made by the Secretary of State in this regard. It is the post's view that the government is not dominated or controlled by the international communist movement.

A. 5. FAA Sec. 620(c). If assistance is to a government, is the government liable as debtor or unconditional guarantor on any debt to a U.S. citizen for goods or services furnished or ordered where (a) such citizen has exhausted available legal remedies and (b) the debt is not denied or contested by such government?

NO

6. FAA Sec. 620(e) (1). If assistance is to a government, has it (including government agencies or subdivisions) taken any action which has the effect of nationalizing, expropriating, or otherwise seizing ownership or control of property of U.S. citizens or entities beneficially owned by them without taking steps to discharge its obligations toward such citizens or entities?

NO

7. FAA Sec. 620(m), 620(f), 620D; Continuing Resolution Sec. 511, 512 and 515; ISDEA of 1950 Secs. 717 and 721. In recipient country a Communist country? Will assistance be provided to Angola, Cambodia, Cuba, Laos or Vietnam? (Food and human animal assistance distributed directly to the people of Cambodia are excepted. Will assistance be provided to Afghanistan or Mozambique with or without? Are funds for fertilizer to be used for planting for cooperation, or for the purpose of cooperation, for

the confiscation
nationalization, acquisition
or expropriation of any
agricultural or banking
enterprise, or property or
stock thereof?

NO

8. FAA Sec. 620 (i). Is recipient country in any way involved in (a) subversion of, or military aggression against, the United States or any country receiving U.S. assistance, or (b) the planning of such subversion or aggression?

NO

- A. 14. FAA Sec. 620(g); Continuing Resolution Sec. 518.

(a) Is the government of the recipient country in default for more than six months on interest or principal of any AID loan to the country? (b) Is the country in default exceeding one year on interest or principal on any U.S. loan under a program for which the Continuing Resolution appropriates funds?

NO

15. FAA Sec. 620(b). If contemplated assistance is development loan of from Economic Support Fund, has the Administrator taken into account the percentage of the country's budget which is for military expenditures, the amount of foreign exchange spent on military equipment and the amount spent for the purchase of sophisticated weapons systems? (An affirmative answer may refer to the record of the annual "Taking into Consideration" memo: "Yes, taken into account by the Administrator at time of approval of Agency CYA". This approval by the Administrator of the Operational Year Budget may be the basis for an affirmative answer during the fiscal year unless significant changes in circumstances occur.

NO

16. FAA Sec. 620(t). Has the country severed diplomatic relations with the United States? If so, have they been resumed and have new bilateral assistance agreements been negotiated and entered into since such resumption?
- NO
17. FAA Sec. 620(u). What is the payment status of the country's U.N. obligations? If the country is in arrears, were such arrears taken into account by the AID Administrator in determining the current AID Operational Year Budget?
- Cape Verde is up to date on its payments to the U.N..
- A. 9. FAA Sec. 620(j). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction, by mob action, of U.S. property?
- NO
10. FAA Sec. 620(k). Does the program furnish assistance in excess of \$100,000,000 for the construction of a productive enterprise, except for productive enterprises in Egypt that were described in the Congressional presentation materials for FY 1977, FY 1980 or FY 1981?
- NO
11. FAA Sec. 620(l). If the country has failed to institute the investment guaranty program for the specific risks of expropriation, inconvertibility or confiscation, has the AID Administrator within the past year considered denying assistance to such government for this reason?
- NO
12. FAA Sec. 620(m). Is the country an economically developed nation, capable of sustaining its own defense budget and economic growth?

and, if so, does it meet any of the exceptions to FAA Section 620 (m) ?

NO

15. FAA Sec. 620(o); fishermen's Protective Act of 1967, as amended, Sec. 5. If country has seized, or imposed any penalty or sanction against, any U.S. fishing activities in international waters,

NO

a. has any deduction required by the Fishermen's Protective Act been made ?

b. has complete denial of assistance been considered by AID Administrator ?

- A. 18. FAA Sec. 620A; Continuing Resolution Sec. 521. Has the country aided or abetted, by granting sanctuary from prosecution to, any individual or group which has committed an act of international terrorism? Has the country aided or abetted, by granting sanctuary from prosecution to, any individual or group which has committed a war crime ?

NO

19. FAA Sec. 666. Does the country object, on the basis of race, religion, national origin or sex, to the presence of any officer or employee of the U.S. who is present in such country to carry out economic development programs under the FAA ?

NO

20. FAA Sec. 666, 670. Has the country, after August 5, 1977, delivered or received nuclear enrichment or reprocessing equipment, materials, or technology, without specified arrangements or safeguards? Has it detonated a nuclear device after August 5, 1977, although not a "nuclear-weapon state" under the nonproliferation treaty ?

NO

B. FUNDING SOURCE CRITERIA FOR COUNTRY ELIGIBILITY

1. Development Assistance Country Criteria.

a. FAA Sec. 102(b)(4). Have criteria been established and taken into account to assess commitment progress of the country in effectively involving the poor in development, on such indexes as: (1) increase in agricultural productivity through small-farm labor intensive agriculture, (2) reduced infant mortality, (3) control of population growth, (4) equality of income distribution, (5) reduction of unemployment and (6) increased literacy.

YES

B. 1. b. FAA Sec. 104(d)(1). If appropriate, is this development (including Sahel) activity designed to build motivation for smaller families through modification of economic and social conditions supportive of the desire for large families in programs such as education in and out of school, nutrition, disease control, maternal and child health services, agricultural production, rural development, assistance to urban poor and through community-based development programs which give recognition to people motivated to limit the size of their families?

2. Economic Support Fund Country Criteria.

a. FAA Sec. 105(b). Has the country (a) engaged in a consistent pattern of gross violations of internationally recognized human rights of (i)

made such significant improvements in its human rights record that furnishing such assistance is in the national interest?

NO

b. FAA Sec. 532(f). Will ESF assistance be provided to Syria?

NO

c. FAA Sec. 609. If commodities are to be granted so that sale proceeds will accrue to the recipient country, have Special Account (counterpart) arrangements been made?

N.A.

d. FAA Sec. 620B. Will ESF be furnished to Argentina?

NO

5C(2) PROJECT CHECKLIST

Listed below are statutory criteria applicable generally to projects with FAA funds and project criteria applicable to individual funding sources: Development Assistance (with a subcategory for criteria applicable only to loans); and Economic Support Fund.

CROSS REFERENCES: IS COUNTRY CHECKLIST UP TO DATE?
HAS STANDARD ITEM CHECKLIST BEEN REVIEWED FOR THIS PROJECT?

A. GENERAL CRITERIA FOR PROJECT

1. Continuing Resolution Unnumbered, FAA Sec. 614A; Sec. 605 (L).

(a) Describe how authorizing and appropriations Committees of Senate and House have been or will be notified concerning the project. (1) Is assistance within operational year budget authority of international organization. Allocation reported to Congress not more than \$1 million over that amount?

a. Through normal AID congressional notification procedures.

b. Yes.

2. FAA Sec. 611(a)(1). Prior to obligation in excess of \$100,000, will there be (a) engineering, financial other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance ?
- a. Yes .
- b. Yes .
3. FAA Sec. 611(a)(2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance ?
- N.A.
- A. 4. FAA Sec. 611(b); Continuing Resolution Sec. 501. If for water or water-related land resource construction, has project met the standards and criteria as set forth in the principles and Standards for Planning Water and Related Land Resources, dated October 25, 1973 ?
- N.A.
5. FAA Sec. 611(e). If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed \$1 million, has Mission Director certified and Regional Assistant Administrator taken into consideration the country's capability effectively to maintain and utilize the project ?
- Yes
6. FAA Sec. 209. Is project susceptible of execution as part of regional or multilateral project? If so why is project not so executed? Information and conclusion whether assistance will encourage regional development programs.
- It is not susceptible to execution as part of a regional project.

7. FAA Sec. 601(a). Information and conclusions whether project will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; and (c) encourage development and use of cooperatives, and credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.
- a. Through eventual export of agriculture surpluses
 b. Research results will benefit private farmers.
 c. N.A.
 d. Research results to be disseminated to all members of society.
 e. Yes, agriculture.
 f. N.A.

8. FAA Sec. 601 (b). Information and conclusion on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).

The project will procure goods and services in the United States.

9. FAA Sec. 612(b), 636(h). Continuing resolution Sec. 588. Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized in lieu of dollars.

Cape Verde is contributing local costs in the form of salaries. The US does not own any local currency of Cape Verde.

10. FAA Sec. 612(d). Does the U.S. own excess foreign currency of the country and, if so, what arrangements have been made for its release?

NO

11. FAA Sec. 611(c). Will the project utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise?

YES

12. Continuing Resolution Sec. 522. If assistance is for the production of any commodity for export, is the commodity likely to be in surplus on world markets at the time the resulting productive capacity becomes operative, and in such assistance likely to cause substantial injury to U.S. producers of the same, similar or competing commodity?

N.A.

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

a. FAA Sec. 102(b), 111, 113, 281 (a). Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor intensive production and the use of appropriate technology, spreading investment out from cities to small towns and rural areas, and insuring wide participation of the poor in the benefits of development on a sustained basis, using the appropriate U.S. institutions; (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage democratic private and local governmental institutions; (c) support the self-help efforts of developing countries, (d) promote the participation of women in the national economies of developing countries and the improvement of women's status, and (e) utilize and encourage regional cooperation by developing countries?

a. The results of the agricultural research is intended for the use of small farmers throughout Cape Verde.

b. self-explanatory

c. N.A.

d. Many heads of households in Cape Verde are women, including farm families.

e. One of the purposes of the project is to establish linkages with other research institutes in the world.

b. FAA Sec. 103, 103A, 104, 105, 106, 107. Is assistance being made available :

(include only applicable paragraph which corresponds to source of funds used. If more than one fund source is used for project, include relevant paragraph for each fund source).

N.A. Project is being funded from Sahel appropriation.

(1) (103) for agriculture, rural development or nutrition; if so (a) extent to which activity is specifically designed to increase productivity and income of rural poor; 103A if for agricultural research, full account shall be taken of the needs of small farmers, and extensive use of field testing to adapt basic research to local conditions shall be made; (b) extent to which assistance is used in coordination with programs carried out under Sec. 104 to help improve nutrition of the people of developing countries through encouragement of increased production of crops with greater nutritional value, improvement of planning, research, and education with respect to nutrition, particularly with reference to improvement and expanded use of indigenously produced foodstuffs; and the undertaking of pilot or demonstration of programs explicitly addressing the problem of malnutrition of poor and vulnerable people; and for extent to which activity increases national food security by improving food production and management and by strengthening national food reserves, with particular concern for the needs of the poor, through increased production, including national

N.A.

food reserves, expanding available storage facilities, reducing post harvest food losses, and improving food distribution.

(2) (104) for population planning under sec. 104(b) or health under sec. 104(c); if so, (i) extent to which activity emphasizes low-cost, integrated delivery systems for health, nutrition and family planning for the poorest people, with particular attention to the needs of mothers and young children, using paramedical and auxiliary medical personnel, clinics and health posts, commercial distribution systems and other modes of community research.

(4) (105) for education, public administration, or human resources development; if so, extent to which activity strengthens nonformal education, makes formal education more relevant, especially for rural families and urban poor, or strengthens management capability of institutions enabling the poor to participate in development; and (ii) extent to which assistance provides advanced education and training of people in developing countries in such disciplines as are required for planning and implementation of public and private development activities.

(5) (106; IDCA of 1980, Sec. 304) for energy, private voluntary organizations, and selected development activities, if so, extent to which activity is (i) concerned with data collection and analysis, the training of

N.A.

skilled personnel, research on and development of suitable energy sources, and pilot projects to test new methods of energy production; (b) facilitative of geological and geophysical survey work to locate potential oil, natural gas, and coal reserves and to encourage exploration for potential oil, natural gas, and coal reserves; and (c) a cooperative program in energy production and conservation through research and development and use of small scale, decentralized, renewable energy sources for rural areas;

(ii) technical cooperation and development, especially with U.S. private and voluntary or regional and international development organizations;

(iii) research into, and evaluation of, economic development process and techniques ;

(iv) reconstruction after natural or man-made disaster;

(v) for special development problems, and to enable proper utilization of earlier U.S. infrastructure, etc., assistance ;

(vi) for programs of urban development, especially small labor intensive enterprises, marketing systems, and financial or other institutions to help urban poor participate in economic and social development .

E. 1. c. (107) is appropriate effort placed on use of appropriate technology? (relatively smaller, cost-saving, labor using technologies that are generally most appropriate for the small farms, small businesses, and small incomes of the poor).

N.A.

d. FAA Sec. 110(a). Will the recipient country provide at least 25 % of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or has the latter cost-sharing requirement been waived for a "relatively least developed" country) ?

Requirement has been waived for Cape Verde.

e. FAA Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing, or is the recipient country "relatively least developed" ?

N.A.

f. FAA Sec. 281(b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civil education and training in skills required for effective participation in governmental processes essential to self-government.

This is an institution building project and clearly meets the requirements of FAA Sec. 281 (b)

g. FAA Sec. 122 (b). Does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities and self-sustaining economic growth?

YES

2. Development Assistance Project
Criteria (Loans Only)

a. FAA Sec. 122(b).

Information and conclusion on capacity of the country to repay the loan, at a reasonable rate of interest.

N.A.

b. FAA Sec. 620(d). If assistance is for any productive enterprise which will compete with U.S. enterprises, is there an agreement by the recipient country to prevent export to the U.S. of more than 20 % of the enterprise's annual production during the life of the loan?

N.A.

3. Project Criteria Solely for
Economic Support Fund

a. FAA Sec. 531(a). Will this assistance promote economic or political stability? To the extent possible, does it reflect the policy directions of FAA Section 102?

YES, YES.

b. FAA Sec. 541(c). Will assistance under this chapter be used for military, or paramilitary activities?

NO

CENTRO DE ESTUDOS AGRARIOS

Mr. JAMES ANDERSON
HEAD OF AID OFFICE FOR CAPE-VERDE AND GUINE-
BISSAU.
AMERICAN EMBASSY - PRAIA

Praia the 6 th of July 1981

Dear Mr Anderson

Ref: 105/DG/82

The Government of Cape Verde places the highest priority on food production and the welfare of its rural population. Major investments have been made by my government to realise our agricultural production potential but due to the magnitude of the problem, the attainment of our goals necessitates ~~the~~ financial and technical support of our friends.

To assist in attaining increases in food productivity the government wishes to reinforce its agricultural research capacity. Currently the Center for Agricultural Studies at Sao Jorge on the island of Santiago has a nucleus of buildings and equipment but lacks trained staff. AID technical advisers and representatives of the Ministry of Rural Development have examined the present situation with a view to strengthening our institutional capacity to do applied research. Their joint conclusion is that there are a number of Cape Verdeans who should be given further training to provide a several staff for the future and that technical assistance is needed at present to reinforce our ability to administer the Center, to establish a body of baseline agricultural data and initiate a national research program whose initial thrust will be in irrigated food crops.

The Government of Cape Verde hereby requests a program of bilateral assistance from the United States Government within this framework. I understand that the cost of such a program will be on the order of \$3.7 million.

I hope AID officials in Washington will ^{understand} this effort and will give their approval to the project in order to start actions as soon as possible.

Thanking for all your help and those of your member staff would you please accept my best wishes.

YOURS SINCERELY

Horacio Gual

/DIRECTOR GENERAL/

C.C. Minister of Rural Development

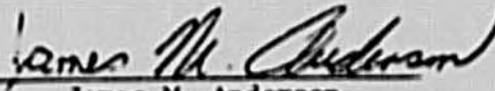


EMBASSY OF THE
UNITED STATES OF AMERICA
AGENCY FOR INTERNATIONAL DEVELOPMENT

CERTIFICATION PURSUANT TO SECTION 611(e) OF THE
FOREIGN ASSISTANCE ACT OF 1961, AS AMENDED

I, James M. Anderson, the principal officer of the Agency for International Development in Cape Verde, having taken into account among other factors the maintenance and utilization of projects in Cape Verde previously financed or assisted by the United States, do hereby certify that in my judgement Cape Verde has both the financial capability and the human resources capability to effectively maintain and utilize the Food Crop Research Project.

This judgement is based upon the implementation record of the previous projects implemented in Cape Verde, and the quality of the planning which has gone into this new project.


James M. Anderson

Country Development Officer, USAID/Cape Verde

Date: July 8, 1982

ANNEX F1

TECHNICAL ANALYSIS1. INTRODUCTION

The Project Identification Document (PID) (655-0011) - Food Crop Research and Extension Project proposed for the Government of Cape Verde (GOCV), was designed to "strengthen the institutional capacity of the Ministry of Rural Development (MRD), to address priority research problems in food production and to strengthen linkages between agricultural research and agricultural extension".

The target beneficiaries are the small-scale agricultural producers who will benefit from the research and dissemination of information and services, secondary benefits to State farms and semi-autonomous production units and ultimately the consumers of food and the GOCV.

A project development team composed of a Design Officer, G.R. King, an agronomist, D.F. Mikkelsen, an agricultural economist, J. Belknap and a rural sociologist, E.F. Moran reviewed available documents and published materials, took field trips, interviewed GOCV officials, USAID personnel and evaluated the PID document during the period of June 13-July 1. They attempted to determine the need for an agricultural research and extension program in Cape Verde and if appropriate, to develop a range of conceptual and strategy considerations for this type of institutional building and operation.

Some of the criteria used in analyzing the proposal include:

A. The need for and potential benefits of an agricultural research and extension program in Cape Verde:

B. The existing national institutions in agriculture, the supporting infrastructure, and the organizational mechanisms linking a coordinated research program.

C. Availability of persons trained in appropriate research management, scientific and technical skills and in self-sustaining mechanisms that develop future human resource capabilities:

D. Potential local capacity and time-frame to assure

broad-based success and sound programs of research for national agricultural development.

F. A final analysis making recommendations for the project, its organization, functional requirements and institutional objectives.

2. GENERAL BACKGROUND - AGRICULTURAL SECTOR

The Republic of Cape Verde is in the implementation phase of an integrated Rural Development Plan with a priority objective of developing its irrigated farm resources. Irrigated subsistence farming is conducted mostly on the islands of Santiago and Santo Antão, and restricted areas of Fogo, Brava and São Nicolau. The current areas under irrigation (1981) represent 1,800 ha of narrow valleys between steep, mountainous terrain. Additional irrigated land may ultimately be developed which may extend the total to 3,000 or more hectares by 1995.

Irrigated farming represents a major input to the agricultural sector. Irrigated land makes up about 3% of some 60,000 total arable hectares; and contributes 4% of Cape Verde's current G.D.P. Rainfall is highly variable in amount and distribution. Crop yields have ranged from 800 kg of corn/ha during normal rainfall to no production during years of drought. Rainfed farming, mostly associated with corn and bean production, does not provide for national food security and up to 73,000 tons of food imports are required annually to provide for national dietary needs.

Drought and famine have plagued the country for centuries and the country is now into its fourteenth year of drought. The Government has acknowledged that, from years of food shortages, a certain degree of security in food production can only be achieved by intensive irrigated farming and by increasing modern production inputs such as improved crop varieties, improved cropping systems, improved water-use efficiency, crop protection and fertilizers. The Cape Verdean climate permits year-around crop production where irrigation is available and the alluvial soils in the valleys have excellent production potentials when irrigation water is available.

Major food crops grown under irrigation include sweet potatoes, cassava, onions, tomatoes, cabbage, melons, peppers, potatoes, carrots and leekish. These are often inter-planted together, as well as with bananas, sugar cane and papayas. But crops are also grown in agro-culture.

TABLE F1-1

Cape Verde: Area of Irrigated Land on Each Island by
Type of Crop (Hectares)

Island	Total	Sugar Cane	Banana	Cassava	Potato	Vegetables	Various
Santiago	950	476	96	92	58	180	48
Fogo	9	-	-	-	3	6	-
Maio	17	-	-	4	2	3	8
Brava	31	25	-	-	2	1	3
Santo Antão	800	544	62	29	35	80	50
San Vicente	18	-	-	2	-	12	4
San Nicolau	29	20	4	1	-	4	-
Boa Vista	1	-	-	-	1	-	-
Total	1855	1065	162	128	101	286	113

Fruit crops are also grown. Corn and beans, in mixed culture, are usually grown in rainfed areas mostly characterized by steep and undulating terrain.

Presently, land tenure of irrigated lands is in both private and State hands. Agricultural lands are located in valley lowlands and the crops are irrigated from wells or piped from bore-holes. A significant amount of irrigated agriculture also is practiced on minor terraces in otherwise sloping land. Water is pumped from wells located in drainages found in the uplands. Plot sizes vary from a few square meters to a hectare (mean= 0.03 ha) while State farms are larger and are operated by the MRD.

Irrigated areas provide the highest crops yields and have a good level of reliable production. They have some constraints, particularly because water is scarce, depending upon rainfall and removal of water from existing aquifers. Land is also limited and the widespread use of dikes around each irrigated basin and each land ownership parcel, reduces total utilization of the land. Irrigation methods appear to be archaic, usually involving flood and crude furrow irrigation which may not allow optimum use of either the land or the irrigation water.

The Ministry of Rural Development (MRD) has placed a high priority on development of an agricultural research and extension program. The concept has been made a part of the First National Economic Development Plan. While there are reasonably good existing research facilities and some trained staff, there is limited research capability at present. Support for construction of additional research buildings, equipment, staffing and more operational support have developed at the Center for Agrarian Studies located at São Jorge. The Center presumably will be developed into an Institute of Agrarian Studies in future years.

Many nations and international organizations have assisted Cape Verde in the agricultural sector and several are currently making bilateral inputs into agricultural research. At São Jorge USAID has contributed to its construction project through PL 484 program; the Federal Republic of Germany to biological and integrated insect control with research and equipment; the Government of France to a heratology laboratory building; and IAC and Brazil with equipment for the soil and water laboratories. Switzerland has an ongoing project in vegetable crop improvement in selected areas of Santiago. An agroecological unit (AGREEMET) has been established in the Cape Verde ecosystem in relation to the Sahel Regional

Crop Protection program. While not directly linked to development of the agricultural research center, USAID has been concerned with direct assistance in soil conservation and watershed management in four major valleys on Santiago Island and currently plans for a further extension of this work. The USAID-Tarrafal Water Resources project has also completed exploratory drilling for increased irrigation capability.

While most agricultural development work is concentrated on Santiago Island, the French have conducted ground water surveys throughout the archipelago beginning in 1974 (BURGEAP, 1974), and a master plan is projected for the island of São Nicolau. The Federal Republic of Germany has developed the Mt. Genebra Irrigation Cooperative on Fogo, as well as an integrated Food Security Project. On Maio, hydrology and reforestation projects have been underway since 1977-1978. Dutch assistance has been provided in agricultural development on Santo Antão. Multilateral assistance has been provided by UNDP and other UN organizations in various agricultural areas.

Agricultural research in Cape Verde has developed in a very dispersed and random fashion, depending upon the specific interests and inputs of donors. Unfortunately, because of a lack of coordination and institutional linkages, much of the effort and benefits may not be fully realized. The systematic collection of information, dissemination to user groups, the training of nationals to provide continuity to the work and build for future progress lacks a clear strategy. Since agricultural research has not been developed, information for extension use of the farming population is not currently available. When these deficiencies are rectified, the agricultural extension service will be indispensable.

3. TESTING OF CRITERIA IN ANALYSIS OF THE PROPOSAL

The five criteria set forth in the Introduction are taken up in the four following sub-sections, and Section 4.

A. The Need For and Potential Benefits of an Agricultural Research and Extension Program in Cape Verde

There exists general consensus that irrigated agriculture is one of the most crucial sectors of the GOCV's economy. Rainfed farming, however, usually contributes towards the subsistence of the farm household. There is also consensus that the development of

agricultural research and extension skills, institutional capabilities, and entrepreneurial abilities loom large as pre-requisites to agricultural development. Successful institutional development depends upon a number of factors and the GOCV, in its development plan, has programmatically provided for this eventuality.

Eng. Horácio Soares, MRD Direcção-Geral de Conservação e Aproveitamento dos Recursos Naturais, has made it plain that São Jorge dos Orgãos, in Santiago Island, will be the site of a new Instituto de Estudos Agrários and will utilize the facilities which have been developed to date. Plans exist for an expansion of these facilities to include additional offices, housing, staff support, teaching and administrative facilities. The MRD indicates that in addition to São Jorge, satellite research will be carried on elsewhere in Santiago and at Fogo, Santo Antão and São Nicolau islands. Currently remodelling of some old classroom buildings is proceeding which will provide for an intermediate school for training for about 60 agricultural technicians per year selected from the different islands of Cape Verde. Currently 21 staff members are appointed to the São Jorge facility; only a few of which have university degrees and without as yet a real program for research or implementation. Five departments are projected for the Agricultural Research Institute to include: (1) Natural Resources; (2) Agriculture; (3) Agro-climatology and Hydrology; (4) Agro-economics and Sociology; and (5) Livestock. Laboratories have been built and equipped for soil-plant-water relationships, soil conservation, plant protection, plant physiology and food quality-pesticide residue research.

The GOCV has made a significant commitment to the establishment of an Institute of Agrarian Studies and has provided land, facilities, equipment, staff and staff salaries for the program. Given its limited financial resources and the lack of an adequately trained research staff, the Institute will require a wide range of technical supports and a reasonably long time-frame to make it a viable and functioning research organization.

B. The Existing National Institutions in Agriculture, Supporting Infrastructure, and Organizational Mechanisms Underlying a Co-ordinated Research Program

The GOCV is organized into three principal branches: legislative, executive and judicial. The executive branch

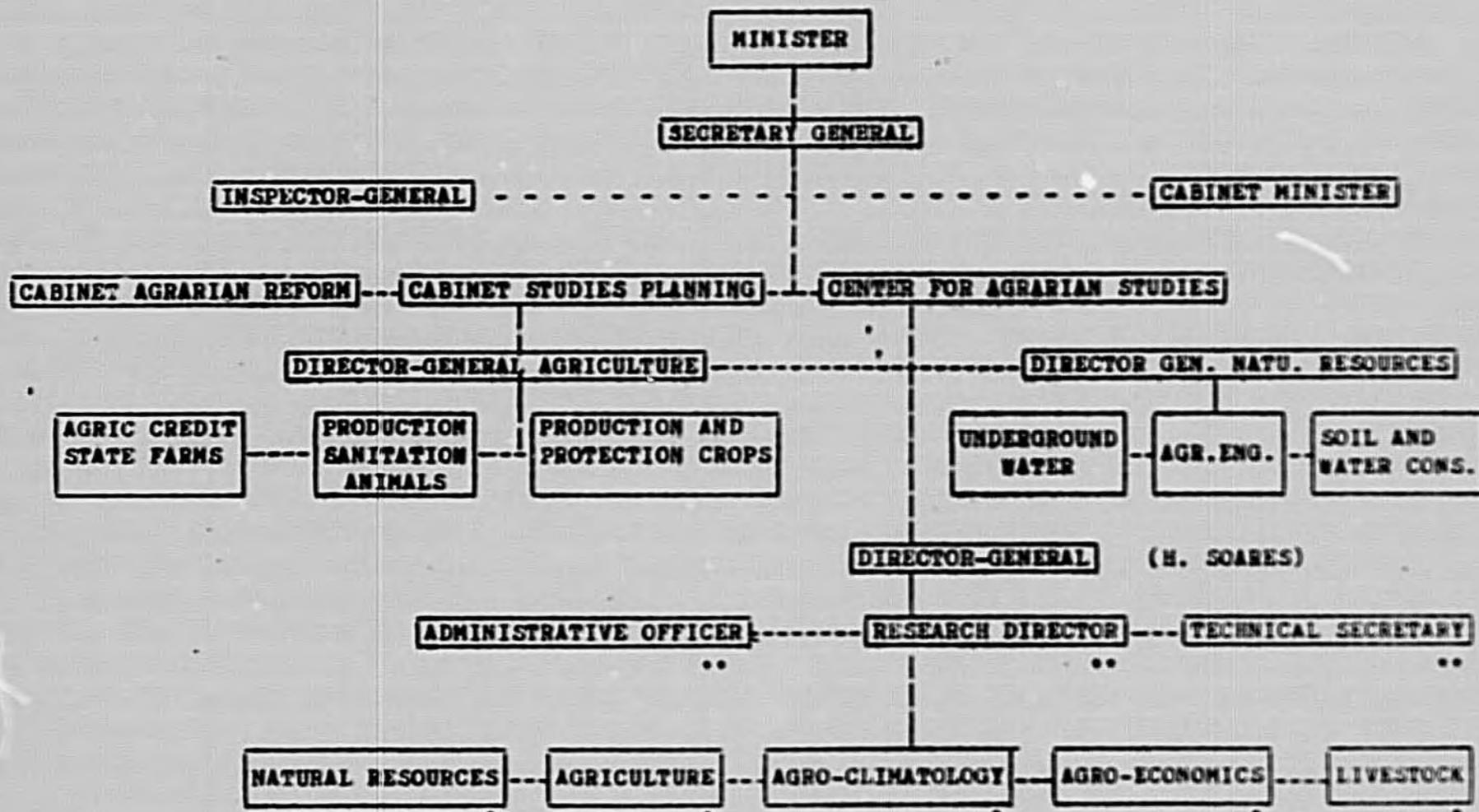
is headed by a Prime Minister, with ten Ministries organized on a functional basis. The Ministry of Rural Development has responsibility for Agrarian Reform, Studies and Planning and the Center for Agrarian Studies. The Center for Agrarian Studies is in the developmental and implementation stages but according to the Director-General designate, Mr. Horacio Soares, the Center will be made into an Institute, with responsibilities for agricultural research and agrarian development. The organization relationship of the Institute to other GOCV functions is shown in this Annex. The agricultural extension service is not located within the Center of Agrarian Studies but, rather, under the Director-General for Agriculture.

In developing countries such as Cape Verde, efficient use of limited economic resources and trained people calls for establishment of a strong central agricultural research facility with strong and direct institutional linkages. Since the GOCV is relatively new, the organizational framework of the agricultural and extension service has not been clearly defined. According to Eng. Horacio Soares, the direction of development is along lines shown in Figure Fl-1. It would be desirable, notwithstanding other possible constraints, to encourage the combination of agricultural research and extension into the functional organization, probably the Institute for Agrarian Studies.

C. Availability of Persons Trained in Appropriate Research Management, Scientific and Technical Skills and in Self-Sustaining Mechanisms that Develop Future Human Resource Capabilities

By virtue of history and colonial links prior to 1975, Cape Verde has had no opportunity to train in-country people beyond the secondary level. Post-secondary education is available only abroad, most students preferring Portugal for language and cultural reasons. Cape Verdeans studying the sciences and agriculture are relatively few. Among the existing 21 staff and technicians (Table Fl-2) at the Center for Agrarian Studies only 6 have university degrees at the Engenheiro Tecnico Agronomo level. This level of training is not sufficient for conducting and assisting professional agricultural research. If institutional development is to continue and their capabilities be increased in developing agricultural research, it must be anticipated that education and training support be derived from external sources. The skills of current employees must be upgraded, positive goals and direction of research must be developed, and an attitude of research and enthusiasm for discovery must be generated within the Institute. At this phase of development a highly sophisticated research institution is not realistic, but a more pragmatic institution with carefully selected goals, capable of introducing new crop varieties, of increasing food crop production capabilities, of managing scarce resources better (especially human, soil and water) is more likely to be relevant. Training programs must clearly focus on the personnel, their functions, administrative direction and the changing agricultural needs of the country.

Figure F1-1 ORGANIZATION CHART OF THE MINISTRY OF RURAL DEVELOPMENT - (GOCV, 1982)



•• Not filled
 • Not implemented

T A B L E F1-2

EXISTING TECHNICIANS AND THEIR LEVELS OF TRAINING

Name	Sector of work	Diploma	Observ.
Luis Alves	Agroclimatology	University degree	
Rui Silva	Hydrology	Technician	a) b)
Daniel Agapito	Equipment maintenance	Technician	a)
Cipriano Tavares	Agroclimatology	"	a)
Magda Tavares	"	"	a)
José Levy	Agronomy	University degree	
Helder Lopes	Food Engineering	"	
João Rosário	Agriculture	Technician	c)
Amadeu Silva	Agriculture	Technician	c)
Manuela Santos	"	"	d) c)
Helena Delgado	"	"	d) c)
Marin José Pereira	Laboratory	"	d) c)
Eulécia	Crop Protection	University degree	
Carlos Soares de Carvalho	Agriculture	Technician	c)
Costa Rosa	Agriculture	"	
Albino Brito	Laboratory	Practical training	
Madalena Macedo	Administration	University degree in Humanities	
Carlos Coutinho	Electronics	College degree	
Francisco Macarenhas	Surveying	Intensive Course	
Carlos Brito	Tracing	Practical Training	
Félicien de Barros	Hydrology	University degree	

- a) Training from ANÍMIO GARCIA - Grammar School - 2 years (Training + dissertation)
- b) Prepared for a 10-year post-graduate training in France (Specialized High School)
- c) Grammar School - 2 years training
- d) 12 months of practical training in Lisbon. In 1951 and later in 1952

D. Potential Local Capacity and Time-Frame to Assure Broad-Based Success and Secure Programs of Research for National Agricultural Development

Empirical evidence exists that the problems of agricultural research, including food production, have not been adequately addressed by the newly independent GOCV. The previous colonial interests developed only a limited agricultural research capability that was primarily designed to benefit large land-owners. Such agricultural research competence, as there was, left when the country was granted independence. Because of limited resources the newly organized government has not been able to make an adequate investment in agricultural research to meet the needs of farmers - who would be the major benefactors of the results of research. Within the research resource limits of the GOCV, mandates have been given and should be given to a focus on training. Ultimately research can be undertaken in a narrow range of variables, such as crop production, and cultural practices which should be beneficial to irrigated agriculture. Careful consideration must be made of the mandates of the new research institute, linkages among researchers and implementing agencies, their professional and practical credibility, efficiency and accountability of the research process and the selection of constraints and evaluation criteria.

Scientists and technicians are in critically short supply and will be needed to develop a viable base for increased agricultural production. The lack of trained personnel will not be quickly overcome. The development of an agricultural research institute in Cape Verde will require inputs over a long time-frame, certainly no less than 10 to 15 years. It is necessary to first build a scientific organization that will have the necessary technical and management skills to make continuing inputs into agricultural development. Agricultural research will hopefully then continue as a systematic process involving activities without foreseeable end, since it is not possible to know everything and because agricultural problems are always changing.

It is questionable whether meaningful progress in Cape Verde in agricultural research can be measured until after 10 or more years considering the social, economic, political and developmental growth of the country. Criteria useful in making an evaluation of institutional development and maturity are generally inadequate in terms such as buildings, laboratory equipment, trained staff, etc.. General guidelines can be established to measure progress such as 1/ administrative capability, 2/ utilization of physical facilities, 3/ research programs and their relevance to Cape Verdean problems, 4/ published results and extendable research information and 5/ ultimately, but certainly not within the LOP of this project, an evaluation of institutional impact on agricultural production.

4. RECOMMENDATIONS FOR PROJECT IMPLEMENTATION

This project should:

A. Provide assistance to the GOCV to establish an Institute of Agrarian Studies, within the Ministry of Rural Development. Efficient use of limited resources calls for the establishment of

a strong central research organization which can develop with national needs and that has the capability of servicing the entire archipelago. The Institute should be organized as a center from which scientists in various disciplines can work together as a team, with a number of regional stations to study the wide differences in climate, soils, water and food crops that effect crop production. Emphasis must be placed on a team approach to planning and conducting research, based on the model of Farming Systems Research, to avoid duplication of effort, to clearly define needed research and to facilitate answers to complex problems using various scientific skills. The organization must have sufficient direction, budget, staff and supporting facilities to work effectively.

B. Provide USAID technical assistance in the form of an experienced agricultural advisor to help develop an adequate administrative and organization structure to meet the immediate and long-term needs of the nation. Technical assistance will be needed in establishing and strengthening the linkages between agricultural research, dissemination of information through an extension service to the farming population and for coordination of national and international agricultural research endeavors. One senior technical assistance officer should spend an appropriate period of time to develop, in liason with the Ministry of Rural Development, this national agricultural research center and to provide such organizational services as may be required by the Ministry of Rural Development.

C. The Director-apparent of the Institute of Agrarian Studies should be allowed to spend an appropriate period of time abroad under USAID auspices visiting possible Title XII host institutions in the United States to discuss experiment station organization, administration, implementation of programs for agricultural research and linkages with a national extension service. The Director-apparent should also visit other selected institutions for a comparison of administrative types and implementing styles of agricultural research and extension. Appropriate centers where institutional linkages can be established for training purposes, exchange of agricultural resource materials and participation in regional research should be included, such as USDA, ARS, Beltsville, Maryland, land-grant Universities and Experiment Stations and international centers such as CYMMIT, CIAT, ICRISAT and IITA (Table F1-3).

D. Technical assistance in the form of two senior agricultural scientists, one in soils science and one in crops science, familiar with research planning, implementation and assignment of research priorities, with sensitivity of Cape Verdian agricultural research who will each serve three years with an overlap of two years when both are there. This assistance should help develop staffing plans, establish research priorities, develop research programs at appropriate locations, provide for functional direction in using and developing the research capabilities of existing research staff and those returning from graduate training in specific disciplines.

E. Research priority should be given to developing the full productive capability of irrigated and rainfed agriculture in Cape Verde. Irrigated lands, though relatively limited in area, are the more

T A B L E F1-3RELEVANT INTERNATIONAL INSTITUTES WITH
TRAINING & LINEAGE POSSIBILITIES

1. **CIMMYT - Centro Internacional de Mejoramiento de Maiz y Trigo - Mexico City, D.C. Mexico**

The basic structure of the Center concerns the improvement of corn, wheat, triticale and barley. Research is concentrated on research with short-term application, rather than basic research; it provides close collaboration among biological, social and economic scientists and focuses on technology involving their crops of specialization.

2. **ICRISAT - International Crops Research Institute for the Semi-arid Tropics -- Hyderabad, India**

The Institute is primarily concerned with developing technologies for improving land and water use systems to raise the economic status and quality of life of people in the semi-arid tropics. Crop improvement programs deal primarily with peanuts, pulses, millet and sorghum. Research, training, international cooperation and extension programs are emphasized.

3. **IITA - International Institute of Tropical Agriculture Ibadan, Nigeria**

Prime responsibility has been assumed for development of crop management and land use suited to agricultural production in the humid and sub-tropical zones of the world. Crop improvement programs are maintained primarily for cereal crops, root and tuber crops and grain legumes. Interrelations are considered between food and potential crops and livestock production.

4. **CIAT - Centro Internacional de Agricultura Tropical Cali, Colombia**

This research organization has been organized around selected crop commodities, particularly cassava, beans and improved pasture for pasturage in tropical areas of Latin America, with secondary programs in cooperation with other international centers, especially CIMMYT and IITA for maize and rice. The research focus is on developing suitable technologies to bring new lands into production and increase yields per unit area.

ADDITIONAL INSTITUTIONS

1. **CATIE - Centro Agronomico Tropical de Investigacion y Experimentacion Turrialba, Costa Rica**

Efforts are primarily concerned with production systems on small farms in interactions of crops cultivated in monocultures, poly-cultures or both. Training programs are offered in farming systems, research concepts and methodologies.

2. ICTA - Instituto de Ciencia y Tecnologia Agricolas,
Guatemala, C.A.

An autonomous regional agency designed to develop agricultural research for the "traditional farmer" and testing technologies for small farmers.

3. ISRA - Institut Senegalais de la Recherche Agricole
Dakar, Senegal

Primary goal is land improvement to intensify agricultural production, traditional studies of plants, soils and various technical factors in crop production.

stable source of food production in Cape Verde and have been identified in the National Development Plan as having the greatest potential impact in the agricultural sector. Rainfed cropping, though, is the most widespread land use system and will receive attention by the Institute. Emphasis should be placed on increasing crop production, orderly marketing and distribution of the major field crops, vegetables and fruit crops that are adapted to Cape Verde. Effort is required to both utilize irrigated land and the limited water resources for their maximum productivity. Applied research should be the major effort of the initial agricultural research program. It means taking established principles and promising theories and developing these into techniques that can be fitted to programs of food crop production in Cape Verde.

This does not imply a lack of interest in basic research, or non-participation in research, since ultimately research turns up new theories and ideas and modifies old ones. Soundly designed applied research, properly executed, usually produces other useful ideas for both applied and basic research. Research in developing countries must emphasize appropriate technology with agro-economic orientation.

Research is a systematic process which can succeed only if it is carefully administered and conducted. Taking into account the limited economic and man-power capability of the GCM, it is recommended that the initial research effort be made to staff an irrigated and rainfed agriculture-crop production team, with responsibilities to:

- 1/ Develop new crops for Cape Verde by introduction, selection and hybridization;
- 2/ Develop appropriate improved cultural practices for field, vegetable and fruit crops;
- 3/ Evaluate land-water use patterns and design systems for their most efficient use;
- 4/ Examine the benefits of more completely coordinated and integrated farming systems;
- 5/ Examine various constraints to agricultural production and develop potential measures;
- 6/ Examine crop production increase in terms of market demands, distribution, utilization and economic returns.

The above recommendations are strictly supportive of the wide specific agricultural research objectives presented to ICAR by the Director General of the Institute of Agrarian Studies which are shown in Table F1-4.

TABLE FI-4

5 Year Agricultural Research Program

Research Area	Research Method	Proposed Use of Research Results
Soil Conservation	Test empirical formulas used for calculating dimensions of conservation structures	To level or through a larger than coefficients appropriate for Cape Verde
	Test soil structure stability according to intensity of rainfall on areas with differing topographic features.	To orient agricultural activity to the topography for optimal results.
	Study the general pattern of hydric balance.	To make reliable estimates of water availability.
Soil-Plant-Water Relationship	Determine irrigation needs according to soil type, climate and specific crop.	To determine water requirements and lay out annual irrigation schedule.
	Study the balance of salts in the soil	To identify toxicity levels and effective ways of dealing with them
	Attempt to identify from many alternatives the optimal irrigation system for Cape Verdean conditions.	To enable the GOV and farmers to make sound decisions on irrigation systems to be used.
	Research on fertilizer trials relative to soil type	To orient farmers on fertilizer use.

Research Area	Research Method	Proposed Use of Research Results
Plant Varieties	Conduct trials for introducing cultures from outside Cape Verde	To provide farmers with more productive varieties.
	Study time of planting and rotation practices (current farming systems)	To modify traditional cycles for better service of the market through out the year, utilizing seasonal varieties.
Crop Protection	Conduct research on pests and diseases in relation to plant varieties	To select least harmful methods of control and most resistant varieties.
Hydrology	Make runoff measurements and estimate runoff coefficients under different topographic conditions and surface treatments	To orient soil conservation and well-drilling programs.
AgroClimatology	Collect weather data	To be able to make reliable forecasts.
	Study rates of evapo-transpiration and climatic influence on crops	To guide irrigation, crop production, and crop protection activities.
Animal Pathology	Study the pathology of small ruminants, chickens and pigs.	To develop better strain of livestock.

Research Area	Research Method	Proposed Use of Research Results
Sociology	Survey folk practices	To determine baseline conditions, and then measure subsequent impacts.
	Survey emigration	To measure impact on rural conditions.
	Survey land tenure	To guide agrarian reform.
Agro-Economics	Determine production costs for various crops using a variety of methods.	To guide farmer decision-making.
	Study the market situation on each island, and inter-relationship	To improve supply, develop road transportation, stabilize prices, increase consumption and improve nutrition.
	Study processing and export potential for certain crops	To provide outlets and incentives for increased farmer production.

F. Successful institutional development will depend upon persons trained in appropriate technical and management skills. It will also require an institutional ability in making training a self-sustaining mechanism so that skill improvement, itself, becomes an institutional process.

The following research personnel should be trained and then assembled to form minimum staffing to meet the requirements for food production research on irrigated lands.

1/ SENIOR CROP SCIENTIST, trained at the Ph.D level to assume administrative direction for conduct of crop production research. Training could be in plant breeding, crop physiology or crop protection.

2/ SENIOR SOIL SCIENTIST, trained at the Ph.D level to assume administrative direction for and conduct of soil/water related crop research. Training could be in soil fertility, soil physics, or water science.

3/ IRRIGATION ENGINEER, trained at the M.S. level for conduct of research, both field and laboratory, in food crop irrigation efficiencies in arid climates.

4/ RESEARCH OLEOCULTURIST (Vegetable crops), trained at the M.S. level for conduct of research, both field and laboratory, on the principles and practices of vegetable crop production.

5/ RESEARCH HORTICULTURIST (Tropical fruit crops), trained at the M.S. level for conduct of research, both field and laboratory, on the principles and practices of tropical fruit production.

6/ RESEARCH ENTOMOLOGIST (Insect control) - This position is to be filled by a person trained at the M.S. level, who will become part of the food production research team.

7/ RESEARCH CROP IMPROVEMENT SPECIALIST, trained at the M.S. level for crop improvement responsibilities dealing with crop introductions and plant and genetic diversity of crops.

8/ RESEARCH AGRICULTURAL/ECONOMIST-ANTHROPOLOGIST, trained at Master level to research socio-economic agricultural aspects of crop production, distribution, farming systems and related marketing distribution considerations.

9/ EXPERIMENT STATION-BUSINESS ADMINISTRATOR, trained at the MBA level to manage the financial purchasing, personnel, inventory staffing, etc., needs of the Institute. This person is to work directly under the direction of the Director and Deputy Director. Several factors must be considered in developing staffing and research strategies. The most important appear to be: a/ the agricultural sector itself which would benefit the nation most, during the initial development of research; b/ the critical mass level of staff for operations; c/ the success in satisfying the exigencies of the development timetable, as well as long-term staying capacity; d/ the use of resources appropriate to the GOVY input; and e/ the

development of a truly indigenous institution.

G. During the developmental stages of the Institute of Agrarian Studies, technical assistance will be required to help young and inexperienced scientists to properly identify researchable problems, determine appropriate experimental methods, apply these to problems of food production, and assess results. It is recommended that 3 man-months of technical assistance be provided based on the needs which develop. These could include the following:

- Soil/plant/water specialist
- Irrigation specialist
- Farming practices specialist
- Agronomic specialist - field crops
- Vegetable crop specialist
- Tropical fruit crop specialist
- Crop pest control specialist
- Library-documentation specialist
- Experimental design and interpretation specialist
- Multiple cropping specialist
- Economic/anthropologist specialist
- Farming systems analyst

The Institute of Agrarian Studies should establish national and international linkages with local, regional and international organizations in order to accumulate and use agricultural technology developed elsewhere (Table F1-3). The Institute should also establish early contact with international sources of new germ plasm to replace obsolete varieties (Table F1-5).

In a policy paper on institutional development (USAID-Washington), J.K. Bolton has aptly stated that "technology transfer and technology generation is accomplished most effectively by those countries which have a scientific establishment capable of developing, evaluating, or adapting knowledge to local conditions. Therefore, the establishment of regional and host country institutions which have the capacity to tap into the world knowledge supply, and contribute to it most, have a high priority in AID's strategy".

H. Since the proposed Institute of Agrarian Studies is designated for development at the São Jorge facility, it will be necessary to assess local requirements for the following:

- 1/ Staff offices and laboratories
- 2/ Staff housing
- 3/ Staff library and documentation center
- 4/ Equipment for field and laboratory research
- 5/ Housing of research equipment and supplies for off-station research
- 6/ Vehicles for travel to research plots and transport of labor and supplies
- 7/ expendable research materials, such as seed, fertilizer, insecticides, paper, laboratory supplies and chemicals
- 8/ Communications equipment

TABLE F1-5SOME SOURCES OF NEW GERMLASM FOR USE IN CAPE VERDE

<u>CENTER AND LOCATION</u>	<u>CROPS AVAILABLE</u>
International Crops Research Institute for the Semiarid Tropics (ICRISAT)	Sorghum, peanuts, millet chickpeas, pigeonpeas
Centro Internacional de Mejoramiento de Maize, Trigo (CIMMYT) El Batan, Mexico	Corn, wheat
Centro Internacional de Agricultura Tropical (CIAT) Cali, Colombia	Cassava, beans
International Institute of Tropical Agriculture (IITA) Ibadan, Nigeria	Cowpeas, yams, tubers, pigeonpeas
Colegio de Postgraduados (INIA) Chapingo, Mexico	Beans, peppers
Waite Agricultural Research Institute Adelaide, Australia	Barley
Centro Internacional de la Papa (CIP) Lima, Peru	Potatoes, amaranth
International Center for Agricultural Research in Dry Areas (ICARDA) Lebanon & Aleppo, Syria	Fava bean, chickpea, wheat
Asian Vegetable Research Center (AVRDC) Tainan, Taiwan, P.O.C	Tomato, cabbage, beans, mung beans
Land Grant Colleges in the United States of America:	
- Agricultural Research Center PGCI, Beltsville, MD with collaborators in all regions	Temperate - semi-tropical Field crops Vegetable crops
- Federal Experiment - USDA, MAYAGUEZ, P.R. Station	Horticultural Materials
- Agricultural Experiment Stations (dry land areas)	
California	Yunnan
Arizona	Oklahoma
Utah	Missouri
New Mexico	Others in USA drained
Colorado	areas

Agricultural research should not be confined to São Jorge, but conducted in ecosystems comparable to the major irrigated agricultural areas of Cape Verde. On the island of Santiago, in addition to São Jorge, irrigated crops research could be conducted on private or State-owned farms at Santa Cruz, São Domingos, Santa Catarina, Tarrafal and other locations. Plans must be established for research and research coordination on other major agricultural islands of the archipelago. Off-station research must be programmed within the organizational framework of the Institute.

I. During the formative years of the Institute, when the technical research will be started with currently available Institute personnel with minimal training, it may be desirable to send selected people to International or Regional Centers for practical training. Provisions should be made to allow specific training to be obtained to increase the immediate and long-term technical capabilities of the Institute. A minimum of six training fellowships should be established to provide short-term training at specific training centers such as CIAT, ICRISAT, ITTA, etc. for time periods up to 6 months.

J. A systematic program for the preparation, collection, and distribution of annual reports and for the publication of research information should be established. Annual reports of research should be collected and the information disseminated to interested persons, agencies and other institutional linkages. An annual research conference should also be held, with presented and published technical papers, to provide research information, which should be of public record, and provide an outlet for demonstrating professional skills and accomplishments.

K. A national seed and plant materials delivery system should be established where the merchandising of improved varieties of field, vegetable and fruit crops can be obtained. Initially the acquisition and merchandising of seed may be done by the GOCV, but ultimately this function should be taken over by private growers who collect and supervise the production of seed stocks and maintain the genetic purity of new crop varieties.

5. LIBRARY AND DOCUMENTATION CENTER FOR SÃO JORGE

A reference library containing appropriate journals, reference books, annual reports and documents is essential for the proper function of a research center. Obviously scientists should be aware of the state-of-the-art of the science in which they work and appropriately have access to apply and improve upon this information pool with application to their discipline.

The Center for Agrarian Studies does not currently have a library and documentation center. The building being constructed by PFD Title II funds will house the future library, and documentation center. So the library will be started with the aim of building a unit sufficient to serve the needs of administrators, scientists and trainees. Library collections are expensive and often difficult to obtain, but efforts should be made to obtain such a

collection. A number of US Land Grant Institutions have collections of journals, books, documents, etc. which they are anxious to donate to worthy institutions. Often these collections can be acquired by sending a formal request with provisions made for shipping charges.

A qualified person should make an inventory of the materials in the library of the Ministry of Rural Development to determine what is available for housing at São Jorge and to prepare a list of required journals. Modern books for reference purposes should also be purchased to meet the immediate needs of researchers.

It is recommended that USAID funds be made available for the establishment of an agricultural library at São Jorge and whatever modest equipment as might be essential to a functioning reference and documentation center. International institutions should be contacted to obtain appropriate annual reports and training materials.

6. PROCUREMENT

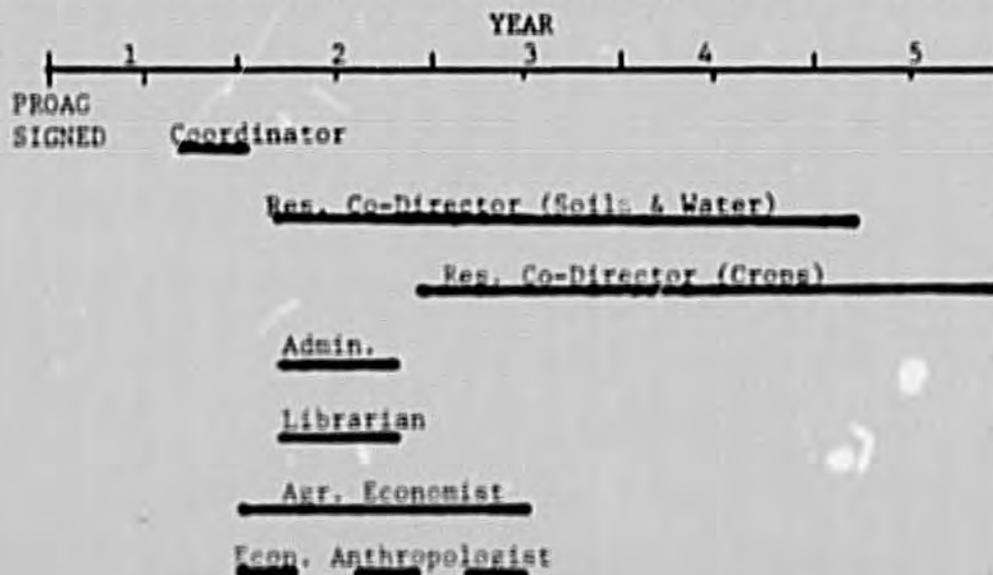
It is not appropriate to list items for procurement in this paper, because this is the technician's job who will be both giving and receiving technical assistance. Nevertheless, an illustrative procurement list is provided in Table F1-6.

7. JOB DESCRIPTIONS OF PROPOSED TECHNICAL ADVISORS

The jobs of the five proposed technical advisors are described on the following pages and a general description of short-term assignments is presented.

- A. Counterpart to Director-General
- B. Counterparts to Deputy Director (Research Co-Directors)
- C. Counterpart in Economic Anthropology
- D. Counterpart in Agricultural Economics
- E. Counterpart in Business Administration
- F. Library Information Specialist
- G. Short Term Technical Assistance Specialists

The bar chart below shows the planned arrival and departure times for the technical assistance personnel during the period of the project.



T A B L E F1-6EQUIPMENT/ITEMS FOR IMMEDIATE PURCHASE

(Partial List for Illustrative Purposes)

- 2 Battery operated pH meters (portable)
 - 2 Soil augers, A screw type and open-face
 - 1 Ball mill for grinding plant materials
 - 1 (Unit of 12) Macro-Kjeldahl digestion unit, 220 volts
 - 1 (Unit of 12) Macro-Kjeldahl distillation unit, 220 volts
 - 1 Centrifuge for determining soil moisture equivalents
 - 1 Set hydrometers for soil texture measurements
 - 1 Box of de-ionizer cartridges and support rack
 - 24 Macro Kjeldahl flasks
 - 1 Reciprocal shaker, variable speed
 - 3 Milk scales with capacity about 20 kg
 - 1 Platform balance about 100 kg capacity, shovels, hoes, shears, buckets
 - 2 Portable scale (10 kg capacity - 1 gram sensitivity)
- Expendable supplies: fertilizers, base, plastic, lab chemicals

A. COUNTERPART TO DIRECTOR-GENERALDESCRIPTION

Person from upper level administration of a U.S. Land Grant University with experience in agricultural experiment station organization and research implementation. Should be fluent in Portuguese, French acceptable as alternative.

TASKS

- 1) To help conceptualize an effective agricultural research organization tailored to country needs.
- 2) To assist in developing linkages with regional and international organizations.
- 3) To assist in developing feed-back mechanisms between the agricultural research center and organizations within the national government.
- 4) To assist in establishing the essential support facilities for agricultural research.
- 5) To assist in formulating research priorities, their implementation, staffing and personnel needs.

TIME FRAME

Position funding allows for three person-months, probably to be used for periodic visits, with consultations and organizational meetings. Additional time will be available for follow-up visits to consolidate planning and for program implementation.

B. TWO CO-DIRECTOR COUNTERPARTS TO DEPUTY DIRECTOR RESEARCH

DESCRIPTION

Two Co-Directors will counterpart the Deputy Research Director of the Institute. One will be an Agronomist (Soil/Water Science) and one will be an Agronomist (Crops Science). These persons will be experienced in agriculture research in their respective fields. They will assist the Deputy Director in developing a Crops Research Capability identified with the needs and capabilities of the country. These persons must be fluent in Portuguese and a knowledge of French would be an added asset. These persons should hold a Ph.D. or equivalent.

TASKS

Within their respective fields, the Co-Directors will:

- 1) Assist the Deputy Director in developing and initiating a national applied agricultural research plan. The plan will be based on a review of all past and current activities of the Institute and analysis of its needs.
- 2) Identify priority research programs for economic food crop production and develop research programs.
- 3) Plan and supervise the research activities of the long-term trainees. These activities should be aimed towards the principal aspects of the Institute's research program.
- 4) Direct and train Institute personnel in their professional roles and assist in the selection and training (or selection of training centers) for the Institute personnel.
- 5) Assist in developing the functional parts of the research station - facilities, staff, laboratories and library.
- 6) Work with the Agricultural Economist and Economic Anthropologist on designing and conducting a Rural Economy Survey.
- 7) Assist in the assessment of research and development of a research reporting system.
- 8) Initiate pilot research activities.

TIME FRAME

Position funding allows for a total of 72 person-months, or 36 months for each position. Two R&Rs are included for each 36 person-months of duty. The first counterpart, Agronomist (Soils/Water Science), will arrive at the beginning of the second year of the project and remain through the fourth year of the project. The second counterpart, Agronomist (Crops Science), will arrive at the end of the second year and remain until the project completion date.

C. COUNTERPART IN ECONOMIC ANTHROPOLOGY

DESCRIPTION

The economic anthropologist will have a Ph.D. in economic anthropology with at least 3 years of field experience in Economic Anthropology/Farming Systems Research, specifically in the use of ethnographic, qualitative and quantitative analysis of rural socio-economic systems. Additional training in agricultural and economic systems will be preferred. The person must have a S-3, R-3 in Portuguese. Housing will be provided at São Jorge. A vehicle will be assigned during periods of work in Cape Verde.

TASKS

1) In collaboration with the agricultural economist and under the general supervision of the Research Co-Directors, he/she will design, pre-test and assist in the supervision of the use of the Rural Economy Survey Instrument. The survey scope is primarily described on page F1-17, Tasks, section 1. In addition to that information, the economic anthropologist will provide advice on collecting information on: a) household demography and nutritional status; b) local knowledge of soils, plant varieties, plant diseases, water sources and use, and animal production; c) household division of crops, labor and participation in non-agricultural/livestock production activities (marketing, crafts); and d) emigration in relation to its character, duration and returns. Analysis of the data will be carried out with the agricultural economist.

2) He/she will assist, when in Cape Verde, the agricultural economist in the selection, training and supervision of enumerators. He/she will also assist in field coding of data.

3) He/she will provide assistance in formulation of Institute research plans and in training personnel in the agro-economics/sociology unit, but will almost exclusively be involved in the work of the Rural Economy Survey.

TIME FRAME

He/she will work for three months concurrent with the first three months of the Agricultural Economist. He/she will return for four months during the period of survey data collection, and again for three months concurrent with the last three months of the agricultural economist.

D. COUNTERPART IN AGRICULTURAL ECONOMICS

DESCRIPTION

The agricultural economist will have a Ph.D. in Agricultural Economics with at least three years of field experience in Rural Economic/Farming Systems Research, specifically in the use of informal survey and cost-route or repetitive data collection methodology, and additional training in agricultural sciences and behavioral science. The person must have a S-3, R-3 in Portuguese. If no one is available at the Ph.D. level, a person at the A.B.D. level with all the other above qualifications will be acceptable. Housing will be provided at São Jorge. A vehicle will be assigned to him/her for the duration of survey work.

TASKS

1) In collaboration with the economic anthropologist and Institute staff, and under the general supervision of the Research Co-Directors, he/she will design, pre-test and supervise the use of a rural economy survey instrument. The survey will examine: agricultural and livestock production (inputs, outputs, costs, labor division and allocation (seasonality, intensity, different crops within household), consumption of produced and purchased goods, marketing (prices, division of products for sale by household members), land tenure, income distribution, and non-agricultural and livestock production economic activities, especially emigration (nature of them, labor allocation and division, returns)). The survey should probably use the cost-route method of repetitive data collection of a representative sample of farm households stratified by at least ecological setting, income and islands. Analysis of the data will also be done by the agricultural economist and economic anthropologist. The survey will be designed in order to provide the shortest possible turn-around time for analysis. Hopefully, preliminary results will be available for Institute research within six months of the termination of data collection.

2) He/she will have primary responsibility in enumerator selection, training and supervision. Field coding of data to prepare it for analysis will also be his/her responsibility.

3) He/she will be in constant contact with the Institute and other T.A. team personnel to provide insights from on-going survey work. However, only when needs of survey work have been covered, will he/she be available for research in other areas. The only exception to this will be an analysis to be performed, by the end of the sixteenth month of the contract, of national policies concerning agricultural production including pricing, inputs, credits, subsidies, marketing and infrastructure. Even this analysis will be secondary to work on the Rural Economy Survey.

4) Assist in the training of the agro-economics/sociology unit of the

Institute by involving them at all stages of survey work, particularly in field methods and analysis techniques.

TIME FRAME

No less than 18 months, beginning at the same time as the first research co-director and the first period of the economic anthropologist's work. The study will include all major islands.

E. COUNTERPART IN BUSINESS ADMINISTRATION

DESCRIPTION

This person should be experienced business manager familiar with the special budgetary procedures of agricultural research institution in non-US setting. This person should be fluent in Portuguese.

TASKS

- 1) To examine current book-keeping procedures at the CAS.
- 2) To examine how the CAS manages donor inputs.
- 3) To devise an efficient, and easily audited, system of record-keeping for materials, construction, office equipment and supplying grants and fellowships, library orders and maintenance of grounds.
- 4) To devise a system for receiving, handling and responding to researcher's request for various types of national needs (i.e. establish a hierarchy of response depending on the urgency of the request).
- 5) To establish regular communication with the Director and division heads in order to make the administrative organization sensitive to the needs of researchers.

TIME FRAME

The magnitude of this task requires not less than 6 person-months. Ideally this individual could come in early (Jan. 1984) to work with the Technical Assistant to the Research Director for 3 months and then return for an additional 3 months when the MIA trainee returns in the 3rd year of the Project.

F. LIBRARIAN/INFORMATION SPECIALISTDESCRIPTION

Person with good academic qualification in the field of librarianship/information science and with work experience in university/college libraries preferably in the agricultural field. A good working knowledge of Portuguese and of French is needed.

TASKS

1) To identify the book stock required to complement that existing at MRD and CAS with the major text and reference books in the English language - or other language if this is felt necessary.

2) To identify the English language scientific journals needed by an agricultural research institute and arrange subscriptions to them.

3) Assist in the creation of a unified catalogue with the book and information resources divided between CAS and MRD.

TIME FRAME

Project funding allows for six person-months. Housing at São Jorge is not provided under the project as this person will probably spend a considerable proportion of his time in Praia where the MRD library currently is located.

G: SHORT TERM TECHNICAL ASSISTANCE SPECIALISTS**DESCRIPTION**

Research specialists will be needed who are familiar with the irrigated production of field, vegetable and fruit crops; strategies to increased crop production and water/land use-efficiency; introduction of improved crop varieties, improved cultural practices and multiple cropping systems; economic and social acceptance. Specialist should have had experience in dealing with technologies appropriate to LDC's. Fluency in Portuguese or French is desirable.

TASKS

1) Assignment to specific research organizational and implementation needs as identified by the research administrator.

2) Assist Research Director in developing specific plans for priority research, personnel training and implementation of research program.

Assist in execution of priority research needs in irrigated crop production; project preparation, experimental design, data collection, interpretation and reporting.

4) Technical assistance may be required in soil/plant/water relations, the culture of specific crops, irrigation-water use practices, multiple cropping, farming systems, economic-social analysis.

TIME FRAME

Three person-months of technical assistance is proposed as needs are identified by the Director of research.

8. RECOMMENDED TRAINING PLANS

(PARTICIPANTS)

PHD - SOIL SCIENCE SPECIALIZATION

(Resource Science Technical National Leader)

Specialization in soil/plant/water relations with emphasis on optimizing soil and water resources for crop production. Person trained should also develop a capability for research management and application with prospective future assignment as senior research officer dealing with natural resources. Training should be received at a reputable institution with irrigation science technology appropriate to semi-arid regions.

PHD - CROP SCIENCE

(Crop Science Technical National Leader)

Specialization in crop science with emphasis in either whole plant physiology, genetics and plant breeding or crop protection. Person trained should also develop a capability for research management and application with prospective future assignment as senior research officer dealing with crop production improvement. Training should be received at a reputable institution with specialization in semi-tropical crops, appropriate to Cape Verdean conditions.

MASTER OF SCIENCE - IRRIGATION ENGINEERING

(Investigations on irrigation engineering)

Specialization and a research degree in irrigation engineering, irrigated farming systems, and management and control of water use and related agricultural engineering technologies. The person trained should be able to conduct field and laboratory research on the above. Training should be received at an institution capable of providing practical experience in research appropriate to arid cropping conditions.

MASTER OF SCIENCE - FIELD CROP PRODUCTION

(Investigations on the field crop production with adapted crops)

Specialization and a research degree in agronomy (field crops). Person trained should be able to conduct field and laboratory research on the principles and practices of producing crops appropriate to

Cape Verdean agriculture. Training should provide the capability of organizing, conducting, collecting and analyzing production-oriented data .

MASTER OF SCIENCE - VEGETABLE CROP PRODUCTION

(Investigations on vegetable crop production with adapted crops)

Specialization and a research degree in oleoculture (vegetable crops). Person trained should be able to conduct field and laboratory research on the principles and practices of vegetable crop production appropriate to Cape Verdean agriculture. Training should provide the capability of organizing, conducting, collecting and analyzing production-oriented data .

MASTER OF SCIENCE - HORTICULTURE - TROPICAL FRUIT CROPS

(Investigations on the production of adapted fruit crops)

Specialization and a research degree in horticulture (tropical fruit crops). Person trained should be able to conduct research on the practices of crop improvement, propagation and culture of fruit crops appropriate to Cape Verdean agriculture. Training should provide the capability of organizing, conducting, collecting and analyzing production-oriented data from field and laboratory investigations .

MASTER OF SCIENCE - ENTOMOLOGY - CROP PRODUCTION

(Investigations on the insect problems and their economic control)

Specialization and a research degree in insect identification, life cycles and economic control. Person trained should be able to identify insect pests indigenous to Cape Verde and conduct research on their economic control, including considerations of integrated pest control management .

MASTER OF SCIENCE - CROP IMPROVEMENT - PLANT BREEDING - PATHOLOGY

Specialization and a research degree in plant breeding, with emphasis on disease resistance of field or vegetable crops. Person trained should be able to identify crop characteristics and constraints to high crop performance; preservation of genetic purity of crop and propagation materials. Supervise a program of acquiring, carrying for propagation, and distributing improved crop varieties .

MASTER OF SCIENCE - PLANT PATHOLOGY - CROP PROTECTION

(Investigations on plant diseases and their economic control)

Specialization and a research degree in plant pathology, development and propagation of disease-free plant materials.

Person trained should be able to deal with pathological disease problems on crops grown and those likely to be introduced into Cape Verdean agriculture. Some capability to deal with nematode identification and control would be desirable.

MASTER OF ARTS - ANTHROPOLOGY/AGRICULTURAL ECONOMICS

(Curriculum of Agricultural Economic Anthropologist)

This is a relatively recent speciality area that combines training in anthropological theory, method, ethnographic concentration, agricultural economics, farming systems, and elective coursework in areas such as soils, pastures, cropping, etc.. Among the schools where such work could be done are Arizona, Florida, Stanford, Michigan State, and Indiana.

MASTER OF BUSINESS ADMINISTRATION

(Curriculum of Public Administration)

The exact curricula vary from school to school but all of them show the fundamentals which have to be approved by NASPA (Soc. of Public Admin.). Among the basic components are: principles of management, fiscal and budgetary analysis, statistical analysis, analysis of statutory legislation, and advanced management coursework. Among the better schools in this field are: University of Texas, Indiana University, Syracuse University and Harvard University.

**9. PROPOSED DECREE FOR THE CREATION OF THE
INSTITUTE OF AGRICULTURAL RESEARCH OF CAPE VERDE**

Decree No. of

Preamble : The development of the agricultural sector of Cape Verde implies a profound knowledge of the various germane components in order to be able to plan the utilization of the land well. The fundamental elements of the planning process are the interaction of the inhabitants with their natural environment providing them with the best living conditions from a socio-economic standpoint and recovering and/or improving the general equilibrium of the ecosystem. It requires a comprehensive and profound knowledge of all elements of the ecosystem with a view to having a better understanding of the environment and exploiting its resources in a more rational manner for the welfare and social justice of the people.

These objectives may be achieved through the organization of a system of research, well-managed and capable of maintaining close relations with its counterparts in other regions of the world which are concerned with similar problems. This being the case and bearing in mind the scarcity of natural resources of the country, the problem of desertification that in recent years has tended to accelerate the existence of a system of agriculture which is rudimentary, the need to execute the aspects of food self-sufficiency contained in the general policy of the Party and the Government, the profound knowledge of rural society and rational land use, the Government considers urgent the creation of a national research entity the fundamental objectives of which are to study, create, conceive, and adapt new resources and new technologies for the sound development of the country.

Therefore, in the use of the authority conferred by item 3 of article 15 of the Law on the Political Organization of the State of 5th July, 1975 the Government decrees and promulgates the following

**Chapter I
 Nature and Functions**

Article 1. It is hereby established in São Jerge the National Institute of Agricultural Investigation of Cape Verde (INIAC) with the functions and structures indicated in this decree.

Art. 2.1. INIAC enjoys the status of a corporation under public law, protect with administrative and financial autonomy.

2. INIAC functions under the guidance of the Minister of Rural Development.

3. INIAC has as an object to promote and coordinate research in the domain within which it exercises jurisdiction, assuring the extension of its technical activity throughout the national territory in terms of this act.

Art. 4. The functions of INIAC are :

a) To contribute to the development of the practices and the sciences of the domain of interest for Rural Development.

b) To contribute to the establishment of the national policy of research in the domain related with rural development.

c) To promote in collaboration with the competent departments the scientific and technical studies necessary for resolution of problems related to rural development.

d) To promote the progressive and national technical perfection of the national services and to mobilise the respective resources with the object of resolving the problems that are relevant.

e) To study, create, consent and adapt new resources and new technologies to the realities of the country.

f) To find most appropriate solutions for the national utilization of the renewable natural resources of the country.

g) To promote the relationship of research with the extension units procuring in this way a more effective utilization of the results obtained in the areas of research and/or experimentation and Catalog of the limitations in agricultural production or in other sectors of rural development.

Art. 5. For the execution of its functions INIAC should do the following with interested government departments.

a) Carry out the agronomic baseline studies, specifically those of agricultural ecology, agricultural biology, fertility and water economy, chemistry and agricultural technology, methods of cultivation, livestock raising, and protection and/or utilization of renewable natural resources.

b) Conduct the agricultural experimentation scientifically planned, implemented and interpreted.

c) Conduct the investigation and experimentation in the sections of forestry, agriculture, livestock, and bee-keeping.

d) Study and promote the introduction of vegetable species and

their protection .

e) Promote studies of rural sociology directed towards knowledge of the socio-economic reality of the rural environment and the impact that these development projects might come to have or will have in rural areas .

f) Promote studies relative to the cost of agricultural production, markets and commercialization networks .

g) Promote the training and preparation of specialists .

h) Disseminate the studies in the fields of its activity editing publications of interest for rural development .

i) Recruit investigators and promote the preparation and train specialists .

j) Cooperate in the sphere of its functions with foreign counterpart institutions with a view toward exchange of experience, resources of personnel

Art. 69 The activity of INIAC embraces the following domains :

- a. Renewable natural resources
- b. Dry-land and irrigated agriculture
- c. Livestock raising
- d. Hydrology and Agro-climatology
- e. Agro-economics and Rural Sociology
- f. Technical scientific information, documentation and dissemination .
- g. Agricultural technology

Chapter II
Organization and component
Sections and Services

Art. 7. INIAC will include the following organizational units and services :

- a. General manager
- b. Deputy
- c. Coordinating Council
- d. Technical Council
- e. Technical Secretariat
- f. Control and Regional Technical Departments
- g. Administrative Services

Section II
As pertains to the Director-General

Art. 8. It is the responsibility of the Director-General to effectively manage INIAC and coordinate its activities and as follows :

- 1. Call and preside over meetings of the Technical Counsel.**
- 2. Resolve subjects that are within the jurisdiction of INIAC which by law do not need higher approval .**
- 3. Present to the Minister of Rural Development issues which require his approval.**
- 4. By October 31 of each year, develop and submit the budget of INIAC to the coordinating counsel for approval.**
- 5. By March 31, of the following year, develop a report of annual activities and submit it for approval to the Minister of Rural Development after first having it approved by the Coordinating Council.**
- 6. Develop management accounts of each activity and submit them for approval to the guardian agency (MDR).**
- 7. Supervise the development of the annual program of activities and development of internal bylaws .**
- 8. According to law employ temporary personnel so long as their respective positions are included in the budget .**
- 9. Propose appointments, contracts, promotions, or resignation of personnel .**
- 10. Exert disciplinary action over the personnel .**
- 11. According to the law and by laws, authorize the granting of assistance and scholarships to technicians and scientists for the purpose of increasing their specialized or general knowledge within their respective fields .**
- 12. And any other act which may be prescribed by law or delegated by superiors .**

Art. 9. The Director-General of INIAC is appointed to his post by Decree of the Council of Ministers or motion by the Minister of Rural Development, being chosen from persons of recognized competence, with a sufficient level of higher education .

Section III

As Pertains to the Adjunct Director-General

Art. 10. The Adjunct Director-General will be appointed by the Minister of Rural Development by way of a proposal from the Director-General .

Art. 11. Duties of the Adjunct Director-General include the following :

- a) Substitute for the Director-General in his absence .
- b) Supervise and execute investigative programs .
- c) Execute other tasks as may be request by the Director-General.

Section IV

As Pertains to the Coordinating Council

Art. 12. The Coordinating Council is the programming and coordinating entity of the scientific and technical activities of INIAC with the following responsibilities :

- 1) Define within the national political context, the prime area of activities which INIAC should develop ;
- 2) Approve the plans for technical activities and annual budgets of INIAC and submit them to the guardian agency (MRD) .
- 3) Appraise and approve :
 - a) The annual report on activities
 - b) Management accounts
 - c) Internal bylaw and their changes
 - d) Proposals for creating technical departments
 - e) Judge the acceptance or not of inheritances, donations and gifts, and
 - f) Any other act which may be required by law or delegated by superiors .

Art. 13.1. Coordinating Council consists of :

- a) The Minister of Rural Development or his legal representative
- b) The Director-General of INIAC
- c) The Director-General of MDR
- d) A representative of each of the governmental departments designated below

The Minister of Education and Culture
 " Health and Social Welfare
 " Transports and Communications

The State Secretariat for Cooperation and Planning

- 2. Able to participate in the Coordinating Council meetings

without the right to vote are other entities or civil servants who may be invited .

Art. 14. The Coordinating Council will meet regularly, on a biannual basis, and on an ad hoc basis when summoned by the President.

Section V
The Technical Council

Art. 15. The internal bylaws will define the responsibilities, composition and functioning of the Technical Council .

Section VI
The Technical Secretariat

Art. 16. The internal bylaws will define the responsibilities, composition and functioning of the Technical Secretariat .

Section VII
The Central and Regional Technical Departments

Art. 17. INIAC will be made up technical departments at its headquarters and on other islands as development program and projects create their need .

Art. 180 The responsibility of the departments will include the study, initiation and execution of such actions necessary to achieve the objectives for which they have been specifically created.

Art. 190 Each department will be able to function as an autonomous entity in applied research within its specialized field without impairment to coordinated development and will possess the technical means and materials considered necessary .

Section VIII
The Administrative Services

Art. 20. The responsibilities and functioning of the Administrative Services will abide by internal bylaws .

Chapter III
Financial Management and Ownership

Art. 22. IMIAC has private ownership consisting of goods, monies and the valuables which are received or acquired in the course or not in the exercise of its functions .

Art. 23. Revenue of INIAC consists of :

- A) The donations ou subsidies which were accorded to them by the general state budget or other public entities .
- B) Profits from provision of its own goods and services .
- C) The donations, inheritances and legacies or gifts in general .
- G) Management profits .
- H) Profits from the sales of its own goods .

Art. 24.1. Funds from INIAC are deposited in the Bank of Cape Verde and are drawn by checks signed by the Director General, his substitute, or by the Head of Administrative Services .

2. For smaller expenditures INIAC will be able to maintain a petty cash box of not greater than fifty thousand escudos.

Chapter IV The Guardian Agency (MRD)

As Ward of INIAC the special responsibilities of the Ministry of Rural Development are to :

- 1) Define the general direction of activities .
- 2) Control, monitor and provide incentives .

Chapter V The Personnel

Art. 26. The technical personnel of INIAC are listed in the annex to this chapter .

Art. 27. The technical and scientific personnel in the annex network referred to will have the right, not only to their respective salaries, but also to a research compensation .

Art. 28. The employment and promotion of the scientific and technical personnel will be fixed regulations to be established.

Art. 29. The employment of the administrative staff will be made to appropriate entry level positions .

Chapter VI
Final Arrangements

Art. 30. The internal by laws will be approved within a period of 90 days after the date of publication of this document in the Official Bulletin .

Art. 31. Doubts and misunderstandings will be resolved by a determination made by the Ministry of Rural Development .

Art. 32. The Center for Agrarian Studies created in the Ministry of Rural Development is dissolved .

ANNEX F 2

ECONOMIC ANALYSIS1. METHOD OF ECONOMIC ANALYSIS

An institution building project dealing with research organization, administration and academic preparation has qualitative rather than quantitative outputs. In this type of project, a cost effectiveness methodology is preferred to the usual benefit/cost analysis. Since this Food Crop Research project proposes no alternative implementation modes the appropriate analysis contrasts the "with" versus the "without" cases. The economic analysis must consider whether the project outputs will have sufficient beneficial impact on the adaptive agricultural research capacity to justify the substantial costs. These costs are in money, material, personnel and especially in alternative opportunities for development activities.

The evaluation of the results of this project must be long-term, using the project's baseline data on productivity and farm management as the control and it must isolate project effects from other exogenous events, such as changes in water availability due to rainfall and water conservation construction.

There are at least three alternative ways to maximize Cape Verdean agricultural production. The first is to maintain the current situation in the agricultural sector, with investments mostly in physical structures. This permits growth in total output due to increases in acreage but will not effect productivity per hectare.

The second alternative would be to improve agriculture through a continuous supply of technical assistance. This must always be somewhat inefficient because of its discontinuous nature, short planning horizons and inadequacy of adapting foreign solutions to Cape Verdean conditions. In this case no indigenous, high level research capability is created.

The third solution, which is proposed here, requires a large initial input in technical assistance and training, with the resultant creation of a viable national research capability. The illustrative example based on current donor activities provided below demonstrates the magnitude of potential returns to an adaptive research effort. One other motivation for institution building is that in a case of high uncertainty concerning future agricultural development in Cape Verde, investments should be chosen which widen the future options.

2. AGRICULTURAL VIABILITY

The question of agricultural viability is addressed in two parts; first, with respect to non-agricultural alternatives and second, concerning alternatives available within Cape Verdean agriculture.

The commonly considered alternative economic activities are light industry, cottage industry, trade, tourism and public services. These are discussed in several planning documents (Robert Best "Food Sector Strategy" and GOCV Round Table, Vol. I-III) and will not be discussed here in detail. The public service sector already represents over 15% of GDP, absorbing much of the educated, managerial talent. Cape Verde's industrious but low-wage labor force does not appear to give it a comparative advantage in assembly or light manufacturing, as one might expect. This field has many competing LDC's with better trade links already established. Cape Verde lacks capital, post-secondary educational training and infrastructure. Transportation among the nine inhabited islands and with foreign countries is extremely irregular. Production for either domestic or international markets will require decades of donor financed investment in both physical and human capital. Thus, trade, tourism, and industry projects would be difficult to justify. The cost of these projects would be so much higher than investments on agricultural research that it is doubtful that donors would consider it.

Within the agricultural sector, however, there exists an apparent difference in productivity between rainfed and irrigated farming. Corn and beans, the rainfed crops, are the food staples of the Cape Verdean family, especially for the rural population. In the last harvest year (1981/82) Cape Verde was able to grow only 3000 tons of corn, of a food requirement of 45,000 tons (7%); moreover, it grew only 500 tons of beans out of a required 8000 tons (6%).

The irrigated food crops (banana, cassava, sweet potatoes, white potatoes, fruits and garden vegetables) are generally not imported at all, although that does not imply that the supply is nutritionally adequate. Some staples (wheat, rice and milk) which cannot be produced are currently received as food aid.

Because of the chronic deficit of rainfed crops (corn and beans), the GOCV has made investments to increase production from an expanding area of irrigated agriculture. Currently there are about 1800 ha irrigated, expected to be near 3000 ha by 1995. The GOCV seeks to become self-sufficient in irrigated crops, a goal strongly supported in AID's Territorial, Watershed Management, Rural Works, and Food for Development projects. The GOCV also wishes to increase productivity in the rainfed crops.

In order to lessen their dependence in food imports, the people of Cape Verde will have to increase their agricultural productivity. Lacking serious opportunities in the alternative economic activities mentioned above, GOCV has little recourse but to put an emphasis on improving its agriculture, given the poor base of physical resources that it has to start with.

Serious consideration should be given to the total amount of land that will be potentially affected by this agricultural research. At most, it will be 3000 hectares of irrigated land, and approximately 57000 hectares of marginal rainfed land that has experienced recurrent drought problems in the last decade. From another view point, the 5 year project can be seen as a capital investment in land worth \$80/hectare (\$32/acre) (not including any discounting for the time period involved). If, as a result of the project, yields can be raised to provide an extra \$15/ha in marginal revenue, the project could potentially recover its costs in 6 seasons. Granted, this form of calculation is very crude. However, as section F.2.6 points out, the potential increase in yields, at least for the irrigated land, is greater than \$15/ha.

It is also a well known fact that there is a high return on investment made in agricultural research. The problem that is often overlooked in project justification, however, is that it takes several years to establish a viable research process where measurable gains can be made. Thus, this project should be considered in light of: a) the necessity of increasing agricultural production; b) the high returns to agriculture research; c) the recognition that measurable gains (not just trained technicians, but increased yields) are often not seen until several years after the initial research has begun.

3. PROJECT INPUTS AND IMMEDIATE BENEFICIARIES

One input, technical assistance in research design and management, meshes well with the GOCV's current development emphasis on increasing its absorptive capacity by establishing an institutional framework. Subsequently, agricultural, industrial and social development will be built upon that framework.

The second set of project inputs are the Cape Verdean agricultural specialists. At the top level, the Institute of Agrarian Studies and the Cape Verdean Ministry for Rural Development (MRD) will participate in research priority selection and research design. Bachelor level students will be sent abroad for graduate training. Other bachelor and technical level employees will receive training both overseas and in-country. (The detailed inputs are given in the Project Analysis section elsewhere). Establishment of the baseline data concerning agricultural practices will involve work by the Center's present staff, returning bachelor degree students, field technicians and local farmers. The location of sites for collection of field data, and later adaptive research, in several islands will encourage a demonstration effect on local farmers (see Social Soundness Analysis).

The major part of the U.S. cost will be the payment of salaries and overhead of the research directors, the other donor country counterparts, and the education of the host country personnel. The cost for GOCV is not as great as it may appear since GOCV is supplying the infrastructure (land, buildings, employees) that is already possessed. This is favourable for GOCV, since additional public expenditure may strain their already weakened economy.

4. LONG RANGE PROJECT BENEFITS

As research results accrue, the entire agricultural sector benefits. Increased fruit and vegetable production at the self-sufficiency level will improve the nutritional status, especially of subsistence farm families, resulting in better health and improved labor capacity. Sale of increased crops will increase rural incomes, with multiplier effects on consumption, farm input investment and demand for public services (electricity and water). The current lack of information on use of farm inputs, production, and family income make further behavioural analysis impossible, until a body of baseline data becomes available. Greater profitability in irrigated food crops may lessen the competing effort put into corn production, which would allow rainfed land to be available for forage crops and vegetative control of erosion.

Increases in agricultural production will also affect the marketing, distribution and transportation sectors. The marketing of agricultural inputs is divided between numerous small private retailers and the GOCV's FAP (Fomento Agro-Pecuario). The private transport fleet in Cape Verde is rapidly expanding due to local demand and appears capable of handling further increases in demand for services. The marketing of fresh produce (collecting, sorting, retailing) is overwhelmingly in the hands of women. The current seasonality of fresh vegetables (which is a research topic) and lack of storage for perishable crops indicates the need for further efforts to improve the marketing support system.

5. OTHER ECONOMIC ASPECTS

Some description of Cape Verde's agriculture and rural population were included in the Project Description and Social Analysis. For an economic description the most important fact is the scarcity of production and farm management data. The available population and land use figures are summarized in Table 1. Note that not all of the islands are listed, nor is the current census necessarily complete.

Three points stand out :

1. The land use (rainfed, irrigated, or both) varies by island, but the largest two islands show that 30 to 50% of farmers have access to some irrigated land.
2. The farm holdings are fragmented and very small.
3. As reported in the official 1969 Agricultural Census, the State's share of rainfed land was less than 1%, and of irrigated land only 10%.

Table 1 - - DESCRIPTIVE STATISTICS

	Santiago	Santo Antao	S. Nicolau	Fogo	Brava	Total
Rural population.....	103 611	45 004	7 452	29 880	16 660	192 607
Mean Family Size.....	5.6	5.8	4.9	5.0	5.0	
% Female head.....	36	32	40	33	40	
% Emigrants.....	9	8	17	5	13	
Density/km ²	147.4	55.5	40.2	65.4	104.2	73.5
LAND USE BY WATER REGIME (hectares 1 x)						
Rainfall only.....	14 959.0169	2 854.6149	1 326.5 179	5 262.21100	1 895.0193	26 297.3
Irrigated only.....	15.31 0	126.11 2	.8 1 0		.21 0	142.4
Both.....	6 739.7131	2 868.9149	370.9 121		147.41 7	10 126.9
State rainfall.....	24	14.5		30.0		68.5
State irrigated:.....	123.5	35.0		20.0		178.5
Total	21 861.5	5 899.1	1 698.2	5 312.2	2 042.6	36 813.6
AVERAGE SIZE:						
Rainfed.....	1.4	.92	1.41	.6	1.8	
Irrigated.....	.03	.15	.046		.03	
total	1.43	1.07	1.456	.6	1.85	

N.B.: Land acreage figures here are taken from 1980 MDR Recenseamento Agrícola for the islands indicated.
They were reported in liters (11 = 1000 m² = 1 hectare)
The results obtained are generally 1/3 less than acreage figures in other sources for the same year.

6. POTENTIAL PRODUCTIVITY INCREASES AND SUMMARY

The potential for increased productivity from present agricultural research is shown below in Table 2.

Table 2

<u>Crop</u>	<u>Current Yield Metric ton/ha.</u>	<u>Experimental Yield ton/ha.</u>	<u>Experimental Factor</u>	<u>% Change</u>	<u>1980 Market Price (\$U.S.)/Ton</u>
Banana	15	40	Irrigated Pattern	167	\$200
Sweet -Potato	6	16	Fertilizer	100	\$ 65
Cassava	6	20	Genetic Improvement	233	\$131

Though farmers rarely, if ever, obtain experimental yields, the above table indicates that there is room for improvement. The actual project outputs are difficult to value in dollar terms, but nevertheless, they represent steps that are being taken toward increasing agricultural productivity in Cape Verde.

SUMMARY

The project will obtain, in measurable terms, nine people with advanced training in agricultural and related sciences, an established agenda for research, a better understanding of the socio-economic variables of Cape Verdean rural economy and agriculture, and the proposal and operational facilities for carrying out the research.

It is one of AID's current strategies to emphasize institutional development and research program building. This project is a step toward fulfilling this policy.

In the final analysis, the decision in proceeding with this project lies in the trade-off between the fact that, in a sense, CAVS is investing in potentially 60,000 ha. of which only 3000 will be irrigated by 1990, and the present reality of the gross need for the 300,000 inhabitants to reduce their dependency (90%) on food imports.

Crop production reports for 1980, by rainfed and irrigated crops (see Table 3) indicated the higher productivity of irrigated farming especially noticeable for those crops grown in both areas.

Table 3 -- PRODUCTION, 1980 (ESTIMATES)

Crop: 1/	ha	tons	yield (t/ha)	value/t	value/ha
Sugar	1 065	10 650	10 t	15 000\$	150 000
Banana	162	2 430	15 t	5 000\$	75 000
Corn (inter mixed)	(11 667	7 000	.6	12 000\$	7 200
Beans	(6,333)	1 900	.3	20 000\$	6 000
Irrigated cassava ..	128	(1 024)	8	15 000\$	120 000
Rainfed cassava			4.7	14 960\$	70 312
Irrigated vegetables	286	(4 342)	13	15 000\$	195 000
Rainfed vegetables			5.2	15 088\$	78 457
Irrigated sweet potatoes			8	12 988\$	103 904
Rainfed sweet potatoes	3 300	19 140	5.8	13 021\$	75 522

(Prices in Escudos, with 1980 exchange rate approximately 35 Escudos per dollar).

1/ Note that only 22,941 of the 36,000 hectares reported in use in Table 1 are shown here. The information on the use of the remaining land is currently not available.

- Wide difference among sources due to intercropping and unusual rainfall pattern in 1980. Estimates in parentheses.

SOURCE: L. Plaisier and J.J. van der Lee, "Strategy for Integrated Development...", March, 1982 and "Report of the Multidonor Mission on the Food and Agriculture Situation" FAO, January, 1981.

These sources did not indicate whether irrigated yields cover per crop or per year (i. harvests generally for potatoes and vegetables). Because yields are generally reported per crop, the actual value per hectare per year for some irrigated crop would be twice that reported here.

ANNEX F3

SOCIAL SOUNDNESS ANALYSIS1. HISTORICAL ASPECTS

Early in the colonial period, the agriculture of the Cape Verde islands took on its current characteristics. The Portuguese attempted to introduce the temperate cereal agriculture familiar to them and successful in Madeira. When this failed, due to the arid conditions, New World crops were introduced. By the second decade of the 16th century corn, beans, and squash had been introduced and quickly spread throughout irrigated areas. As the slave trade developed in the 18th and 19th centuries, cotton displaced corn, beans, and squash in the irrigated areas, wherein it has thrived, and onto rainfed areas. From that time on, the food base of the Cape Verdean population became dependent on the vagaries of the weather and susceptible to cyclical failures lasting several years. Irrigated areas from that time on have been occupied with cash crops: first with cotton made into textiles (panos da terra) that were used as currency in the slave trade, then by coffee, sugar cane, and bananas (Freeman et al. 1978).

The result of this allocation of subsistence crops to areas susceptible to drought brought about famines with unpleasant regularity. Famines played an important role in the past in reducing the size of the population to numbers more in line with available resources and economic constraints imposed by colonial rule. The drought of 1773-75, for example, reduced Santiago's population by one-third, and the archipelago's by 44 % (Amaral 1964 : 182). See Table F3.1.

The Cape Verdean population is the product of the longest period of colonial rule in human history. From the time the islands were discovered in 1460, until their independence from Portugal in 1975, Cape Verde was saddled with a form of administration geared less at making the archipelago a sustainable entity than at maintaining its locational advantage at least cost. In agriculture the result was the introduction and maintenance of agricultural practices inappropriate to the environmental conditions prevalent on the islands.

Portugal used Cape Verdeans as administrators of other colonies, recognizing the relative development of the human resources of the islands. Now that the Republic of Cape Verde is free to pursue a course that will directly favor the economic and social development of its own population, rather than that of a colonial power, the new nation finds itself with the lack of a critical mass of university-trained agriculturalists, especially those with the training level and capacity to direct and conduct research on the agricultural problems of the islands. This is not surprising in a country without

Table F3.1

DROUGHTS AND FAMINES IN CAPE VERDE^a

Year begun	Islands affected	Duration (years)	Mortality ^b	Aid provided to islands
1719	Santiago	1	Unknown	Very little
1747	All	3	Unknown; but cannibalism was noted	Unknown
1754	All	2	High	Unknown
1764	Boa Vista, S. Nicolau	1	Unknown	Corn sent to Boa Vista
1773	All	3	22,000 people or 44 % of total population. Cannibalism noted	30 contos provided by Comp. Geral de Grão Pará e Maranhão
1790	Barlavento and Brava	1	Unknown; 800 in Santo Antão alone	Unknown
1804	All	2	Unknown	Unknown
1810	All	1	High	Very little
1825	Santo Antão	1	Unknown	Very little; Governor used Crown taxes to feed people and lost his job
1830	All	3	30,000 or 42% of total population	None; Portuguese Government occupied with civil war
1845	Santiago, S. Nicolau, Santo Antão, Brava	1	Unknown	Unknown
1850	S. Antão, S. Vicente, S. Nicolau, Boa Vista, Sal	1	Unknown	Unknown
1853	Sal, Boa Vista	1	Unknown	Unknown
1854	Fogo, S. Antão, Boa Vista, Sal, S. Nicolau	3	High	77 contos from Portuguese Government
1858	Maio, Santiago, Brava	3	Unknown	Unknown
1863	All	3	30,000 or 40% of total population	
1875	S. Antão, Santiago	1	Unknown	Unknown
1883	All	1	Unknown	60 contos from Governor of islands
1885	All	1	Unknown	105 contos from Queen of Portugal
1889	All	1	Unknown	134 contos in public works
1892	Maio, Brava	1	Unknown	Unknown
1896	All	1	Unknown	50 contos
1897	Sotavento islands, Boa Vista, Sal	1	Unknown	Unknown

(continued)

(continued)

Year begun	Islands affected	Duration	Mortality ^b	Aid provided to islands
1900	All	3	11,000 or 15% of population	Very little
1920	All	2	24,000 or 16% of total population	4250 contos
1931	Santiago, Fogo	1	Unknown	Unknown
1935	Fogo	1	Unknown	Unknown
1940	S. Nicolau, Fogo, Santiago	3	20,000 people or 15 % of total population	High
1946	All	2	50,000 people or 18 % of total population	50,000 contos
1968 ^c	All	To present (14 years)	None noted	US\$110 million largely from international donors

^a Based on Lessa and Ruffié (1960); Amaral, 1964: 188.

^b Mortality attributed to famine

^c Figure for 1968-1978 assumes the Portuguese gave only one-half the 1970-1977 levels during 1969-1973. Aid since 1975 based on U.N. World Food Program, "External Assistance to Cape Verde". Praia, unpublished table, 1975.

a university, and with a history of emigration of the better trained. Most of the original research on the islands has been, and continues to be carried out by expatriates (cf. Teixeira and Barbosa 1958; Nunes 1962, 1968; BURGEAP 1974; Fernandopulle 1977). While there is a small cadre of engenheiros agrónomos (licenciate level) and of técnicos agrónomos (bachelor's level) there is understandably little capability to conduct and direct research within Cape Verde. It has been noted time and again, by Nobel Prize winner Theodore Schulz (1981), by Bumgardner et al. (1971), Moran (1982), and others, that improving the human capital for research within developing countries is the best option for long term and sustainable development.

2. SOCIAL INDICATORS

a. The Land and the People

The land is divided into very tiny plots throughout the islands, although there are notable differences between islands. Santiago and Fogo have the largest proportion of non-owners relative to the owners who work the land, a result of the greater interest of the Portuguese in these two islands. Thirty to fifty percent of farmers currently have access to some irrigated land, and in some valleys that portion is as high as 90%. The average size of each irrigated plot is, however, less than a tenth of a hectare.

This lack of land relative to population has had severe consequences for the population. The diet is deficient in vitamins A and C, in fat, and in calories (especially for pregnant and lactating women). The population is relatively healthy but there is a fairly high rate of infant mortality (over 100 per 1,000) due to gastro-enteritic diseases. Neither malaria or schistosomiasis are expected to occur due to the minimal levels of irrigation used and the absence of standing or running water. Malnutrition in children runs about 15% but it is unevenly distributed in the archipelago, being found mainly in isolated areas wherein food donations have not easily reached.

Cape Verdeans have always demonstrated an interest in education but access to schools is difficult due to transportation constraints and lack of sufficient number of facilities. Literacy is fairly high in cities like Praia and Mindelo but illiteracy is more pronounced in the countryside. Primary schools enroll close to 87% of children in various age groups, but the failure rate per year is close to 50%. This appears to be due to the fact that most teachers have inadequate preparations, especially in the countryside, whereas the yearly exams are prepared by licensed teachers with formal training. The result discourages continuation of schooling. By the time the fourth grade is completed, the proportion of students in the age group entering fifth grade drops to

just over 7 %. The number of students who reach senior high is very small (less than 1 %) and those who go on for bachelors' degrees abroad are a highly selective elite with mostly urban backgrounds, a not always desirable base upon which to foster agrarian sensitivity. Fortunately, Cape Verde is a small nation and the whole country is aware of its condition of environmental poverty and underdevelopment of its human resources. They are eager to undertake the task of maintaining the environment and human advancement through education and research.

The rural people speak Crioulo, and some Portuguese. The educated elite speak Crioulo, Portuguese and often French. There are no ethnic divisions or language barriers of significance. The rural population is remarkably concentrated in an area no larger than the State of Rhode Island. Communications on land are good.

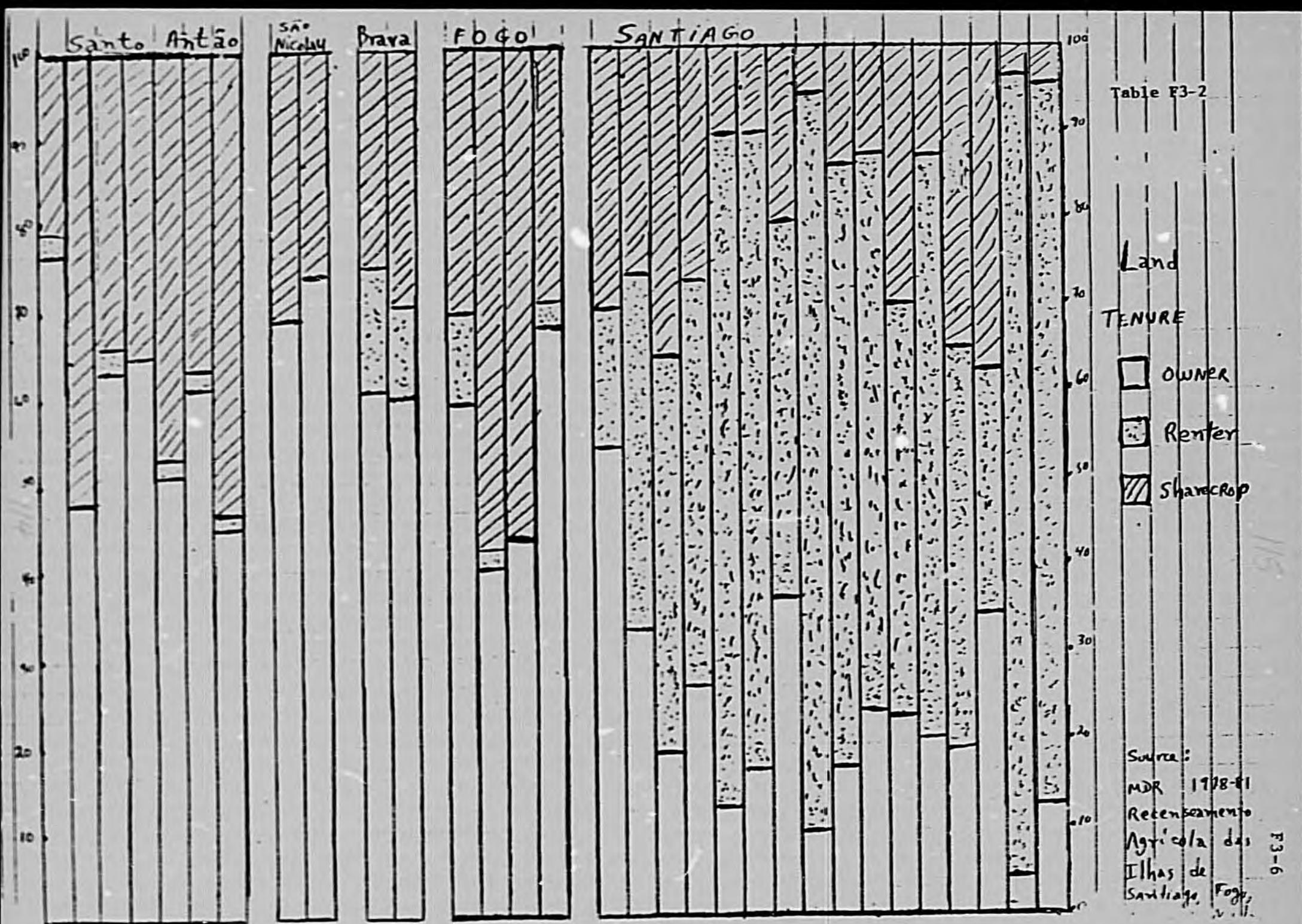
The existence of a neo-colonial educated elite who will direct the research activity can pose a problem, but this is easily avoided through a forthright policy of participation in the research program by the target population as described in Annex F3.3. The proposed adaptive research program requires demonstration of results under real-life conditions, in which farmer participation is indispensable.

b. Land Tenure

The lack of food, resulting from the inadequacy of arable land in rainfed areas has always been aggravated by a land tenure situation that discouraged improvements of the land (see Economic Analysis). However, one must note that there are important differences between islands. - Santiago and Fogo were plantation islands, with control of the land in the hands of a few. To the present, these two islands have a greater proportion of the population who rent or sharecrop rather than own the lands they cultivate. Santo Antão, S. Nicolau, and Brava, on the other hand, have always had a much larger proportion of people who own their holdings (see Table F3-2)

Traditional rent and sharecropping arrangements did not reward farmers for planting trees, finding water, or improving the farm infrastructure. On the contrary, it was common to raise rents immediately upon improving a property. Since arrangements were made only from year to year, farmers who planted fruit trees and other vegetation experienced an immediate increase in rent. The high demographic density and scarcity of lands with access to water created a competitive environment in which farmers had to accept these land tenure arrangements or risk having no land at all.

The prime irrigated lands in Santiago, for example, were in the hands of influential Portuguese families, a fact that explained why agricultural research up to 1975 was on crops of export interest to these larger holders: coffee and bananas. The quality achieved in Cape Verdean banana production suggests that if comparable efforts were spent on food crop research, significant improvements could be achieved in both quantity and quality of staples.



c. Demographic Aspects

Cape Verdeans are a people with a remarkable openness to the outside. Their long history of out-migration to the United States, to Europe, and to Africa and Asia has oriented them to the outside, a needed escape valve to the difficulty of sustaining sizable population on these arid islands. Some islands have been more affected than others by recent outmigration. The island of S. Nicolau has had nearly half of its male population depart for Holland in recent years, and it has lost a smaller, yet significant number of females to Italy. A recent study of two regions in Santiago noted this same phenomenon of depopulation in the age groups 25 to 44 (see Table F3-3), that characterized the islands as a whole (Rodrigues et al. 1981). Better statistical data are needed, as is an inquiry into the production consequences of this demographic process. In general the outmigration of this most fecund age grouping is probably desirable at this stage of the development process of Cape Verde.

Some 70 to 90 percent of Cape Verde's population is rural. The agriculturally significant islands of Santiago, Fogo, Santo Antão, and S. Nicolau include 90 percent of all rural people of Cape Verde. These islands, therefore, should receive special priority in siting agricultural demonstrations and agricultural development efforts.

The pattern of recurrent mortality due to famine was ended with the provision of international aid to Cape Verde since 1975. The population policy of Cape Verdean families still favors numerous births — a not unexpected phenomenon given the recurrence of demographically devastating famines in the past. The current level of donor food assistance makes an insufficient impression on the population that people/land relationships changed significantly. One should not expect any significant shift in demographic norms for at least 40 years. There is some evidence that both outmigration by high fertility age groups and current drought conditions have acted synergistically to reduce the growth rate of the population to a significant extent (note the reduced 0-4 cohort in Table F3-3 and the decline in primary school enrollments in Table F3.8).

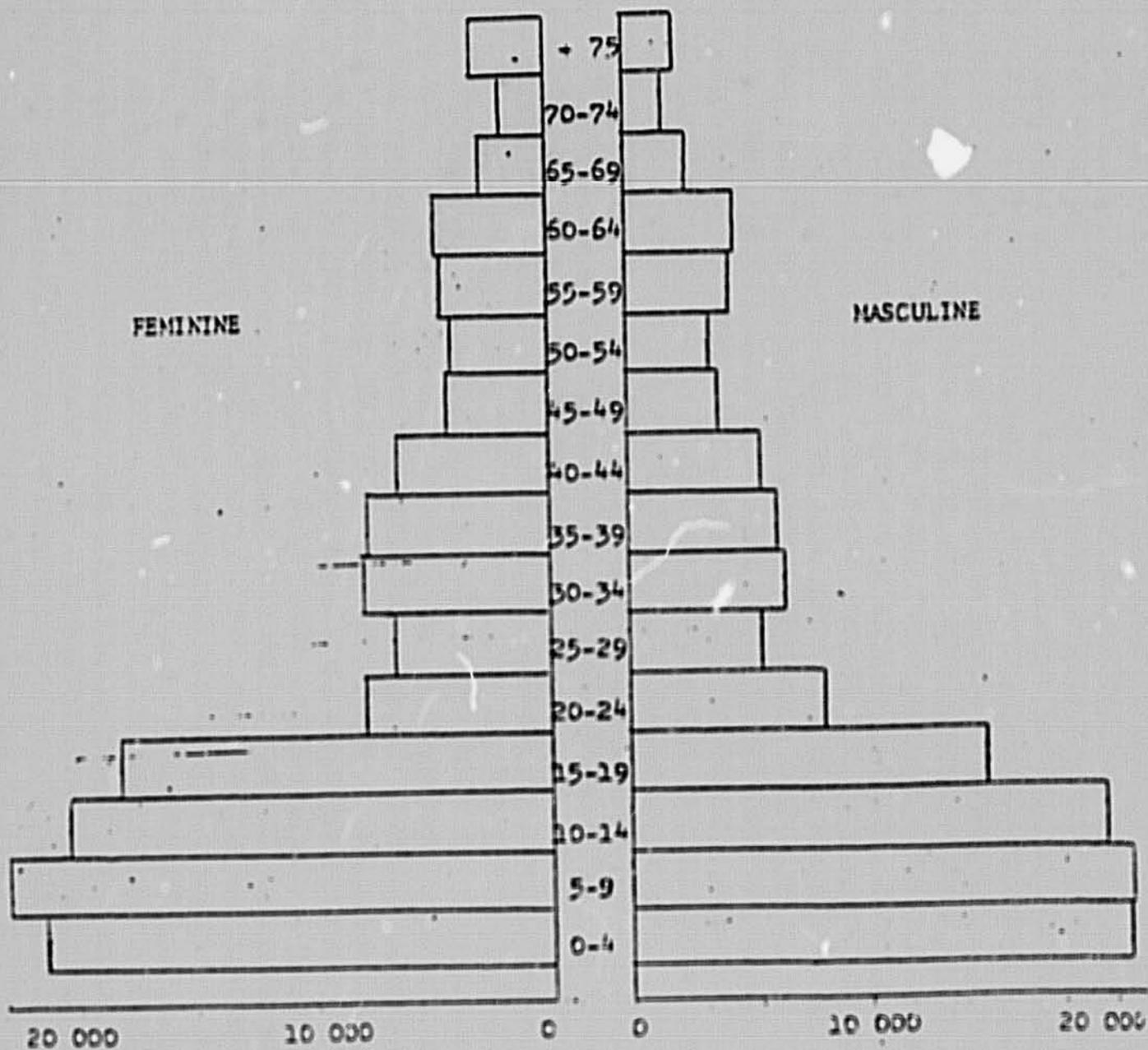


Table F3-3 Age and sex distribution of the Cape Verde population, 1970. Based on provisional census data, Direção Geral de Estatística.

d. Nutritional Status

The nutritional status of the average Cape Verdean is precarious. The staple dish, cachupa, is consumed three times a day. It is made up of corn, water and salt with additions of beans, fat, and meat or fish when available. The "poor man's cachupa" (mostly corn) which is the norm, provides only about 2,170 calories per person per day and 69.7 grams of vegetable protein. A cachupa-based diet provides an inadequate supply of calories, low quality protein, insufficient vitamins A and C, and an insufficient amount of fat. Prof. Jorge Sans, a nutritionist with the Institute of Tropical Medicine in Lisbon, concluded, following a ten-year study of the population of Fogo and S. Nicolau, that "the population is in a habitual state of chronic malnutrition". (see Tables F3.4 and F3.5). In isolated areas on the islands of Fogo, Santo Antão and S. Nicolau the problems are especially severe.

The nutritional deficiencies of the population are directly the result of an insufficiency of food production. It is difficult to see how households headed by females manage at all. Cachupa is an inadequate diet for lactating and pregnant females (see Table F3.4). The IAS will need to include in its food crops research effort a component that focuses on the diet of females and children, and to assist the research effort in devising a farm production mix that provides a better dietary balance for farm households. In these functions the socio-economic unit together with the food scientist at IAS will play an important role. Above all, research efforts should not ignore nutritional balance in the narrow goal of high achievable yields. Both goals can be sought simultaneously.

e. Health Status

Given the lack of adequate medical personnel on most of the islands (cf. Greenard et al. 1978; Katz et al. 1981), the health status of the population is remarkably good. The most serious causes of mortality seem to be heart disease in adults, and gastro-enteritic diseases in children (see Table F3.6). There are foci of malaria in Santiago, of leprosy in Fogo, and Santo Antão, of hookworm in Santiago and Brava. Infant mortality, always a good indicator of the health environment, has oscillated around ten percent for its decades (see Table F3.7). This is a relatively high figure, but it represents a 50% reduction over the figures prevalent in the early decades of this century. The persistence of gastro-enteritic problems is related to the scarcity of water and the difficulty of controlling its quality when a little is available to households.

f. Educational Situation

Cape Verde is unlikely to escape the burden of more than 500 years of neglect unless its human resources are better developed. Already, considerable investment has been made in primary and non-formal education (see Table F3.8). Such investments, totalling 1 million \$700,000, directly address the problems faced by a

Table 3.4
 NUTRITIONAL DEFICIENCIES IN A SAMPLE POPULATION, 1973^a

	Age Group				Total
	0-6	7-14	Lactating females	Pregnant females	
Number examined	5,326	3,718	831	525	9,860
PERCENT SUFFERING DEFICIENCIES					
Moderate protein-calorie malnutrition	24	38	15	8	27
Edemas	-	-	1	23	10
Serious protein-calorie malnutrition	2	2	3	2	2
Moderate anemia	6	7	15	30	8
Serious anemia	3	1	3	11	3
Vitamin A deficiency	7	15	6	6	9
Iodine deficiency (goiter)	0.1	2	4	5	1
Vitamin C deficiency	1	16	12	9	7
Fluorine deficiency	-	4	-	-	1
Vitamin B ₂ deficiency	4	9	1	2	5
Vitamin D deficiency	5	4	-	-	4

^aData from Ministério de Saúde e Assuntos Sociais, 1978, Inquérito Nutricional, Praia.

Table F 3.5

NUTRITIONAL NEEDS BY AGE AND SEX (CAPE VERDE STANDARDS)^a

Age Group	Calories	Protein (g)	Ca (mg)	Fe (mg)	A (mg)	B ₁ (mg)	B ₂ (mg)	FP (mg)	C (mg)
Children									
Less than 1 year	812	27.5	976	12.8	0.6	0.4	0.5	4.3	50.2
1-3 years	1,372	31.2	800	12.8	0.5	0.7	0.7	7.2	50.2
4-6 years	1,820	39.2	800	12.8	0.6	0.9	1.0	9.8	50.2
7-9 years	2,184	49.3	800	12.8	0.9	1.2	1.2	11.7	50.2
Young boys									
10-12 years	2,604	58.7	1,152	12.8	1.2	1.3	1.4	14.0	50.2
13-15 years	2,912	72.5	1,152	23.2	1.5	1.6	1.5	15.3	75.0
16-19 years	3,080	74.7	1,152	12.0	1.5	1.6	1.5	16.4	75.0
Young girls									
10-12 years	2,352	56.6	1,152	12.0	1.2	1.2	1.2	12.4	50.2
13-15 years	2,492	61.0	1,152	30.8	1.5	1.3	1.3	13.3	75.0
16-19 years	2,324	58.7	1,152	36.0	1.5	1.2	1.2	12.3	75.0
Adult males	2,800	72.5	800	12.0	1.5	1.6	1.6	16.0	75.0
Adult females	2,212	56.6	800	36.0	1.5	1.2	1.2	11.7	75.0
Pregnant females	2,548	74.7	1,952	12.0	1.5	1.3	1.3	13.6	125.2
Lactating females	2,744	90.0	1,952	12.0	2.4	1.5	1.5	14.7	125.2

Source : Ministério de Saúde e Assuntos Sociais, 1978, Inquérito Nutricional, Praia.

new nation with a current illiteracy rate of 60 %, poorly trained teachers largely responsible for a 50 % failure rate of students in the first four grades, and a lack of adequate classroom space for the school age population. About 7 % of the national budget is currently allocated to the Ministry of Education .

At the secondary level, there is a much smaller proportion of students for those age-groups (see Table F3.8). Barely 3 % of the population ages 13 to 18 is currently enrolled. Less than 7,000 students attend basic secondary school and barely 400 reach the pre-university level called curso complementar. Although numbers are going up slightly, one can expect numbers of secondary students to begin to decline in about five years, as the decline in primary enrollments begins to affect secondary school enrollments. There is a historical preference for the humanities in senior high and in university careers. In order to deal with this undesirable tradition, the Ministry of Education, in cooperation with the Ministry of Rural Development, is creating a technical school with a distinct agricultural orientation. The location of this school at São Jorge has a number of advantages. It will be adjacent to the IAS research center and students will have the opportunity to learn from the research carried out there. The research library will be accessible to them and it is hoped that this connection between a learning institution and a research center will provide a vivid example to cohorts of Cape Verdeans that careers in agricultural research are both satisfying and desirable .

Table F 3.6

DEATHS BY CAUSES, 1971-1976^a

Diseases diagnosed	1971	1972	1973	1974	1975	1976
Tuberculosis	9	14	9	14	11	8
Pneumonia ^b	65	56	59	36	45	66
Bronchitis	24	6	15	15	12	11
Gastroenteritis ^b	330	44	84	53	39	21
Dysentery	12	2	6	5	8	4
Meningitis ^b	4	6	15	16	5	7
Measles ^b	6	7	4	10	7	5
Congenital defects	15	15	11	20	13	12
Perinatal diseases	64	78	50	33	51	71
Heart diseases ^c	74	54	69	48	50	51
Hepatic Cirrhosis	6	4	4	2	2	3
Burns	15	12	22	19	17	16
Infectious and parasitic diseases	29	16	9	15	29	15
Malignant tumors	51	27	27	23	19	33
Total	1027	698	868	671	731	699

^aData from Direcção-Geral de Estatística, Boletim Trimestral de Estatística, 1971-76, Praia.

^bChiefly among children.

^cChiefly among females over 50 years of age.

Table F 3.7
INFANT MORTALITY, 1912-1978

Year	Deaths per thousand	Year	Deaths per thousand
1912 ^a	220.6	1963	109.7
1913	174.2	1964	85.3
1915	117.9	1965	76.7
1920	155.0	1966	83.6
1927	217.6	1967	99.9
1931	206.7	1968	91.7
1937	223.4	1969	123.1
1943	317.9	1970	95.0
1946	268.7	1971	130.9
1947 ^b	542.9	1972	90.9
1948 ^b	428.6	1973	110.6
1949	203.9	1974	78.9
1950	130.7	1975	103.9
1962 ^c	106.1	1976	97.0
		1977	87.0
		1978	110.0

^aAlexandre Sarmento, 1959, "Aspectos e Evolução da Mortalidade no Arquipélago de Cabo Verde", Anais do Instituto de Medicina Tropical - 16:229-266.

^bDrought years and the last major famine.

^cMinisterio de Saúde e Assuntos Sociais, 1976, Estratégia Nacional de Saúde, Praia.

Table F 3.8
NUMBER OF STUDENTS IN CAPE VERDE

	1976	1980	1981
Primary (grades 1-4)	61,000	52,209	50,788
Preparatory (grades 5-6)	5,600	5,900	6,966
Lycee (grades 7-9)	2,400	2,078	2,296
Complementar (grades 10-11)	400	413	446

Data furnished by the Secretaria de Estatística, 1978 ; and by the Ministério da Educação e Cultura, 1982 .

Students for this agricultural vocational school will be chosen proportionately according to each island's population and aiming to balance those from rural and urban areas. Among the criteria for selection will be their interest and sensitivity towards rural life. Two levels of training will be provided at the school: cadres de base (basic-level personnel) and cadres moyens (middle-level personnel). The former will be field-oriented technicians entering the civil service to direct public works, extension, and other rural development activities. Thirty students will be admitted yearly to this program lasting either 24 intensive months or a normal 3 years. The middle-level personnel have a higher entrance requirement (9 years of schooling) and will receive 3 years of training plus a year of specialized training in an agricultural field (see Table F3.9). Both curricula combine general education with theoretical and practical training. The practical emphasizes rural development subjects such as soil conservation, pest management, rural sociology, extension, agrarian reform, and rural development planning. Graduates of basic-level training will be equivalent to the current técnico profissional, whereas the middle level graduates will equal técnico superior.

Postsecondary education is available only abroad. Traditional preference for medicine and law continues to deprive the new nation of a sufficient cadre of specialists in agricultural sciences, engineering, applied social sciences, and public administration. Although more students are abroad now than ever before, their career preferences follow Iberian patterns. This Project proposal seeks to enhance

the quality and quantity of qualified staff in applied agricultural research. In fact, there is no research staff at present and no clear institutional priorities for research as a result of this lack of expertise (see Table F 3.9). The CAS is committed to improving the relative salaries of CAS staff. This will create an attractive situation that will guarantee that the graduates from the training proposed herein do, in fact, return to the CAS to carry out the research initiated in the first three years.

The creation of the Center for Agrarian Studies and its evolution into the IAS is a major step forward for Cape Verde. Until now the MRD has been more concerned with Disaster Assistance than with research and development. Its staff of 291 in 1978 has increased to 421 in 1981; but has only 16 técnicos superiores. These top-level technicians have four years of primary, seven years of secondary, and four to five years of college abroad. There are few staff members with Masters' degrees and none with Doctoral degrees — a deficiency that hampers undertaking scientific operations. An MRD budget used to hire temporary personnel, perpetuates an allocation that reduces the quality of the investment made by MRD itself.

Table F 3.9

CAPE VERDE'S EDUCATIONAL SYSTEM AND CAPABILITIES

RESEARCH LEVEL	age	Grade level	No Cape Verdeans currently at this level	By 1988 8 - 13 MSc. MBA MA	Graduate work
OPERATIONS LEVEL	22	16	↑ "Engenheiro agrônomo	University (only Abroad)	Specialization
	21	15			
	20	14			
	19	13			
	18	12			
FIELD TECH. LEVEL	17	11	Complementar (pre - Univers.)	Cadres Moyens (S. Jorge)	9
	16	10			
	15	9			
BASIC EDUCATION	14	8	Basic Secondary (3.1 % enrollment)	Cadres de Base (S. Jorge)	6
	13	7			
	12	6			
	11	5			
	10	4			
Pre School	9	3	Primary (87 % enrollment*)		
	8	2			
	7	1		* 50 % failure per grade	

Sources: USAID 1978 and interviews with MDR and MEC.

3. IMPACT OF THE PROJECT

This section identifies the target population, discusses roles of women, assesses burdens and benefits, and spells out a strategy for diffusion of research results.

a. Target Population

Some 30 to 50 percent of farmers presently have access to irrigated land in Cape Verde (see economic analysis). The land reclamation projects currently underway hope to increase irrigated areas from the current 1800 ha in cultivation up to 3-6,000 ha. Even if this optimistic figure is not reached, and only half of this projected increment is achieved, it would increase the proportion of farmers with access to over 80 percent. Already there are areas where up to 90 % of farmers have access to irrigated land (Achada Baleia in Santiago) (cf. Rodrigues et al. 1981). The focus on irrigated food crops research is appropriate since the 3 % of the land currently under irrigation provides 4 % of GDP and practically all the fresh vegetables, fruit, and a modest portion of some staples for the islands' population - this in a time of severe drought now into its 14th continuous year. Rainfed areas need attention as well, but they are overly susceptible to the droughts which have made Cape Verde a ward to the international community. Development of research expertise in irrigated agriculture is more likely to lead to gains in food production than efforts in rainfed areas.

People are potentially interested in participating in improvement of agricultural practices as demonstrated by the experience with the pigeon pea (known locally as congo) on the Watershed Management project, however results must be demonstrated first. Last year it was difficult to get volunteers to try it; this year there are hundreds of applicants. The people are very attached to the land and show strong motivation by expending incredible effort to make it produce.

Leadership falls easily to the better educated and the more successful. Emulation is commonplace and tradition strong, especially in rural areas. Religious, political and intellectual leaders are accorded respect though not necessarily obedience. The interaction between the rural area, the town or city, and even the overseas connections is surprisingly intense. Mobility is pronounced as the emigration rate proclaims.

Women have strong roles as heads of households, cultivators on irrigated as well as rainfed lands, and dominate marketing activities partly because a considerable proportion of men have emigrated. Current projects of a variety of donors have been more or less participatory, with participation being a hallmark of development accomplishment. An adaptive research program following a participatory strategy and concentrating at first on irrigated lands would have the best chance for success initially; and thereafter as means of introducing new practices to the rural population. In the long

term the program would not be confined to irrigated land, and its results would be expected to be applied eventually to rainfed conditions.

Cape Verde currently has the beginning of an extension program. A two-year training program of technical specialists in extension techniques is to start this year. A head of the Extension Division of the Rural Development Ministry has been named. It is expected that a full fledged GOCV Extension Service will be in business about mid-way through the implementation of this project. In the meantime, pilot extension activities are being performed on projects supported by various donors, including AID's Watershed Management Project. Since 70 to 90 percent of the population on each island is poor and rural, programs aimed at increasing the productivity of small farms can only lead to better living conditions - especially given that the GOCV is committed to correcting the inequities in land tenure inherited from the colonial period. The marginal dietary status of the population is duly noted in the Social Soundness Annex F-3. The emphasis on food crops, rather than on cash crops such as bananas and sugar cane, will most directly benefit the smallest farmers since the cash crops tend to be grown by the larger landholders (although even these are owners of no more than 6 ha). A new law of Agrarian Reform approved in March, 1982 and to take effect from January, 1983 will make irrigated areas that have been acquired from the Portuguese owners or that are underutilized by absentee landholders available to small-holders, thereby enhancing the areas available for farming and the social benefits derivable from adaptive research. The Law has, as its main thrust, to clarify the property rights of underutilized areas, the elimination of sharecropping from Cape Verdean agriculture and giving farmers who rent land greater rights than they have had heretofore. The latter measure was needed to provide incentive to tenants to practice conservation measures. In the past, tenant farmers had seen their rents increase whenever they planted trees and made improvements in the quality of the land.

The new Law allows tenants to use the land for seven years without added rent due to the adoption of conservation practices derived from the Institute. As such, it is a positive contribution to the goal of greater food security.

b. Women in Development

The degree of participation of women in Cape Verdean agriculture depends on how much labor they can expect to get from husband and children. During peak labor demand times, Cape Verdean women take full part in the activities of planting, harvesting, and weeding. Women also dominate the marketing of agricultural products. Extensive visiting activities are related to the identification of potential markets for her products and obtaining needed credit.

Rural women put in much longer hours at work than their urban sisters. In addition, their contribution to the family income is more significant. In a sample of 62 families, it was estimated that 40 % of family income resulted from female economic activities (Silva, 1963). The burden of women is all the greater due to an unbalanced sex ratio. For most of this century the ratio has been 116 females for each 100 males. This ratio appears to result from higher mortality among male children, higher male mortality during droughts, and, most importantly, higher rates of emigration among males. In short, 32 % of households are headed by women and these women must carry a greater burden to support their families. Although there appears to have been some sex-based division of labor in the cultivation of rainfed (women) and irrigated (men) lands in the past, today both men and women work the irrigated areas equally. Field observations even suggest that more women than men currently cultivate irrigated land. Focusing research on irrigable areas does not appear to present the danger of favoring one sex over another.

c. Burdens and Benefits

Applied research as described does impose a burden of risk-taking on the participating farmers, but a few risk in order to demonstrate to others that benefits are assured. While the burdens are few, the potential benefits are widespread:

(a) In areas where water is the main constraint, better ways to utilize water are of paramount importance. The principal impact is on irrigated land;

(b) Improved varieties, tested to make sure they withstand the rigors of Cape Verdean climate, are also of interest to small farmers;

(c) Greater variety of crops as well as more abundant yields can improve nutrition of people and animals;

(d) More agricultural possibilities can absorb the time of the rural under-employed.

Possible cautions are the following :

(a) Delivery of credit and other inputs, including extension services, are in their infancy. Much needs to be done, and the GOCV recognizes this.

(b) Land tenure - The current situation discourages the tenant to develop his land, particularly on Fogo and Santiago, but the proposed land reform is designed to deal with some manifestations of the problem.

(c) Increase of yields could produce problems of marketing excess supplies on a seasonal basis. Government pricing policies,

as observed in the recent fisheries study, can have pernicious effects on production and consumption, particularly during times of excess supply.

A favorable aspect of a research program is the opportunity to obtain data on availability of inputs, on the effects of land tenure, and the interplay of marketable surpluses with Government pricing policies. Therefore, the existence of the research program increases the likelihood that problems in these areas will be recognized and dealt with appropriately.

The fact that the project will start with a baseline study of current folk practices facilitates participation through knowledge by the technical people of what already exists. It also facilitates measurements of impacts on the baseline situation as the project progresses.

d. Probability of Diffusion of Research Results

This Project aims at improving the institutional capability of the GOCV to conduct adaptive research through investments in its human capital by creating a basic cadre of technically capable personnel linked to farmers' practices. The five-year project proposal begins with a baseline study of the agricultural practices, varieties and inputs of the Cape Verdean farmer. Towards this end an agricultural/economic anthropologist will study the folk practices of seed selection, planting, farm management, and marketing. This folk system will then be made available to the agronomic staff of the Center for Agrarian Studies so as to test the results of current practices and compare them with the results from alternative management, new crop varieties, and other technical changes. The baseline module and its alternatives will then be tested in both experimental plots and farmers' fields to determine the appropriateness of techniques for the Cape Verdean conditions.

This approach to research and experimental procedure is a socially sound way to open up the farmer to the researchers who, thereby, show respect for traditional folk agronomic practices and the rationality of the small holder. In addition, the research will fill an important gap that currently exists: the total absence of a detailed description of the agricultural cycle, management practices, and marketing of produce in Cape Verdean agriculture. Improvements generated by the research from this project will take into consideration the range of variation in micro-ecology, management, and the marketing/price constraints.

ANNEX F4

ADMINISTRATIVE ANALYSISA. Function and Capabilities of
the Center for Agrarian Studies

An organogram depicting the Ministry of Rural Development and a description of the present Center are in Annex F1. The Center's place in the Ministry, with its degree of autonomy, and the project chain of command can be seen. The future field organization of the Center, which has not yet been clearly established, will include field stations on Santiago and other islands.

The Center, as the key element of the project, will be the principal organizer, planner, manager, coordinator and monitor of the project. It will :

- select trainees for degree work
- manage everyday business
- prepare budgets
- coordinate and monitor research
- evaluate progress
- handle personnel matters
- communicate with outside research organizations
- disseminate research information

The current administrative staff is headed by the Director of the Center. The project proposes to strengthen its leadership abilities by regular seminars, staff and technical meetings and advanced management training. By these means and others, the project envisions giving greater "depth" to the administrative/managerial component.

B. The Proposed Institute

The legal basis for the Center will change when a proposed law goes into effect later this year (see Annex F10 - the proposed statutes of the Institute). When this law is effected, the Center will become an "Institute" with autonomy under the overall authority of the MRA.

The Institute will have an Advisory Committee to help formulate its broad policies and assist it the support of relevant government officials. The Committee will be composed of the Minister of Rural Development, MRA, the division directors of the MRA (Agriculture, Natural Resources, and Extension), representatives from the Ministry of Public Works, Education, Health and Transportation, the department heads of the Institute (Agronomy, Zoology, Natural Resources,

agro-economics/Sociology, and Livestock), and the Director-General of the Institute. They will be required to meet no less than twice yearly. The Advisory Committee offers the advantage of assuring that inputs from researchers and relevant ministries are taken into account in the administration and activities of the Research Institute.

The managerial and administrative arrangements in the creation of the Institute will enable the benefits of world-wide agricultural research developments to be the subject of in-depth adaptive research for the benefits of the Cape Verdean people as a whole. At the level of out-reach from the research institute to the farmer, it is well to remember the small population of Cape Verde (ca. 300,000) and the small agricultural area in which the rural population is clustered. It is expected, therefore, that the demonstration effect of off-station experimental research and the personal contact of researcher and farmer will be very high and that informal advice will be exchanged on an ongoing basis.

The incorporation within the Institute of a vocational educational establishment at both entry and middle levels, with an island-wide quota admission system, will further strengthen the links between researchers and farmers from whose families many of the students will hopefully come and who will subsequently constitute the future agriculture leadership.

C. Linkage to U.S. Institution

The ideal solution for the institutional capacity of the Institute would be to create a link to a U.S. agricultural university and experiment station. The linkage should be across all disciplines and with the University administration. The advantage to Cape Verde would be the utilization of appropriate institutional ties, with continuity of resources upon whom they could call for assistance in specific administrative and subject matter areas as these needs became apparent. The creation of a fund of knowledge concerning Cape Verde's special needs and problems would provide for more appropriate assistance. Students placed at the U.S. institution would receive appropriate teaching and research supervision based on a knowledge of their country. The advantage to an American institution would be to strengthen capabilities of the university in teaching and research appropriate to their interests in solving specific problems and further mutually beneficial involvement in the international network of agricultural sciences.

The title link arrangement has distinct advantages for training staff members from Cape Verde and building and strengthening the Institute of Agrarian Studies. It is recommended that AII & and the Board for International Food and Agricultural Development examine at an early date if such an institutional partnership can be developed. Early action will be required so that the link and Institute can

execute selected elements of their agricultural and rural development plans.

While a Title XII arrangement is preferred and has certain mutual benefits, it may not be feasible for a number of reasons.

The Consortium execution method appears to have the disadvantage that in many cases the Consortium groups do not have a commonality of programs, lack ongoing links with qualified faculty or possess little institutional continuity. Furthermore, these inputs are very much regulated by the U.S. University demands during the academic year and a scarcity of faculty to serve in long-term assignments.

The "body shops" seldom have the capacity to draw on experienced university and experiment station personnel, establish adequate staff training programs and the student guidance and the broad range of disciplines with a sufficiently close identity with the perennial needs of the Cape Verdean institute. An alternative position would be one of identifying a private research institute with a proven track record in developing and executing an agricultural research development program . . .

In any case, the Cape Verdeans should have a large input in the selection process of a sister institution. It is for this reason that funding is included for the Director-General to travel to the United States to identify institutions which would accept such an institutional linkage and subsequently arrange a series of visits for institutional familiarization .

D. USAID Relationship to the Project

This project has been assigned to one of USAID's project officers. Because the Mission is very small, all direct-hire staff will be kept apprised of project implementation through quarterly project reviews which will be attended by Cape Verdeans as well as American staff. In actuality the mission U.S. direct hire will constitute the "team" with the project officer designated as "team leader". This team will be responsible for monitoring project progress and will work with the GOCV project manager, his counterpart and staff. The team will also assist with project implementation, evaluations and reports as required.

USAID also anticipates assistance from REDSO/WA. The engineer will review and approve changes in construction plans and designs as they develop. Legal advice will be required early on in the project

*Along the lines of IRI's (International Research Institute, Inc.) working in Brazil since the 1950's.

and during implementation. During evaluations and commodity procurement USAID anticipates REDSO assistance as required.

USAID/Praia has no financial officer. Therefore financial arrangements will be handled through AID/Dakar. The assistance of a USAID Financial Analyst, who is stationed with AID/Guinea Bissau with responsibilities for Cape Verde, will backstop financial matters to some degree.

ANNEX F5

INITIAL ENVIRONMENTAL EXAMINATION

(IEE)

Project Title and Number: Cape Verde Food Crop Research
Project No. 655-0011

I. Threshold Determination

II. Description of the Project

III. Identification and Evaluation of Environmental Impacts

- A. Land Use
- B. Water Quality and Quantity
- C. Atmospheric
- D. Natural Resources
- E. Cultural
- F. Socio-Economic
- G. Health
- H. Miscellaneous

IV. Checklist worksheet on Impact Identification and
Evaluation Form

I. Initial Environmental Examination - Threshold Determination

Project Location : Cape Verde
Project Title : Food Crop Research and Extension (655-0011)
Funding Amount : AID Grant \$3,688,000
Life of Project : Five years
IEE Prepared by Wayne Slotten
Agriculture Development Officer
USAID/Cape Verde
Date : July 30, 1982

Environmental Action Recommended : Negative Determination

A Negative Determination is recommended for which neither an Environmental Assessment or an Environmental Impact Statement is required. The proposed project has a focus on developing the capacity of the Center for Agrarian Studies (CAS) in Cape Verde to be able to conduct adaptive research in agriculture. This will be done by strengthening the policy, management and organization of the CAS. Other aspects of the proposed project will assist in the conducting of research and evaluation leading to preparation of written reports and recommendations for improving cultural practices and technical packages for introduction to small scale agriculture producers in Cape Verde. The USAID major dollar inputs are in technical assistance and participant training, with other costs being primarily construction and equipment. No U.S. funds will be expended for chemicals, and other project activities fall within the parameter of controlled experimentation for purposes of research and evaluation.

II. Description of the Project

The broader objective ("goal") of the project is to enable the GOCV to optimize its agriculture potential by reducing the country's dependence on food aid, improving rural employment, broadening the nutritional base and increasing farm revenues. The purpose of the project is to reinforce the institutional capacity of the existing CAS (Center for Agrarian Studies) and from this basis create a viable active research institute. This will have the effect of increasing agricultural production by raising the educational level of those involved in Cape Verdean agriculture development by enabling them to bring improved techniques to the farmers. The project will undertake to accomplish these objectives through a grant which provides for long and short term technical assistance in strengthening the institutional capacity of the CAS, scholarships/or advanced degrees in various research disciplines and a limited amount of construction and equipment for research facilities.

The field research will be conducted initially at one of two state-owned farms on Santiago Island, either at Santa Cruz on the eastern coast or at Serrado in the interior, and ultimately on farmers fields. Complementary extension training and development will occur in Praia and at the Center for Agrarian Studies at São Jorge, approximately 35 kilometers north of the capital city.

III. Identification and Evaluation of Environmental Impact

A. Land Use

The project will make very limited modifications in approximately two hectares of land at the project site. The land now forms part of a state farm. AID will finance the construction of one residence for a U.S. researcher. Construction area will cover approximately 200 square meters of currently non-productive land. No significant changes in land forms and land uses will occur. No land clearing is envisioned. There will probably be some extensions and improvements of a canal system in order to better measure and regulate irrigation water, some modifications in terraces, diking, bunding, and land preparations as part of alternative cultural/technical practices.

No minerals will be extracted in the project area other than those nutrients in the soil naturally extracted in the production of crops. No changes in soil character are expected. Regarding natural defenses against water or wind erosion provided by the area, the project area had few defenses prior to its current state of improvement for crop production on the state farm. Any further changes in channeling of water or modifications of terraces and land forms will be designed to improve their natural defenses.

In the short term, project field trials will continue on state farm land. In the future the project will be testing alternate cropping techniques and cultural practices on farm fields in order to obtain higher yields. The long term production function is

expected to be increased yields and better use of the land. Man and his works will not be put into a zone of potential hazard or disaster because of the project initiatives.

B. Water Quality and Quantity

Water will be extracted in the project area for small irrigated perimeters. The amount drawn will be insignificant in terms of the estimated reserves of the aquifer. As the GOCV plans to increase irrigated crop land from 1800 hectares to 3000 hectares over the next fifteen years, the potential exists for AID research on irrigated crop efficiency to have a positive impact on the utilization of water resources in Cape Verde. AID does not have knowledge of or control over the details of possible GOCV activities that may have an effect on water quality and quantity.

Project activities will not affect the quality of water. The project is not financing, from any U.S. funding source, the purchase or use of fertilizers and pesticides in the project area. Although not U.S.-funded, the possibility exists that the project may fund and use a limited amount of chemical or biological fertilizers and pesticides as part of the research trials.

Although AID will not have control over the use of these pesticides and fertilizers, several circumstances suggest that any hazards to man and his environment can be reduced, minimized, or eliminated. Firstly, the U.S.-funded long-term technical consultant under this project will be expected to advise the GOCV on sound environmental practices, and this requirement will be a part of the Scope of Work in any PIO/T that is prepared. Secondly, the AID-funded Regional Food Crop Protection and Integrated Pest Management projects are helping to strengthen the National Crop Protection Service through a program of technician training, construction, and commodity inputs. Crop Protection technicians have received training in approved methods and optimal timing of product application, personal safety measures, and proper storage procedures. AID-funded warehouses have provided secure storage structures away from inhabited areas, and AID-financed commodities have included safety masks, glasses, and clothing. In addition, the Regional Food Crop Protection Project and a West German-financed project are conducting research on biological control of insect pests in an attempt to reduce dependence on pesticides.

C. Atmospheric

The project should have no significant atmospheric effects. No air additives, no noise pollution and no air pollution will result.

D. Natural Resources

The minor natural resources impacts are use of water, discussed above, and the commitment of land. The uses of land and water are not irreversible or irretrievable.

E. Cultural

No cultural impact is foreseen. There will be no altering or destroying of important physical symbols or dilution of the Cape Verdean culture since the introduction of new agricultural technical packages or crop production practices will be done only after testing under Cape Verdean farm conditions with full popular participation.

F. Socio-Economic

The primary purpose of this project is to improve changes in the socio-economic growth and development patterns. Desired increases in food production should yield increases in farm incomes, and some changing patterns of consumption associated with rising incomes. The economic return of research and development is difficult to quantify and measure. No dramatic short term income increases are expected; no disorientation of Cape Verdean society is foreseen. Some changes in socio-economic organization, such as formation of farming cooperatives, are a possibility.

Rural urban migration resulting from changing agricultural economies is occurring. If the project can demonstrate increased yields and farm profitability through improved cultural practices and technical packages, this migration might be somewhat reduced. On the other hand, increased efficiency of land use, particularly on irrigated perimeters, could create a small amount of rural unemployment or underemployment. On balance, a changing production function, a part of which can be attributable to this project, should have little net effect on population movements or resettlements. Slowly rising farm incomes should have a generally salutary effect.

G. Health

Any health impact foreseen is positive, such as better nutrition from a wider or more readily available selection of food crops. Any increase in farm incomes from improved yields can marginally contribute to a family budget for better health care. The irrigated perimeters will not result in standing water for any period of time and increase in transmission of water-borne diseases seems very remote. No AID funds will be used for chemical additives, pesticides, or fertilizers. (See also paragraph E above).

H. General/Miscellaneous

There are no significant political issues of local or national interest. The question of using irrigated lands for sugar cane production, which is extensively used to make a distilled hard liquor, is frequently discussed. It is noted, however, that AID will finance no research into sugar cane production. The limited effect of this project on the United States and other nations is related to reduced food donations and food imports from these countries. Depending on the citizen's view as taxpayer or producer or merchant, the possible effects are positive or negative.

The activities of this project are intended to be a part of a larger program generally defined as a program to reduce food imports and increase food production. As the project is basically an institutional project on a small area of land, it will have only indirect effects in terms of direct production. To the extent that improved cultural practices and technical packages can be developed, disseminated, and accepted, this project can have a growth and multiplier effect over a longer term on the Cape Verde population and economy. The expansion effects on a macro-level would simply be a multiple of the effects on the small agricultural producer, and the effect on national growth should not require a full-blown appraisal of the environmental impact.

IV. Impact Identification and Evaluation FormImpact Areas and Sub-areas

Impact Identification and Evaluation 1/

A. Land Use

1. Changing the character of the land through:

- a. Increasing the population
- b. Extracting natural resources
- c. Land clearing
- d. Changing soil character

N
L
N
L

2. Altering natural defenses

L

3. Foreclosing important uses

N

4. Jeopardizing man or his works

N

B. Water Quality

1. Physical state of water

L

2. Chemical and biological states

L

3. Ecological balance

L

1/ see next page

C. Atmospheric

- | | |
|--------------------|----------|
| 1. Air additives | <u>N</u> |
| 2. Air pollution | <u>N</u> |
| 3. Noise pollution | <u>N</u> |

D. Natural Resources

- | | |
|--|----------|
| 1. Diversion, altered use of water | <u>L</u> |
| 2. Irreversible, inefficient commitments | <u>N</u> |

E. Cultural

- | | |
|------------------------------------|----------|
| 1. Altering physical symbols | <u>N</u> |
| 2. Dilution of cultural traditions | <u>N</u> |

F. Socio-economic

- | | |
|--|----------|
| 1. Changes in economic/employment patterns | <u>M</u> |
| 2. Changes in population | <u>N</u> |
| 3. Changes in cultural patterns | <u>L</u> |

G. Health

- | | |
|-------------------------------------|----------|
| 1. Changing a natural environment | <u>N</u> |
| 2. Eliminating an ecosystem element | <u>N</u> |

H. General

- | | |
|---------------------------|----------|
| 1. International impacts | <u>N</u> |
| 2. Controversial impacts | <u>N</u> |
| 3. Larger program impacts | <u>M</u> |

 1/ Use the following symbols : N = No environmental impact
 L = Little environmental impact
 M = Moderate environmental impact
 H = High environmental impact
 U = Unknown environmental impact