

**OFFICIAL PROJECT  
DOCUMENT**

**PROJECT PAPER**

**CAPE VERDE  
WATERSHED DEVELOPMENT  
(655-0013)**

**AGENCY FOR INTERNATIONAL DEVELOPMENT**

**Submitted: April 9, 1984**

**UNCLASSIFIED**

PROJECT DATA SHEET

OFFICIAL PROJECT DOCUMENT  
 Amendment Number  
 DOCUMENT CODE 3

1. TRANSACTION CODE

A = Add  
 C = Change  
 D = Delete

COUNTRY/ENTITY: CAPE VERDE

3. PROJECT NUMBER: 655-0013

4. BUREAU/OFFICE: AFRICA 06

5. PROJECT TITLE (maximum 40 characters): WATERSHED DEVELOPMENT

6. PROJECT ASSISTANCE COMPLETION DATE (PACD): MM DD YY 09 30 88

7. ESTIMATED DATE OF OBLIGATION (Under "B" below, enter 1, 2, 3, or 4)  
 A. Initial FY 84 B. Quarter 3 C. Final FY 87

8. COSTS (\$000 OR EQUIVALENT \$1 = )

A. FUNDING SOURCE	FIRST FY 84			LIFE OF PROJECT		
	B. FX	C. L/C	D. Total	E. FX	F. L/C	G. Total
AID Appropriated Total	1,611		1,611	5,500		5,500
(Grant)	(1,611)	( )	(1,611)	( 5,500 )	( )	( 5,500 )
(Loan)	( )	( )	( )	( )	( )	( )
Other U.S. 2 IPI.480, Title II, Sec. 206					7,800	7,800
Host Country						
Other Donor(s)						
<b>TOTALS</b>	<b>1,611</b>		<b>1,611</b>	<b>5,500</b>	<b>7,800</b>	<b>13,300</b>

9. SCHEDULE OF AID FUNDING (\$000)

A. APPROPRIATION	B. PRIMARY PURPOSE 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	1. Grant	2. Loan
(1) SH	B233	090				5,500		5,500	
(2) PI.480	B263	090				7,800		7,800	
(3)									
(4)									
<b>TOTALS</b>								<b>13,300</b>	

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each)

060

11. SECONDARY PURPOSE CODE

12. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each)

A. Code ENV. LAB BR  
 B. Amount

13. PROJECT PURPOSE (maximum 480 characters)

To develop and protect the soil and water resources in the project-designated watersheds.

14. SCHEDULED EVALUATIONS

Interim MM YY 10 8 6 Final MM YY 8 8

15. SOURCE/ORIGIN OF GOODS AND SERVICES

000  941  Local  Other (Specify)

16. AMENDMENTS/NATURE OF CHANGE PROPOSED (This is page 1 of a \_\_\_\_\_ page PP Amendment.)

17. APPROVED BY:

Title: Acting Country Development Officer USAID/Praia

Date Signed: MM DD YY 04 05 84

18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION: MM DD YY 04 05 84

PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS

COUNTRY: Republic of Cape Verde

PROJECT: Cape Verde Watershed Development

PROJECT NO: 655-0013

Pursuant to Part I, Chapter I, Section 121 of the Foreign Assistance Act of 1961, as amended, I hereby authorize a Grant to the Government of Cape Verde, the "cooperating country" of not to exceed one million six hundred eleven thousand United States dollars (\$1,611,000) to help in financing certain foreign exchange and local currency costs of goods and services required for the project as described in the following paragraphs.

The project consists of providing technical assistance, training and commodities funded under development assistance, and rural worker salaries funded under a PL 480 Title II, Section 206 agreement to develop and protect the soil and water resources in designated watersheds, (hereafter referred to as the "Project"). I approve the total level of A.I.D. appropriated funding planned for this Project not to exceed five million, five hundred thousand United States dollars (\$5,500,000), Grant, including the amount authorized above, during the period of FY 1984 through FY 1987, subject to the availability of funds in accordance with the A.I.D. allotment procedures.

I hereby authorize the initiation of negotiation and execution of the Project Agreement by the officer to whom such authorization has been delegated in accordance with A.I.D. regulations and Delegations of Authority subject to the following essential terms and concurrent and major conditions, together with such other terms and conditions as A.I.D. may deem appropriate.

1. Goods and Services

Goods and services, except for ocean shipping, financed by A.I.D. under the Project shall have their source and origin in the cooperating country or in countries included in A.I.D. Geographic Code 941 except as A.I.D. may otherwise agree in writing. Ocean shipping financed under the Grant shall be procured in the U.S. or in the Cooperating Country except as A.I.D. may otherwise agree in writing.

2. Condition Precedent to Disbursement

No project funds may be disbursed under the Development Assistance account until the Transfer Authorization for the PL 480 Title II, Section 206 agreement is negotiated and signed by both the U.S. and the Government of Cape Verde.

Covenants

The Project Agreement shall contain the following covenants providing in substance as follows:

1. The GOCV agrees to establish a separate account for the local currency proceeds generated by the sale of the PL 480 commodities.
2. The GOCV further agrees to transfer all unexpended local currency remaining in the Food for Development account to the new account upon 1984 year-end accounting.
3. The GOCV will formalize the administrative structure set forth for implementing the project (see Administrative Analysis).

---

Date

---

Alexander Ray Love  
Acting Assistant Administrator  
for Africa

UNITED STATES INTERNATIONAL DEVELOPMENT COOPERATION AGENCY  
AGENCY FOR INTERNATIONAL DEVELOPMENT  
WASHINGTON, D.C. 20523

TRANSFER AUTHORIZATION

Section 206  
Food for Development

AID No. xxx-xxx-xxx-xxxx

Executive Vice President  
Commodity Credit Corporation  
U.S. Department of Agriculture  
Washington, D.C. 20520

Program Approval Dated:

Program Title: Section 206  
Watershed Development: Soil  
and Water Conservation; Employment  
Generation and Data Collection and  
Analysis

In accordance with the provisions of Title II, PL 480 (as amended),  
Section 1-201 of Executive Order 12220 and International Development  
Cooperation Agency Delegation of Authority No. 5 (effective June 27, 1980)  
the Commodity Credit Corporation (CCC) is hereby authorized to transfer  
and deliver food grain to the Government of Cape Verde in an amount  
estimated at \$7,800,000 pursuant to the following instruction:

- I. Quantity - Metric tons not to exceed:
- |                      |                |
|----------------------|----------------|
| USG fiscal year 1985 | 15,000 MT corn |
| USG fiscal year 1986 | 15,000 MT corn |
| USG fiscal year 1987 | 15,000 MT corn |
| USG fiscal year 1988 | 15,000 MT corn |

II. Commodity to be Shipped:

Code	Commodity	Amount (metric tons)	Estimated Value \$
044.0020	corn	60,000	7,800,000

III. Estimated Ocean Transportation Costs: \$6,000,000

All actual ocean transportation expenditures under this program,  
regardless of the estimate shown above, are to be charged to the  
blanket Freight Authorization No. 935-9500-000-2899.  
AID No. XXX-XXX-XXX-XXXX

IV. Specifications:

Corn - #2 or better, USDA specifications

V. Shipping Instructions:

A. Delivery Schedule and Port of Discharge:

-- 15,000 MT each fiscal year for Praia and/or Mindelo as  
rec red.

B. Consignee: EMPA - Empresa Publica de Abastecimento  
Ministerio da Economia e Financas  
P.O. Box 107  
Praia, Republica de Cabo Verde

C. Send copies of Bills of Lading to:

1. Original and two copies to consignee via air mail.
2. Original and two copies to Consignee accompanying cargo.
3. Original and two copies to SER/COM/TR, Agency for International Development, Washington, D.C. 20523
4. Original and two copies to AmEmbassy, Praia, Republica de Cabo Verde via airmail.

VI. Program Objectives - Use of Commodities and Conditions of Transfer:

The commodity authorized herein is contributed by the United States Government (USG) to the Government of the Republic of Cape Verde (GOCV). Funds generated from the sale of these commodities will be used for soil and water conservation activities. The use of these funds will be for program objectives that are fully described in the Watershed Development project paper (655-0013), of which this assistance constitutes a component. The Watershed Development Project contains Development Assistance funding to provide technical assistance, training, commodities and other project-related FX costs necessary for the support of activities financed by the local currency generations under this Transfer Authorization. This Transfer Authorization should, therefore, be considered a part of the Watershed Development Project which is an integral part of the general U.S. supported assistance program. All local currencies that remain undisbursed on January 1, 1985 under TA 2606, approved June 1, 1982, shall be used in accordance with the provisions of this Transfer Authorization.

- A. The GOCV may, for the purposes indicated in B below, sell up to 100 percent of the commodity. However, the GOCV may provide portions of the grant food without cost to those persons unable to buy food. The GOCV will communicate in writing to USAID for approval of the proposed selling price of the commodity and any future proposed changes in that price. The GOCV shall have as a target maintenance of a price that equals the local currency value of the world market price of the commodity plus the amount incurred by EMPA in handling, storage and internal distribution. It shall be the responsibility of the USAID to monitor GOCV compliance with this condition, and to advise the GOCV from time to time on its attempts in meeting this condition.

B. All local currency proceeds from the sale of commodities shall be deposited in a separate PL 480 account from which two types of transfers will be authorized:

To pay authorized storage, handling and distribution costs of the following types:

Direct costs of storage, transportation and distribution of commodities throughout the country. These costs are established at 2110 escudos per metric ton in March 1984.

The depreciation charges for the port silos at Mindelo and Praia. These charges are set at 590 escudos per metric ton. Proceeds from these charges will be either placed in a separate depreciation account against future replacement structures or used for new storage construction, improvement in present storage facilities, or repair and maintenance of existing storage facilities. The intent should be to maintain or increase the capital base in storage facilities or other facilities used for improving food distribution in Cape Verde. The GOCV shall submit an annual report to USAID on the status of these generations, and their planned and actual utilization.

Indirect costs and margins of EMPA. These costs and margins are established at 600 escudos per metric ton in March 1984.

The GOCV will report to USAID annually on the composition of these charges in a degree of detail that is determined by USAID, and that is not deemed unreasonable by usual accounting and reporting requirements. In addition, the GOCV agrees to permit USAID, or such certified accountants as USAID may choose, to perform such audits or examinations of accounts and accounting documents as USAID may deem necessary to comply with Congressional reporting.

2. To pay authorized costs of the following project activities:

Contour Furrows - Based on the watershed plans, the project will target approximately 7,500 hectares of agricultural land to be treated with contour furrows. With approximately 30 meters of furrows requiring one worker-day to complete, this will employ about 1500 workers each project year and cost about 22,200 escudos per hectare.

Rock Stabilized Terracing - Rock walled or rip-rap terraces will be constructed as another level of conservation treatment. These are basically a deep cut in the slope with fill stabilized by rocks. Terraces are most effective when they function as contour furrows with sufficient basin storage capacity. They will be designed to store about 35 mm of run-off between terraces. The terrace basins will also be tied each 5-6 meters to prevent cross-slope flow. Two meters of rock-walled terrace requires one worker-day to build.

The project will finance the construction of rock-stabilized terraces on approximately 1,000 hectares, employing 500 workers annually.

Check Dams - Check dams will be constructed in ravines, in lateral valleys and in the main ribeira channels. The major purpose of these dams is torrent control and channel stabilization. Check dams are a standard soil and water conservation methodology, and their effects in stabilizing channels, increasing and storing infiltration and collecting arable alluvium are well understood in Cape Verde. The project will finance the construction of approximately 2,600 check dams over the four years. The dams will average about 40 cubic meters of dry masonry rock work, 12 cubic meters of which will be reinforced in gabion cages in the dam's apron and downstream foundations. The spillways will be sealed and reinforced with 8 cm of concrete. Thus, the average dam will require approximately 40 cubic meters of rocks, 8 gabion cages, 5 sacks of cement and 850 work days. The construction of check dams will therefore employ about 2,000 workers per year.

Subterranean Catchment Dams - Evaluations of previous U.S. funded projects have concluded that subterranean catchment dams have had the largest direct effect on agriculture in the watershed. Increased water availability from these dams has enabled increased production on existing, temporary irrigated areas and resulted in 55 hectares of new land being brought into irrigated production. Subterranean dams seldom exceed 15 meters in length although their depth may attain 6 meters. Several factors are critical to their effectiveness: The depth, shape and permeability of the bedrock formation, the impermeability of the dam surface and seal to bedrock, and where appropriate, a properly graded filter bed at drains. Ten subterranean catchment dams are expected to be constructed. Although several sites have been suggested, no positive investigation or identification has been made. Based on MDR information, subterranean dams average approximately 300 cubic meters of masonry construction and require about 400 tons of cement, although this should be increased to assure that sufficient cement is used to ensure an impermeable concrete lining. Construction of these dams should employ approximately 500 workers annually who will be paid out of PL 480 generations.

Channel Stabilization Groins and Embankments - These structures will be built exclusively of rock-filled gabion cages, and will be placed, as necessary, to protect irrigation systems, roadways, and public structures from bank erosion and changes in the major flood channels. The instability of the ribeira channel and banks during the flash floods is a constraint on investment in irrigation and seriously affects transport. Bank stabilization will be coordinated with any road construction in the project watersheds. It is estimated that approximately 4,000 meters of embankments and groins can be completed during the project which will require approximately 100 tons of gabion cages and will employ 300 workers annually.

Vegetative Soil and Water Conservation Measures - As recommended under the current projects, the implementation of vegetative soil and water conservation will continue at an estimated level of 1,000 person days/year. The planting of trees and congo beans is used to complement physical structures, and provides a future source of fuel wood and fodder. USAID monitoring will be carried out by the contract sylvo-pastoralist.

Miscellaneous Structures - The construction of several types of smaller structures are also planned by the MDR's soil and water conservation service. They include four 100 cubic meter masonry reservoirs, 10 10 meter deep hand dug wells, and twenty minor roadway drainage structures.

3. EMPA may transfer funds from the PL 480 account to other EMPA accounts to cover the types of costs described in Para B1 above. EMPA will transfer all other funds to a separate PL 480 National Development Fund Account to cover the rural development costs described.

The PL 480 local currency generations will be used for payment of workers salaries in the above-defined conservation structures. These figures of labor requirements are approximate, and are used for budgetary planning. They are based on the MDR's construction data. Final quantities will vary somewhat depending on the modified standard designs developed by the MDR and the exigencies of particular sites. The estimates give a total employment of 5,000 workers for 25 days per month over a 12 month period each year, or 1,250,000 worker days annually. The actual number of workers will vary, as it is not expected that a constant work force of 5,000 persons would be employed everyday. Past experience has shown that employment levels vary throughout the year depending on such things as the agricultural work cycle. Holidays will also reduce the total number of days worked in any given month. Regular workers will also be given a bonus each year of 3/4 of a month's salary. Thus variations from 3,000 to as many as 7 - 8,000 workers would be expected.

#### VII. PL 480 Food for Development Program - Indicative Budget

The following estimated budget has been prepared for indicative planning purposes. It is realized that the elements of this budget may change due to changes in commodity prices, exchange rates, and costs of storage, transportation and distribution of commodities. The GOCV and USAID should revise these estimates on an annual basis to assure achieving, to the maximum extent possible, the objectives of this project. Costs are given in thousands of Cape Verdean escudos, with an exchange rate of 78 escudos per U.S. dollar. Figures in parentheses ( ) are thousands of U.S. dollars.

	<u>Y1</u>	<u>Y2</u>	<u>Y3</u>	<u>Y4</u>	<u>Tot</u>
A. Estimated Revenues (Dollars)	165,000 (2,115)	165,000 (2,115)	165,000 (2,115)	165,000 (2,115)	660,000 (8,460)
B. Deductions					
Handling & Distr. (Dollars)	31,650 (406)	31,650 (406)	31,650 (406)	31,650 (406)	126,600 (1,624)
Depreciation (Dollars)	8,850 (113)	8,850 (113)	8,850 (113)	8,850 (113)	35,400 (452)
EMPA, INDIRECT (Dollars)	9,000 (115)	9,000 (115)	9,000 (115)	9,000 (115)	36,000 (460)
Total Deductions (Dollars)	49,500 (634)	49,500 (634)	49,500 (634)	49,500 (634)	198,000 (2,536)
C. Net for Development (Dollars)	115,500 (1,481)	115,500 (1,481)	115,500 (1,481)	115,500 (1,481)	660,000 (5,924)

d. Projects

a. Contour Furrows	33,750	33,750	33,750	33,750	135,000
b. Rock Terraces	11,250	11,250	11,250	11,250	45,000
c. Check Dams	45,000	45,000	45,000	45,000	180,000
d. Subterranean Dams	11,250	11,250	11,250	11,250	45,000
e. Channel Groins	6,750	6,750	6,750	6,750	27,000
f. Misc. Structures	4,500	4,500	4,500	4,500	18,000
SUB TOTAL	101,250	101,250	101,250	101,250	405,000
(Dollars)	(1,298)	(1,298)	(1,298)	(1,298)	(5,192)
g. Unallocated	14,250	14,250	14,250	14,250	57,000
(Dollars)	(183)	(183)	(183)	(183)	(732)

Budgeting for local currency generations has been done on the basis of daily wage rates averaging 90 escudos per worker for 25 days of work per month for a period of ten months. The above indicative budget contains no provisions for increasing workers wages over the project period. Increases in wages have been offset in the past by changes in the exchange rate.

#### VIII. Development Fund and Controls

- A. Total funds from the sales of commodities net of internal storage, transportation and handling costs and any free distribution of commodities to the exceptionally needy, shall be deposited in the USAID PL 480 Watershed Development Account with the National Development Fund. The funds shall be deposited according to a commodity sales flow as reported by EMPA, and a specified schedule tied to the project expenditure requirements as agreed upon by USAID and the GOCV. The National Development Fund shall submit to USAID a quarterly statement on the funds it has deposited into the account and disbursed to the project. These reports will be checked against the quarterly project progress reports submitted by the Ministry of Rural Development and their respective expenditures. At the end of each program year, project expenditure requirements will be compared to the sales revenue deposits to determine the outstanding balance, if any, to be credited to the account. Any remaining funds in the account will either (a) be credited to the subsequent program year, or (b) be programmed to other mutually agreed upon activities.
- B. If at any time an advance is required to alleviate the delays in payment of rural worker salaries, EMPA will deposit an amount of money equivalent to three months expected salary and material purchase expenditures (approximately \$400,000). It will be EMPA's responsibility to maintain this level of advance on average over each calendar quarter.
- C. EMPA shall deposit the net revenues generated from the sale of PL 480 corn at a rate which will be determined, with approval from USAID, prior to each program year, for the shipments of corn for that year. The rate set each year will be a target rate reflecting the world price of corn and the historical experience of EMPA for direct and indirect handling and distribution costs. Free distributed grain will be an exception to this provision as noted in "D" below. The National Development Fund will be responsible for the management of the account, depositing revenues received and disbursing revenues to finance implementation of the agreed projects. EMPA will be responsible for managing grain stocks from time of delivery at Praia or Mindelo ports to points of sale, and for accounting for generated currencies until their deposit with the FND. EMPA will also be responsible for accounting for the funds used to cover the direct and indirect costs of handling and distribution of the commodities, and the uses of the depreciation funds.

D. The GOCV may determine that needy persons without resources to procure foodstuffs may receive a portion of the commodities free. It will be the responsibility of the Ministry of Health and Social Affairs to determine the need for and amount of free commodities to be given to individuals or families and to request EMPA to make such commodities available to those determined in need. In this case, EMPA may deduct the cost of handling and distribution from other sales revenues, but is not obligated to deposit the net value in the PL 480 account. The Ministry of Health and Social Affairs will report to USAID on the type and quantity of commodity distributed free each quarter. EMPA will report to the FND and USAID the type and amount of commodities transferred for free distribution, the value of the commodities and the amounts deducted for internal handling and distribution costs. If and when necessary, the GOCV and USAID shall adjust project objectives to reflect the decreased revenues caused by the free distribution of commodities.

#### IX. Self Help Measures

The GOCV, in conformity with the principal outlines of its agricultural and food policies, will undertake self-help measures to improve the production, storage and distribution of agricultural commodities. In this sense, the GOCV will undertake the following activities, and in so doing will provide adequate financial, technical and managerial resources for their implementation:

##### 1. Storage and Distribution Infrastructure for Food Commodities:

Utilize the accumulated capital depreciation funds for the improvement of existing storage and distribution structures or the construction of new structures.

Benchmark: By January 1, 1985, the GOCV will submit a plan to USAID for the utilization of funds to be accumulated over the life of this project. By January 1 of each subsequent year, the GOCV will report on the actual utilization of funds over the previous year and submit an updated plan for the following years.

##### 2. National Food Policy:

The GOCV will undertake to develop a long range policy to address the problem of the structural deficits in the food balance.

Benchmark: In consultation with the U.S. Government, the GOCV will develop a proposal to address, as a national food policy issue, meeting the country's food requirements in 20 years. The plan should include the means for studying the macro level issues, setting the development and investment targets and locating the capital for implementing the policy. The target should be a national policy position by the end of this project (1988) that will provide guidance for the GOCV and foreign donors.

- X. The U.S. Government will supply the commodities specified herein and pay the ocean freight and independent survey report costs to designated points of entry in Cape Verde
- Xi. The GOCV agrees to keep USAID fully informed concerning the status of commodity receipts, distribution and sales, and will provide complete details, as requested. Representatives of the U.S. Government will be permitted to audit and have access to all records pertaining to the use of commodities and local currency generations provided by the Transfer Authorization. The GOCV agrees to submit quarterly reports to the USAID/Praia including the following:
- a. Beginning Stocks
  - b. Arrivals
  - c. Distributions
  - d. Sales
  - e. Damaged or Lost Stocks
  - f. Ending Stocks
  - g. Currency Generated and Interest Accrued, if any,
  - h. Deposits and Disbursements and Uses of Generated Funds

XII. Amendments

The above terms may be amended upon request of the GOCV with concurrence of USAID and upon cabled concurrence of AID/Washington.

- XIII. In the event of conflict between the Portuguese and English versions of this Agreement, the English version will prevail.

XIV. Request and Acceptance:

The Assistance described in this Authorization is hereby requested and the terms and conditions of the agreement and of AID Regulation 11, 44F.R. 34034-34-45, June 13, 1979, except as otherwise specifically provided herein, are hereby accepted.

---

Date

---

For the Government of the United  
States of America

---

Date

---

For the Government of the Republic  
of Cape Verde

List of Acronyms

AGRHYMET

DA	Development Assistance
DEA	Departamento de Extensao e Animacao (Department of Extension and Animation)
EEC	European Economic Community
EMP	Empresa de Abastecimento (GOCV Importing and Marketing Agency)
FAO	Food and Agriculture Organization
FAP	Fomento Agro-Pecuarria (Agriculture and Livestock Development)
F.A.S	Free Along Side
FCR	Food Crop Research
FOB	
FFD	Food for Development
FND	Fundo Nacional de Desenvolvimento (National Development Fund)
GEP	Gabinete de Estudos e Planeamento (Office of Studies and Planning)
GIR	Gabinete de Inqueritos Rurais (Office of Rural Surveys)
GTZ	West German Assistance Program
ICRISAT	International Crop Research Institute for the Semi-Arid Tropics
MDR	Ministerio do Desenvolvimento Rural (Ministry of Rural Development)
MEF	Ministerio da Economia e Financas (Ministry of Economy and Finance)
PL480	Public Law 480

SECP	Secretaria de Estado de Cooperacao e Planejamento (Secretary of State for Cooperation and Planning)
SWC	Soil and Water Conservation
UNDP	United Nations Development Program
RAP	Rural Assistance Program

TABLE OF CONTENTS

EXECUTIVE SUMMARY. . . . .1

PROJECT RATIONALE. . . . .7  
Introcuton. . . . .7  
Rationale. . . . .7  
Relationship to Agency Policy. . . . .8  
Project Area . . . . .11

PROJECT DESCRIPTION. . . . .13  
The Project Goal . . . . .13  
The Project Purpose. . . . .13  
Project Outputs. . . . .14  
Intermediate Output. . . . .16  
Inputs . . . . .17  
Project Beneficiaries. . . . .17  
Participants and Responsibilities. . . . .18  
Other Donor Activities in Watershed Conservation . . . . .19  
Land Reform in Cape Verde. . . . .20

COST ESTIMATES AND FINANCIAL PLAN. . . . .21  
PL 480 Local Currency Expenditures . . . . .21  
Summary of Cost Estimates and Financial Plan . . . . .24  
Costing of Project Outputs/Inputs. . . . .25  
Projection of Expenditures by Fiscal Year. . . . .26

TECHNICAL ANALYSES SUMMARIES . . . . .30  
Engineering Analysis . . . . .30  
Economic Analysis. . . . .31  
Watershed Monitoring . . . . .32  
Environmental Analysis . . . . .32  
Financial Analysis . . . . .32  
Sociological Analysis. . . . .33  
Administrative Analysis. . . . .33

CONDITIONS AND COVENANTS . . . . .34  
Conditions Precedent . . . . .34  
Covenants. . . . .34

TECHNICAL ASSISTANCE PLAN. . . . .35  
Introduction . . . . .35  
Long-term Technical Assistance . . . . .35  
Short-term Technical Assistance. . . . .39

TRAINING PLAN. . . . .42

EVALUATION PLAN. . . . .44  
Annual Evaluation. . . . .44  
Project Mid-term Evaluation. . . . .45

PROCUREMENT PLAN . . . . .	.46
Responsibilities . . . . .	.46
Commodity Procurement . . . . .	.46
Commodity Eligibility . . . . .	.46
Shelf-Item Procurement . . . . .	.47
Title to Commodities . . . . .	.48
Waivers . . . . .	.48
Local Cost Procurement . . . . .	.48
Commodity List . . . . .	.48
 FUNDING WORKER SALARIES (Graph) . . . . .	 .53
 IMPLEMENTATION PLAN . . . . .	 .54
 PL 480 TITLE II, SECTION 206 . . . . .	 .56
Introduction . . . . .	.56
The Food Balance Sheet . . . . .	.59
Infrastructure . . . . .	.63
Handling, Storage and Transport Costs . . . . .	.69
 Annex A - Logical Framework . . . . .	 .79
Annex B - PID Approval Cable . . . . .	.80
Annex C - Design Team Membership . . . . .	.84
Annex D - 611(e) Certification . . . . .	.85
Annex E - Engineering Analysis . . . . .	.86
Annex F - Economic Analysis . . . . .	100
Annex G - Social Soundness Analysis . . . . .	116
Annex H - Extension Analysis . . . . .	123
Annex I - Agronomic Considerations . . . . .	134
Annex J - Watershed Monitoring Analysis . . . . .	139
Annex K - Financial Analysis . . . . .	153
Annex L - Administrative Analysis . . . . .	166
Annex M - Environmental Analysis . . . . .	172
Annex N - B/G Request for Assistance . . . . .	178
Annex O - Statutory Checklist . . . . .	179

EXECUTIVE SUMMARY

As per State 224906(83), this project paper, entitled Cape Verde Watershed Development (655-0013), submitted to AID/W for review, is summarized as follows:

(A) Grantee or Borrower

Republic of Cape Verde (GOCV)

(B) Implementing Agency

Ministry of Rural Development (MDR)

(C) Financial Plan

Development Assistance Component (LOP)	\$5.5 million
-- Technical Assistance	(\$1.7 million)
-- Training	(\$0.6 million)
-- Commodities	(\$1.6 million)
-- Contingency/Inflation	(\$1.4 million)*

PL 480 Title II, Section 206	
--local currency equivalent of approximately	\$7.8 million

TOTAL LOP FUNDING	\$13.3 million
-------------------	----------------

(D) Term of Project

Project Activities Completion Date (PACD)	September 30, 1988
-- Development Assistance funding year	FY84 - FY87
-- PL 480 Program years	FY85 - FY88

(E) Description of Project

The proposed Cape Verde Watershed Development Project (655-0013) combines PL 480 Title II, Section 206 local currency with a Development Assistance Project to focus on the protection of the soil and water resources of part of Santiago and Santo Antao Islands. This project is spawned from two current projects with similar objectives - Watershed Management (655-0006) and Food for Development (655-PL01). Both projects aim at strengthening agricultural production potential through labor-intensive construction of soil and water conservation structures: Watershed Management through foreign exchange in a limited number of watersheds and Food for Development, exclusively through local currency funding of rural workers salaries. This project seeks to continue the soil and water conservation project emphasis in an expanded area, in a mutually supportive project framework of foreign exchange and local currency funding.

\* Contingency includes freight, insurance, PSA fixed fee contract for commodities and inflation.

(F) Purpose of Project

The project purpose reads:

"to develop and protect the soil and water resources in project-designated watersheds".

(G) Background of Project

The proposed project is the result of two successful projects in USAID/Praia's bilateral portfolio: Watershed Management (655-0006) and Food for Development (655-PL01). Both projects will terminate by 3/31/85. Both projects have received favorable evaluations in the recent past (Watershed Management - 12/82, and Food for Development - 10/83). Both projects were scheduled for continuation in the FY85 Cape Verde Annual Budget Submission (ABS). The PID for the subject project postulated the melding of the two projects to accomplish a similar objective on a larger scale, maximizing the impact of the different funding sources. The PID review authorized submission of one Project Paper for review by AID/W and the OMB Food Aid Subcommittee.

(H) Whether Small, Small Disadvantaged and Women-Owned Firms have Been Considered

It is expected that project technical assistance will be contracted on a competitive basis. The Mission, however, sees no reason why achievement of stated project purpose should exclude small, small disadvantaged and women-owned firms.

(I) Waivers Required

A waiver is required to include partially-government owned firms in bidding for local construction of storage and small office buildings. Justification is included in the Procurement Plan.

(J) Major Conditions Precedent and Covenants

There is one Condition Precedent to the Project:

"No project funds may be disbursed under the Development Assistance account until the Transfer Authorization for the PL 480 Title II, Section 206 agreement is negotiated and signed by the U.S. and the Government of Cape Verde."

The following Covenants have been discussed with the GOCV and are included in the Project:

1. The GOCV agrees to establish a separate account for the proceeds of the PL 480 commodities;
2. The GOCV further agrees to transfer all Food for Development local currency to the separate account after 1984 year-end accounting; and,
3. The GOCV will formalize the administrative structure set forth for implementing the project.

(L) List of Project Team Members

The expatriate technical assistance will consist of the following:

Long-term

Watershed Management Specialist/Team Leader	3 years
Community Development/Extensionist	2 years
Agricultural Engineer	1 year
Sylvo-Pastoralist	1 year

Short-term

Hydrologist/Geological Engineer  
Extension Training Specialist  
Irrigation Engineer  
Financial Management/Auditing Specialist  
Aerial Photography

It is expect that a Food Monitor and an Administrative Assistant will be recruited locally.

(M) Technical Summary Findings

Engineering Analysis - Reviews the designs of structures, planning and management capability of MDR, and recommends commodities, training and relevant technical assistance. Findings:

1. Principles of soil and water conservation used by MDR are largely sound, but there is room for refinement;
2. Workers need increased physical support (tools, equipment, construction supplies) and more supervisors to provide direction;
3. Some technical assistance is necessary to improve upon design of certain structures; and,
4. Long-term training would improve Soil and Water Conservation Department's ability to manage projects.

Economic Analysis - Describes systematic conversion of grain donations into employment and soil and water conservation measures. Findings:

1. PL 480 corn does not create a disincentive to production;
2. PL 480 salaries contribute a large multiplier to strengthen local private enterprise;
3. Micro economic effects of salaries on workers' salaries can have major impact on nutrition, health and purchased agricultural inputs.
4. MDR's data collection/analysis divisions would benefit from additional training and project support.
5. Food aid does not appear to be inflationary.

Hydrological Analysis - Discusses the need for improved monitoring of hydrological information, specifically:

1. A network of rain gages will be set up on project and control watersheds;
2. Periodic technical assistance will be used to monitor GOCV data collection and analysis;
3. Long-term training would be provided in Hydrology.

Environmental Analysis - Reviews the project activities that may require further analysis and commends the soil and water conservation efforts of the project. Other findings include:

1. Risk analysis for proposed grain treatment pesticides on file in AID/W/S&T;
2. Training in application of pesticides may be available under Kansas State University's Cooperative Agreement AID/DSAN-CA-0256;
3. Construction of large water holding structures should not be project funded.

Financial Analysis - Reviews accounting procedures of GOCV import/export agency (EMPA) and investigates the flow of grain to local currency to payment of rural workers. Findings include:

1. EMPA is a parastatal organization (no alternatives exist) with an acceptable system of accounting that requires better monitoring by USAID;
2. Establishment of a separate account for PL 480 local currency will allow better access to accounting issues;
3. There is an issue of gross proceeds deposits and there is a related issue of late payment to rural workers. Solutions need to be worked out with the GOCV with the help of stronger USAID monitoring.
4. EMPA and project would benefit from periodic technical assistance

Sociological Analysis - Discusses the sociological implications of project with analysis of extension component. Findings as follows:

1. Maintenance and repair of SWC structures should involve local community groups and will be addressed during project implementation
2. Long-term technical assistance will be requested in Community Development/Extension;
3. Continued support of pilot extension program is warranted with somewhat increased commodity support and training;
4. This project will benefit from formal linkages to Food Crop Research (655-0011) and MDR Center for Agrarian Studies.

Administrative Analysis - Describes the entities involved in project implementation and offers a bi-level project implementation structure. Findings:

1. The GOCV is determined to implement the project cooperatively with the participation of EMPA (Import/Export Agency), MEF (Ministry of Economy and Finance), FND (National Development Fund), and MDR (Ministry of Rural Development). Their personnel are capable, and require only the services of a coordinator to facilitate flow in information; and,
2. The USAID management capacity depends on prompt replacement of the recently vacated Agriculture Projects Officer.

PL 480 Title II, Section - This section covers the PL 480-specific issues and documents the costs involved in corn shipment, storage, handling and distribution. This is followed by descriptions of the uses for the local currency and the self-help measures. Findings include:

1. Cape Verde qualifies as a chronic food importing country;
2. EMPA's overall cost structure for handling and distribution of donated corn appears to be reasonable;
3. EMPA should be required to reinvest depreciation funds in new warehouses, or repair existing warehouses; and,
4. In order to conform to other programs, the selling price of the corn should be increased to equal the world market price plus the cost on internal storage, handling and distribution. This could be done on a gradual basis.

(M) Project Issues

1. Handling costs of GOCV parastatal import/export agency - The main issue raised in the design is the question of whether the retail corn price should be raised sufficiently to absorb EMPA's handling costs, and, if it is raised, what use will be made of the additional funds. This issue requires further negotiations with the GOCV, both as to targets and strategy for raising the corn prices, and potential uses for the additional funds generated.

A decision to raise the corn price gradually over the life of the project to absorb all of EMPA's handling costs by EOP would increase total funds generated for development by about 20 percent.

2. Reconsideration of development activities - The design team adhered to the type of development activities already used in earlier projects. Suggestions of the GOCV to add components for construction of small dams and road projects were rejected. These and other alternatives to the type of SWC activities outlined in the Engineering Analysis need to be looked into further as another aspect of the continuing policy dialogue.

3. Maintenance and repair of structures - The issue of developing a maintenance system for SWC structures and improvements was addressed with a general formula for community participation proposed. The possibility of using generated funds to pay for the costs of community maintenance contracts during a trial period could utilize a substantial part of any additional funds generated through the sale of PL 480 corn.

## PROJECT RATIONALE

### Introduction

The proposed Cape Verde Watershed Development Project (655-0013) combines a Development Assistance project with PL 480 Title II, Section 206 local currency to focus on the protection of the soil and water resources of Santiago and Santo Antao Islands. The project is spawned from two current projects with similar objectives - Watershed Management (655-0006) and Food for Development (655-PL01). Both of these projects aim at strengthening the agricultural production potential through labor-intensive construction of soil and water conservation structures: Watershed Management through foreign exchange in a limited number of watersheds, and Food for Development exclusively through rural employment funded by local currency. This project seeks to continue the works in an expanded area, in a mutually supportive project framework of foreign exchange and local currency funding.

### Rationale

Almost since its inception, the USAID program in Cape Verde has supported projects of an agricultural/soil and water conservation nature. The need still exists to stabilize the agricultural land and protect the soil and water resources of the country. While having neither the land resources nor the rainfall patterns to become self sufficient in agricultural production, the Government of Cape Verde invests significant resources (20 - 30 percent of its Development Budget) into the agricultural development of the islands to preserve and improve the natural environment and maximize the benefits derived from the limited land and water resources. Emphasis is placed on increasing agricultural production and on long term investment in potentially productive agricultural land. The agricultural policy states the need for:

- (a) combatting desertification and ecological deterioration, whether the result of climatic conditions or human depredation; and,
- (b) generation of rural employment, both to offset agricultural production activities reduced during the drought and to expand rural participation in the rural economy.

Steep slopes, erratic rainfall, and occasional torrential downpours combined with a generally denuded landscape, give Cape Verde a fragile and vulnerable natural environment subject to erosion and excessive run-off. The very soil and water that is needed for agricultural production is being progressively lost. Through development of rural structures such as retaining walls, the project will help to decrease the erosive force of run-off, and thereby conserve Cape Verde's soil resources. At the same time, the structures will enhance infiltration of rainfall, supplying a greater recharge to underground water reserves. Increased recharge and capture of run-off will translate not only into more available water for irrigation, but also into less susceptibility to salt water intrusion into aquifers, and a greater supply of water for other non-agricultural uses. There are positive implications for vegetation and forests, livestock grazing, and social and institutional aspects.

As development is the realization of potentials as well as the resolution of problems, the project is well-directed given the present situation confronting Cape Verde. The project addresses the rural population, dependent on a fragile and deteriorating resource base for its livelihood and agricultural production. Effectively employing the rural population, and developing the resource base from which they must extract an existence, can eventually be complemented by other more diversified approaches to development.

This project is in strict accordance with the A.I.D. Strategy Statement and the FY85 Annual Budget Submission. The variation is in the melding of two funding sources combining \$5.5 million in Development Assistance and the local currency equivalent of approximately \$7.8 million generated through the sale of PL 480 commodities under a Title II, Section 206 program. As stated in the PID Issues Cable (State 038243), the proposed project "integrates food aid with development assistance to achieve maximum benefits".

#### Relationship to Agency Policy

In addition to supporting the AID Country Strategy, the proposed project is also directly supportive of Agency policy directives in private sector initiatives, institutional development, technology transfer, and promoting policy dialogue. The subject of recurrent costs will also be addressed.

Private Sector Initiatives - Project activities in support of private sector initiatives are as follows:

- a) Inland Distribution of PL 480 Commodities - Although the GOCV imports the PL 480 commodities through the Empresa Publica de Abastecimento (EMPA), a parastatal import/export agency, inland distribution is done privately. It is only through EMPA that commodities can be brought to port as the GOCV runs the entire shipping fleet. However, EMPA sells the grain to private vendors at the island ports for private distribution inland. Even at the two international ports in Praia and Mindelo, where EMPA has a truck fleet, land transportation is contracted privately.
- b) Grain Prices - As a result of the food aid program's success in policy dialogue, the PL 480 corn is being sold at, roughly, the world market price as established in the previous Transfer Authorization. This project seeks to maintain that parity.
- c) Multiplier Effect - The estimated multiplier effect of the salaries paid rural workers is 2.84. This money is reinvested in the local economy to the benefit of private entrepreneurs.

Institutional Development - Institutional development requires long term donor commitment rather than a shot-in-the-arm infusion of resources. USAID is committed to support for the Ministry of Rural Development and will continue these efforts in the proposed project through the following activities:

- a) Expanding Program Coverage - Through the assistance of USAID, the Soil and Water Conservation Program will expand to approximately fifteen different watersheds on Santiago and Santo Antao Islands;
- b) Technical Support - USAID will provide technical assistance to the MDR in data collection/analysis, mapping, watershed management, community development/extension, etc. to work closely with relevant MDR technical divisions in project implementation; and,
- c) Training and Skill Development - This project provides long-term training opportunities in specialized project-related disciplines (hydrology, physical geography) and improves skills through short term in-country and third country training (water harvesting, extension methods, construction supervision).

Technology Transfer - This project is based on implementation of present technologies of soil and water conservation, as they are already being practiced. However, these practices will be subject to analysis and subsequent modification by way of several procedures. Hence, the technology is self-correcting. The procedures are summarized as follows:

- a) The project keeps detailed records on comparative costs of alternative treatments, and will keep records also on results obtained by comparing water runoff and related indices in sub-watersheds of varying characteristics. From the analysis of this data, refinements of conservation methodology will be continually generated.
- b) Technical advisors on this project as well as those supported by other donors are alert to the relative advantages of different conservation methods. The Center for Agrarian Studies plans to have periodic meetings where representatives of all projects will share experiences.
- c) The Food Crop Research Project will be doing most of its field testing in the project area, and will include as relevant the evaluation of its technological components in arriving at recommendations for new technical practices.
- d) The extensionists on Watershed Development will be working with small farmers to suggest new practices, receive farmer feedback, and eventually to extend field-tested technologies suitable for broader application. They will also exchange experiences with extensionists from other donor-funded projects.

Policy Dialogue - Project activities in support of promoting policy dialogue are as follows:

- a) Food Pricing - Maintaining the price of corn at the world market price will require continued policy dialogue between the two governments. This is especially true as years of poor rainfall and the need for affordable food continue.
- b) Food Aid - The donation of food aid requires, by the nature of the legislation, that governments meet to discuss long term food requirements, and appropriate policies to meet those requirements. This project calls for the GOCV to outline long term strategies which will allow them to meet future food needs.

Recurrent Costs - Recurrent costs for the project are of three types: Cost of maintenance of soil and water conservation structures and other land improvements; Cost of maintaining the project staff and facilities in operation, particularly the extension component; and, The cost of providing employment to rural people so as to maintain their income.

As discussed in the Social Soundness Analysis, the maintenance responsibility for structures constructed by the project should involve the participation of community groups in the benefitted areas. Ideally, the MDR would contract maintenance responsibilities with such groups, who could be relied upon to perform necessary maintenance at a small fraction of the cost if the GOCV were to perform maintenance directly. The maintenance program must be worked out during implementation. Community maintenance by contract would involve a cost, but it would be relatively low, while the benefits should justify that investment.

In areas where the project is working, there will be an intensive program of soil and water conservation that will provide maximum employment to people in the area and, at the same time, lead towards watershed completion. The concept of completion is not defined clearly, but is believed to mean that most high priority SWC work (in terms of the current state of the art) will have been completed, leaving only a relatively modest residual which will be gradually continued, particularly as the state of the art evolves.

Therefore, a major recurrent cost of GOCV technical services is not foreseen with the exception of extension, which will be ongoing. The extensionists will be prominent in working with community groups and assisting them to take advantage of environmental improvements. The recurrent cost of the extension component will be justified in terms of the rate of participation of rural people in assuming responsibility and adopting technological change. The GOCV plans to incorporate all project extension components into a National Extension Service, the cost of which will eventually be borne by the GOCV.

Assuming the water resources will be generally more abundant in the project area in the future, first because of a return to "normal" rainfall, and second, because the SWC improvements effectively conserve more water, there will be more employment of farmers in their own agricultural pursuits. Conservation maintenance responsibilities will add to the employment of rural people as already discussed. This may still leave a portion of rural people who are structurally underemployed. For these people, part time work off the farm in public works, fishing, construction, and other urban pursuits is the obvious answer.

### The Project Area

The project area covers the eastern half and northwest corner of Santiago Island and part of the Island of Santo Antao. The geographical sub-unit for the project is the watershed river basin. In all, this project area includes 15. The watershed is a standard unit in soil and water conservation, as it provides a perimeter in which data such as rainfall, soil erosion rates, agricultural production may be collected discretely and applied back to the land in a meaningful way.

As stated, this project absorbs the past Watershed Management Project (655-0006) and Food for Development (655-PL01). The expansion is a result of the programmed food aid which allows for increased levels of rural employment and the increased support provided under this project. The GOCV estimates that within the project area, as defined, employment can be provided at up to 8,500 person years per year. With the increased technical support and in-country training provided by this project, the MDR will be able to utilize the increased availability of rural labor to reach more watersheds, and ultimately, to conserve and make available more water.



## PROJECT DESCRIPTION

Annex A provides a Logical Framework for the proposed project, initially developed during PID preparation and modified based on comments during the PID review as well as information obtained during the PP design. For project design purposes, this is a Development Assistance (DA) project supported by a PL 480 program, although the PL 480 component is of a greater monetary value.

### The Project Goal

"to stabilize the natural environment and increase agricultural production potential in the project area"

The goal is shared, in principle, by most of USAID/Praia's project portfolio. This project directly addresses the issue of environmental stabilization (soil and water conservation structures, collection and analysis of hydrological data), believed to be the key to an increase in agricultural production potential. The degree to which the potential is realized is dependent mainly on future rainfall. However, one can also expect a measurable increase in water infiltration and availability given whatever rainfall level.

Since achievement of the goal is of a more long range nature, the time-contingent assumptions are that:

- 1) International donor assistance to Cape Verde is consistent with, and funded in preparation for achievement of such a goal; and,
- 2) Health, population and migration trends favor agricultural production.

### The Project Purpose

"to develop and protect the soil and water resources of the project-designated watersheds"

The original Watershed Management project covered the following four watersheds: Ribeiras dos Flamengos, de San Miguel, dos Saltos and de Sta. Cruz. The food for Development Program covered these additional watersheds: Ribeiras San Francisco, dos Picos, Seca, do Mangue, Sao Felipe and Santo Domingos. The proposed project will include these, and be expanded to include: Ribeiras Barrata, Grande, Cuba, Principal, and the Tarrafal Region, thereby encompassing more than half of the island of Santiago and part of the island of Santo Antao.

The rationale for increasing the area of coverage is to continue to implement the "macro" soil and water conservation measures in new areas, such as dikes, catchment dams and contour furrows, while monitoring changes in the original watersheds.

To develop and protect the soil and water resources is to:

- become aware of the effects of time and neglect on the resources (monitoring, data collection and analysis);
- take conservation steps (soil and water conservation measures); and,
- begin integration of systems to maintain and utilize the resources wisely (extension and research linkages).

Hence, by the PACD, it is expected that a quantification of the improvement in soil and water resources will be possible; analysis of the resources will provide rational planning information; and, the watersheds with the most potential will have independent development plans based upon quantifiable conclusions. This project is also intended to employ 6000-7000 persons annually for four years. By the end of the project, it is anticipated that alternative sources of employment will have been identified and the need for this type of assistance will be reduced. The per capita impact of this project should be greater than either of the previous projects as the system is integrated to provide increased labor with appropriate levels of support through technical assistance, commodities and training.

#### Project Outputs

Expected outputs from the project, or "means" that will lead to the development and protection of soil and water resources are listed below. They are described in somewhat greater detail in the corresponding technical annexes.

1. Treat approximately 7,500 hectares with contour furrows - These are simple earthworks - ditches to decrease runoff and erosion, resulting in increased water infiltration. They are recommended by the FAO in reforestation activities for their low initial cost and high potential benefit.
2. Treat approximately 1,000 hectares with rock-stabilized structures - Rock-walled or rip-rap terraces are the next level of conservation treatment. They are basically a deep cut in slope and fill stabilized by rocks. These structures stop soil creep and increase infiltration.
3. Construct 2,600 check dams - The major purpose of these structures is torrent control and channel stabilization. Although they increase infiltration and store water for short periods, their prime function is to "check" the flow of water during the rain(s) and prevent downstream crop losses.
4. Construct 10 subterranean catchment dams - Evaluation of past projects states subterranean dams have the greatest direct impact on agriculture, by catching the subterranean or bed flow and making it immediately available for domestic and agricultural uses. Sizes and designs vary greatly to suit the hydrology of a site, which will be inspected by Agency representatives with the appropriate authority (REDSO).

5. Install 4,000 meters of embankment groins - Built with rock-filled gabion cages, embankment groins protect irrigation systems, roadways, and farm land from bank erosion and changes in major flood channels.
6. Augment physical structures with vegetative soil and water conservations - Vegetative soil and water conservation controls, such as tree planting, congo beans, etc. will be implemented by rural workers. The vegetative measures augment physical structures by providing windbreak, holding soil in place, and provide potential sources of fuel wood and fodder.
7. Train 6 persons in U.S. degree programs and short term opportunities - As described in the Training Plan, several U.S. degree participants are planned in water resources engineering, hydraulic engineering, geohydrology, physical geography and statistics. Short term training will include water harvesting, construction supervision, mapping, extension short courses and water modelling.
8. Support the pilot extension (rural assistance) effort until National Extension and Animation Service in fully operational - Under the MDR Farmer Support Program, the project will provide technical assistance to support the rural assistance in the field. The function of the agents is to extend limited technical assistance to farmers in the ribeiras, primarily in the area of soil and water resource utilization. They also provide a dynamic link to research as per the Food Crop Research Project (655-0011).
9. Support community-based water management committees - The project will provide community development technical assistance to specifically design and implement a program for maintenance and repair of SWC structures built under past as well as the proposed project. The program will be based on the existing community organizations called Water Committees and will be developed in accordance with the GOCV-approved principles of Community Development.
10. Foster the coordination of research and extension in soil and water research utilization - The existence of an AID-supported network of field agents and a separate Food Crop Research project will be formally linked in implementation. The research project will offer training opportunities to the rural assistance workers, and the research personnel will have access to farmers through the field agents. A line item for approximately \$50,000 exists to support the coordination.
11. Institutionalize a hydrological monitoring system - The project provides technical assistance (short term), training and commodity support to improve the collection and analysis of hydrological data. This is in conjunction with the Sahel Regional AGRHYMET and will be administered through MDR Subterranean Water Resources. This component will document changes in water availability, measure infiltration and train MDR staff to analyze data.

12. Build two office buildings to meet the expanding watershed development needs - The construction of two buildings will be financed under the project for the Soil and Water Conservation Service use in the field and as storage space for commodities procured for their support.
13. Refine watershed plans - An overall output will be the refinement of the watershed development plans. Aerial photographs will be taken to document the changes resulting from the construction of SWC structures since the late 1970's. These will assist MDR to make future plans and to evolve current plans to more directly reflect agricultural potential in treated watersheds.

Many of the above-noted project outputs are the result of project evaluations, accepted by both USAID and the GOCV. They are measurable by actual reporting or in the course of sound project management.

It is understood that watershed development is an inter-disciplinary endeavor, and not the exclusive domain of engineers. The process of developing and protecting the soil and water resources will ultimately permit planned exploitation for the benefit of the population. While construction and implementation of soil and water conservation measures constitute the substantive foundation for this project, serious attention is also given the institutionalization and integration of the support systems that make watershed development meaningful to the population: i.e. extension agents to improve efficiency of information/communication; links to research capacity in monitoring new information as well as mechanisms for agricultural research; training a cadre of select GOCV personnel to fill the shoes of technical assistance at project's end.

#### Intermediate Output

##### "employed labor force"

Although the PID issues cable advises that the project purpose should be to use the rural labor force, it is clear that labor is an intermediate output toward achievement of the actual project outputs (assumptions considered) and then the project purpose. As is fully described in the PL 480 Section, the labor for these project outputs is largely provided by local currency generated through the sale of commodities donated under a continuation of Cape Verde's Title II, Section 206 agreement. Use of the funds for these purposes has been approved in past programs and evaluated favorably. In addition, it partially satisfies a great need on the part of the GOCV. During these years of drought, temporary sources of employment have been needed to keep body and soul together for the Cape Verdean people and continue with the country's plans for progress. The system of account for these funds and the sale of the commodities is well defined and adequate. The government agencies involved are experienced in the procedures and, considering the context of an archipelago of nine islands, perform well.

### Inputs

Inputs for this project are from three sources: Development Assistance (Sahel Appropriation) will contribute \$5.5 million in grant funds over four fiscal years (FY84 - FY87); Local currency generated through the sale of PL 480 commodities will amount to approximately \$7.8 million over four years (1985 - 1988); and, inputs provided by the GOCV (approximately \$1.0 million over the life of project in personnel, office space, training, and maintenance of vehicles).

Development Assistance - The \$5.5 million in DA funds will be used to fund technical assistance, training and commodities in support of the project purpose. Particular emphasis is placed on the purchase of commodities to support rural workers (tools, construction equipment, cement, gabion wire cages, etc.) to make the greatest impact from their efforts. Also stressed is training, both at the operational level of project implementation (training foremen in supervision of workers, planning, grain storage improvement, etc.) and the management level (watershed management, hydrology, waterharvesting, statistics, physical geography, etc.). The GOCV technical and management capability is good; They are more limited by the numbers of trained personnel than by capability.

PL 480 Local Currency - The expected \$7.8 million in local currency (Cape Verdean Escudos, CVE) over four years will be used to pay salaries of rural worker and to procure local materials. Each year, the program will donate 15,000 metric tons of #2 corn. The local currency proceeds generated from the sale of the corn is expected to generate the equivalent of \$2.0 million. The Empresa Publica de Abastecimento (EMPA), the parastatal import/export agency may be permitted to deduct up to 30 percent for handling and internal distribution. The remaining \$1.4 million will be programmed for the rural development activities. The project employment levels are calculated at between 6000 - 7000 person days per year over the life of the project. Should the exchange rate change markedly, or the world market price of corn, alterations may have to be made. The project is designed to guarantee coverage of 6000 workers per year, but may have the capacity to employ significantly more.

GOCV Inputs - The GOCV will supply personnel at all levels in project implementation (see Administrative Analysis), office space, training, and fuel for project vehicles.

### Project Beneficiaries

Primary direct project beneficiaries are the 6000 - 7000 rural families in the project area receiving the additional income from the rural works construction. These are the poorest families in the project area (selected according to strict criteria), and the income will allow for a balanced diet and the pride of having earned an income. This group constitutes approximately 70 percent of the total population in the project area, who would otherwise be unemployed.

In the long term, the entire country benefits from conservation of soil and water resources. When the rains return to normal, the Cape Verdean agricultural sector will have significantly improved their infrastructure to support increased production targets. Evidence indicates that areas of past rural works projects are already producing more food, in addition to slowing the rate of soil erosion, and mitigating the floods during the rainy season.

### Participants and Responsibilities

Project implementation depends on the timely cooperation of all implementing agencies (for an appraisal, refer to the Administrative Analysis ). The project will be implemented by the Ministry of Rural Development with technical and managerial support provided by the USAID. The Empresa Publica de Abastecimento (EMPA) is the pivotal actor, providing the local currency for payment of rural workers and purchase of local commodities. The coordinating agent will be the Secretariat of State for Cooperation and Planning. A secondary role will be played by the National Development Fund (FND) of the Ministry of Economy and Finance, who accounts for the local currency generated by EMPA. Below are the implementation agents and major responsibilities:

#### Participants

A. Ministry of Rural Development  
(MDR)

B. Empresa Publica de Abastecimento  
(EMPA)

C. Secretary of State for  
Cooperation and Planning  
(SSCP)

#### Major Responsibilities

1. Technical and administrative implementation of soil and water conservation measures
  2. Provide support to farmers
  3. Collect and analyze data
  4. Vouchers on a regular basis to FND
  5. Facilitates all construction.
1. Receive, store, distribute and sell P1 480 commodities
  2. Remit local currency proceeds to USAID account in a timely fashion
  3. Maintain adequate grain storage facilities
1. Provide coordination for the inter-agency exchange of information in project implementation
  2. Establish price levels for grain sales in accordance with TA
  3. Engage in policy dialogue with USAID

D. National Development Fund

1. Maintains separate account for local currency generated under PL 480 program
2. Pays MDR upon receipt of voucher

E. Agency for International Development (AID)

1. Provides major funding for project
2. Through direct contract, provides technical support, training and commodities
3. Manages all activities listed above
4. Monitors GOCV management of resources

Other Donor Activities in Watershed Conservation

AID's activity in watershed conservation under earlier projects as well as the proposed project has been concentrated on Santiago Island. In 1984, work began on Santo Antao Island as well. By GOCV design, other donors have been assigned other areas: The West Germans are working on Fogo and Brava, the French on Sao Nicolau, FAO on the western part of Santiago Island and Maio; and, the Dutch on the northern part of Santo Antao.

The topographic conditions on the various islands, even on different parts of some islands, are varied enough to suggest a variety of soil and water conservation techniques. Three major varieties of topography and climate are readily apparent as the following table shows:

Low, flat islands	Boa Vista Maio Sal Sao Vicente*	Accessible water table, often brackish; low rainfall
Mountainous, deeply eroded islands	Santiago Santo Antao* Sao Nicolau Sao Vicente*	Deep water table, but accessible in valley bottoms; higher rainfall
Recent volcanic, moderately eroded islands	Brava Fogo Santo Antao*	Very deep water table, accessible mainly near sea level; high rainfall areas with high condensation from clouds

(\* mixed features)

All in all, the policy of assigning different geographical areas to different donors makes sense, providing there is an exchange of experience among the personnel working on these projects. Up until now, there has been little exchange, but it has begun. The Center for Agrarian Studies, where an inter-island communication system is being installed, will be the focus of coordination of technical activities, and plans to hold seminars for technicians at least annually.

#### Land Reform in Cape Verde (an update)

The Land Reform Program got off to a start in January, 1983, and has apparently distributed land already owned by the GOCV in a number of locations. The distribution amounts to a right to use the land, but is not clear title. Cape Verde has a special problem because so many residents have emigrated, are temporarily absent, or were obliged to leave during the Independence process. Much of the land in the country is absentee owned, with title clouded by multi-party ownership reflecting inheritance.

The GOCV does not want to outright expropriate land of emigrants, upon whom the country depends as a group for remittances. At the same time, there is a need to put idle land to productive use, and to keep buildings maintained in urban areas. The GOCV is proceeding as it must, but with extreme caution.

In areas served by AID projects, such as Tarrafal Water Resources and Watershed Management, there have been increased water resources developed which permit expanding irrigated areas in several watersheds. In those locations, land is allocated to small farmers on which they cultivate mainly vegetable crops. By bringing new irrigated land into being, the Watershed Development Project will enable the GOCV to add to the number of small farmers practicing irrigated agriculture on their own land.

PL 480 Local Currency Expenditures

Following are three tables, the first of which gives an estimate of the local currency which will be available on September 30, 1984 from the sale of PL 480 corn and after deduction of worker salaries and materials purchased. The second table presents three possible cases for employment of funds generated from the sale of PL 480 corn in the period 1985-1988. The CVE/\$ exchange rate is assumed to be constant at 77 CVE/\$1.00 over the period. The third table shows the financial effect in unexpended funds of not attaining the target of 6,000 workers.

TABLE I  
Food for Development Account : PL 480  
Estimated Local Currency Available at 9/30/84

	<u>CVE - 000's</u>	<u>\$ - 000's</u>
Opening Balance 1/1/83	26,673	346
Net Revenue to FND from corn sales 1/1-6/30/83	53,452	694
Less workers' salaries materials purchased 1/1-6/30/83	<u>(30,342)</u>	<u>(394)</u>
Ending Balance - 6/30/83	<u>49,783</u>	<u>646</u>
Opening Balance 7/1/83	49,783	646
Net Revenue to FND from corn sales 7/1-12/31/83	46,256	601
Less estimated worker salaries and materials purchased 7/1- 12/31/83	<u>(32,000)</u>	<u>(416)</u>
Estimated Ending Balance	<u>64,039</u>	<u>832</u>
Estimated Opening Balance 1/1/84	64,039	832
Estimated Net Revenue to FND from corn sales 1/1/84 - 9/30/84 *	115,500	1,500
Less estimated worker salaries and materials purchased 1/1 - 9/30/84	<u>(48,000)</u>	<u>(624)</u>
Estimated Ending Balance 9/30/84	<u>131,539</u>	<u>1,708</u>

\* According to FND (F. Fortes), the 15,000 MT of corn, 10,000 MT of which arrived on 10/30/83 (Del Valle) and 5,000 MT of which arrived on 12/28/83 (Kopaa) will be sold in calendar year 1984 at the new price of 11,000 CVE/MT. FND will receive 7,700 CVE/MT for development purposes. EMPA will receive 3,300 CVE/MT to cover handling.

T.F. 2

3 Cases for Employment of Funds Generated Pl 480

<u>\$ - 000s</u>	<u>Case A</u>	<u>Case B</u>	<u>Case C</u>
<u>FY85</u>			
PL480 Carry-over from FY84	\$1,708	\$1,708	\$1,708
Grain Sales	1,650	1,500	1,650
Available Funds	\$3,358	\$3,208	\$3,358
Salaries:			
PL480 2,000 workers <sup>a</sup>	(643)	(643)	(643)
PL480 1,300 additional workers <sup>b</sup>	(296)	(296)	(440)
Watershed Management - 2,700 workers <sup>c</sup>	(521)	(521)	(521)
			1900 additional workers <sup>d</sup>
Balance - end FY85	\$1,898	\$1,748	\$1,754
<u>FY86</u>			
Opening Balance	\$1,898	\$1,748	\$1,754
Grain Sales	1,815	1,500	1,815
Available Funds	\$3,713	\$3,248	\$3,569
Salaries:			
6,000 workers	(2,123)	(2,123)	(2,336)
			6,600 workers
Balance - end FY86	\$1,590	\$1,125	\$1,233
<u>FY87</u>			
Opening Balance	\$1,590	\$1,125	\$1,233
Grain Sales	1,997	1,500	1,997
Available Funds	\$3,587	\$2,625	\$3,230
Salaries:			
6,000 workers	(2,338)	(2,338)	(2,571)
			6,600 workers
Balance - end 87	\$1,249	\$ 287	\$ 659
<u>FY88</u>			
Opening Balance	\$1,249	\$ 287	\$ 659
Grain Sales	2,196	1,500	2,196
Available Funds	\$3,445	\$1,787	\$2,855
Salaries:			
6,000 Workers	(2,571)	(2,571)	(2,829)
			6,600 workers
Balance - end FY88	\$ 874	\$ 784	\$ 26

- a PL480 : 2000 workers (approximate current level of employment) for for entire FY85 @ 99 CVE/day for 250 days.
- b PL480 : additional 1,300 workers hired as follows:
  - (i) 7/1/84-11/30/84 - 400, with an average of 200 working over the 5 month period at a weighted average salary of 94 CVE/day (3 months @ 90 CVE/day, 2 months @ 99CVE/day).
  - (ii) 12/1/84-4/30/85 - 400, with an average of 600 working over the 5 month period at an average salary of 99 CVE/day.
  - (iii) 5/1/85-9/30/85 - 500, with an average of 1050 working over the 5 month period at an average salary of 99CVE/day.
- c Watershed Management : 2700 workers @ 99CVE/day for period 4/1/85-9/30/85 Current Watershed Management Project (655-0013) funds this level of employment through 3/31/85.
- d Additional 1900 workers hired, 600,600 and 700 respectively for the same time periods as shown in b , in order to bring total to 6,600.

TABLE 3  
Funds Unexpended Per 1000 Workers not Employed  
at Different Salary Levels

	<u>6 months</u>	<u>1 year</u>
1000 workers x 125 days x 99CVE/day ÷ 77CVE/\$=	\$161,000	\$322,000
1000 workers x 125 days x 109CVE/day ÷ 77CVE/\$=	\$177,000	\$354,000
1000 workers x 125 days x 120CVE/day ÷ 77CVE/\$=	\$195,000	\$390,000
1000 workers x 125 days x 132CVE/day ÷ 77CVE/\$=	\$214,000	\$428,000

SUMMARY COST ESTIMATE AND FINANCIAL PLAN  
(US \$ 000)

PROJECT PAPER

Source	AID		Host Country		Others		TOTAL
	FX	LC	FX	LC	FX	LC	
Technical Assistance	\$1,491	\$224	—	—	—	—	\$1,715
Training	614	3	—	—	—	—	617
Commodities	1,350	140	—	—	—	—	1,490
Construction	150	—	—	—	—	—	150
Other	150	—	—	1,021	—	(8,462)*	1,171
Sub-Total	\$3,755	\$367	—	\$1,021	—	—	\$5,143
Procurement	590	56	—	—	—	—	646
Inflation Factor	255	37	—	237	—	—	529
Contingency	460	46	—	126	—	—	632
TOTAL	\$5,060	\$506**	—	\$1,384	—	—	\$6,950

\* Estimate of LC generated from sale of PL480, Title II, commodities not included in totals.

\*\* This total was rounded off to 5500

COSTING OF PROJECT OUTPUTS/INPUTS  
(In \$000 or equivalent)

Project n° 655-0013

Title Watershed Development

Project Inputs	Project Outputs				TOTAL
	S & W 1	Ext. 2	PL480 3	DC & A 4	
AID Appropriated	\$2,651	\$1,107	\$601	\$1,207	\$5,566
Other U.S.					
Host Country	\$659	\$275	\$150	\$300	\$1,384
Other Donors					
<b>TOTAL</b>	<b>\$3,310</b>	<b>\$1,382</b>	<b>\$751</b>	<b>\$1,507</b>	<b>\$6,950</b>

**PROJECTION OF EXPENDITURES BY FISCAL YEAR**  
( US \$ 000 )

Fiscal Year 1985	AID	Host Country	Other(s)+	Total
Technical Assistance	\$ 447	--	--	\$ 447
Training	158	--	--	158
Commodities	1,001	--	--	1,001
Construction (buildings)	150	--	--	150
Other <sup>①</sup>	150	220	--	370
Sub-Total	\$1,906	\$ 220	--	\$2,126
Procurement Allowance	450 <sup>②</sup>	--	--	450
Inflation factor	③	11	--	11
Contingency <sup>④</sup>	236	23	--	259
<b>Total</b>	<b>\$2,592</b>	<b>\$ 254</b>	<b>--</b>	<b>\$2,846</b>

- ① Other-AID is aerial photography; Other-Host Country includes POL, staff time, office space.
- ② Procurement allowance is set at 40% of the FOB value of the commodities to cover freight, insurance, PSA fixed fee contract, inflation and a \$50,000 contingency for the construction of 2 buildings.
- ③ No inflation is assumed for FY85 because most of the expenditures will be made in the first quarter. Host country inflation is assumed at 5% average over FY85.
- ④ Contingency funds are based on 10% of expenditures, the procurement allowance and inflation.

**PROJECTION OF EXPENDITURES BY FISCAL YEAR**  
( US \$ 000 )

Fiscal Year 1986	AID	Host Country	Other(s)+	Total
Technical Assistance	\$ 730	—	—	\$ 730
Training	324	—	—	324
Commodities	178	—	—	178
Construction (buildings)	—	—	—	—
Other	—	242	—	242
Sub-Total	\$1,232	\$ 242	—	\$1,474
Procurement Allowance	71	—	—	71
Inflation factor	123	37	—	160
Contingency	143	28	—	171
<b>Total</b>	<b>\$1,569</b>	<b>\$ 307</b>		<b>\$1,876</b>

1 For FY86 on inflation rate of 10% is assumed to allow for inflation during FY85 to the midpoint of FY86. Thereafter, inflation is assumed at 5%/yr. based on current US inflation rates. Host country inflation is assumed to run at 10% from FY86-FY88.

PROJECTION OF EXPENDITURES BY FISCAL YEAR  
( US \$ 000 )

Fiscal Year 1987	AID	Host Country	Other(s)+	Total
Technical Assistance	\$ 450	—	—	\$ 450
Training	99	—	—	99
Commodities	156	—	—	156
Construction (buildings)	—	—	—	—
Other:	—	\$ 266	—	266
Sub-Total	\$ 705	\$ 266	—	\$ 971
Procurement Allowance	62	—	—	62
Inflation factor	109	72	—	181
Contingency	88	34	—	122
<b>Total</b>	\$ 964	\$ 372	—	\$1,336

**PROJECTION OF EXPENDITURES BY FISCAL YEAR**  
( US \$ 000 )

Fiscal Year 1988	AID	Host Country	Other(s)+	Total
Technical Assistance	\$ 88	--	--	\$ 88
Training	36	--	--	36
Commodities	156	--	--	156
Construction	--	--	--	--
Other	--	293	--	293
Sub-Total	\$ 280	\$ 293	--	\$ 573
Procurement Allowance	62	--	--	62
Inflation factor	59	117	--	176
Contingency	40	41	--	81
<b>Total</b>	<b>\$ 441</b>	<b>\$ 451</b>	<b>--</b>	<b>\$ 892</b>

## TECHNICAL ANALYSIS SUMMARIES

### Engineering Analysis

The soil and water conservation works to be financed by the project are based on the same fundamental principle. In order to control and store surface runoff from rainfall, the works must first present an impediment to the flow of water in order to dissipate its kinetic energy (into friction and, to some extent, pressure), thereby reducing velocity and causing deposition of transported soil particles as well as limiting downslope flow and scour.

Ideally, this can be best accomplished by "checking" or containing the water behind a barrier which reduces the water's kinetic energy and velocity to zero. On sideslopes, this effect can be achieved with small basins, although more permeable treatments such as rip-rap, vegetation ridges are also effective in dissipating the water's energy. For large flows, the water must be channeled and dropped or "spilled" into a stilling area to dissipate its energy. When the velocity of the runoff is reduced, the finer particles suspended in the water "fall out" but, much more significantly, the heavier materials which are carried by siltation or in the bed load (approximately 98% of the sediment transported) are stopped. Reducing the energy of the runoff also allows more time for water to infiltrate into the soil and percolate into aquifers. With the highest intensity rainfalls on the order of 60 mm/hr and infiltration rates on the light volcanic soils of 20-30 mm/hr, considerable infiltration and storage is possible with appropriate treatments. Each additional millimeter of runoff which is infiltrated on a hectare of land translates into 10,000 additional liters of water stored in the aquifer.

Findings of the analysis include:

1. The principles of soil and water conservation used by the MDR are largely sound, but there is room for refinement in the design of some of the structures. This could be addressed by technical assistance in engineering and long term training of project personnel.
2. Workers need increased physical support (tools, equipment, construction supplies) and more supervisors to provide direction. In the illustrative commodity list, these commodities have been given priority.
3. Some technical assistance is necessary to improve upon designs of certain structures. One year of agricultural engineering assistance has been programmed, rather than the original three years recommended.
4. Long term training would improve Soil and Water Conservation Department's ability to manage projects. This has been programmed for the Director.

### Economic Analysis

The Economic Analysis describes the systematic conversion of grain donations into employment and physical soil and water conservation measures. There are five major conclusions, described in detail in the complete analysis:

1. PL 480 corn does not create a price disincentive to local producers of corn;
2. Although regional macro economic data and models are lacking, the PL 480 salaries (\$1.5 million per year, paid to 6,000 workers) contribute a large multiplier to strengthen local private enterprise;
3. Micro economic effects of workers salaries can have major impact on nutrition, health and purchased agricultural inputs;
4. A comparison of Watershed Development via Title II, Section 206 versus Emergency Food Aid shows that the Present Value costs (\$4,727,790) at 10 percent interest would require only \$78 in benefits per worker hired per year, or only \$39 in benefits per year per family in the target population, in order to justify the project; and,
5. The MDR divisions of data analysis are being recommended for training and commodity support to improve their capability to fulfill their function.

### Watershed Monitoring Summary

In order to measure the effectiveness of project works on soil and water conservation and evaluate various treatments, a hydrologic monitoring system should be set up. The strategy would be to make precise measurements of rainfall and resulting runoff (the difference between the two is infiltration). The reduction in flood peaks is a direct measure of increase in infiltration and soil moisture and an indirect indication of erosion reduction.

In order to measure basic data, a network of recording and non-recording rain gages will be set up on project and control watersheds. Stream gaging stations for monitoring runoff using water level recorders will also be set up. Data will be collected and analyzed by a GOCV hydrologist assigned to the project.

A hydrologist/water resources engineer will be trained to replace the hydrologist assigned to the project. Technical assistance to the project will be provided in the field of hydrology. They will be responsible for rain gage installation, data collection and analysis, setting up stream gaging stations and watershed modelling. Commodities to accomplish this will be procured.

### Environmental Analysis

Three of the suggested project activities require environmental assessment: Road building, check dam construction, and the purchase/utilization of pesticides for PL 480 grain storage. Three other activities though not budgeted for, might be considered in the future or be implemented by project staff using other funding sources. They are: large-scale pumping for agricultural irrigation, small-scale pumping of shallow aquifers and open water impoundments. None of the six activities will cause undue environmental degradation if proper planning, design, monitoring and training is done. The project provides adequate technical assistance and education to deal with these concerns.

A discussion of possible risks and general benefits for each type of activity plus the standard section 216.3(b)(1)(i)(ii) and (iii)(a) evaluation on proposed pesticide use is included in the main body of this report.

### Financial Analysis

Review of the current accounting procedures and system of the pertinent GOCV agencies (EMPA, FND, MEF and MDR) shows them to be generally satisfactory for the GOCV's purposes, as it sees them. Recording of receipts and expenditures, filing systems, cross-referencing to trace both to some documents, and controls were found to be adequate. In sum, then:

1. EMPA is a parastatal organization (no alternatives exist) with an acceptable system of accounting that requires better monitoring by USAID;
2. Establishment of a separate account for PL 480 local currency will allow better control over accounting issues;
3. There is an issue of gross proceeds deposits and a related issue of late payment to rural workers. Solutions need to be worked out with the GOCV with the help of stronger USAID monitoring.
4. EMPA and project would benefit from short term financial technical assistance.

### Sociological Analysis

The Social Soundness Analysis discusses the implications of the project with a description of an extension component. Findings are as follows:

1. Maintenance and repair of SWC structures should involve local community groups and will be addressed during project implementation.
2. Long-term technical assistance will be required in Community Development/Extension to adequately cover the project responsibilities in these areas.
3. Continued support of the pilot extension program begun under the Watershed Management Project (655-0006) is warranted with an increased level of commodity support;
4. This project could benefit from formal linkages to the Food Crop Research Project (655-0011) and has been designed to foster this cooperation.

### Administrative Analysis

The Government of Cape Verde is determined to implement the project in a coordinated fashion. While this will require the commitment of each of the agencies involved, increased USAID monitoring of the implementation process will facilitate the cooperation. All have been extremely cooperative during the design, only waiting for guidance.

As in any inter-agency effort, a coordinating force is necessary. The MDR has proposed an implementation structure to divide the functioning of the project into two levels: the national inter-agency level coordination (through the Secretary of State for Cooperation and Planning); and, the project implementation committee to implement the project on-the-ground. Both structures require the timely replacement of the USAID project's officer position.

## CONDITIONS AND COVENANTS

### Conditions Precedent

There is one Condition Precedent for the proposed project:

"No project funds may be disbursed under the Development Assistance account until the Transfer Authorization for the PL 480 Title II, Section 206 agreement is negotiated and signed by both the U.S. and the Government of Cape Verde."

It is felt that the simultaneous beginning of both projects is critical to the coordinative nature of the funding, in particular, with respect to the local currency component. The division of function for the two funding sources creates an interdependency that leaves one half crippled without the other. The PL 480 commodities will be used to provide rural employment and some local commodities. Evaluation of the current Food for Development (655-PL01) commented on the lack of technical support for project implementation that caused protracted delays in achieving targets. The Development Assistance component is designed to provide the necessary support (through foreign exchange expenses) to strengthen the implementing institution and improve the efficiency of the rural works.

### Covenants

The following Covenants have been discussed with the GOCV and are included in the project:

1. The GOCV agrees to establish a separate account for the proceeds of the PL 480 commodities;

Although the accounting procedures used by the GOCV in their commingled account were certified acceptable, it is the desire of USAID to maintain a totally separate account for local proceeds. The delays that occur between the arrival of commodities and the ultimate remittance of proceeds are such that only through a separate account can adequate monitoring be achieved.

2. The GOCV further agrees to transfer all Food for Development (655-PL01) local currency to the separate account after the 1984 year-end accounting;

The food shipments for the current program have arrived (the last shipment in January 1984). The estimated balance (accounting for works-in-progress, wage increases, etc.) is approximately \$1.7 million. The GOCV will not know the exact amount until after the year-end accounting for 1984. In the meantime, the USAID will bring an outside auditor to verify the estimate sometime in late 1984.

3. The GOCV will formalize the administrative structure set forth for implementing the project.

The organizational framework shown in the Administrative Analysis is being reviewed by the Minister of Rural Development. It is expected that a formal approval will be forthcoming shortly.

## TECHNICAL ASSISTANCE PLAN

### Introduction

USAID and the GOCV have carefully worked out the long term technical assistance (TA) needs for implementation of the project. In many areas, long term TA needs are accompanied by similar long term training needs as evidence of the functional necessity and mutual agreement. To a large extent, the TA is support-oriented. The GOCV is capable of project implementation, but requires support by a select group of professionals on a long term basis and the flexibility to call upon a larger number of specialists for a shorter period of time.

All long-term TA will be expected to work closely with the GOCV in project implementation. Cape Verde is remote, with few medical facilities and virtually no developed tourism infrastructure.

The national language is Portuguese, although French is spoken on a limited basis. Foreign language proficiency is, therefore, important. Without unnecessarily restricting the audience, Portuguese, Spanish or French fluency will be required of all long-term technicians with the ultimate goal of fluency in Portuguese. One month intensive Portuguese will be provided as required, and funded, for long-term technicians prior to arrival in country.

### Long-Term Technical Assistance

The objective of the long-term technical assistance in the project is to provide technical support to:

- Rural workers involved in construction of soil and water conservation structures;
- MDR technicians managing the project;
- GOCV scientists in collection and analysis of hydrological and agricultural data;
- Local communities in developing civic organizations to wisely exploit the improved soil and water resources; and,
- GOCV import agency (EMPA) to monitor the movement of U.S. PL480 commodities.

The long-term needs are depicted below along with duration and support responsibilities:

<u>Speciality</u>	<u>Duration</u>	<u>Support Responsibilities</u>
Watershed Management/ (Team Leader)	3 yrs	Ministry of Rural Development -- Soil and Water Conservation -- Center for Agrarian Studies
Community Development/ Extension	2 yrs	Ministry of Rural Development -- Farmer Support Program
Agricultural Engineer	1 yr	Ministry of Rural Development -- Agricultural Eng. Department -- Soil and Water Conservation -- Division of Underground Water
Sylvo-Pastoralist	1 yr	Ministry of Rural Development -- Soil and Water Conservation -- Center for Agrarian Studies
Food Monitor (Local Hire)	4 yrs	Secretary of State for Cooperation and Planning -- EMPA

Below are descriptions of the long-term technicians' positions with desired qualifications and general responsibilities. It will ultimately be the technicians themselves who translate their general responsibilities into detailed workplans.

Watershed Management Specialist/Team Leader - This three-year position is required to ensure coordination and integration of the separate components (soil and water conservation, rural assistance/extension, data collection and analysis, and the PL480 component). He/she will also be required to work with entities outside the project, such as other AID projects, new GOCV initiatives, etc. It is expected the greatest share of time will be devoted to the coordination and leadership, with the least share on PL480. Responsibilities envisioned include:

1. Joint preparation of plans to achieve project outputs in timely fashion;
2. Working with Soil and Water Conservation Service of MDR to ensure adequate support is reaching the workers--
  - \* tools, materials for construction are available
  - \* supervision of workers is adequate
  - \* plans are rational
  - \* arrangements for other technical specialists are made
3. Assist GOCV to refine watershed plans, with emphasis on resource utilization;

4. Provide seminar-type training sessions, upon request, by Center for Agrarian Studies in areas of special expertise;
5. Determine and coordinate short term technical assistance needs, with the need to explicitly represent team needs to USAID;
6. Provide substantive direction to the other long and short term technicians;
7. Assist the extension specialist in community organization efforts within the ribeiras;
8. Provide a rational plan of data collection -- analysis -- presentation.

Qualifications - Qualifications include advanced degrees in Resource Development, or Watershed Management, with experience in modelling desirable. Generalist nature and leadership qualities should allow easy cross-over to work substantively with other disciplines, notably community development and mapping. Language requirement as stated earlier.

Community Development/Extension Specialist - Working through the Ministry of Rural Development, Farmer Support Program, this technician will divide his/her time between: 1) assisting local communities in the project area to organize themselves to manage soil and water resources locally; and 2) providing support to a pilot rural assistance program, ultimately to be integrated into a National Extension and Animation System. The technician will work with farmers and policy makers alike and represents the social scientist function in project implementation.

The Community Development/Extension Specialist will be responsible for the following areas:

1. Support the Director of the Rural Assistance Program through on-the-job training in areas such as planning and management, field staff supervision, coordination of research and extension;
2. Design and implement a workable, community-based system to repair and maintain soil and water conservation structures (consistent with the CD approach recommended by MDR);
3. Develop training plan for short and long term extension and community development training;
4. Collaborate in watershed planning with other MDR specialists;
5. Work with representatives of other programs to ensure rural assistance workers obtain thorough exposure to opportunities for collaboration with research;
6. Prepare reports corresponding to team leader's needs.

Qualifications - The candidate should possess professional experience in both community development/organization and extension systems. An academic background in some aspect of rural development and agriculture is required, with at least a Master's Degree. Relevant overseas experience will weigh most heavily, as well as some indication of potential for success in the position.

Agricultural Engineer - The agricultural engineer is required to advise on potential development for agricultural purposes and monitor the implementation of soil and water conservation structures. Although the Engineering Analysis called for three years of engineering assistance, the MDR believes the Scope of Work justifies only one year. He/she will work closely with the MDR Division of Soil and Water Conservation. Responsibilities include:

1. Study designs of any existing SWC structures and recommend design improvements;
2. Work with hydrological monitoring unit and short-term hydrology advisor to evaluate storm events and their effect on soil and water conservation treatment;
3. Recommend, organize and facilitate short-term training, as appropriate (hydraulic design, etc.);
4. Prepare reports responding to team leader's needs;
5. Provide training in water harvesting techniques.

Qualifications - Request agricultural engineering background with an advanced degree and relevant professional experience in flood/erosion control, water harvesting, preferably in arid zones. Language requirements as stated earlier.

Sylvo-Pastoralist - This one-year position is intended to address the mapping, range management and forestry needs for project implementation. Responsibilities include:

1. Design, organize and facilitate short term training, as appropriate with Community Development/Extensionist;
2. Identify appropriate areas for vegetative SWC measures, recommending improvements in species density, land preparation, planting techniques, planting times.
3. Analyze aerial photos and draw comparative conclusions from past photos in terms of new land under irrigated agriculture.
4. Prepare reports responding to team leader's needs.

Qualifications - Advanced degrees in range management, forest management and relevant experience in developing countries, familiarity with basic map making and photogrammetry equipment; Experience in aerial photo interpretation and surveying equipment. Language as listed above.

Timing of Long Term Technicians

Below is a tentative schedule for long-term technicians.\* For further discussion on the relationship of TA procurement to other project implementation issues, see the administrative analysis of the USAID:

Watershed Management/  
Team Leader (3/83 - 3/88)

Community Development/  
Extensionist (5/85 - 6/87)

Agricultural Engineer  
(6/86 - 6/87)

Sylvo-Pastoralist  
(1/86 - 1/87)

85                      86                      87                      88

\* Assume 6/84 Project Authorization and standard competitive procurement process.

Short-Term Technical Assistance

As a result of the recommendations of the various technical analyses, a list of tentative short term technical assistance needs was generated. While some short term needs are undisputable, there is a degree of flexibility that must be given to project management. USAID/Praia project management will rely heavily on the advice of long-term technicians in determining exact short term needs and specific tasks.

What follows is a list of short-term technical assistance, in a decreasing order of certainty:

Hydrologist/Geological Surveying Specialist - To provide technical assistance in data collection and analysis to the MDR Department of Agroclimatology. Will advise and provide staff training in stream gaging techniques, watershed modelling, and collection and analysis of water data. This position would require 3 trips of approximately 2 months each, in order to be present during the rainy season (September/October).

Aerial Photography - As a separate contractual action, USAID will have the entire project area photographed at a scale of 1:10,000. This is part of the data collection and analysis. The most recent photos are from the late 70's, before most SWC construction took place. This will allow a

quantitative comparison of land under irrigated agriculture, and hence, provide rationalization for future efforts in conservation and/or agriculture. This action occurs very early in the implementation schedule as it will provide a useful tool for technicians.

Extension Training Specialist - There will be special training needs that the long-term technician will not be capable of fulfilling, and hence, a training specialist in extension methods is required for two trips of approximately two months each. The Center for Agrarian Studies provides general training to field workers, and the training specialist will want to take their curriculum into account (attached to Extension Analysis). Training topics may include: Communication, Theory of Change, Cooperative Management, etc. Fluency in Portuguese is required.

Financial Management/Auditing Specialist - In support of the PL480 component, an auditing specialist may be called in mid-project to review procedures and evaluate the impact of the computerization. Although Portuguese proficiency is preferred, French or Spanish is acceptable.

Irrigation Specialist - This technician will be responsible for:

- 1) providing training to rural assistance workers in the basics of irrigated agriculture applied to the project context;
- 2) preparing a written report on the potential for investment in agriculture in the project area.

Two trips are anticipated totalling not more than six months total. Qualifications include advanced degrees in economic analysis of irrigated agriculture and foreign language proficiency (Portuguese preferred, but Spanish or French acceptable). Relevancy of field experience and academic credentials are most important.

Evaluation Specialists - Four person months of TA are reserved for the mid-term evaluation (early 1987). It is expected that skills would include watershed development, management, economics, hydrology, etc. Language proficiency as stated above.

Other Specialists - Nine person months are reserved for needs that may arise during project implementation, especially in terms of support to the soil and water conservation measures, and data collection and analysis.

Local Hires - Advertising will be done locally to recruit a food monitor. The food monitor is a full time position (as recommended in past food programs) and is responsible to the USAID Project Manager. Responsibilities are generally to maintain smooth function of the PL480 component, and will require significant domestic travel. The coordination between the different GOCV Ministries will also be within this person's domain.

Qualifications - Candidate must be a high school graduate with Portuguese fluency and some English. Availability to travel often. Must be able to assess situation quickly and be organized to present complicated materials.

Tasks include the following:

1. Assist USAID/Praia personnel in monitoring PL480 commodity arrival, treatment, storage, sales, and distribution and end-use.
  - (a) Check on final utilization of generated local currencies by spot checking MDR records on work performed (check dams and terraces built, trees planted) and workers employed;
  - (b) Verify free food distribution progress with Ministerio de Saude e Assuntos Sociais (frequency to be determined);
  - (c) Conduct site visits of food warehouses and warehouse records (frequency to be determined)
  - (d) Conduct periodic surveys of corn prices at selected localities.
2. Visit all receiving EMPA port facilities twice/year and report on following:
  - (a) Inventory of PL480 commodities;
  - (b) Improvements made in storage;
  - (c) Movement of Commodities.
3. Recording the financial flow from EMPA, through BCV, FND, and MDR; work closely with MDR Administrative Chief to speed the system.

## TRAINING PLAN

Long and short term training needs have been solicited by the project design team members and the GOCV to develop a training plan for the proposed project. Both USAID/Praia and the GOCV view training as one of the most valuable ways to eliminate constraints to development. There are, however, several issues to consider in proposing the following plan:

1. With a 4-year project, it is understood that some long term participants (particularly the Bachelor's level) will not return until after the PACD. Although they will not directly affect the project, they will strengthen the MDR capacity in continued efforts.
2. Some recommended training at the Master's level may require special backgrounds (i.e. Hydrological Science). If a suitable candidate cannot be identified for funding under this project, one of the B.S. trainees may be funded under a regional training project (AMDP or SMDP) after this project's completion.
3. Identification of long term trainees (Bachelor and some graduate level) will take place early in project implementation. The project aims to have long term participants enrolled by September 1985.
4. The long term extension/social scientist M.S. was recommended during the initial design. The GOCV prefers to relegate such training to the donor most closely involved in extension (Italy). In its stead, they have requested Bachelor's level training in statistics or physical geography.
5. It is understood that degree equivalency presents somewhat of a problem. The U.S. system is, however, sufficiently recognized to ensure the future of B.S./M.S. degree holders. Anything below the B.S. level has limited recognition academically.
6. Long term training includes six months English language training.
7. See budget for cost breakdowns of training courses.
8. The list of short term training is illustrative. While many of the courses listed will be used, some flexibility is needed to meet changing needs during implementation.

Listed below are training requirements and the project output each supports

Long Term U.S. Training

<u>Discipline</u>	<u>Degree</u>	<u>Output Support</u>
Water Resources Engineering	B.S.	Soil and Water Conservation
Water Resources/Hydraulic Engineering	M.S.	Data Collection/Analysis
Geohydrologist	M.S.	Data Collection/Analysis
Civil Engineer	M.S.	Soil and Water Conservation
Physical Geography/Statistics	B.S.	50% Soil and Water Conservat 50% Data Collection/Analysis

Short Term Training

<u>Discipline</u>	<u>Type</u>	<u># P's</u>	<u>Output Support</u>
Watershed Modelling	U.S. 6 weeks	1	Soil and Water Conservation
Water Harvesting	in-country	15	Soil and Water Conservation Extension
Construction Foremen Seminar	in-country	30	Soil and Water Conservation
Mapping	in-country	15	Data Collection/Analysis
Extension short courses	in-country	30	Extension
Training Unspecified	in-country & third country		

## EVALUATION PLAN

The Watershed Development Project (655-0013) will contain two methods of evaluation in the implementation plan; As required by Title II, Section 206 agreements, the food component will be evaluated on an annual basis, and one mid-term evaluation of the entire project.

### Annual Evaluation

The Title II, Section 206 Transfer Authorization requires an annual evaluation report to be written by the recipient government with assistance from the USAID. The recipient government retains the responsibility for the evaluation report; including recommendations for changes in future programming of development activities.

Content of the Evaluation Report - The following is a generalized scope of work for the annual evaluation report:

#### For the Government of Cape Verde

- (a) Examine the background and current structure of the project. Discuss the roles of the cooperating GOCV agencies in fulfilling the terms of the agreement.
- (b) Discuss current progress and evaluate achievements toward implementation benchmarks. Where shortfalls occur, offer alternative means for achievement.
- (c) Provide an accounting of funds generated by sales, funds used, and the end-of-year balance.
- (d) Present recommendations for changes in the project activities.

#### For the USAID

- (a) Work with the relevant GOCV agencies in preparation of the evaluation report, providing guidance as to possible alternative means, analysis of data, etc.
- (b) Prepare separate section recommending additional commodities, or changes in implementation plans.

The document will be forwarded to AID/W for review and further comment.

### Project Mid-term Evaluation

In addition to the periodic Mission project review, and mandatory annual PL480 Title II, Section 206 evaluations, a mid-term project evaluation is programmed. It will be an outside evaluation, bringing consultants in for approximately one month, and will invite GOCV participation.

Timing of the Evaluation - The most appropriate time for the evaluation is during late 1986, just after the rainy season. It is scheduled for four (4) weeks.

Team Composition - Four outside specialists have been planned to provide input into the evaluation. An exact team composition is not certain, but a probable skill cluster would include:

Food Aid Specialist

Soil and Water Conservation Specialist

Community Development Specialist

Agricultural Economist

During project design, the GOCV made available a wide range of specialists from within its ranks. They are willing to perform a similar service during the project evaluation, with similar personnel.

Scope of Evaluation - Just as the design of the project has been integrated with Development Assistance and PL480, the evaluation should be so combined. The primary questions will likely be progress toward project benchmarks, and the logical framework matrix provides the substance for generating the report. Of secondary yet still fundamental importance will be the ultimate effectiveness of the combination of funding sources in achieving development results.

Documents/Reports for Evaluation - Useful documents for the design will be the previous project documentation (project papers, evaluations, etc.), current project periodic evaluations from within the Mission as well as GOCV evaluation reports. Finally, reports from contractors and any new research germane to the project subject area should be considered.

## PROCUREMENT PLAN

### RESPONSIBILITIES

The Ministry of Rural Development, Government of Cape Verde, will be the implementing agency for this project. Procurement of commodities and technical assistance contractors will be performed in accordance with all pertinent AID regulations and rules. Procurement of technical assistance will be in conformance with current FAR and AIDAR regulations which become effective in April 1984.

### COMMODITY PROCUREMENT

Procurement of commodities will be performed by two methods, as follows:

- (1) Procurement will be performed through a procurement services agent (PSA) selected by the GOCV to procure most of the commodities in the U.S. Selection criteria in AID HB15, Chapter 4 will be used to make a contract to a PSA to procure commodities in conformance with chapter 3, AID HB11.
- (2) USAID/Praia together with the MRD will procure locally available commodities such as POL, cement, gabions, and hand tools for this project. In all instances procurement will be on a competitive basis to the extent possible (considering the limited number of suppliers available in Cape Verde). Also, commodities eligible for procurement under the shelf item rules (see V, below) will be purchased as appropriate.

The Project Officer, USAID/Praia is the responsible officer to initiate PIO/Cs in full coordination with MDR personnel. Procurement will be initiated as soon as possible following the signing of the PROAG and the meeting of condition precedent by the GOCV. The technical assistance Team Leader will also assist in the development of additional commodity lists as required. The Project Manager may also call upon the services of the Regional Supply Management Officer, REDSO/WCA on at least a quarterly basis to assist in clearing up any bottlenecks in the procurement process.

Procurement rules and regulations concerning competition, source and origin requirements, shipping, marking, etc. will be observed in conformance with AID Handbooks. Shipping of commodities will be on U.S. or Cape Verdean flag vessels unless otherwise arranged and agreed upon in writing.

### COMMODITY ELIGIBILITY

All commodities listed are eligible for AID financing, and will be procured from only AID Geographic Code 941 Countries, except for items designated for local procurement.

## SHELF-ITEM PROCUREMENT - LOCAL COST FINANCING

The Watershed Development Project will utilize approximately \$600,000 for local cost procurement of such items as POL, agricultural implements and construction material. Procurement under the shelf-item rule will be in accordance with rules outlined below. Local procurement of commodities can provide the following items:

Indigenous commodities - those mines, grown or produced in the cooperating country. Non-free world componentry is disallowed.

Shelf-items - those items imported and stocked to meet a general public demand in the cooperating country. They are not goods imported solely to support an AID-financed project.

Both indigenous goods and shelf-items must meet eligibility criteria - they are subject to the statutory and policy restrictions found in Handbook 1, Supplement B. Chapter 4.

Financing Support - Indigenous goods can be financed by AID project funds without limitation, other than the total local currency limit of the project.

Imported shelf-items from Code 000 (U.S.) sources can be financed in unlimited quantities. Commodities from Code 941 sources (U.S. and Less Developed Countries) can also be financed in unlimited quantities; the eligible source(s) must be identified in the project agreement. Shelf-items coming from Code 899 (Free World) sources but not from Code 941 (Selected Free World) sources, can be procured if the price per unit does not exceed \$5,000; the total amount of these project purchases cannot exceed \$25,000 or 10 % of the total project local cost financing, whichever is higher, but in no case will they exceed \$250,000 without a source/origin procurement waiver.

Prices to be paid for locally procured commodities will be no more than the lowest available competitive prices, and purchases will be in accordance with good commercial practices. Commodities on the local market that are imported from non-Free World countries are not eligible for AID financing.

Vehicles are not eligible items under the "shelf-item rule" but cement, sand, gravel, POL, and other construction materials are obtainable with local cost financing.

Some locally-procured items may be ineligible as a result of being shipped aboard non-Free World vessels; high visibility commodities (tractors, farm equipment, fertilizers, etc.) may fall under this heading.

Invoices for payment should state the source and origin of locally purchased materials, if such a requirement is practical.

TITLE TO COMMODITIES

Title to commodities procured through AID financing normally rests in the cooperating country. Exceptions may be made to the policy of titling commodities in the cooperating country if the commodities are procured for a project, specifically for use by, or in direct support of an AID/financed technician. Commodities falling in this category will normally be confined to:

- (a) Motor Vehicles for Transportation
- (b) Household Equipment and Furnishings
- (c) Office Furnishings and Equipment

Title to AID-financed project commodities should be fixed in the project Agreement, if possible.

WAIVERS

No source/origin procurement waivers are anticipated at this time. Should waivers be required later, a waiver request must be made to the USAID/Praia Principal Officer and REDSO/WCA concurrence obtained prior to any procurement transaction taken place.

LOCAL COST PROCUREMENT

Commodities identified as being procured with 'LC' funds are to be financed with funds generated by PL-480 food sales receipts. These funds are not included in the procurement plan as they will not be included in the authorization package for the project.

COMMODITY LIST (TENTATIVE)

(A) SUMMARY

1. Rural Works Component	\$1,052,500
2. Hydrology Equipment - Watershed Monitoring	76,300
3. Extension Component	110,150
4. PL-480 - Grain Treatment Component	175,400
5. (GEP/GIR) MDR Equipment	21,000
6. Photo Mapping - Aerial Photography	<u>200,000</u>
Commodity Total	1,635,000 (rounded)
Contingency - freight, insurance	365,000
PSA Fixed Fee Contract, initiation	<u>          </u>
Grand Total	<u>\$2,000,000</u>

DETAIL COMMODITY LIST (ILLUSTRATIVE)

I. RURAL WORKS COMPONENT

<u>Quantity</u>	<u>Description</u>	<u>FOB Unit Price</u>	<u>Total Price</u>
1	Backhoe excavator such as Caterpillar Model 215	\$160,000	\$160,000
1 lot	Spare parts, extra tires		20,000
3	Dump Trucks, 5 CU.YD/7-8 ton (Ford LN 7000 or equal)	22,000	66,000
1 lot	Spare parts and extra tires		24,000
6	Front End Construction Dumpers 1/2 Capacity	3,000	18,000
1	Air Compressor w/Diesel Motor 300 CFM, 100 PSI, trailer MTD	20,000	20,000
1 lot	Spare Parts		3,000
4	Jack Hammers w/hoses+ (Ingersoll - RAND J-40) for compressor	2,000	8,000
6	Cement Mixing 1/2 CU/YDS CAP. Motorized, Trailer Mounted	3,000	18,000
4	Pick-up Trucks, 3/4 ton Diesel Motor	10,000	40,000
2	4 Wd Drive Vehicles, 5 pass.	12,000	24,000
1 lot	Spare parts for above vehicles		12,000
1 lot	Gabion tools - wire stretchers+ cutters		2,000
1000	Shovels	12	12,000
1000	Pick w/handles	12	12,000
1000	Hoes (heavy duty) w/handles	12	12,000
300	Steel PRY Bars, Assorted 11, 12 1/14 LBS		8,000
800	Sledge Hammers; 500-8 LBS; 300 15	15	12,000
2	Levels - Construction type w/Tripod (Lietz B-4)	750	1,500
2 sets	Drafting Tables and Equipment	1,500	3,000
7 sets	Office furniture - 7 desks 21 chairs; 7-3 x 60 tables; 7 filing Cabinets		11,000
1 set	Garage Tools, including tool boxes,		

<u>Quantity</u>	<u>Description</u>	<u>FOB Unit Price</u>	<u>Total Price</u>
	Jacks, Stands, Compressor, Grease, Guns, etc.		15,000
1000 ton	Cement (local procurement)	140	140,000
400 ton	Gabions - Assorted Cages	1,000	400,000
2000 m	Pipe-reinforced PVC, 6" + 8 Heavy duty, accessories		5,000
20 ton	Re-Bar - 6, 8, 10 mm	300	6,000
Subtotal			\$1,052,500

II. HYDROLOGY EQUIPMENT -  
WATERSHED MONITORING

10	Raingage, recording	2,000	20,000
30	Raingage, non-recording	300	9,000
5	Water level recorders, float type	1,500	7,500
5	Water level recorders, bubble/gas type	6,000	30,000
1	Engineer level	1,800	1,800
1	Micro Computer and accessories	8,000	8,000
Subtotal			\$76,300

III. EXTENSION COMPONENT

1	Typewriter, electric	1,200	1,200
2	Typewriter, manual	600	1,200
1	Calculator - printout	400	400
6	Calculator (small) printout	75	450
20	Calculator - handled	20	400
2	Survey Transit - with Built in Distance Measurement Capacity	2,000	2,000
1	Mimeograph Machine	1,200	1,200
1	Copying Machine (Office)	1,500	1,500
1 lot	Office Supplies		4,000
1 lot	Training Materials		3,000
1 set	Video Cassette Player, Camera (White paper for Pre-Recordings on Agronomy/Extension)		4,000
1	35 mm Camera w/special Lenses (telephoto) tripod		1,000
1 lot	film and processing		1,000
1 set	Slide projector/screen/battery		800
1 lot	Farm Tools, irrigation equipment, supplies (wire, cement, pipes, etc)		6,000

<u>Quantity</u>	<u>Description</u>	<u>FOS</u> <u>Unit Price</u>	<u>Total Price</u>
1 lot	Agr. input - seed, fertilizer, pesticides		2,000
4	2 WD, Pick-ups, Diesel	10,000	40,000
20	125 cc (approximately) Motor-cycles	1,500	30,000
1 lot	Spare Parts for the Above		10,000
	Subtotal		<u>\$110,150</u>

IV. PL-480 GRAIN TREATMENT EQUIPMENT COMPONENT

EMPA

2	Foggers	300	600
60	Hand sprayers	30	1,800
4	Wet suits	150	600
2	Solution applicators	200	400
1 lot	Tarps		20,000
4	Bobcats - small 1/2 ton port loaders	7,500	30,000
	Subtotal		<u>\$53,400</u>

PESTICIDES (yearly)

	Malathion 1 % liquid - 7500 l. x	2	15,000
	Malathion 5 % liquid 500 l.	3	1,500
	Malathion 25 % dust - 500 kg	\$2/kg	1,000
	Phostoxin 10 tablets per tube 40 tubes/box x 40 box/yr	\$50	2,000
	Raticide 30 x 20 kg (600)		1,200
			<u>30,700</u>
			x 4 yrs
	Subtotal		<u>\$122,000</u>
	Component subtotal		<u>\$175,400</u>

<u>No.</u>	<u>Description</u>	<u>Unit Price</u>	<u>Total Price</u>
V (GEP/GIR) MDR EQUIPMENT LIST (PRICES)			
1	Micro-computer 16 BIT, 640 MB storage Min.	\$4,000	\$4,000
2	Printer (Epson Olivetti) 1 dot-matrix, 1 daisy/ink jet	750	1,500
1	Plotter 4 color (HP 7174 A)	2,000	2,000
1	Modem D-cat	400	400
1	Air conditioner	700	700
1	Dust filter	500	500
1	Dehumidifier	200	200
	Required under environmental conditions in Cape Verde		
		2,500	2,500
1	Photocopier 2 sided, collator		
1	Binding machine Plastic spiral or "velobind"	800	800
5	Diskettes (box of 100)	100	500
3	Interface cables	33	100
1	Noise, surge filters	400	400
1	Battery pack	600	600
1	Spirit Master duplicator	500	500
1	Thermo-fax machine	1,000	1,000
2	Typewriters electric, interface-ready	750	1,500
	Software:		
1	Word processing document preparation	200	200
1	Spreadsheet data storage analysis	300	300
1	Financial Analysis Project analysis	200	200
1	Statistical Survey analysis	400	400
1	Graphics Document preparation	200	200
2	File system Inventory, catalog	400	400
6	Calculators \$30 range, solar printer	30	180
	Office supplies [printer paper (fanfold), spirit masters, thermofax]		

Subtotal

401,000

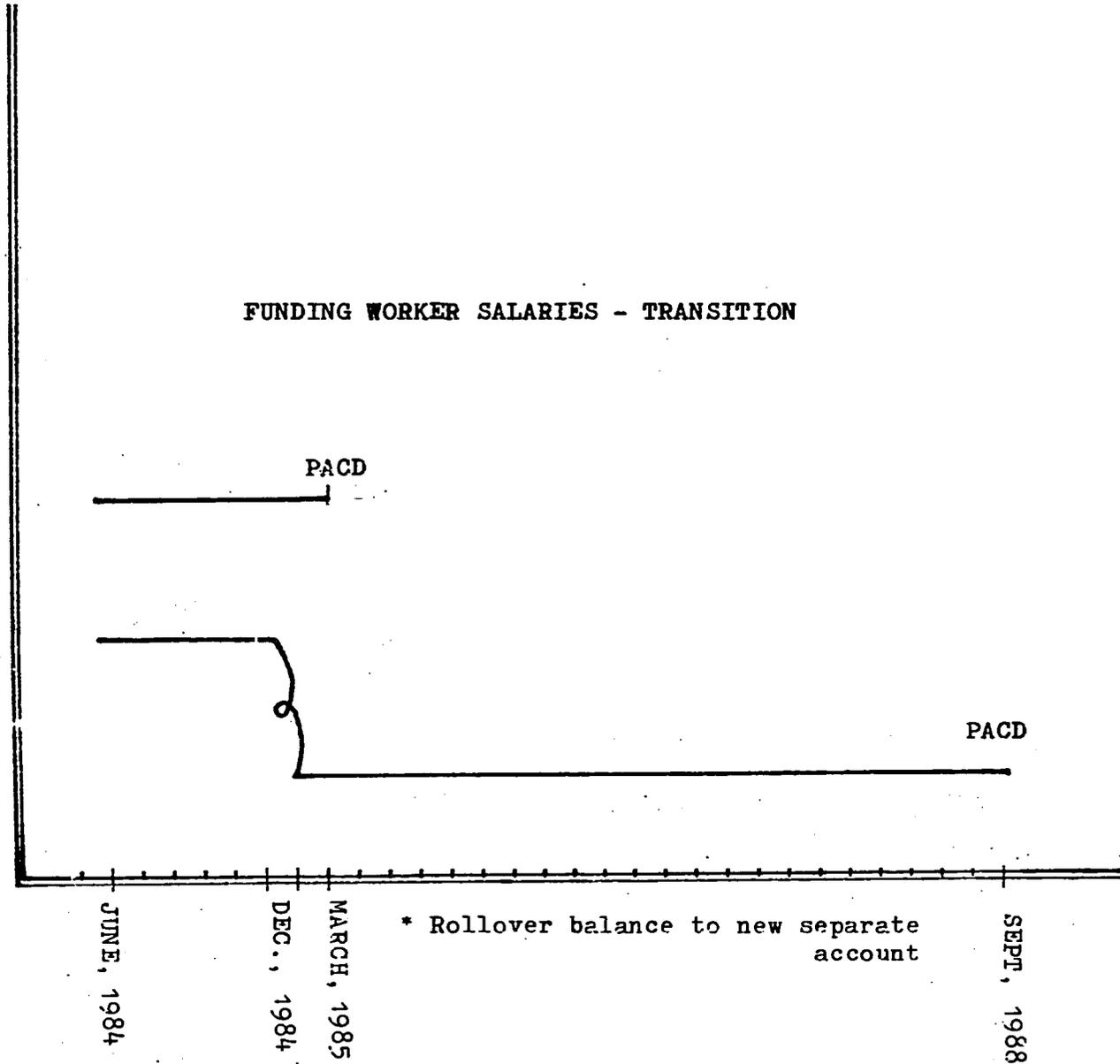
SOURCE:

FUNDING WORKER SALARIES - TRANSITION

WATERSHED MANAGEMENT  
(655-0006)

FOOD FOR DEVELOPMENT  
(655-PL01)

WATERSHED DEVELOPMENT  
(655-0013)



IMPLEMENTATION PLAN -- YEAR ONE

1984/85	PROCUREMENT T.A.	PROCUREMENT COMMODITIES	TRAINING	PL480 SHIPMENTS	FINANCIAL MANAGEMENT	CONSTRUCTION (BUILDINGS)	GENERAL PROJECT MGMT.
MAY							PP authorized in AID W
JUNE				Signing of T.A. between USAID and GOCV	FY84 obligation \$1.6 million		ROAD signing between USAID and GOCV
JULY	PIO/T submitted to AID/W: T.A. and aerial photos	Selection of PSA for most commodities		Recruit full time food monitor (1'-20,000)		GOCV submits building plans already approved by engineers	
AUG	Cable traffic revisions	PIO/C for 1st trach of commodities - \$800,000			Call for audit of PL 01 to close out account	Plans received by Trindole	
SEPT	Advertise CBD 30-40 days on street		Long term P's begin training			Site selection for buildings complete	
OCT		Call REDSO/WCA if necessary to expedite PIO/CS				Plans received by REDSO/WCA and approved for contracting	
NOV	Travel to Washington to review proposals - perhaps GOCV Rep.		Selection of long term participants (B.S./MS)				
DEC	Aerial photos taken and delivered	Commodities arrive		First food shipment arrives			
JAN	Selection of T.A. contractor		Long term P's begin ELT at ALIGU		Transfer old account balance to new "separate" PL480 Account		
FEB						Construction begins on buildings	
MARCH	Long-term team leader arrives/recruit local staff			Food shipment arrives			Waterched Mgt. PACD; close out activities
APRIL							Semi-annual project review
MAY							

IMPLEMENTATION PLAN -- YEARS TWO THROUGH FOUR

YEAR	TECHNICAL ASSISTANCE	COMMODITIES	TRAINING	PL480 SHIPMENTS	FINANCIAL MANAGEMENT	BUILDING	GENERAL MANAGEMENT
JUNE 85/ 86	Extension/Community Dev. arrives  Sylvo Patoralist arrives.  Ag Engineer arrives	2nd tranche commodities ordered	Short term training plan for LOP drafted	Two food shipments  GOCV evaluation self-help benchmarks	FY86 Obligation \$1.5 million	Construction complete by DEC. 85	Semi-annual project review
JUNE 86/ 87	Recruit Evaluation Team  Sylvo-Pastoralist leaves  Ag Engineer leaves	Final commodities ordered		Two food shipments  GOCV Evaluation	FY87 Obligation \$4 million		Semi-annual reviews  Midterm Project Evaluation
JUNE 87/ 88	CD/Extensionist leaves  Team leader leaves		Trainees return for integration	Two food shipments  GOCV Evaluation			Semi-annual review
PACD			B.S. trainees return to be placed				Trainee follow-up Project close-out procedures.

PL 480, TITLE II, SECTION 206

INTRODUCTION

The direct cause of Cape Verde's emergency food requests is the chronic dependency on food imports made worse by the prolonged drought now in its 16th year. Since the Country's independence 8 years ago, the GOCV has given high priority to restoring a nearly totally degraded environment through widespread soil and water conservation activities and enlisted donor support for this objective. In the long run it is expected that this ambitious program will result in increased water resources for irrigated agriculture, which, in combination with somewhat better rainfall, can move the country significantly toward food self-sufficiency. To the extent that this strategy is successful, dependency on food aid will diminish.

The total agriculturally useful land area in the Cape Verde archipelago is estimated to be in the range of 55,000 to 60,000 hectares. Of this, presently no more than about 1800 hectares can be irrigated due to lack of water. If more water were available, there is enough land to expand irrigated area several times over. Of the remaining rainfed agricultural land, crop production is limited due to the unreliability of rainfall, poor quality of soils in some cases, and steepness of the terrain. In the last 16 years, rainfall was reported to be considerably lower than the long term average. It is doubtful if this is a real climatic change, since the literature reveals (see the 1978 Agricultural Sector Assessment, pp 13-18) that drought and famine have regularly occurred in Cape Verde since as early as 1719. Although the earlier drought and famine periods seem to have been shorter than the present one, it is also clear that the available farm land did not have to support the size of population that it presently does. Nicholson's report on Sahel rainfall indicates that long term droughts of ten years or more are historically common.

Reliable figures on crop production are not available for an historical period, but export figures over the last century suggest that the sector has had periods in which production attained impressive levels. However, today it is generally believed that exceptional rains, both in total precipitation and in even distribution over a fairly long duration, would be necessary to produce the basic food requirements of the islands, particularly for cereals. The environment of Cape Verde has obviously always been quite fragile, and its present degraded state suggests that the attention which has been given to maintaining the environment in a productive condition has been inadequate. Over-population has been cited as one cause of environmental deterioration. Too many people depending on too small an area for food, water and energy has left the islands with a barren landscape, almost denuded of trees and other vegetative growth, with signs of excessive soil erosion due to water and wind action. Thus what little rain does fall does not remain on the land for long, making survival of plant life extremely

Difficult

In many areas of food production Cape Verde is currently at or near self-sufficiency. These include meat, fish, fruits and vegetables. Legume production would meet national consumption requirements with normal rainfall. The food components where Cape Verde is far from meeting consumption needs are corn, wheat, rice, milk and oils.

Assuming additional land can be brought under irrigation, it by no means follows that that land would be used to meet Cape Verde food deficits. Currently, fully two thirds of the irrigated land is dedicated to sugar cane, for making alcoholic beverages, and bananas, which are mainly exported. Also a significant proportion of fish production is exported. It is probable that Cape Verde, following the experience of other tropical countries such as Canary Islands and Senegal, will increasingly produce agricultural products for export to countries whose climate limits or prohibits such production. Certainly the strategic geographic location favors exploitation of international trading opportunities.

Following such a policy of stimulating food exports Cape Verde could earn the foreign exchange to import those foods for which Cape Verde does not enjoy a comparative economic advantage. This "solution" would be termed food self-sufficiency based on international trade.

#### FOOD SUPPLY/DEMAND

Even under extreme drought conditions it is evident that supplies of fruits and vegetables are improving significantly. This trend may be expected to continue. Supplies of fish exceed local demand on many islands, and increased price to producers currently provide more incentives. Livestock herds are currently being reduced due to the extreme shortage of forage, resulting from the disastrous level of 1983 rainfall particularly on Northern Islands.

Aside from the livestock situation, which is a temporary phenomenon, there are food supply excesses for certain products, either actual or potential, that could become serious at any time. For example, should normal rainfall resume for one or more years, vegetables and legumes could be expected to be even more abundant, while native corn supply would also increase though not to excess. The concern would be one of absorbing temporary excesses in order to avoid price instability and thus maintain farmer production incentives.

Cape Verde should never be expected to produce enough to meet needs for milk, oils or grains other than legumes. It will, therefore, continue to be dependent on substantial imports of these products. Now it receives these imports mainly as donations. In the long run, when Cape Verde's economy has developed to the point where it can earn foreign exchange through export of goods and services, sufficient to pay for its essential imports on a commercial basis, the food aid would no longer be needed.

The exports of goods and services might include high value agricultural products, mainly for seasonal European markets, industrial products, or any of a variety of services, all of course based on exploiting Cape Verde's strategic location. Cape Verde historically has only prospered when it has used its location for economic advantage.

The major longterm policy issue for Cape Verde is a macro economic approach to solve its food needs. In short, how should the country find the food it needs to feed its population (or let them migrate elsewhere), or the means with which to buy the food it requires. This review will have to include not only agriculture, but other sectors as well. Particularly the potential for ocean fishing should be addressed, and possibilities for small scale industry, high tech food production, desalination of sea water, alternate energy sources, and waste recycling. It appears that only with a long-range policy, covering twenty years or more, can the dependency syndrome of the archipelago on foreign donations of food be addressed.

The policy dialogue to date has centered on the selling price of imported corn, and this dialogue will be required to continue in order to maintain the selling price at world market level or to raise it to the point where storage and handling charges are absorbed. However, if the decision is made to push for higher prices, the funds generated will increase significantly, so that another area of policy dialogue will be introduced - how to use the additional funds.

#### ALTERNATIVE PROJECT ACTIVITIES

There has not been adequate discussion of alternative project activities during the development of this Project Paper. The bilateral policy dialogue will focus on this issue in the future. The indicated directions for such a dialogue to take are the following:

1. Higher selling price for corn, that will generate more funds for development activities.
2. Development of strategies for commercializing food and agriculture products so as to deal with any overproduction in specific lines, and also develop a broader range of export goods. These may lead to a separate agricultural commercialization project, which might absorb additional funds generated.
3. Development of strategies for generating employment and commercial exports outside the food and agriculture sector, with the expectation that increases in non-agricultural activity and employment will serve as a viable alternative to increased food sector activity, should this prove intractable. It would be expected that the increased non-food exports would eventually pay for essential food imports.

## II. THE FOOD BALANCE SHEET

### A. Current Food Production in Cape Verde

Government estimates of the production of the two major foodstuffs, corn and beans, since 1970 indicate a maximum production for corn of 9000 MT (1979), and for beans of 8900 MT (1980). For corn this would represent only about 1/5 of total corn requirements for the archipelago. Consumption of beans could be met by local production if yields and acreages were consistent with the 1980 figures every year. However, in most years since 1970, the data indicate that national production of these two crops has not come close to approaching the high figures noted above. Table I, below shows the low production figures of the main rainfed crops as well as the inconsistency of that production from 1979-1983.

TABLE I  
Corn and Bean Production, 1979-1983  
(metric tons)

	1979	1980	1981	1982	1983
Corn	9000	2895	3000	4800	2700
Beans	n/a	8900	500	4400	2200

Source: FAO/WFP

Corn consumption requirements are usually placed at about 150 kg per person per year, or 45,000 metric tons given a population of 300,000 people. Thus for corn, Cape Verde has been experiencing a structural deficit of 43,000 to 36,000 metric tons per year over the past 14 years. In years of good rainfall, most of the estimated available rainfed acreage of 55,000 hectares will be planted. However, given the steepness of the land (in some cases slopes exceeding 30 % are planted), the permeability of the subsoil, and the constant winds, in order for the corn and bean crops to reach reasonable levels of production, the rains would have to fall slowly, on a regular basis with no extensive dry periods and continue throughout the growing season. In most years this does not happen; rather the limited rains that do fall, come in very few and heavy rainfalls, and the large part of the rainfall is turned into runoff on the steep slopes and is soon lost to the sea.

Considering the acreage available for planting, about 55,000 hectares, and corn needs of about 45,000 MT annually, the land would have to yield over 800 kg/ha to meet present requirements. Without irrigation, or some other drastic shift in agricultural technology, it seems highly unlikely that this would occur. Such production levels certainly cannot consistently be expected, if they can ever be attained at all. If, for example, the 55,000 hectares available for planting are actually planted, and the highest production has been 9000 tons, then the yields are approximately

164 kg/ha. The government estimates that only about 30,000 hectares are planted in these dry years, thus indicating a high yield in recent years of about 300 kg/ha. Even this acreage may be high. The Food Crop Research technical analysis suggest that 30,000 hectares were in use, but they could only determine 22,941 actually being cropped. In an extensive analysis undertaken as part of the 1982 evaluation of the Watershed Management (December 1982), comparisons of control corn yields ranged from 121.5 to 306 kg/ha versus 344 to 555 kg/ha on land behind the dikes. This suggests that under current technology, averaging 800 kg/ha is virtually impossible.

B. Imports

The Government of Cape Verde normally imports 10,000 MT of flint corn from Argentina every year (in some years this has been considerably higher, particularly when food aid has been inadequate or not shipped when needed, see Table II). The imported corn, very similar in quality to the locally grown corn, is preferred for preparing the national dish cachupa, and commands a premium price in the local market. In 1983 EMPA was selling imported Argentine flint corn for 7 escudos per kilo over the second grade, or U.S. corn. Very few beans appear to be imported, although the Government has programmed an importation of 2000 MT for 1984, due to expressed shortages in 1983. Unfortunately, the 10,000 MT of corn that had been budgeted for 1984 had to be imported in 1983 because of shortfalls in donated grain. Thus corn imports for 1984 are expected to be nil, raising the question of a need for increased donated grain.

TABLE II  
Availability and Requirements of Food, 1979-1984 (metric tons)

	1979	1980	1981	1982	1983	1984
<b>Food Production</b>						
Corn .....	1000	7000	3000	4800	2700	2700
Beans .....	9000	2000	500	4400	2200	2200
Total production	10000	9000	3500	9200	4900	4900
<b>Commercial Imports</b>						
Corn .....	10200	20650	10500	10000	18000	10000
Beans .....						1500
Other .....						-
Total Imports ...	10200	20650	10500	10000	18000	11500
<b>Food Donations</b>						
Corn .....	15000	23500	18600	18100	22600	17715
Beans .....	1500	11500	150			2000
Wheat .....	8000	9500	11000	11200	5000	14000
Rice .....	4500	6300	6500	15100	6000	3905
Total Donations	29000	50800	36250	44400	33600	37620
<b>Total Available .....</b>	<b>49200</b>	<b>80450</b>	<b>50250</b>	<b>63600</b>	<b>56500</b>	<b>54020</b>
<b>Population .....</b>	<b>287437</b>	<b>291814</b>	<b>296258</b>	<b>300770</b>	<b>305350</b>	<b>310000</b>
Food needs at 250 kg/person, MT ....	71859	72954	74065	75192	76338	77500
<b>Surplus (deficit), MT</b>	<b>-22659</b>	<b>7496</b>	<b>-23815</b>	<b>-11592</b>	<b>-19838</b>	<b>-23480</b>

See footnote on the next page.

C. Food Aid

Food aid, primarily corn, wheat and rice, has been received from several donors over the past years, and generally makes up the deficits of consumption over production not covered by commercial imports. As much as 40,000 MT of the three major cereals are donated each year (see Table III). Unless the Cape Verde country receives substantial and prolonged rains over the coming years, it is unlikely that food aid requests will diminish. Taking into consideration stocks at the end of 1983, "pipeline" donations, committed donations and expected production (estimates from the base of harvest season well underway), the FAO/WFP mission calculated that international assistance for cereals and beans would be required of 36,871 tons in 1984 (see Table III). Since that estimate, further commitments of 2000 MT of beans, 3000 MT of corn, 2500 MT of wheat, and 1000 MT of rice have been received. Thus the 1984 requirements would appear to be approximately 28,000 MT.

Almost without exception, the Government of Cape Verde has preferred to sell the food it receives from donors and to use the local currency generated by these sales to employ people in public works projects. In addition to mobilizing a part of the national income for projects, which is seen as socially useful, this approach prevents a welfare attitude from developing in the population, and employs large numbers of otherwise unemployed people.

D. Food Balance

Table III gives the calculated food balance sheet for 1984. As can be seen, the production of corn barely reaches 5 % of the requirements for that major cereal. Even under the supposition that adequate rains will give a good harvest, one still cannot expect much more than 20,000 to 30,000 MT (50,000 ha X 400 to 600 kg/ha). It is doubtful if Cape Verde could reach more than about 50 % of its requirements in the next few years.

Wheat and rice are not grown at all in the islands, but increasingly are consumed, especially in the urban areas. Because of the large quantities of donated wheat and rice, these cereals have become major components in the food balance sheet of Cape Verde. Beans are generally not a major donated food item. A donation of 2000 MT was received in 1983, and the U.S. has committed 2000 MT of beans as emergency aid for 1984. Other commodities making up the food aid are cooking and vegetable oils and powdered milk. Nutritional requirements for Cape Verde are calculated at 2800 calories for people employed in public works), 420 grams of carbohydrates and 93 grams of fats. The figures of 400 grams of corn and 50 grams of

- a. 1984 figures from Table
- b. Population estimates based on 1.5 % growth rate

Average MT of available food 1979-1984	59003
Per capita available food 1979-1984, kg	198
Average MT of available food required 1979-1984	74651
Per capita available food required, 1979-1984, kg	250
Average per capita food deficit, 1979-1984, kg	-52

TABLE III  
Availability and Requirements for Food - 1984

(in metric tons)

Product	Stock Jan. 1, 1984	Production estim. -1984	Commercial import -1984	Approved aid -1984	Total available -1984	Consumption needs -1984	Deficit	Res sto nee
Corn	16000	2700	-	14215	32915	47000	14085	117
Wheat	-	-	-	11500	11500	13200	1700	33
Rice	5634	-	-	4405	10039	8500	-1539	21
Beans	-	2200	1500	2525	6225	7000	775	17
Total	21634	4900	1500	32645	60679	75700	15021	188
Veg. oil	250	-	-	1574	1824	1950	126	5
Powdered milk	145	-	-	555	700	1500	800	5

Corn	5000 MT	U.S.	Wheat	5000 MT	Austria
	7000 MT	EEC		3500 MT	Belgium
	2215 MT	WFP		3000 MT	Netherlands
Rice	1870 MT	Japan	Beans	525 MT	WFP
	810 MT	Kuwait			
	290 MT	Germany	Milk	50 MT	Swiss
	435 MT	WFP		505 MT	WFP
	1000 MT	USSR			
Vegetable oil	120 MT	Germany			
	1200 MT	Netherlands			
	150 MT	Saudi Arabia			
	104 MT	WFP			

1. The United States furnished 10,000 MT in 1983 scheduled 5000 MT for 1984
2. Consumption needs are based on 310,000 people in 1984
3. The imports of the private sector have been subtracted from needs
4. The Government purchased 8000 MT of corn due to shortages in 1983. This corn had been budgeted to be purchased in 1984
5. Recent figures indicate a donation expected from France of 2500 MT corn and 2500 wheat
6. The People's Republic of China has promised 500 MT of corn

SOURCE: WFP/FAO Report of November, 1983 updated March, 1984

beans are used to meet the basic staple requirements. This translates into about 120 MT of corn/day or 43,800 MT/year. These figures correspond closely with the quantity of corn sold annually by EMPA. Beans would calculate out to 5,475 MT.

Table II presents the calculated food balance for the period 1979-1984. Only in 1980 was the availability of cereals and beans considered adequate to cover national requirements. The overall deficit of 52 kilograms per person per year over the period demonstrates the precariousness of the food balance and the Government's concern about adequate food availability and distribution. Food aid, which represents from 1/2 to 2/3 of available basic foodstuffs, outside of meat and fish, has become a major element of national planning and a chief concern of the administration.

### III. INFRASTRUCTURE

#### A. Food Storage

Storage of all imported foodstuffs, whether donated or purchased commercially is handled by EMPA and effected in their warehouses. EMPA maintains warehouses throughout the islands both for food storage and general use. Table IV lists the warehouses by location, type and capacity throughout the country. The two types of warehousing space of the most concern for the PL 480 project are those listed as "suitable" (for food storage) warehouses and silos. Of the former group, EMPA has suitable warehouse structures in all but three of the principal towns. These warehousing points serve as wholesale outlets for commodity sales to merchants who retail throughout the islands. Of these warehouses, reportedly 20,000 tons of capacity is of excellent quality. Warehouses visited were exceptionally well organized, very clean and free of insects, dirt and other foreign materials, were in excellent repair and appeared to be very well maintained. With the exception of one warehouse that was reported to need new roofing, all others were reported in good condition, though some apparently needed improvement in the ventilation systems.

In Praia and Mindelo, the port cities that receive international food shipments, new bulk storage silos for grain have been constructed and are presently in use. Praia has fifteen silos with a total capacity of 10,000 tons, while Mindelo has 8 with a capacity of 4,200 tons. The silos are used to receive bulk shipments of wheat (Mindelo) and corn (Praia and Mindelo). The facilities were constructed with technical assistance from the FAO and financial aid from the Netherlands. They contain facilities for cleaning bulk grain upon arrival, and bagging facilities for local distribution or trans-shipment to other islands.

Given the combination of silos and warehouse capacity, the port cities of Praia and Mindelo have a total capacity of 28,500 tons of storage, or roughly one-half of the total annual imports of all cereals. In addition, 3,500 tons of temporary capacity also exists in Mindelo, which can be used in the non-rain periods (virtually year round), in the unlikely event that too many shipments arrive at the same time. Sales of corn by EMPA are relatively constant throughout the year as can be seen in Table V. In

TABLE IV  
REPUBLIC OF CAPE VERDI  
EMPRESA PÚBLICA DE ABASTECIMENTOS (EMPA)  
CAPACITY OF WAREHOUSES

LOCATION	SUITABLE WAREHOUSES				OTHER WAREHOUSES		
	No.	Type	Capacity (M ton)	Area (m <sup>2</sup> )	(M ton)	(M ton)	Silos (ports) (M ton)
<b>SOUTHERN ZONE</b>							
Praia:							
Achada Grande . . . . .	4	B	10000	4800	6000	2020	10000
Z. Cais Velho . . . . .						1000	
Z. Cais - Santa Catarina:							
Assomada . . . . .						2400	
Santa Cruz:							
Pedra Badejo . . . . .	2	A	500	400		125	
Tarrafal:							
Vila do Tarrafal . . . . .	2	A	500	400		400	
Calheta . . . . .						500	
Boa Vista:							
Sal-Rei . . . . .	1	A	250	200		100	
Maio:							
Porto Inglês . . . . .	1	A	250	200		150	
Sai:							
Palmeira . . . . .	2	A	500	400	150		
Espargos . . . . .						250	
Fdgo:							
S. Filipe . . . . .	2	B	1600	1215	380		
Mosteiros . . . . .						100	
Brava:							
Nova Sintra . . . . .	1	A	250	200	220	80	
Total South . . . . .			13850	7815	6750	7125	10000
<b>NORTHERN ZONE</b>							
S. Vicente:							
Italcable . . . . .		new	4300	3200			
CC-2 . . . . .		comp	1000	700			
CC-2 . . . . .		patio		2500			
Alfândega . . . . .			400	500	1000		
Z. cais - Santo Antão:							
Porto Novo . . . . .	1	new	3000	2000			
Paul . . . . .	1	A	300	225			
Ponta do Sol . . . . .				200		300	
Janela . . . . .						100	
S. Nicolau:							
Ribeira Brava . . . . .	1	A	250	200			
Tarrafal . . . . .	1	B	800	600	400		
Total North . . . . .			10050	10125	1400	400	4200
Grand total . . . . .			23900	17940	8150	7525	14200

SOURCE: Technical Committee, EMPA, June 13, 1983.

1982 the average sales were 3456 tons per month, while in 1983 they were 3718 tons per month. EMPA prefers to have at least three months of stocks on hand, therefore its silos and central warehouses should usually contain about 10,000 MT of corn, about 1/3 in Mindelo and 2/3 in Praia.

EMPA reports that it would like to add some new warehouses, particularly on islands where suitable storage does not presently exist, or on islands (such as Fogo) where all the storage is in one place necessitating long distances to retail markets. There does not appear to be any suitable private sector owned storage space that is adequate for the storage of foodstuffs. Therefore the possibility of warehouse rental does not exist at this time. The equipment (other than transport, see transport section)

TABLE V  
EMPA SALES OF CORN - CAPE VERDE - 1982-1983

Delegation	Sales 1982			Sales 1983			Average	
	Jan-Jun	Jul-Dec	Total	Jan-Jun	Jul-Dec	Total	1982	1983
Praia.....	3594.0	3373.4	6967.4	3590.2	4596.8	8187.0	3483.7	4093.5
S.Catarina	1761.0	2933.4	4694.4	2719.7	3989.7	6709.4	2347.2	3354.7
Tarrafal	2454.0	2554.7	5008.7	2252.5	2140.2	4392.7	2504.4	2196.4
Santa Cruz	1971.0	1967.6	3938.6	1424.1	1797.1	3221.2	1969.3	1610.6
Sel .....	309.0	398.3	707.3	359.3	442.8	802.1	353.7	401.1
Boa Vista	363.0	464.0	827.0	436.6	524.2	960.8	413.5	480.4
Fogo .....	1480.0	1674.1	3154.1	1377.5	1474.3	2851.8	1577.1	1425.9
Brava .....	406.0	265.4	671.4	257.7	318.6	576.3	335.7	288.2
Maio .....	290.0	398.4	688.4	362.8	323.2	686.0	344.2	343.0
Total DDS	12628.0	14029.3	26657.3	12780.4	15606.9	28387.3	13328.7	14193.7
S. Vicente	2300.0	2820.2	5120.2	2534.3	2927.4	5461.7	2560.1	2730.9
Porto Novo	3460.0	3945.6	7405.6	1901.4	2127.8	4029.2	3702.8	2014.6
Ra Grande	-	-	-	1950.3	2036.4	3986.7	-	1993.4
S.Nicolau	816.6	1471.4	2288.0	1221.0	1532.1	2753.1	1144.0	1376.6
Total DDN	6576.6	8237.2	14813.8	7607.0	8623.7	16230.7	7406.9	8115.4
Total General	19204.6	22266.5	41471.1	20387.4	24230.6	44618.0	20735.6	22309.0

SOURCE: EMPA, Division of Stock Control, March 1984

that EMPA uses for handling commodities, although certainly not excessive, appears to be adequate in most cases. Given the national policy of labor intensive systems, items such as conveyors, hand trucks, etc. are probably sufficient. In the case of ship unloading, however, a need for improvement is obvious. In Praia, the method is to load a large bottom-unloading bucket with bulk grain in the ship's hold. This bucket is unloaded into a dockside bottom-unloading hopper by means of the ship's crane. The hopper is high enough to permit gravity loading of trucks from a bottom-unloading gate. The trucks dump the grain into a hopper at the silo, where it is conveyed to the pit and the elevator leg.

The major problem with the system is that it takes an inordinate amount of time to unload a ship; usually 6 days to unload 5000 tons in Praia (Beyond six days demurrage must be paid). As ocean freight rates are linked to turn around in port, reducing the unloading time should bring a reduction in freight rates. Although this is not important to EMPA in the case of PL 480 grain (U.S. pays for ocean freight), it should be of possible concern in the case of commercial imports. A solution would be to install a vacuum unloader at the port. This could be done with a portable unit, which could be removed from the area between cargo shipments. EMPA reports that it needs to study the problem to determine an economical solution soon.

Some items of peripheral equipment, particularly small items, should be provided. Large impermeable tarps are needed at warehouses, primarily for the fumigation of bagged grain. Grain probes should be provided for drawing samples of stored grain at the silos. EMPA has no grain shovels, now needed for bulk grain handling (reportedly, the ship's captain provided shovels to the men in the hold for the last shipment, as EMPA did not possess any). Grain moisture meters, sieves for determining foreign matter, and grain scales for quality samples should also be provided. These items are scheduled for procurement. Bagging equipment seems adequate, as does equipment for small bagging (one kilo size) of grain, sugar, or processed rice (most of this rebagging in small packages is done out of broken bags that inevitably are accumulated through handling. These small bags are then sold at EMPA retail outlets in Praia, or repackaged in larger lots and sold through merchants). (Equipment for handling grain fumigation, insecticides applicators is covered in the environmentalist's assessment of EMPA's storage facilities).

Presently, EMPA charges a depreciation cost for each ton of grain handled of 590 escudos (\$7.56 @ 78 escudos = \$1.00 U.S.). This represents 8,850,000 escudos per year (\$113,461) for the proposed PL 480 section 206 project, or 35,400,000 escudos (\$453,846) over the life of the project. Ordinarily, the depreciation allowance would be intended for replacement of capital structures at the end of their depreciated life. Depreciation is charged against the use of capital assets, and funds accumulated to counterbalance the declining value of those capital assets as they are used up. It is, therefore, the usual way of preventing decapitalization of a firm's assets. Maintaining liquid fund balances against depreciation allowances is, in most cases, neither warranted nor wise. If the firm's business is sufficiently profitable (or socially useful, as in the case of a government service agency), it is usually advised to reinvest its capital recovery funds in its own enterprise, maintaining only sufficient liquidity for annual plant and equipment replacement requirements. The firm should not, however, utilize capital recovery funds for operating costs, unless such use will generate at least as much return as could be gained in liquid or semi-liquid investments (i.e. bank or bond type holdings). In Cape Verde opportunities for investment of these funds in interest bearing holdings are very limited, and it appears that the interest rates paid are very low. Therefore, it is recommended that the funds that accumulate in the depreciation account be utilized for the construction of additional warehouse space that EMPA needs, to make repairs to any existing facilities that need them, and to make modifications and extensions or improvements where needed. The guiding criteria should be to maintain or increase the fixed capital assets that EMPA has in food storage facilities, and to improve the distribution

system of EMPA in reaching everyone in the archipelago.

Depreciation funds that are not used for the above purposes, should be placed in a separate account, preferably interest bearing, against the future replacement of depreciated structures. It is recommended that EMPA develop a plan for the utilization of these depreciation funds with the intent of maintaining or expanding its capital base, improving its food distribution system, or preventing the decapitalization of its plant and equipment. An annual report should be submitted to USAID of the accumulation of and disposition of these funds, and included with the direct and indirect cost reports of handling and distribution of the PL 480 commodities.

B. Transport

1. On-land transport

EMPA maintains a fleet of 28 trucks used for transport of commodities in Cape Verde. Most of these units are located in Praia. Table VI gives the type and location of trucks owned by EMPA. Of these, 5 were reported to be broken down in March of 1984, leaving a total of 23 available for use. EMPA reports that for distribution of commodities its own fleet is insufficient and that it generally rents trucks from private truckers, this is especially true when shipments of grain arrive from international sources when up to 25 trucks are required to remove grain from the port. In fact, it was reported by EMPA that generally the rental of private trucks was less expensive than operating its own trucks. In general, it seems that private transport is readily available when needed, with possible rare exceptions on some of the smaller islands where trucks are sometimes difficult to rent.

TABLE VI  
Capacity and Location of EMPA Trucks

Model:	Delegation	Praia	Fogo	Brava	Boa Vista	São Nicolau	Sal	Maió	Total
VOLVO Ten Ton		18			1				19
BEDFORD Seven Ton			2	1		2	3		8
BEDFORD Two 1/2 Ton								1	1
Total		18	2	1	1	2	3	1	28

Summary: Nineteen x 10 T = 190 ton  
 Eight x 7 T = 56 ton  
 One x 2.5 T = 2.5 ton

Source: EMPA, March, 1984.

From sales warehouses, transport is done by private merchants, who act as retailers to smaller towns and settlements where EMPA does not sell grain. There are no reported problems with this arrangement, and it appears to be an economical and efficient way to distribute commodities throughout the country. Merchants buy commodities; grain, both whole corn and polished rice, beans, cooking oil, and sugar at EMPA central or "delegation" selling points, load the commodities on small trucks, and resell them in markets throughout the islands.

2. Ocean shipping

Cape Verde has its own shipping line which is used for inter-island transport as well as international shipping. The shipping company owns 13 ships considered ocean going vessels ranging in size from 5,500 to 120 tons. In addition it has four coastal traders of shallow draft.

TABLE VII  
Fleet of the Cape Verde National Shipping Company

Ship Name	Capacity in tons
Long distance:	
SANTIAGO	5,500
SANTO ANTÃO	3,000
ILHA DO KOMO	3,000
MINDELO	3,000
INDEPENDÊNCIA	1,100
VILMA	600
BOA VISTA	600
BRAVA	600
ELSIE	1,200
ARCA VERDE III	300
BOA ENTRADA	540
SANTA LUZIA	400
ILHA DO SAL	120
Coastal traders:	
ARCA VERDE I	116
VITORIOSO	200
PRIMOS	108
SANTA MARIA	90

Source: EMPA, March 5, 1984

EMPA usually has one of the ships available for its shipping requirements in each of the ports of Mindelo and Praia. It usually prefers to ship quantities of 600 tons of grain at a time, but reports that some of the islands do not have the capacity to handle that much grain, and therefore smaller quantities are shipped. Scheduling shipments was reported to be some problem, and EMPA is restructuring its inventory control and dispatching system at the present time to try to streamline shipments to out

islands. Problems of obtaining ship space were not incurred.

### 3. Ports

Cape Verde has three international ocean ports, at Praia, Mindelo, and Porto Novo. Praia has two docks, the first is 200 meters long and has a maximum depth of 8.5 meters. The second is 300 meters long and has 7 meters of depth. Mindelo has two deep water piers and one shallow water pier. The former are 315 meters and 160 meters long, and have water depth of 11.5 and 9.5 meters respectively. The shallow water pier is 288 meters long, and has 5.7 meters of water. Porto Novo has four quays: (1) 27 meters long by 15 meters wide with a draft of 10.5 meters, (2) 64 meters long by 15 meters wide with a draft of 3.5 meters, (3) 56 meters long by 15 meters wide with a draft of 3.5 meters, (3) 56 meters long by 15 meters wide, with a draft of 4.5 meters, and (4) 150 meters long by 8 meters wide with a draft of 7.5 meters, and reported capable of taking ships of 4000 tons.

The three ports listed above are capable of charging and discharging cargo at dockside. Because of the extra depth of the Mindelo port, grain shipments from the U.S. usually call there first on split cargo loads to lighten the load for the shallower Praia port. All other ports of call on the islands require cargo to be lightered, increasing turnaround time and handling costs.

## IV. HANDLING, STORAGE AND TRANSPORT COSTS

### A. Cost experience of EMPA

The total charge by EMPA for handling PL 480 grain is 3,300 escudos per ton, or 30 % of the current selling price. That figure should be considered under three cost accounts. (1) The direct grain handling costs from port to sales; (2) The indirect charges of EMPA; and (3) the depreciation charges levied against the port silos (no depreciation charges have been levied against other capital structures unless they fall under indirect charges). These charges were detailed in a report to USAID of January 6, 1984, and are given below.

#### EMPA Handling and Distribution Charges for No. 2 Corn in Bulk (In escudos per MT, January, 1984)

##### 1. Direct handling and Distribution Charges

###### 1. Receiving:

Agency:	Ship unloading	60\$00
	Freight forwarder	P.M.
	Other, ship	P.M.

Port:	Cargo Handling	150\$00
	Use of port	20\$00
	Normal labor	10\$00
	Overtime	12\$00
	Equipment use (cranes, hoppers, etc.)	<u>50\$00</u>
	Subtotal	242\$00
Dispatching:		10\$00

TOTAL RECEIVING COSTS

312\$00

2. Bulk storage and bagging

Transport to silo (EMPA or private)	50\$00
Electricity	48\$00
Weighing & storing	5\$00
Unloading silos and movement	100\$00
Silo depreciation	P.M.
Silo Maintenance	18\$00
Loss & spoilage 2.9 %	P.M.

221\$00

3. Charges of central storage  
(Praia and Mindelo)

Transport, silo/ware- house (40 % of 180\$00)	72\$00
Receiving (40 % of 97\$)	39\$00
Handling (40 % of 97\$00)	39\$00
Loss & spoilage 0.25 %	P.M.

TOTAL CENTRAL STORAGE

150\$00

4. Distribution charges (75%)

Transport to port (180\$00/ton)	135\$00
Freight-shipping agent loading/unloading st (517\$00/ton)	388\$00
Central port (100\$00)	75\$00
Island port (200\$00)	150\$00
Transport (180\$00/ton)	135\$00
Receiving/handling (194\$00/ton)	146\$00
Loss & spoilage 1.12	P.M.

TOTAL DISTRIBUTION

1 029\$00

5. Losses and spoilage (c.i.f. 7700\$00./ton)	
Losses at reception 2.9%	259\$00
Losses through central warehouse 0.25 %	23\$00
Losses in distribution 1.112 %	116\$00
TOTAL LOSSES	398\$00
6. TOTAL DIRECT HANDLING AND DISTRIBUTION	2 110\$00
II. Depreciation charges (from I. 2. above).	590\$00
III. Indirect EMPA Charges	<u>600\$00</u>
TOTAL HANDLING AND DISTRIBUTION CHARGES	3 300\$00

B. Analysis of Cost Factors

Discussions were held with EMPA, other government officials and USAID to ascertain if the cost factors included seemed appropriate and reasonable. The cost factors charged by EMPA are established by the government from recommendations made to it by EMPA, either through its cost experience or as fixed prices by the government. Examples of fixed costs to EMPA are port charges, wages and salaries, transport and shipping charges, and dispatching and forwarding costs. Handling, bagging, electricity and losses and spoilage are calculated by EMPA as unit costs based on its experience.

1. Receiving and Port Costs

These are longshoremen and stevedore costs incurred in the unloading of vessels at the port beyond those paid for by the shipping company and included in ocean freight, and normal charges of the port authority for use of port and equipment, checkers and weighers, customs, and dispatchers. The costs seem reasonable and in line with charges levied in international ports, and verification would normally have to be done by inspection of the port's records.

2. Storage and Bagging at Silos

EMPA normally utilizes private transport for moving grain from the ship to the silos (as it also does for the majority of its other transport needs). Although the distance from the port to the silos is short (about 1/4 of a mile), the number of trucks used (20-25) and the number of days required to unload 5000 tons of corn (6 days) suggest that each truck makes only about 4-6 trips per day, at about \$6.40 per load (500 escudos). This means a gross per truck revenue per day of about \$25-\$35 per day. These figures seem quite reasonable for the rental of ten ton trucks.

The costs of putting grain in the silos are limited to controlling trucks at the dumping hopper, cleaning grain and operation of the legs; the costs are very low (about 6.5 cents per ton). Grain is taken out of the silos through gravity feed at the bottom of the silos. It flows into a hopper, where it is weighed into 50 kg and put into bags. The bags are carried by hand to a sewer who closes the bags. They are then placed on a conveyor and put up into the truck where they are stacked by workmen. Ten to twelve laborers are involved in this operation. This cost runs about 6.4 cents per bag of grain.

### 3. Central Warehousing Charges

Three items make up this cost category: Transport of grain from silo to warehouse; unloading of trucks at the warehouse, and moving and stacking grain sacks in the warehouse. This operation is costed at \$1.92 per ton, or about 9.5 cents per bag of grain. Because EMPA only moves a portion of its grain through these central warehouses, in determining its overall per ton cost factor, it bills 40 % of these costs to all grain received.

### 4. Distribution Charges

The calculation of these charges include transporting grain (in sacks) to the wharf, inter-island shipping costs, shipping and receiving port costs, transport to island warehouses, unloading and storing in warehouses. Almost all of these costs are pre-determined. The transport costs are set on a per ton basis within the port cities, interisland shipping costs are set by the government owned shipping line, and port charges are set by the port authorities. It should be noted that port charges are double on the outer islands compared with the international ports of Praia and Mindelo. The reason for this is that ships can only dock at the three international ports (see section on transport). In all other ports lighters must be used to off-load the ships, increasing the port costs substantially. EMPA pro-rates 75 % of these costs to the handling costs of corn. Total interisland transport and handling costs are therefore charged as 1029\$00 or US\$13.19 per ton.

### 5. Losses and Spoilage

Starting from a base of 7700 escudos per metric ton, handling charges are added and the percentage loss is attributed to the base value of the corn plus costs at each stage of the distribution system at which losses are incurred. Thus the losses recorded ex-silo are 2.9 % of the base plus 312+811 or 8823 escudos per ton. This figure, 259\$00 (due to rounding the figure is slightly above the 256\$00 calculated), is added to the per ton basis against the total tonnage received by EMPA. Similarly, the 23\$00 is taken against losses at the central warehouses, and 116\$00 incurred as losses in inter-island distribution. Losses therefore are equivalent to approximately 3.5 % of the total grain value of sale. Most of the loss incurred is due to grain cleaning, which is done at the silo, and shrinkage due to the decrease in moisture content of the grain in storage in Cape Verde. Losses in ocean shipment are 1 % to 03 %. Figures for the losses at the silo are actual, and the others are pro-rated.

Including losses from storage and handling is a normal accounting procedure in inventory and sales accounting of grain. However, to do so requires that the value of inventories be established as their final expected sales value, at the time the inventories are received. In the case of the corn shipments, this point has to be the ex-ship inventory. Under commercial imports, EMPA would establish this price as the c.i.f. price of the corn received. They would then add handling and distribution costs, so that a c.i.f. value at the point of sale would be established. The difference between this value and actual sales value would give them their margin of profit or loss. In the case of donated grain, the only reference price for the commodity is the agreed upon selling price of the corn. That price times the total quantity shipped establishes the gross proceeds expected from the grain sales. However, unless losses and shrinkage are deducted from gross proceeds, the net deposits would be greater than the agreed net deposit requirement by the amount of the losses.

EMPA adjusts for this accounting problem in two ways: (1) the net amount of grain is entered as inventory upon receipt of the grain so that losses incurred during ocean shipment are deducted; and (2) rather than adjusting inventory figures at each transfer of grain, EMPA pro-rates a cost factor against all corn sales that covers the inventory losses. This is perfectly acceptable, except that it means that the net proceeds deposited in the account for development must be the selling price less handling and distribution costs times the inventories received at dockside.

The following example demonstrates the accounting requirement.

Calculation for Deduction of Losses in Handling

Corn shipped	1,000	MT		
Loss in ocean shipping	3	MT	est.	.03 %
Corn on dock Praia	997	MT		
Cleaning and shrinkage in silo	29	MT	cal.	2.9 %
Ex-silo	968	MT		
Central warehouse loss	2.4	MT	p.r.	.25 %
Net ex-warehouse	965.6	MT		
Inter-island shipping loss	10.8	MT	p.r.	1.12 %
Net for sale	954.8	MT		
Value @ 11,000/MT	10,502,800			
Distribution costs @ 3300/MT	3,150,840			
Net Deposit @ 7700/MT	7,351,960			
			actual deposit against	
			net received portside/MT =	7374.
Gross value of grain at				
portside, 997 @ 11,000	10,967,000			
Distribution @ 3,300/MT	3,290,100			
Net for deposit	7,676,900			
Loss factor	324,940			
Calculated loss factor	42.57	MT	4.2 % total	
Value of net deposit lost	327,804			

Because EMPA collects (or deducts from gross proceeds) the amount of the grain losses (actually at its net agreed deposit value plus all handling costs incurred before the loss was recorded), it would be expected to return that amount to the development account, or more simply, to deposit the agreed upon net value of the total grain received at dockside. Because EMPA only makes deposits against actual sales of grain, an adjustment should be made either annually or at the end of the project.

The cost factors discussed in 1 through 5 above are the direct costs of handling and distribution as reported by EMPA for the past year. The total per ton cost is 2110 escudos, or 19 % of the sales price of corn. Two other cost accounts are added, structure depreciation and indirect costs of EMPA, discussed below.

#### 6. Depreciation

Depreciation charges against the new port silos are fixed by the Ministry of Economy and Finance (MEF) at 590 escudos per metric ton. Although the actual calculations were not available some hypothetical calculations can be done to determine the reasonableness of this amount.

The port silos in Praia cost approximately \$5.5 million to construct, and it is estimated that those in Mindelo cost about \$2.5 million. Thus the total construction cost is \$8.0 million. If the silos were depreciated on a straight line basis for 30 years, the annual depreciation cost would be \$266,666 per year. The flow through of grain averages about 45,000 MT per year. Thus charging the depreciation factor on a pro-rata basis would be \$5.93 per MT of grain handled. Not counting any inflation, this figure (462 escudos per ton) would just replace the structures after 30 years. The actual figure of 590 is, therefore, 128 escudos per ton over the straight line rate. However, a depreciation account in Cape Verde can earn a maximum of 5 % compounded interest. Given an inflation rate of an estimated 10 %, therefore will require \$126.9 million to replace the structures in 30 years.

#### 7. Indirect Costs

EMPA charges a fixed fee of 600 escudos per metric ton for indirect costs of the firm. This figure is set by the MEF as an "operating margin", and is based on gross turnover of EMPA. Actual financial reports, including results of the periods over the life of the previous PL 480 project, were not available. EMPA's director of finance reported that last year EMPA had a total turnover of 2,800,000,000 escudos (\$35,897,435 at 78 escudos to the dollar), on a total capital of 74 million escudos. Given the total sales of corn by EMPA of approximately 45,000 MT, this would generate 26,550,000 escudos or approximately \$340,384 each year. The estimated value of corn handled (donated as well as commercial imports) each year is \$7.0 million, or about 20 % of EMPA's total turnover. If the indirect costs of EMPA are equally pro-rated on turnover, then the 5.4 % indirect charges against corn suggest that EMPA's total indirect costs are approximately \$1,958,041 or 152.7 million escudos. We were not able to verify these estimates.

## 8. Summary of Costs

The overall cost structure for handling and distribution of donated corn by EMPA appear to be reasonable. Although somewhat higher than some other countries (i.e. 30 % versus about 22 % in Upper Volta) it is also true that EMPA generally handles less volume because it is not involved in local purchases for price stabilization or distribution. It is also true that the costs of inter-island shipping of commodities adds considerably to the cost of distribution. Verification of accounts will be undertaken at the end of the existing PL 480 Title II 206 Project and before the proposed project gets underway. It is recommended, therefore, that a final accounting of local currency generations and uses from shipments of commodities under the previous project be done between October 1, 1984 and January 1, 1985. At that date, the net amount after all available deductions for handling costs, should be transferred to the new separate account to be used for rural development work as specified. It is also recommended that each year, prior to establishing the price level for new commodity shipments, EMPA submit a detailed report on its cost experience for the previous year, including direct and indirect costs and disposition of the depreciation account.

## 9. Determination of Sales Price

PL 480, sec. 401b requires that a determination be made such that commodities distributed under the Act will not result in a substantial disincentive to domestic production or marketing in that country. There are usually three tests of this condition: (1) that the commodity distributed is not likely to cause long range disincentives to production due to shifts in consumer tastes and preferences; (2) that the quantities distributed are not in excess to national requirements as supplied by local producers; and (3) that the price of commodities sold not be such that it is below local production or market prices for the same commodity.

Local corn in Cape Verde is a flint type variety that is preferred by consumers due to traditional tastes. With the recent shortage of production, the Government has imported Argentine flint corn as a substitute. Both these corns are so much preferred that they command a premium over U.S. corn of about 100 per cent in price. Because of the high demand for this corn, and the shortage of donated grains, the Government is obligated to import the Argentine corn to meet requirements. Thus, the condition is met for both the taste and quantity tests.

Determining a price for PL 480 commodities that are used to generate local currencies is usually less straight forward. A normal rule of thumb is to charge at least the world market price for the commodity. This price is then compared to local commodity prices to insure that the world market price is not a disincentive to local producers, taking into consideration local production costs such as labor, rent, inputs, etc. In most cases that will require a price at least equal to the local farmgate price plus the marketing and transport costs of getting it to the consumer (which in many cases means moving commodities from the surplus areas to the deficit areas). In other words the local producer should be in a competitive position in the market. The world market price can be interpreted as the FAS price of corn in U.S. ports as the U.S. is the overwhelming supplier

in the world market and is therefore the price determining supplier. For a country that is a net importer but also a producer of the same or substitute commodities, the higher the international transport costs are the more the local producer is favored and the consumer is disfavored. The world market price for the consumer is obviously the c.i.f. price of corn, for the producer (exporter) it is the FAS price. In fairness to both the local consumer and to the local producer it is essential to try to determine a price that rewards the producer without overly punishing the consumer. Because the ocean freight charge on PL 480 shipments is so high (\$97 to \$120 per metric ton to Cape Verde) due to the U.S. cargo preference, and because the shipping costs are a contribution of the U.S. Government under the Act, c.i.f. values are not appropriate as a price target. More logical is the FAS price plus the cost of internal distribution and handling. This would equal about \$130/MT (about \$3.20 per bushel) plus \$42/MT (3300 escudos) for EMPA's costs. This price would presently be 13,416 escudos per ton, or about 2.4 escudos higher than the current price. With the local consumer preference for local or Argentine corn of about 100 % in price terms, this would make local corn prices equivalent to 26.8 escudos per kilo, which appears to be slightly above the current market price for flint corn. However, since there is almost no local production, it is doubtful if any price structure would be a disincentive to local producers. In fact, it appears that when it rains, all the land that is available will be planted to corn. Thus other concerns seem to be more important in determining prices in Cape Verde.

If higher prices were charged for PL 480 and other donated grain without a concomitant increase in worker salaries, the effect would be a dissaving to individual households with an equal increased savings to the government sector. This "forced savings" would be beneficial only if the government sector more effectively employed the money in investments than the individual households. In as much as large scale rural works are beyond the scope of households, either individually or collectively, and are more productive than individual household investments, this would be true.

If, however, the rural household is very near subsistence, increased prices may result in nutritional shortfalls, while decreased prices, i.e. increasing disposable income that could be spent on non-donated commodities, may not be put into savings and subsequent investment, but rather into consumer items which are imported and therefore do not contribute to GDP.

Increasing wages by the equal amount as the increased prices (the technique used in 1983, and without increasing employment) would have no impact at the national level on savings and investment unless households receiving the increased wages invested them more productively than those households that paid more for food, and the latter group did not drop below the subsistence level. An income shift would occur from the net purchasers of the commodities to the net recipients of the increased wages.

In general then, the target price should be one which approaches the world price plus local distribution costs so that a future shock, caused by a cheap food policy in the present is averted; so that a reasonable level of national savings can be generated for public works; so that the maximum number of people can be put to work; and, so that a consistency in food for work projects is attained.

## 10. Self Help Measures

Section 109 (a) of PL 480 as amended specifies that the President "shall consider the extent to which the recipient country is undertaking wherever practicable self-help measures to increase per capita production and improve the means for storage and distribution of agricultural commodities..." The efforts that are included for analysis are:

- devoting land resources to food crops;
- development of the agricultural support sector in the private sector;
- training of farmers;
- constructing adequate storage facilities;
- improving marketing and distribution systems;
- creating a favorable environment for private sector investment;
- establishing Government policies to insure incentives to producers;
- establishing institutions for research; and
- allocating budget resources in support of food production.

With the limited resources available to the Government of Cape Verde, and the extreme limitations of the natural environment, it is clear that major efforts are being made within the interpretation of the Law.

1. Over the life of the present PL 480 Title II, Section 206 project, the Government has constructed new silos for grain storage at its major ports of 14,200 metric tons capacity, and has expanded other warehouse capacity through new construction and renovations of about 10,000 metric tons. Given the Government's shortage of resources, it is suggested that a part of the funds set aside for capital depreciation be used for further expanding this storage base through new construction and major renovations and repairs.
2. In the past year, the Government has entered into a project funded under USAID for a Food Crop Research Project that will begin about the same time as this Project. This research effort is aimed at maximizing the output of food on the limited irrigated farm land in the country.
3. Under an Italian sponsored Project, the Government is improving its agricultural extension service by increased training of extension workers, and establishment of a national extension service.

Pricing policies relative to farm produce cannot be considered to be a disincentive to the local producer. It is clear that the use of price mechanisms to stimulate increased production would have no effect within what would be considered rational price ranges, from a policy standpoint.

Rather, what may be considered is a long-term policy relative to the approach the country is going to take to meet its food needs through combinations of production and imports. Obviously this entails determining the means with which foreign exchange can be earned to satisfy the cost of imported food. A policy plan should be developed for at least a twenty-year period that aims at increasing the means with which exporting can be accomplished. It would seem logical for the Government to encourage a study to be undertaken by the major donors that can lead to establishing long-term guidelines for both the donors and the Government of Cape Verde relative to investment and development decisions.

It was proposed under the previous PL 480/206 Project that a study be undertaken to improve the marketing and storage of vegetables on the island with the long range view of becoming self-sufficient in vegetable production and aiming for export of winter vegetable toward Europe. It appears that this was not done due to the lack of a person to undertake the study. The study should continue to be encouraged, and if necessary, an outside source of expertise should be sought to complete the study. It should be pointed out that as a part of this project, a major effort will be undertaken in data collection and analysis, primarily for the purposes of determining the most effective way to utilize soil and water resources.

In summary, it should be significantly stated that the Government of Cape Verde appears to be undertaking self-help measures within the meaning of the legislation. Further efforts could be achieved in:

- A. Storage and Distribution Infrastructure for Food Commodities: Utilize the accumulated capital depreciation funds for the improvement of existing storage and distribution structures or the construction of new structures.

Benchmark: By January 1, 1985, the GOCV will submit a plan to USAID for the utilization of funds to be accumulated over the life of the project. By January 1 of each subsequent year, the GOCV will report on the actual utilization of funds over the previous year and submit an updated plan for the following years.

- B. National Food Policy: The GOCV will undertake to develop a long range policy to address the problem of the structural deficits in the food balance.

Benchmark: In consultation with the U.S. Government, the GOCV will develop a proposal for addressing, as a national policy issue, meeting the country's food requirements in 20 years. The plan should include the means for studying the macro level issues, setting the development and investment targets, and locating the capital for implementing the policy. The target should be a national policy position by the end of this project (1988) that will provide guidance for the GOCV and foreign donors.

CAPE VERDE WATERSHED DEVELOPMENT - (655-0013)  
LOGICAL FRAMEWORK

LOP Funding - \$5.5 million (DA)  
\$7.8 million (PL480)  
PACD - 9/30/88

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS																		
<p>Goal: To stabilize the natural environment and increase agricultural production potential in the project area</p>	<ul style="list-style-type: none"> <li>- Increased utilization of water for agricultural and domestic purposes</li> <li>- Increased agricultural production within project watersheds</li> </ul>	<p>GOCV and International Donor Reports on food production</p>	<ul style="list-style-type: none"> <li>1. Long range U.S. and other donor assistance is consistent in policy direction and funding levels</li> <li>2. Health, population and migration trends favor agricultural production</li> </ul>																		
<p>Purpose: To develop and protect the soil and water resources of the project-designated watersheds</p>	<p>End of Project Status:</p> <ul style="list-style-type: none"> <li>1. Watershed Development plans accepted and used by GOCV</li> <li>2. Data-based justification of agriculture strategy developed</li> <li>3. Community-based system for maintenance exists for SWC structures.</li> <li>4. Report to determine investment potential of watersheds complete</li> </ul>	<ul style="list-style-type: none"> <li>1. Project Evaluations</li> <li>2. Land use maps</li> <li>3. USAID reporting</li> </ul>	<ul style="list-style-type: none"> <li>1. Farmers will invest more in agriculture on secure land.</li> <li>2. Project watersheds have potential for increased agricultural production.</li> </ul>																		
<p>Outputs:</p> <ul style="list-style-type: none"> <li>1. Physical SWC structures</li> <li>2. Water Resources Monitoring System (Data collection &amp; Analysis)</li> <li>3. Support system for rural assistance workers (extension)</li> <li>4. Refined watershed development plans</li> <li>5. Trained personnel</li> </ul>	<ul style="list-style-type: none"> <li>1. Aerial photos analyzed</li> <li>2. 6 long term degree participants</li> <li>3. Physical structures complete               <ul style="list-style-type: none"> <li>- 7,500 has contour furrows</li> <li>- 1,000 has rock-stabilized structures</li> <li>- 2,600 check dams</li> <li>- 10 subterranean dams</li> <li>- 4,000 m. embankment groins</li> <li>- 1,000 person days in vegetative measures per year</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>1. Project Evaluation</li> <li>2. USAID/GOCV reports</li> <li>3. Financial Records (EMPA, MEF, FND)</li> <li>4. Contractor reports</li> </ul>	<ul style="list-style-type: none"> <li>1. SWC technology appropriate for Cape Verde</li> <li>2. Local labor exists in sufficient supply.</li> <li>3. Interagency cooperation realized</li> </ul>																		
<p>Intermediate Output: Employed rural labor force</p>	<ul style="list-style-type: none"> <li>- local currency expended in a timely fashion</li> </ul>																				
<p>Inputs:</p> <ul style="list-style-type: none"> <li>1. U.S.           <ul style="list-style-type: none"> <li>A. PL 480, Title II, Section 206 (local currency for salaries)</li> <li>B. Development Assistance               <ul style="list-style-type: none"> <li>1. Technical Assistance</li> <li>2. Training</li> <li>3. Commodities</li> </ul> </li> </ul> </li> <li>2. GOCV           <ul style="list-style-type: none"> <li>A. Personnel, office space, recurrent costs, POL</li> <li>B. Training of rural assistance workers.</li> </ul> </li> </ul>	<p>Part I</p> <ul style="list-style-type: none"> <li>A. Budget           <ul style="list-style-type: none"> <li>1. PL 480 (see Financial Breakdown) \$7.8 million</li> <li>2. Development Assistance \$5.5 million</li> <li>3. GOCV contribution \$1.1 million</li> </ul> </li> </ul>	<p>Part II</p> <p>B. Scheduling (millions)</p> <table border="1"> <thead> <tr> <th>Year</th> <th>DA</th> <th>PL 480</th> </tr> </thead> <tbody> <tr> <td>1984</td> <td>1.611</td> <td>--</td> </tr> <tr> <td>1985</td> <td>2.0</td> <td>1.95</td> </tr> <tr> <td>1986</td> <td>1.5</td> <td>1.95</td> </tr> <tr> <td>1987</td> <td>.389</td> <td>1.95</td> </tr> <tr> <td>1988</td> <td>--</td> <td>1.95</td> </tr> </tbody> </table>	Year	DA	PL 480	1984	1.611	--	1985	2.0	1.95	1986	1.5	1.95	1987	.389	1.95	1988	--	1.95	<ul style="list-style-type: none"> <li>1. Approval and funding of DA and PL480 assisted components occurs in a timely fashion</li> <li>2. USAID/Praia Project officer position is refilled promptly.</li> </ul>
Year	DA	PL 480																			
1984	1.611	--																			
1985	2.0	1.95																			
1986	1.5	1.95																			
1987	.389	1.95																			
1988	--	1.95																			

(1) ACTION (REDSO)

VZCZCAPO325  
PP RUEHAB  
DE RUEFC #9343/01 0401  
7NR UUUUU 7ZH  
P 092723Z FEB 84  
FM SECSTATE WASHDC  
TO RUEHPR/AMEMBASSY PRAIA PRIORITY 9668  
INFO RUEHAF/AMEMBASSY ABIDJAN PRIORITY 1575  
BT  
UNCLAS SECTION 01 OF 02 STATE 238843

LOC: 42 006  
29 FEB 84 1217  
CN: 16117  
CERG: AID  
DIST: AIDL

AIDAC ABIDJAN FOR REDSO/WCA

F.O. 12356: N/A  
TAGS:  
SUBJECT: CAPE VERDE WATERSHED DEVELOPMENT (655-2213)  
PID -RESULTS OF THE ECPR

Action PDR  
Info PDR  
Due Date 2/10  
Action Taken

REF ST 021990

1. THE ECPR FOR THE CAPE VERDE WATERSHED DEVELOPMENT (655-2213) PID WAS HTID ON JANUARY 23, 1984 AND CHAIRED BY DAA/APR/CWA, JPJOHNSON. THE PID WAS APPROVED. IT WAS AGREED BY ALL PRESENT THAT THIS PROJECT WAS A GOOD EXAMPLE OF HOW FOOD AID CAN BE INTEGRATED WITH ECONOMIC DEVELOPMENT ACTIVITIES TO ACHIEVE MAXIMUM BENEFITS.

2. GOAL/PURPOSE - IT WAS AGREED THAT THE PROJECT DESIGN SHOULD SHIFT EMPHASIS AWAY FROM INCREASING AGRICULTURAL PRODUCTION BECAUSE IT MAY BE PREMATURE. THE PROJECT SHOULD BE RECONSIDERED WITH A SHORTENED TIME FRAME (3 OR 4 YEARS) SUFFICIENT TO PROVIDE INSIGHT AS TO WHETHER OR NOT THE GOAL OF INCREASING AGRICULTURAL PRODUCTION IS POSSIBLE AND IS WARRANTED IN VIEW OF ALTERNATIVE OPTIONS. GOAL AND PURPOSE STATEMENTS WOULD HAVE TO BE ALTERED ACCORDINGLY.

THE GOAL OF THE PROJECT WOULD THEN BE TO STABILIZE THE NATURAL ENVIRONMENT AND MAXIMIZE AGRICULTURAL PRODUCTION POTENTIAL IN THE PROJECT AREA. THE PURPOSE OF THE PROJECT SHOULD THEN BE DEVELOPMENT OF SOIL AND WATER CONSERVATION STRUCTURES USING RURAL LAEOR PAID WITH THE PROCEEDS FROM FOOD AID IN THE PROJECT WATERSHEDS OF SANTIAGO ISLAND.

A 3 OR 4 YEAR ACTIVITY WOULD PERMIT AID AND THE GOCV TO FOCUS UPON THE PHYSICAL ENVIRONMENT (SOIL AND WATER) WHILE AT THE SAME TIME DEVELOP ENOUGH INFORMATION TO ASSESS WHETHER OR NOT A VIABLE TECHNOLOGICAL PACKAGE FOR INCREASED AGRICULTURAL PRODUCTION COULD BE DEVELOPED.

IT IS RECOMMENDED THIS PROJECT ACCENT THE LONG TERM CONSERVATION OF NATURAL RESOURCES ( SOIL, WATER, AND VEGETATION ) AND THE VALUE OF TRAINING GOCV PERSONNEL IN

THE IMPLEMENTATION AND MANAGEMENT OF CONSERVATION PROJECTS.

3. POINTS NEEDING SPECIFIC TREATMENT IN THE PP DESIGN - (IN ORDER OF PRIORITY)

- A. GOV INSTITUTIONAL CAPABILITY, ALONG WITH CLEARLY DEFINED ROLES FOR COORDINATION, MONITORING, AND MANAGEMENT OF THE VARIOUS INSTITUTIONS INVOLVED.
- B. THE AID ROLE IN MANAGEMENT AND MONITORING OF PROJECT ACTIVITIES MUST BE CLEARLY DETAILED. A PERT CHART WOULD ALSO BE USEFUL.
- C. THE TECHNICAL ASSISTANCE COMPONENT WILL HAVE TO BE OUTLINED IN DETAIL.
- D. AGENCY POLICY OBJECTIVES - SHOW HOW THIS ACTIVITY WILL CONTRIBUTE TO THE FOUR OVERALL POLICY THRUSTS OF THE ADMINISTRATION: POLICY DIALOGUE, INSTITUTIONAL DEVELOPMENT, TECHNOLOGY TRANSFER, AND PRIVATE SECTOR DEVELOPMENT (THE 4 PILLARS)
- E. ECONOMIC ANALYSIS - ANTICIPATED COMMODITY, SHIPPING AND HANDLING COSTS FOR THE FOOD AID, AND GROSS AND NET PROCEEDS MUST BE INCLUDED IN THE ECONOMIC ANALYSIS. A COST EFFECTIVENESS TYPE OF ECONOMIC ANALYSIS MAY BE APPROPRIATE IF THE BENEFITS ARE DIFFICULT TO QUANTIFY. A DISCUSSION ON WHAT THE RESULTS TO THE ENVIRONMENT WOULD BE IF THIS PROJECT WERE NOT UNDERTAKEN (HOW MUCH SOIL AND WATER WOULD BE LOST IF THIS PROJECT WERE NOT IMPLEMENTED) SHOULD BE INCLUDED IN THE ANALYSIS.
- F. RECURRENT COSTS - DISCUSS HOW THE GOV PLANS TO MAINTAIN THE CONSERVATION STRUCTURES AFTER COMPLETION OF THE PROJECT.
- G. THE TIMING OF PROCUREMENT, SALES, AVAILABILITY OF PROCEEDS, AND USE OF PROCEEDS FOR THE PROJECT SHOULD ALSO BE EXAMINED.
- H. RELATIONSHIP TO OTHER AID PROJECTS, SUCH AS FOOD CROP RESEARCH.
- I. WHY THE PROJECT IS CONCENTRATED ON SANTIAGO ISLAND AND WHAT OTHER DONORS ARE DOING IN WATERSHED DEVELOPMENT AND AGRICULTURAL EXTENSION.
- J. THE FACT THAT LABOR WILL NOT BE A CONSTRAINT SHOULD BE DETAILED IN THE PP DESIGN. HOWEVER, WITH RESPECT TO THE MAINTENANCE OF THESE STRUCTURES, LABOR AVAILABILITY

AND INSTITUTIONAL SUPPORT MUST BE ASSESSED. SHOW HOW THIS PROJECT REPLICATES AN ON-GOING SYSTEM THAT HAS PROVED SUCCESSFUL.

- K. EFFECTS OF THE CURRENT GOV AGRARIAN LAND REFORM (IF ANY).

4. 206 COMPONENT -THE REQUIREMENT FOR A SEPARATE PP FOR THE TITLE II, SECTION 206 PROJECT IS WAIVED IN THE CASE OF CAPE VERDE. AS DA AND PL 482 RESOURCES ARE APPROXIMATELY EQUAL AND ARE TO BE THOROUGHLY INTEGRATED, IT HAS BEEN DETERMINED THAT THE REQUIREMENTS FOR BOTH DA AND PL 482 DOCUMENTATION CAN BE MET IN ONE INTEGRATED PP.

- A. THE MISSION SHOULD ENSURE THAT THE REQUIREMENTS FOR A 206 PROGRAM I.F., FOOD SECTOR ANALYSIS DESCRIBING THE CAUSES OF CAPE VERDE'S EMERGENCY FOOD REQUESTS, DISCUSSIONS OF POLICY DIALOGUE, SELF-HELP MEASURES, LOCAL CURRENCY USES AND YEARLY EVALUATION ARE TREATED ADEQUATELY.

- B. FVA IS ESPECIALLY CONCERNED THAT THE PP IDENTIFY ALL SIGNIFICANT FACTORS THAT CONTRIBUTE TO CAPE VERDE'S STATUS AS AN "EMERGENCY SYNDROME COUNTRY." THE PP MUST PRESENT A COMPELLING CASE THAT, AS A RESULT OF THE SECTION 206 COMPONENT, THESE MAJOR FACTORS WILL BE ADDRESSED AND THE FREQUENCY OF FOOD AID EMERGENCY REQUESTS WILL DIMINISH. FOOD EMERGENCY REQUESTS IN

SUBSEQUENT YEARS SHOULD OCCUR ONLY UNDER EXCEPTIONALTY SEVERE CIRCUMSTANCES.

- C.-THE PP MUST EXPLAIN HOW THE LOCAL CURRENCY PROCEEDS WILL BE USED TO PROMOTE ECONOMIC DEVELOPMENT AND AS AN INCENTIVE TO FOOD PRODUCTION ( ASSUMING FAVORABLE CLIMATIC CONDITIONS) IN SUCH A WAY AS TO REDUCE THE CAUSES FOR THE NEED FOR FOOD AID.

- D. THERE SHOULD BE AN UPDATE OF THE CURRENT FOOD SUPPLY/DEMAND AND CAUSES FOR THE DEFICIT. THIS SHOULD DRAW ON AND/OR REFER TO (A) PREVIOUS PP, (P) FOOD SECTOR ANALYSIS, (C) FOOD CROP SYSTEMS RESEARCH, (D) COUNTRY STRATEGY STATEMENT, ETC.

- E.- A SEPARATE ACCOUNTING TO RECORD GROSS PROCEEDS IS REQUIRED. THE ACCOUNTING SYSTEM SHOULD SHOW A CLEAR BREAKDOWN OF THE TRANSPORT AND HANDLING COSTS PAID TO EMPA. THE GOAL IS FOR 15 PER CENT FOR TRANSPORT AND HANDLING COSTS. GROSS PROCEEDS MUST BE DEPOSITED AND THEN TRANSPORT AND HANDLING COSTS TAKEN OUT.

- F. MEASURABLE SELF-HELP ACTIVITIES MUST BE DEVELOPED AND IDENTIFIED IN THE PP. WE RECOMMEND LINKING THE SELF-HELP MEASURES WITH POLICY REFORM, SUCH AS A PRICING POLICY WHICH WILL ASSURE MAXIMUM SALE PROCEEDS AND WHICH WILL ACT AS AN INCENTIVE TO AGRICULTURAL PRODUCTION.

- G. - DISCUSS ANY OTHER PROJECT ACTIVITIES THAT WERE CONSIDERED FOR THE USE OF THE LOCAL CURRENCY PROCEEDS AND WHY THIS ACTIVITY IS CONSIDERED THE BEST OPTION.

- H. THE PP SHOULD HIGHLIGHT THE ONGOING POLICY DIALOGUE AND SET BENCHMARKS FOR PROGRESS.

- I. PARASTATALS - A DISCUSSION ON THE ROLE OF THE THE PARASTATAI (EMPA) IS NEEDED AS IT RELATES TO THIS PROJECT. TO WHAT EXTENT HAVE ALTERNATIVE, PRIVATE VEHICLES FOR FOOD DISTRIBUTION BEEN EXAMINED?

- J. IF THE COST OF DISTRIBUTING THE FOOD TO THE OUTLYING AREAS WERE INCLUDED IN THE CONSUMER PRICE, WHAT IMPACT WOULD THIS HAVE ON SALES RECEIPTS?

- K. THE PP SHOULD ALSO INDICATE THAT BY PROVIDING THE COMMODITIES THEY WILL NOT HAVE A SIGNIFICANT DISINCENTIVE EFFECT ON DOMESTIC FOOD PRODUCTION AND MARKETING.

THE MAJOR SECTION 225 ISSUES SHOULD BE DEALT WITH IN A SEPARATE, SELF-CONTAINED SECTION TO FACILITATE REVIEW BY THE INTER AGENCY DEVELOPMENT COORDINATING COMMITTEE- (DCC). SFULTZ

PT

#8843

NNNN

WATERSHED DEVELOPMENT DESIGN TEAM

Team Leader	Engene Rauch, REDSO/WCA
Design Officer	Denny Robertson, AID/W/PM/TD/IDI
Food Aid Specialist	Warren Enger, Ronco, Inc.
Agricultural Engineer	Glenn Anders, REDSO/WCA
Hydrological Engineer	Daniel Jenkins, REDSO/WCA
Economist	John Belknap, University of Wisconsin
Environmentalist	Dennis Panther, AID/W/AFR/TR/ARD
Social Scientist	Ron Schwartz, Ronco, Inc.
Agronomist	Victoria Marcarian, University of Arizona
Financial Analyst	David Harmon, Ronco, Inc.
Support	Mary Salles, Ronco, Inc.

GOCV DESIGN COUNTERPARTS

Co-Directors	Horácio Soares, MDR Antônio Sabino, MDR
Hydrologist	Antônio Gonçalves, MDR
Agroclimatologist	Luís Alves, MDR
Finances	Fátima Fortes, National Development Fund
Soil Scientist	Aristides Semedo, MDR
Extensionist	Carolino Fortes Dias, I
Irrigation Spec.	Amadeu Silva, CAS
Economist	Elizabeth Silva, MDR
Food Aid	Elisa Rodrigues, EMPA

DESIGN CONSULTANTS

August Hartman	ADO/Praia
Francisco Barbosa	MDR
Frank Dimond	Acting CDO/Praia
Herbert Bedolfe	USDA
Herminaldo Brito	MDR
Orlando Semedo	MEF
Richard Pelleck	USDA
Thaddeus Kaminski	Soil and Water Conservation Specialist

CAPE VERDE WATERSHED DEVELOPMENT PROJECT

Certification Pursuant to Section 611(e) of the Foreign Assistance Act, as amended: I, Frank Dimond, Acting Country Development Officer for the Agency for International Development, do hereby certify that, in my judgement, the Government of the Republic of Cape Verde (GOCV) will have the financial and human resource capabilities to implement, maintain and utilize the subject Capital Assistance Project. This certification takes into consideration the requirements placed on the GOCV to maintain and utilize other projects previously financed or assisted by the United States.

This judgement is based on the (1) high priority the GOCV places on agricultural development, and in particular, watershed development, and (2) past experiences with USAID project assistance to the GOCV. Both past and present performance of the GOCV in maintaining and continuing projects initially funded by A.I.D. is commendable.

---

Frank Dimond  
Acting Country Development Officer  
USAID/Praia

---

Date

## ENGINEERING ANALYSIS

### Technical Principles

The soil and water conservation works to be financed by the project are based on the same fundamental principle. In order to control and store surface runoff from rainfall, the works must first present an impediment to the flow of water in order to dissipate its kinetic energy (into friction and, to some extent, pressure), thereby reducing velocity and causing deposition of transported soil particles as well as limiting downslope flow and scour.

Ideally, this can be best accomplished by "checking" or containing the water behind a barrier which reduces the water's kinetic energy and velocity to zero. On sideslopes this effect can be achieved with small basins, although more permeable treatments such as rock rip-rap, vegetation ridges are also effective in dissipating the water's energy. For large flows, the water must be channeled and dropped or "spilled" into a stilling area to dissipate its energy. When the velocity of the runoff is reduced, the finer particles suspended in the water "fall out" but, much more significantly, the heavier materials which are carried by saltation or in the bed load (approximately 98% of the sediment transported) are stopped. Reducing the energy of the runoff also allows more time for water to infiltrate into the soil and percolate into aquifers. With the highest intensity rainfalls on the order of 60mm/hr. and infiltration rates on the light volcanic soils of 20-30mm/hr., considerable infiltration and storage is possible with appropriate treatments. Each additional millimeter of runoff which is infiltrated on a hectare of land translates into 10,000 additional liters of water stored in the aquifer.

As a final note, the soil and water conservation works discussed below have often been referred to as soil retaining, earth holding or land forming structures. While this may be true and an important consideration in structural design, it is incidental to their function. The major criteria in the choice and design of these works should be hydraulics: the extent to which they absorb water and control its energy.

### Soil and Water Conservation Works

There are four major types of soil and water conservation works to be financed by the proposed project. In order of increasing expense and difficulty, they are:

1. Contour furrows
2. Rock-stabilized terracing
3. Check dams, and
4. Subterranean catchment dams

Cape Verdean workers and the MDR have been building similar structures since colonial times, and are well-acquainted with the designs and skillful in their execution, especially in rock masonry works.

### Contour Furrows

Level furrows or ditches dug along the contours are the simplest earthworks to decrease runoff and erosion. By increasing the micro-topography and holding water<sup>in</sup> furrows there is increased infiltration and slowed runoff. The furrows are effective on slopes up to 30%. They should be about 30cm deep (with a downslope ridge of about 10cm) and should be spaced from 1 meter apart on lesser slopes to 2 meters on steeper slopes. The furrows should be blocked or "tied" every 5 meters of length and they will have storage volume of over .04-.07 cubic meters/meter which should be able to handle the most intense rainfalls (assuming an infiltration index of 20mm/hr. Blocking or "tying" these ditches every 5 meters has an important effect. It compensates for leveling error (making execution much less demanding) and prevents erosive concentrations of runoff due to irregularities or sideslope flows along the furrows.

Trials conducted in Tarrafal by Stutler (1982) indicate that the furrows prevented runoff and increased infiltration. No results on cropping are available, although the unseeded vegetation which quickly spreads in the moister furrows is startling visual evidence. The FAO recommends furrows in their reforestation activities. The Watershed Development Evaluation concluded that, the furrows' low cost and potential benefits gave them a marked cost advantage over other conservation practices, especially when combined with plantings.

Based on the Watershed plans, the project will target approximately 30 meters of furrows, requiring one worker-day to complete this will employ about 1,500 workers each project year and cost about 22,200 escudos (\$281)/hectare.

A drawback with furrows are their limited longevity and heavy maintenance requirements. Areas with considerable animal or human movement or particularly friable soils are most vulnerable and will be excluded from this treatment. Maintenance and repair of structures is important in successful implementation of this project. The Social Analysis contains recommended strategies to address this issue.

### Rock-Stabilized Terracing

Rock walled or rip-rap terraces are the next level of conservation treatment. These are basically a deep cut in the slope with fill stabilized with rocks. Terraces are most effective when they function as contour furrows with sufficient basin storage capacity. They should therefore be designed to store about 35mm of runoff from the area upslope between terraces. The terrace basins should also be tied every 5-6 meters to prevent cross-slope flow. Spacing of the terraces is determined from the formula:

$$\text{Vertical interval} = 0.6 + \% \text{slope} / 13$$

Hence, on a slope of 20%, terraces would be spaced at 10.7 meter along the grade, with a storage capacity of 0.37 cubic meters/meter. Figure I 11-

Figure

I

Studies have indicated that rock-stabilized terraces increase yields of crops planted nearby: Pelleck (1983) found 5% increases in corn yields in a poor rainfall year and Stutler (1982) observed 10-20% increases in plant heights. The depth and capacity of the upslope basin or channel is the major factor in their effectiveness. Soil creep was observed to be stopped by simple rock-walled terraces. Precautions must be taken where terraces intersect depressions, rills or ravines. Normal terrace walls do not hold up in these areas where runoff flows concentrate and require substantial reinforcement and/or small upslope check structures to spread flows. Most structural failures can be attributed to such situations.

The location of rock-stabilized terracing is proscribed by the ready availability of rock. In fact, terraces appear to be most cost-effective on rocky fields where the rocks must be removed anyway. Due to the stabilization of the soils by the rocks, less maintenance is usually required, compared to contour furrowing. However, maintenance remains a problem and farmers must agree to assume responsibility for project-financed terracing on their land.

No time studies on terrace construction could be found. It is estimated that 2 meters of rock-walled terrace will require 1 worker-day to build. The project can finance the construction of rock-stabilized terraces on approximately 1,000 hectares, employing about 500 workers annually.

#### Check Dams

Check dams can be located in ravines, in lateral valleys and in the main ribeira channels. Their function is somewhat more complex than the side slope works discussed above. These dams also increase infiltration and store water, but heavy sedimentation rates and their placement in drainageways minimize the amount of surface storage possible. Therefore, the major purpose of these dams is torrent control and channel stabilization. The dams "check" the flow by dropping it into a stilling area to dissipate the flow energy and, to the extent possible, reduce net stream velocity to zero. A series of well placed check dams can gradually "step" flows down ravines like a ball rolling down a carpeted stairway: water drops in critical flow over spillways, crashes into a stilling area reinforced to absorb the impact (and transfer of energy from kinetic to pressure and friction), and then flows uniformly to the next drop. Considerable infiltration can take place in these latter zones. Spillway and stilling area design are obviously critical to the dam's effectiveness.

Designs vary with location and the exigencies of the site. A typical design is shown in Figure 2 along with a table of typical sizes. The ideal spacing of dams limits the slope between the toe of an upstream dam and the spillway of next to about 2%.

Check dams are a standard soil and water conservation methodology, and their effects in stabilizing channels, increasing and storing infiltration and collecting arable alluvium are readily observable throughout the watersheds. The quantity and effects of the work to date are impressive. Questions

Figure

2

do however arise about the present designs. Many of the check dams are presently constructed in dry rock masonry without aprons, stilling basins or structured spillways. There are instances, many in less accessible upper watershed areas, of spillway deterioration, scour and undermining, and complete failure, due apparently to design flaws rather than construction faults. Therefore, the project-financed check dams will replicate several typical designs which will incorporate a greater use of gabion cages, mortar, and concrete for aprons, basins, spillways and drop structures. This design will be insured by the provision of appropriate technical training and assistance which is discussed below.

The project will finance the construction of approximately 2,600 check dams over four years. The dams will average about  $40\text{m}^3$  of dry masonry rockwork,  $12\text{m}^3$  of which will be reinforced in gabion cages in the dam's apron and downstream foundations. The spillways will be sealed and reinforced with 8cm of concrete. Thus, the average dam will require approximately  $40\text{m}^3$  of rocks, 8 gabion cages, 5 sacks of cement and 850 worker-days. The construction of check dams will therefore employ about 2,000 workers each year.

These are approximate budgetary planning figures based on the MDR's construction data. Final quantities will vary somewhat depending on the modified standard designs developed by the MDR and the exigencies of particular sites.

#### Subterranean Catchment Dams

The largest soil and water structures to be financed by the project are subterranean catchment dams, some with galleries. These dams are built only across the ribeiras or their major tributaries to catch the subterranean or bed flow, down the permeable gravely alluviums which fill the ribeira channel. These impermeable barriers must be constructed in deep excavations down to bedrock to ensure a completely sealed alluvial aquifer, and minimize deep seepage losses. They are presently built of rock masonry lined on the upstream side with concrete. Some have hollow cores, or galleries, into which groundwater can seep through a filter bed. Most simply retain water in the alluvium upstream, preventing slow groundwater flow down the ribeira to the sea. This retained groundwater is then tapped by gravity drains or by pumps for irrigation.

The Watershed Management evaluation rightfully concludes that the subterranean catchment dams have had the largest direct effect on agriculture in the watershed. Increased water availability from these dams has enabled increased production on existing, temporary irrigated areas and has resulted in 55 hectares of new land to be brought into irrigated production. But, the costs have sometimes been high due to initial difficulties in the design of these more complicated structures.

A typical selection of a subterranean catchment dam is shown in Figure 3. Sizes and designs, however, vary greatly to suit the hydrology of the particular site. Catchment dams seldom exceed 15m in length although their depth may attain 6m. Several factors are critical to their effectiveness: the

Figure 11

depth, shape and permeability of the bedrock formation, the impermeability of the dam surface and seal to bedrock, and, where appropriate, a properly-graded filter bed at drains. Several of the subterranean dams which have been constructed have had leakage or drainage problems due to a lack of thorough investigation of these critical factors. Roadway crossings must also be an integral part of the design.

The project must address these problems directly not only through the provision of technical assistance and training, but also by requiring that site-specific designs include test borings and construction specifications for each subterranean dam. These designs should be approved by REDSO engineering or its delegate.

Ten subterranean catchment dams are expected to be constructed. Although several sites have been suggested, no positive investigation or identification has been made (the construction of four subterranean dams has just begun under the Watershed Management Project). Based on MDR information, subterranean dams average approximately  $300\text{m}^3$  of masonry construction and require about 400 tons of cement, although this should be increased to assure sufficient cement to ensure an impermeable concrete lining. Construction of these dams should employ approximately 500 workers annually.

#### Flood Control

One other type of conservation related structure will be financed by this project: channel stabilization groins and embankments. These will be built exclusively of rock-filled gabion cages, and will be placed, as necessary, to protect irrigation systems, roadways, and public structures from bank erosion and changes in the major flood channels. This has been identified as a major problem in the ribeiras. The instability of the ribeira channel and banks during the flash floods is a constraint on investment in irrigation and seriously effects transport. Bank stabilization should be coordinated with any road construction in the project watersheds. Typical structures are shown in Figure 4. It is estimated that approximately 4,000m of embankments and groins can be completed during the project which will require approximately 100 tons of gabion cages and will employ 300 workers annually.

#### Secondary Works

Finally, the construction of several types of smaller structures has been proposed by the MDR's soil and water conservation service. Specific plans are not yet available but they include four  $100\text{m}^3$  masonry reservoirs, a  $50\text{m}^2$  office with garage, ten 10m-deep hand-dug wells, and twenty minor roadway drainage structures. The MDR has requested only cement and labor to complete these project-related structures. Approximately 50 tons of cement and 200 workers annually should be sufficient for these secondary works.

Financing for road construction has been proposed for this project. Construction of national roads running through two of the project's watersheds, one of 7.4km from Casa Grande to Assomada and another of, as yet, undetermined length from Santa Cruz to Picos (approximately 15km). These roads

Figure 4

are an extremely costly way (\$150,000/km according to Public Works) to provide access; they are not particularly labor intensive (about 50% of costs) requiring large foreign exchange expenditures for heavy equipment; the executing agency is another Ministry, Public Works; and, they are peripheral to the project purpose. For these reasons, major road construction appears well beyond the financial, technical, and institutional capacity as well as the purview of the project, and is therefore not recommended. The more cost-effective, and direct way to increase access into the watersheds is through the continuing MDR's rural workers program. In fact, access roads become an integral factor in the layout of the flood protection, and water catchment systems. In flood zones, road embankments can serve as dikes and levees. By designing the roads to serve as channel embankments and flood protection structures, the cost of the whole will be less than the sum of the parts.

#### DESIGN AND SUPERVISION

The MDR's soil and water conservation service is the executing agency for works planned in this project, as well as for those underway in the Watershed Management Project (655-0006). This service now has six years' experience in large rural works programs since independence, although several of the staff members experience dates back to the 1960's.

The director is a Portuguese-educated, graduate engineer and has had several short-courses overseas. The technical staff consists of four engineering technicians with various levels of experience and the equivalent of U.S. Associate degrees, a Portuguese Engineer, two surveyors, and two drafts men and several Junior Assistants. On Santiago Island, the service also has a Regional Chief in Tarrafal who is a graduate engineer and a field supervisor in Calheta who is a Construction Technician. This staff is responsible for all planning, design, and overall supervision of the soil and water conservation works programs, the majority of which are the USAID Watershed Management Project and Food for Development Program with combined work forces of approximately 4,800 persons in 1983.

In the field, semi-skilled supervisors and job foremen oversee the actual construction of the conservation works. Once work is completed, personnel are transferred to new work sites to expand the area to be treated. A typical work site will have from 25 to 100 workers carrying, breaking and placing rocks in walls or inside the cobion cages. The only heavy equipment used are air hammers and compressors to break up rock outcroppings and dump trucks and bulldozers to move the larger rocks. These crews also construct small reservoirs and water canals and place pipe for irrigation.

The workforce is usually composed equally of men and women. This varies with the season; if and when the rains come, more women than men generally leave the job site to tend the fields. Wages are paid according to skill. For example, women predominate as carriers, while men break up the rocks. Work crews building terrace walls are comprised almost exclusively of women. These public works jobs are eagerly sought after due to the virtual non-existence of alternative employment. The men and women la-

borers are generally from the area thus further motivated by the improvement of their own local surroundings.

Quantities of labor and materials are closely monitored at the work site. The MDR prepares field sheets for each dike. Using these field sheets, at each site, the number of hauls made by trucks, and the operating hours of other machines utilized, a 15-day summary is made for each work site. This information is then checked against the technical information developed for the given dike or dam. Copies of a set of forms which were completed for a dike at Vila Quente, in Ribeira Seca are found annexed.

A spot check of one dike construction in Ribeira Seca showed meticulous accounts with only minor errors. Actual construction costs have run only about 5% higher than those estimated by the MDR. Judging from the extensiveness of the completed project works, and the costs reported by the MDR, there is no reason to suspect irregularities. Likewise, the overall quality of construction work appears to be good.

Weaknesses in the present system of design construction are attributable to quantity, not quality. Starting at the top, the executing agency has only two graduate engineers (one of whom is a technical assistant) and a limited number of engineer-technicians in the central and field offices. This staff must plan and oversee several multi-million-dollar watershed improvement and rural works programs. Workload and staff constraints appear largely responsible for the time necessary to develop adequate plans and schedules for the sub-projects. The training and placement of lower-level, skilled personnel (controllers and foremen) also requires time. The available labor force also varies due to the rains and consequent demands of farm-work, as well as to the employment needs of other projects.

Present activities are also somewhat hampered by transportation and equipment needs. Chief among these are dump trucks, vehicles for field technicians, a backhoe for excavation and miscellaneous office equipment. Much of this will be purchased under the Watershed Management Project.

#### Proposed Project Assistance

As discussed previously and recommended in previous evaluations, the Soil and Water Conservation Service requires reinforcement in order to carry out the enlarged works program finance by FFD proceeds in a competent and timely fashion.

#### Training

Foremost is technical training. The chief of the SWC Service should receive 24 months graduate-level training in Watershed/Water Resource Management in arid lands at an appropriate U.S. university in the southeast. This should give him a better understanding of water harvesting, flood control and land use in the project watersheds and enable him to better plan the works. Fortunately, he already has a good basic understanding of English and language training can be concurrent with initial technical coursework.

One of the staff technicians should also be trained to the B.S.C. level (48 months) in Civil Engineering with a specialty in hydraulic design and flood control. This will augment the design capability of the SWCS. Language training will also be necessary. No further long-term training is recommended. The proven construction competence of the present staff and its limited size precludes sending another technician overseas for a lengthy period. In order to assure adequate staffing in the SWCS for this project, the GOCV should be obliged to transfer another engineer-technician into the service during the absence of the trainee. The long-term training should be predicated on this replacement.

Short-term technical training should be stressed. The following short courses and in-country sessions would be valuable:

- Four weeks of courses in basics of hydrology and hydraulic design in Praia taught by a U.S. engineer.
- Six weeks of sessions on Construction Management for foremen on Santiago Island taught by MDR staff.
- Four weeks of courses in Design and Construction with rock masonry and concrete taught in Praia by a U.S. or Portuguese engineer.
- Four weeks of courses on Design and Construction with gabions given in Praia by a company representative.
- Two weeks of courses in Heavy Equipment Operation and Maintenance given in Praia by a company representative.
- Four weeks of courses on Leveling and Surveying given in Praia by a U.S. or Portuguese engineer.

Short courses in the U.S. or third countries in the following topics for up to three months each: water management, groundwater, soil conservation, water harvesting, flood control, erosion, and basic hydrology.

#### Technical Assistance:

As previously stated, the SWCS could profit from specific engineering assistance. The director has requested U.S. engineering assistance to implement the project, as well as to help out during the absence of personnel in training.

Therefore, a civil engineering advisor should be recruited. This person must have a B.Sc.C.E. with hydraulics courses from a U.S. university, and five years of engineering experience in the design of erosion and flood control works, preferably in arid zones and developing countries. The nature of the work requires an engineer experienced and interested primarily in estimation and design, rather than management and construction. Work and living conditions will be onerous and isolated; prior technical work in rural or small town communities is desirable. Language ability is important and 2-level in Portuguese must be obtained before long-term hire.

The engineering advisor would be assigned to the MDR's soil and water conservation service for up to 3 years and would be under the supervision

of the Watershed Development Project Manager and the SWCS Director. The advisor would work with the SWCS staff to ensure the necessary planning, calculation, design, estimation, and inspection of the watershed works to be financed by the project. The specific tasks are as follows:

- study both main channel and smaller upstream check dams as presently designed, and develop cost-effective design modifications and standards;
- identify and investigate sites for the subterranean catchment dams, and prepare the necessary designs and inspect construction work for the dams;
- study the design of existing contour furrows, rock-walled terraces and other soil and water conservation treatments and recommend any design changes which would improve effectiveness;
- inspect and approve sites and plans for project-financed construction;
- work with the hydrological monitoring unit and the short-term hydrology advisor to evaluate storm events and their effect on soil and water conservation treatments;
- train and organize in-country training for MDR technicians in basic hydrology and hydraulic design;
- accompany and assist trainees in selected short courses in the U.S. or third countries;
- report to Project Manager, USAID Project Officer, and REDSO/WCA Engineers on important technical issues in the soil and water conservation works in Cape Verde.

#### Management:

The technical orientation and the vast-scale rural works of this project make it imperative that the contract manager have an engineering background. The MDR has a proven record of performance in management of large rural works' programs. However, as past evaluations have pointed out, technical issues frequently arise on planning, works and commodities which require a modicum of engineering experience and savvy to fully appreciate. Although Watershed Development Planning is a major project output, the main thrust and output of the project is a multi-million dollar rural works program.

Furthermore, it is recommended that USAID select a Project Officer who has at least a background in Construction Management (if not Engineering) as well as in Soil and Water conservation. The multiple responsibilities of this project's management also warrants upgrading the Project Officer's position from a Junior Project Manager to a co-equal General Development Officer. The project is technical and ambitious in scale, combining development assistance objectives with large Food for Development financial resources. Performance will be to a large extent a function of close technical management by the USAID Project Officer and the Contract Manager.

Commodities:

The following is a list of materials and equipment which are necessary to carry-out the rural works program described above. Note that a considerable amount of additional construction equipment (trucks, motorized shovel parts, etc.) is just being ordered by the on-going project.

Equipment:

- 1 backhoe excavator\*, 90 HP, rubber tires 20' digging radius 5000 lb. force, 2 sets extra tires, 20% spare parts
- 3 dump trucks, 5 cu.yd./8 ton capacity, elevating bed (Ford LN 7000), 2 sets extra tires, 20% spare parts
- 6 front-end construction dumpers, 3/4 cu.yd. 1/2 ton capacity, (Hyster), 2 sets extra tires, 20% spare parts
- 1 air compressor with diesel motor, 300 CFM, 100 psi, 100 HP, trailer mounted, 10% spare parts
- 4 jack hammers with hoses, couplings and bits (Ingersoll Rand J-40) for air compressor above
- 6 cement mixers\*, 1/2 cu.yd. capacity, motorized, trailer mounted
- 4 pickup trucks, 3/4 ton capacity, diesel motors, heavy-duty suspension, 2 sets extra tires, 20% spare parts
- 2 4x4 vehicles, 5 passenger, diesel motors, heavy-duty suspension, 2 sets extra tires, 20% spare parts
- 6 utility trailers, 1/2 ton capacity, 2 sets extra tires
- gabion tools: asst'd cutters, stretchers, etc.
- digging tools: 1000 picks, 1000 shovels (round) and 1000 hoes with handles, heavy-duty construction types
- 300 steel pry bars: asst'd 11, 12 1/2, 14 lb.
- sledge hammers: 500 8-lb. short-handles, 300 16-lb. long handles
- 2 construction levels with tripods (Lietz B-4)
- 2 drafting tables and equipment sets\*
- 7 sets of basic office furniture
- 1 complete set garage tools including boxes, hydraulic jacks, stands, compressor, grease guns, etc.

Materials:

- 1000 tons of cement
- 400 tons of assorted gabion cages
- 200 tons of steel re-bar: asst'd 6, 8, 10mm\*
- 2000m PVC pipe, 6":8", heavy-duty, with accessories\*

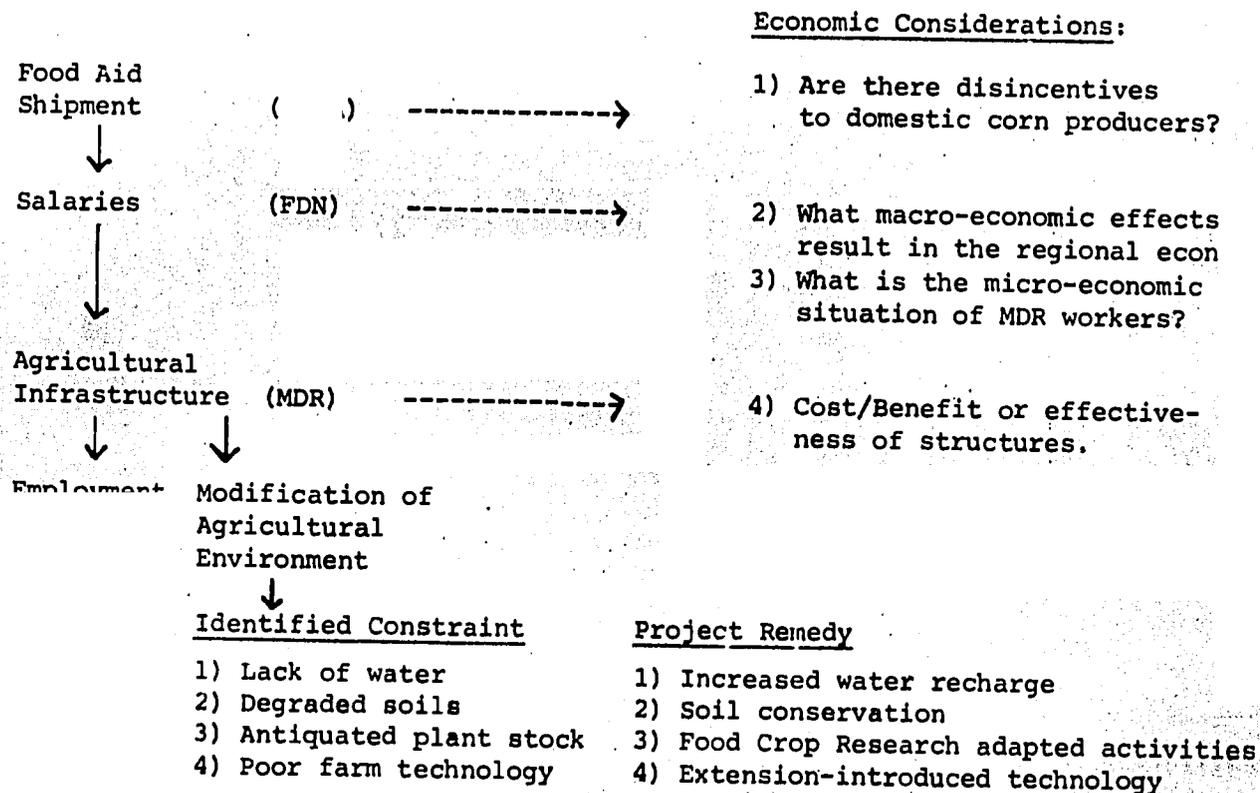
A contingency factor of 10% should be added to the above list to account for additional equipment, parts, materials and quantities which may not be included (this is separate from budgetary price or budgetary contingencies). Asterisked items will be specified in more detail by MDR and REDSO/WCA Engineering.

ECONOMIC ANALYSIS

Introduction

During the short time since Cape Verdean Independence, USAID has worked with the Ministry of Rural Development (MDR) to create and execute a system of investments in the agricultural sector. One institutional form for rural, physical investments is a series of AID and assisted projects using local, surplus labor to create soil and water conservation structures. These projects to date include: Rural Works (655-0001), Tarrafal Water Resources (0003), Watershed Management I (0006), and PL480. Typical conservation structures were: check dams, catchment systems, groins, contour walls, ditches, wells and perennial vegetation (Congo bean, acacia and fruit trees).

As shown in the following diagram, the process of converting corn into physical structures begins with the Empresa de Abastecimento (EMPA). EMPA receives, stores, transships and sells (wholesale and retail) the PL480 corn. Receipts are deposited with the National Development Fund (FND). The FND, upon receipt of vouchers from MDR, releases funds to pay worker salaries at the MDR construction site in bi-weekly cash payments.



As indicated at the right of this chart, this system engenders the following four questions, to be addressed below:

- 1) Does a production disincentive exist because of PL480 donations?
- 2) In 1983 PL480 funded \$1195 000 in salaries (\$1339 000 at 1984 price and proposed in Watershed Development at \$1.5 million). What impacts have this injection of money had on the regional/national economy?

TABLE I  
CORN SITUATION IN CAPE VERDE

Year	1983	1982	1981	1980	1979	1978	1969
National	2.7	4.4	2.9	8.5	9.0	1.0	3.5
Argentine	10.5	N/A	10.5	10.6	10.2	22.0	0.0
PL 480	15.0	10.0	15.0	15.0	15.0	15.0	0.0
EEC	9.2	15.0	3.0	11.8	0.0	18.1	0.0
TOTAL	36.9	?	31.4	45.9	34.2	56.1	?
Hectares Planted (000)	33.3	N/A	22.0	21.2	N/A	N/A	37.2

- 3) What micro economic effects do these salaries have on the wage earners and their families?
- 4) Does a cost effectiveness analysis show that probable benefits to all members of the target population sufficiently outweigh expected costs of construction and maintenance?

The data necessary to answer these questions are generally non-existent, deficient, or forthcoming only from the "Baseline Economic Survey" planned under the Food Crop Research for mid-1984.

Production of Domestic Corn and the Provision of U.S. No. 2 Yellow (dent) Corn in the Market.

Table I illustrates the change in local corn production and imports for selected years. Total domestic production should equal sales, auto-consumption, losses (spoilage and shipping), and food exchanged. Data is not available for these items except for estimates of total production. There are four types of corn marketed in Cape Verde. Domestically produced corn are generally centuries old, adapted flint varieties. A similar flint corn is commercially purchased from Argentina. The U.S. donates No. 2 yellow (dent) corn for sale and charitable distribution. Occasionally other donors (EEC) supply a softer dent corn. U.S. corn includes 2.9% impurities, 6% broken grain, .5% fungus and .32% moisture loss. The relative importance of corn in the Cape Verde diet can be seen by rough estimates of the frequency of serving in the family diet: of 15 ingredients in the Cape Verdean diet (corn, beans, rice, meat, fish, coffee, etc) the most frequently served is corn, constituting 33% of servings.

Readings from Table I indicate a strong price preference for local corn and a decline in area planted related to rainfall rather than competition from imported corn. Three hypotheses are possible:

- 1) Corn types are competitors in quality and price,
- 2) Corn types are sufficiently distinguished in quality, price and preference that they are independent, or
- 3) Corn types, distinguished by price, may have alternative uses and actually be complements.

Statistical testing of these hypotheses is impossible with current data.

Conclusions:

Consideration of Table I indicates four reasons for believing that PL480 corn doesn't create any production disincentives:

- 1) Area planted has changed little, mostly in response to continuing drought. Extensionists in WSM area confirm that all areas are planted.
- 2) Wide price differentials among types of corn shows a consumer preference for national corn.
- 3) Importation of Argentine corn sold above U.S. corn price indicates the willingness of consumers to purchase higher priced corn in return for

quality differences. Whether Argentine corn availability limits the possible maximum price of domestic corn and therefore reduces the producers' surplus is not a question here.

- 4) Calculated profits from domestic corn production, if the farmer sold his crop, indicate a potential profit under current prices of 138.4%. Costs of production = opportunity costs of labor in Frente for one member of farm family plus labor costs of family at  $\frac{1}{2}$  that of the Frente during short period of cultivation of corn, eg.  
 $C = (1 \text{ person} \times 17.5 \text{ days} \times 80\$/\text{day}) + (3 \text{ persons} \times 17.5 \text{ days} \times 20\$/\text{day}) = 1400\$ + 1050\$ = 2450\$$

Production is calculated at 114 kg/ha of corn times the (corn) land size, sometimes reduced because of rent or sharecropping obligations, using averages:

$$P = .78 (1.46\text{ha} \times 114 \text{ kg/ha}) = 129.8 \text{ kg}$$

Value of Production is product times average market price (1982)

$$VP = 129.8\text{kg} \times 45\$/\text{kg} = 5840.6\$$$

Profit =  $VP - \text{Costs} = 5840.6\$ - 2450\$ = 3390.6$  gives return on investment of 138.4%.

Obviously in the real world of C.V. drought, many of these assumptions do not hold -- especially the assumption that farmers will sell their very limited subsistence. Additional benefits of rainfed crops are the bean production intercropped, the use of plants for animal fodder, and the use of plant residual for fuel.

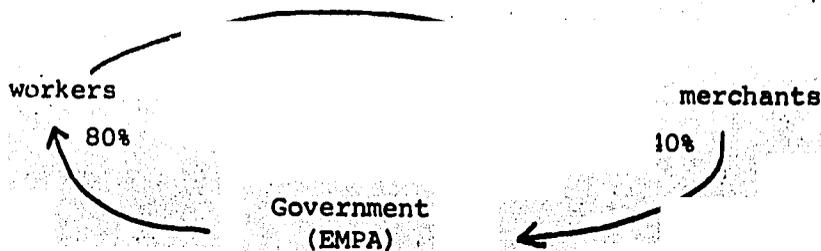
#### Macro Economic Effects of PL480 Salaries

No verified answers are available to major macro economic questions such as the effect of \$1,200,000 to \$1,500,000 in salaries on the local economy. Major areas of concern would be the escudo-size of the market, inflationary effects of excess demand, negative effect on balance of payments if salaries increase the demand for imports, effects of re-spending in support of local merchants and transportation services, and the use of earnings for investments in agricultural inputs and housing. While only a complete, regional Input/Output model would verify the magnitude and direction of such inter-sectoral linkages, a modest hypothesis serves to illustrate the importance of this neglected question:

Assume that there are only these elements:

- 1) rural workers and families,
- 2) local (Santiago) merchants,
- 3) government entities (EMPA, FAP, MDR)

Further assume that workers spend 80% of salaries locally; that merchants spend 40% for salaries and local goods and services; and 80% of government food aid goes into salaries.



Under these assumptions, for each \$500,000 in salaries, in such a crude model, there would be a total of \$1,421,299 respent in the islands' economy, a multiplier of 2.84.

Inflationary effects are improbable for the following reasons:

1. Workers spend most income on food. The project supplies imported corn at low prices, and stimulates production of vegetables and legumes. Quantity and quality of vegetables in local market has improved dramatically during LOP while prices have remained stable.
- 2) Workers also spend on imported consumption items, whose prices are not affected by the relatively miniscule Cape Verdean demand.

To date, the lack of data and training have prevented the MDR from attempting to develop a I/O model even within the agricultural sector.

#### What are the micro economic effects of salaries?

No household budget studies exist to quantify the intimate knowledge of MDR personnel concerning the spending habits of rural "subsistence" families. However, a list of possible categories of spending (which equals or exceeds the family's PL480 derived wages) could include:

1. Food, including PL480 corn for subsistence,
2. Rent for agricultural land,
3. Clothing,
4. Agricultural inputs (seeds, hoes, irrigation water, gas for irrigation pump, livestock)
5. Transportation,
6. Social obligations (baptism, weddings, religious organization and entertainment),
7. Education,
8. Health care,
9. Family assistance,
10. Housing including domestic water
11. Artesan, fishing and commercial ventures.

A solid knowledge of family spending and elasticities of demand is a prerequisite for pricing socio-economic benefits for Cost Benefit analysis.

#### Cost Effectiveness of the Multi-Objectives for the Watershed Development Project

AID Handbook 3 offers guidelines on the preparation of an economic analysis. The Handbook requires that "real" prices, that is true opportunity costs, be used. This would require three major adjustments in the WSD case, because of the PL480-206 component:

- 1) The value of PL480 corn must be a price free from subsidies, not the U.S. market support price.
- 2) In calculating local currency equivalents of dollar prices, adjustments should be made for the overvalued dollar and for the GOCV controlled Escudo exchange rate, and

- 3) the cost of labor paid out of PL480 funds must be valued at the opportunity cost which, with near 70% unemployment and large emigration, would be close to zero wage.

In a multi-objective project with some unqualifiable benefits, the Handbook indicates a cost-effectiveness (least cost for a given set of objectives) analysis. In this case, the only valid comparison is of this project versus a straight food distribution (Emergency PL480).

There are three project goals with varying appropriateness for economic analysis. Thus rural employment is measurable both as a cost and as income to the target group. Soil and water structures are tangible but their impact is currently unknown. Whatever potential they hold for future agricultural production is overwhelmingly conditioned by the amount and frequency of rainfall. Training goals, where effective, spread the benefits over the life time of the trainees, long after the four year project period.

Because of similarity and linkage to other AID/Praia projects, it is useful to review the economic analysis and evaluation of these projects (Tarrafal, Public Works and WSM). The results of previous projects should provide quantitative information for cost effectiveness analysis, although all acknowledge data shortcomings.

The Rural Works Project Paper states:

With respect to economic analysis, it has not been possible to qualify the project benefits, although this would be feasible if adequate data were available. The project does probably represent the least-cost alternative in terms of construction methods..... The economic costs of the material and labor resources to be utilized (with the possible exception of supervisory personnel) are zero or close to zero. (p. 7)

Tarrafal Water Resources Project Paper hypothesized B/C ratios, from bringing new land under irrigation, which ranged from 1.09 to 1.3 (in Tables 16 - 18). Neither the increased water supply increased irrigated acreage, nor increased crop production occurred during LOP.

The most recent data comes from the 1982 Watershed Management Interim Evaluation.

"The Project (Watershed Management) simply does not know what the impact is of the construction works that have been built" (WM-006, Interim Eval. p.15). If that is true of the physical impacts, then the long term, economic benefits are completely unmeasurable.

The following points of the "Interim Evaluation" need re-stating:

"Given that drought and massive unemployment in rural Cape Verde, and the fact that food aid would have been given to farmers without this project, rural labor should have been "shadow priced" in the original analysis." (p.12)

The overall data base created in WSM is insufficient for economic evaluation. Increases in agricultural production did occur despite lack of rainfall, but measurement of results was limited to number of hectares for irrigated agriculture and areas planted in Congo bean. The increase in production in Cape Verde agriculture depends overwhelming on rainfall. Therefore, the most that can be planned for is to increase the potential for agricultural production, in the years when there is rainfall. In controlled experiments of the effect of SWC structures on output, when there was rain in 1980 the improvement averaged 49%. But in 1982, with almost no rain, the difference was only 5%.

In summary, none of these previous projects demonstrated a favorable B/C ratio, based solely on increased production. The reasons were:

- 1) Drought - There was not enough rainfall to take full advantage of the increase in agricultural potential,
- 2) Scarce land - Arable land area has not increased, as desertification and erosion reduces acreage.
- 3) Poor farm inputs and technology - Low yield, drought resistance plant stock and poor techniques have not been affected yet by the embryonic extension and crop research activities.

Because of the large amount of non-qualified benefits the discussion of benefits below is qualitative. There are four years to the project, an interest rate of 10% is assumed and there are no differentiable inflation effects.

COSTS (\$000's)

Labor: Hiring 5500-6000 persons from the poorest rural families at a current salary of 90\$/day (\$1.16) for 200-225 days

Commodities  
Training  
Technical Assistance

Contingency

	yr1	yr2	yr3	yr4	
	1,500	1,500	1,500	1,500	1,500/yr
	net labor (with-without)=0				
	2,856	1,420	170	170	0
	225	225	225	225	0

Total net costs/year  
Discount rate/yr  
Present Value of Costs

	3,081	1,645	395	395	0
	1.10	1.21	1.331	1.464	
	2,801	1,360	297	270	

Total PV =

\$4,727,790.

Because most benefits (see below) are qualitative, currently unknown or unmeasured, one means of evaluation is to ask what annual return would justify spending 4.7 million dollars. Assume the same 10% interest rate and a 20 year pay-back period. This would give an annual repayment of \$470,348. Since the target population is the 6000 employees and all rural, poor families in the Watershed areas, expected per family value of benefit can be calculated. The levels of benefits required (\$78.39, 39.20, and \$9.41) appear quite reasonable.

$$\text{Payment} = \text{PV} \times \left( \frac{\left( i + \frac{i}{n} \right)}{i} \right); \quad \begin{array}{l} i = 10\% \\ n = 20 \\ \text{PV} = \$4,727,790 \end{array}$$

Payment = \$470 348/yr

Payment per 6000 families employed = \$78.39  
Payment per family in Watershed (12000) = \$39.20  
Payment per persons in Watershed area (50,000) = \$9.41

Benefits

	WITH	WITHOUT
1. Income: 6000 of neediest rural families will receive \$225/year†	\$6,000,000 in salaries	\$6,000,000 welfare in commodities
A. This income (salaries will have further effects, some life long, on:		
- Health care and medical care (with further productivity benefits)	yes	no
- Food spending and nutritional improvement for entire family, including some spending for further PL480 corn	yes	(corn only)
- Housing improvement	yes	no
- Family structure and stability, with the employment and salary offering the opportunity for the head of household to remain, rather than migrating to urban areas or overseas	yes	possible
- Assistance to other family members	yes	commodity
B. Multiplier effect of spending on local/regional economy (6,000,000 respend locally)		
- Support to local merchants and transport services	yes	competitive
- Generate employment in local economy	yes	no
- Support for local consumer cooperatives and supplier cooperatives	yes	competitive
- Receipts from sales of products by government corporations (EMPA and FAP) generates a larger market and less need for subsidies	yes	enlarges
C. Equity: payments go to lowest income, neediest families based on community selection process, in return for work.	yes	welfare

Benefits

WITH

WITHOUT

2. Agro-environmental Structures

A. Water

Water conservation structure will:

- slow run-off
- increase aquifer infiltration
- increase water spreading
- increase POTENTIAL agricultural productivity of rainfall (subsistence crops and of irrigated (vegetables, export) crops
- provide "better" source of domestic water less distance/time to carry water; therefore better quality of living, health.

yes  
yes  
yes  
yes

no  
no  
no  
no

yes

no

B. Land

Soil conservation structures will:

- increase the amount of irrigated land
- increase the amount of rain-enhanced land (paul) behind dams
- lessen erosion, especially on upper valley, steep slopes
- improve flood control by lessening torrential run-off thereby saving roads, housing washout and agricultural (downstream) fields

yes  
yes

no  
no

yes

no

yes

no

- C. Agricultural production increases occur because salaries are a major source of funds to pay for land rent, seeds, agro-chemicals, tools, and water for irrigation

yes

no

## Benefits

WITH

WITHOUT

Agro-Environmental (continued)

## D. Forestry activities will

- reduce erosion (soil and water conservation)
- increase fuel availability (less distance)
- increase fodder for animals
- increase fruit and bean production

yes  
yes  
yes  
yes

nc  
nc  
nc  
nc

## E. Livestock production will benefit from better sources of feed and water, cash for purchase of stock, feed and medicine.

yes

no

Improved agricultural potential (conditional upon rainfall) may increase actual production.

yes

no

## F. Extension - provide better technology, inputs and training for agriculture, forestry and family

yes

no

## G. Facilities - road repair to improve marketing efficiency and the reach of extension services

yes

no

MDR storage and maintenance facilities - increase productivity

yes

no

3. Training - Institutional Capability

- Technical assistance in areas of engineering, hydrology, extension, economic evaluation and data collection
- On-the-job training (especially in masonry)
- Development of Extension Service
- Specific data functions: data collection, project monitoring data analysis, and program evaluation
- Linkages to Food Crop Research

yes

no

yes

no

yes

no

yes

no

yes

no

4. Spillover - Tertiary Benefits

- Social organization improved through work on Frentes de Trabalho and extension activities
- Improved efficiency in development through implementation of integrated watershed development plans

yes

no

yes

no

Benefits

WITH

WITHOUT

Effect of rational land/water use plans on Cape Verdean policies regarding land tenure and water rights

yes

no

Spillover Value of training received in agricultural projects applied elsewhere in Cape Verde

yes

no

Increased probability of benefits from projects already undertaken (WSM, Rural Works) based on completing infrastructures investments, according to sequential plans for development

yes

no

Proposed Improvement in MDR Capability for Data Collection, Data Analysis and Project Evaluation

The persistent inability to quantify or evaluate the economic benefits of MDR projects indicates the need for greater efforts in data collection and project evaluation, especially from the economic viewpoint. Therefore, at the request of MDR officials, a training component was elaborated to improve the performance in the area of statistics and analysis of projects. The successful implementation of this training will be incorporated in one of the final products of this project - improved watershed development plans.

Where not dispersed by function (forestry, soils, subterranean water), data collection, analysis, and project evaluation within MDR is the function of two offices: Gabinete de Inqueritos Rurais (GIR) and the Gabinete de Estudos e Planeamento (GEP).

Present functions:

GEP: Using available data, prepares statistical summaries and analyses of MDR projects

GIR: Prepares and conducts surveys regarding rural population, e.g. agricultural census, and special studies (use of labor in rural areas, Watershed Management Worker Survey, Food Crop Research Baseline Economic Survey)

Major limitations:

GEP: Only staffed within last year, shortage of staff, limited training in economics, statistics and econometrics for project planning and evaluation, lack of equipment

GIR: Overworked, lack of theoretical understanding of statistics of surveying, lack of equipment (1 calculator and 1 manual typewriter for entire office)

Technical Assistance (UNDP) has to date, concentrated on questionnaire design, relying on extensive enumeration instead of sampling, and using only tables of frequency counts for analysis.

GEP/GIR

ISPC Type Education Curricula for Overseas Study

Position

1. Sampling Specialist

6 month

Intro to Statistical Methods  
Design of Sample Surveys  
Design of Tables and Questionnaires  
Intro to Analysis of Data  
Survey Sampling Laboratory

(IBGE)

- |   |                      |
|---|----------------------|
| 2. Computer Science Specialist  | 6 months             |
| Computer Processing Fundamentals<br>Data Base Design and Management<br>Intro to Data Processing<br>Micro Computers in Agricultural/Social<br>Economic Surveys   | US Commercial School |
| 3. Agricultural Economics   | B.A./B.S.            |
| Micro-Economics<br>Macro-Economics<br>Statistics/Econometrics<br>Economics of Agricultural Development<br>Data Collection in LDC<br>Project Planning and Analysis<br>Cost/Benefit Analysis<br>Resource Economics Topics<br>Input/Output Modelling | 2 years in U.S       |
| 4. Statistics   | 1 year               |
| Statistical Methodology<br>Analysis of Data<br>Agricultural Statistics<br>Computer Concepts<br>Data Base Management<br>Advances Statistics Related to<br>Data Collection  |                      |
| 5. Development Theory/Project Evaluation  | 1 year               |
| Economics of Agricultural Development<br>Computer Fundamentals/Data Base Mgmt<br>Economic Development Planning<br>Analysis of Data<br>Project Analysis/Evaluation   |                      |
| 6. Agricultural Statistics  | year                 |
| Intro to Statistical Methods<br>Management of Statistical Activities<br>Agricultural Survey Operations and Methods<br>Agricultural Statistics in Economic Development<br>Planning   |                      |
| 7. Socio/Anthropology   | 2 year               |
| Rural Sociology<br>Methods of Field Research in Anthrop<br>Economic Anthropology<br>Statistics and Sampling<br>Data Analysis in Development Plannin   |                      |

Technical Assistance: Two months "hands-on" training to 6 MDR people in:

- Computer fundamentals
- Data Entry
- Data Base Management
- Software Selection
- Uses of micro-computers
- Word Processing

GEP/GIR Equipment List (1984 Retail Prices)

#	ITEM	DESCRIPTION	COST
1	Micro Computer	Zenith Z100, dec, IBM, 16 bit, 640MB storage	4,000
2	Printers (Epson, Olivetti)	1 dotmatrix, 1 daisy/ink jet	1,500
1	plotter	4 color (HP 7174A)	2,000
1	modem	D-cat	400
1	air conditioner	required under environmental conditions in Cape Verde	500
1	dust filter		500
1	dehumidifier		200
1	photocopier	2-sided collator	2,500
1	binding machine	plastic spiral or "velobind"	800
5	diskettes	box of 100	
3	interface cables		100
2	noise, surge filters		400
1	battery pack		600
1	Spirit Master duplicator		500
1	thermo-box machine		1,000
2	typewriters	electric, interface-ready	1,500
	SOFTWARE	USE FOR:	
1	word processing	document preparation	200
1	spreadsheet	data storage analysis	300
1	Financial Analysis	Project analysis	200
1	Statistical	survey analysis	400
1	Graphics	documentation preparation	200
2	File system	inventory catalogues	400
6	Calculatores	solar, printer	180
	Office Supplies	varivous	2,000

20,380

with 20% discount \$16,304

## SOCIAL SOUNDNESS ANALYSIS

### Background

Cape Verde is a small country, with a population just over 300,000 comprising nine inhabited islands. The islands are located about 600 kilometers from the West African mainland and, until their discovery by the Portuguese in the 1450's, were uninhabited altogether. The economic history of Cape Verde is related to its strategic location astride transportation arteries connecting the four continents bordering the Atlantic. Cape Verde became an important trading center and link to the transfer of Portuguese culture and administration to other colonial outposts.<sup>2</sup> Unfavorable ecological conditions undermined attempts to establish agriculture on a commercial basis, although a few crops (cotton, urzela and castor beans) were temporarily productive and others, notably sugar and coffee, were exported in small quantities throughout the 19th and 20th centuries. Salt was also a major export for Cape Verde.

The islands were first populated by Portuguese emigrants who brought in slaves beginning at an early date.

Racial intermarriage resulted in a mestizo population that was pressed to fill Portugal's overwhelming requirements for manpower to administer its vast colonial empire. The mixing of languages, cultures and races evolved into a Cape Verdean culture in which African and Portuguese elements blended to form a unique creole culture and society. There are no ethnic divisions of any significance in Cape Verde. The historical and cultural developments in Cape Verde parallel those in the West Indies rather than any mainland African Society. A creole dialect (criulo) derived from Portuguese spoken throughout the islands and Catholicism enriched by a hybrid of African religious beliefs, is a dominant cultural influence. Like the West Indies, the Cape Verde Islands are characterized by over-population, the inability to produce enough food and a high rate of migration.<sup>3</sup>

During the early colonial period, Cape Verdean society was divided into two groups, masters and slaves. The masters were Europeans of various nationalities and in the mid-eighteenth century constituted only about 13% of the population. Mestizo children were sometimes kept as slaves but in most cases were treated as legitimate and given the opportunity for education and employment. With emancipation, continued miscegenation and the economic success of migrants, a three-tiered society evolved: an upper class of large landowners, wholesalers, professionals and civil servants; a middle class made up of small landowners, storeowners and minor civil servants; and, a large rural mass of sharecroppers, renters and wage earners that make up more than 90 per cent of the population.<sup>4</sup>

<sup>2</sup> Cape Verde: Assessment of the Agricultural Sector, Freeman et al, 1978

<sup>3</sup> Newitt, 1981.

<sup>4</sup> Freeman 1978: 168 .

The predominant productive activity in Cape Verde today is subsistence agriculture characterized by simple tools and manual cultivation. There are a large number of Cape Verdeans, including descendants, living abroad and their remittances combined with donor contributions are the mainstay of the islands' economy.

#### Ecological Conditions

The topography of the islands features wind-eroded plains and steep hills. Rainfall patterns are erratic and frequently concentrated in torrential downpours which erode the land and carry fairly heavy rocks and boulders downstream. There are few trees and even the steepest slopes are planted annually with corn and beans. The more gentle slopes and valley bottoms are used for irrigated agriculture.

The total area of the nine islands is approximately 429,000 hectares, of which 60,000 are classified as suitable for cultivation. Most agricultural land is found on the hill and mountain sides and presently about 1,800 hectares are irrigated.

Some Cape Verdean soils are relatively fertile, but the lack of rainfall and other sources of water is a major constraint to agricultural production. The quantity and seasonal distribution of rainfall is erratic, and periodic droughts caused frequent famines and, on three occasions in the 18th and 19th centuries, resulted in the death of over 40 per cent of the population. As recently as 1946, 50,000 deaths (18 percent of the population) were attributed to drought conditions.

#### Needs of the Target Population

The employment, ecological and extension objectives of the project address problems which most affect the islands' inhabitants. These are:

- (i) the lack of employment opportunities;
- (ii) deteriorating environmental conditions; and,
- (iii) limited water resources.

#### Beneficiaries

The project will directly benefit 70-80 percent of the population in the target area. Between 6000 and 7000 families will participate in public works projects and earn cash to assist them to meet basic needs. Rural residents who work on these projects are generally poorer than those excluded from participation because they fail to meet certain criteria, or because they earn more from other activities. The project implementation strategy relies on community participation in the recruitment of the labor force, and not only promotes an equitable distribution of benefits, but targets them to the poorest group which includes a high percentage of female heads of households.

Other residents as well as those employed on the project will benefit from soil and water conservation programs. Since lack of water, including moisture retained on rainfed slopes, is the principal constraint to increased agricultural production in Cape Verde, the full range of watershed development activities should increase the agricultural potential of lands cultivated by many small farmers.

Cape Verdean project personnel, extension staff and students enrolled in the Center for Agrarian Studies will benefit from the technical assistance and in-country and overseas training. The construction of project offices, provision of commodities will enable local staff to develop and conduct more effective programs and make more efficient use of available resources.

### Participation

Local participation is built into the current Watershed Management Project and will be strengthened and expanded in the proposed project. Forms of participation include:

- (i) manual labor for soil and water conservation measures (structures, tree planting, etc);
- (ii) recruitment of the local labor force;
- (iii) rural assistance activities (demonstrations, agricultural education sessions, etc).

A strong point of the current approach is the close coordination between project management and comissoes de moradores (local development committees) in the selection of the local labor force. There is, however, no local input into technical plans, and potential socio-economic benefits are assumed rather than investigated. Methods to expand local participation in the new project include:

- (i) increase the labor force to between 6000 and 7000 persons;
- (ii) add rural assistance agents to organize and assist local development committees;
- (iii) involve local groups in the design and implementation of a maintenance/repair program for SWC structures;
- (iv) recruit female agents for fieldwork;
- (v) train auxiliary field workers to improve communication between farmers and project staff;
- (vi) carry out special youth and school projects in soil and water conservation; and,
- (vii) determine local needs and develop strategies to increase the community participation in project implementation through socio-economic research.

The addition of trained rural assistance agents will strengthen the participation of local groups in project decision making, particularly in regard to downstream development activities. These groups will eventually assume responsibility for the repair and maintenance of physical works and the management of water distribution. They will identify problems, recommend solutions and help evaluate the effectiveness and appropriateness of innovations proposed by research staff. They will also participate in the selection and supervision of auxiliary extension personnel. These agents will be a permanent communication channel for farmers and village committees. Local participation in project planning and management could also include:

- (i) decisions on which crops they cultivate and test;
- (ii) the design and location of secondary water storage and distribution systems;
- (iii) the formulation of operating procedures for the maintenance and water management committees; and,
- (iv) contributions of local labor and other resources to repair physical works, build other structures, and plant trees.

This participatory strategy has the support of GOCV rural development administrators and the new MDR training and extension programs. This revised participation strategy deals with the attitudinal and behavioral changes needed to promote environmental conservation and increase agricultural production. It focusses on the transfer of knowledge and skills to residents and the gradual development of local institutions to assume increased responsibility.

#### Impact, Spread Effects, Sustainability

Material impact and benefits - The most direct project impact is the stable employment and income it provides to poor families. Since the vagaries of climatic conditions occasionally cause severe reductions in agricultural output, income derived from work on the project will provide a measure of economic security. Money earned from rural works employment will more than double the net annual income of the majority of participants.

The structures themselves will reduce erosion and increase rainfall infiltration into the soil. The impact of these structures will likely not be felt for years, but contribute much to the stabilization and revitalization of the environment.

Social impact/technology transfers - The project employment opportunities within rural communities allow workers, many of whom are female household heads, to earn income locally. The lack of this option in the past contributed to the high rate of migration and the project may reduce the rate at which this occurs. The extension education activities will increase awareness of soil and water conservation and assist in developing technical and management skills required to continued these activities. There are no sociocultural or psychological barriers to the use of new technology.

Institutional development impacts - One of the major constraints to rural development in Cape Verde is the lack of skilled technical and administrative manpower to plan and implement programs. The training and technical assistance components of this project will have a positive impact on this problem and should result in improved program planning and management. The organization of activities calls for close coordination among the multiple project components and the establishment of cooperative ties to other development programs. The technical and material support they provide will improve the effectiveness of the project and they, in turn, will also benefit other USAID-supported projects such as Food Crop Research, AGRHYMET, Regional Food Crop Protection and Integrated Pest Management, as well as GOCV programs including Fomento Agro-Pecuario (FAP), The Center for Agrarian Studies and the Soil and Water Conservation Service. The cooperative activities will lead to more effective coordination of research and extension programs and a multi-disciplinary approach to watershed planning and evaluation.

The project will also strengthen the role of rural organizations and increase their capacity for involvement in development activities.

#### Spread Effects/Sustainability/Replicability

Project benefits and impacts will diffuse beyond the groups directly involved. The increased cash available in the project area will be spent in local markets and will increase the rate and volume of commercial activities. The increased supply of water in some areas has been accompanied by expansion of irrigated agriculture and agricultural demonstrations have increased farmer demand for new seed varieties and crop protection. The rapid pace at which the GOCV is expanding development institutions and technical manpower will assure that successful programs will be sustained and replicated in other areas. The transfer of technology and information to the rural population, and the strengthening of local organizations should enable continued local development when the project ends.

#### Sociocultural Feasibility, Implementation Constraints, Issues

The proposed project has strong support from the GOCV and the rural population. It strengthens and expands successful components of the Rural Works and Watershed Management Projects. The proposed strategy addresses some of the technical and organizational problems of earlier projects and includes measures to improve the administrative situation and participation of rural residents. The most significant obstacles and problems to successful implementation are related to the lack of trained technical and management personnel rather than sociocultural barriers or institutional conflict. The absence of ethnic or linguistic divisions and frequent contact between senior staff and the rural population will facilitate information flow and allow rapid resolution of most problems. There is a high level of cooperation among senior administrative and technical personnel in different departments within MDR and this project will encourage and strengthen this.

Obstacles and issues related to effective implementation include the administrative capacity to efficiently manage and maintain project resources, timely logistical support to construction and extension components, technical support and the embryonic state of several other programs involved in project implementation - the Food Crop Research Program, and the National Extension and Animation Program. These are operational problems which all projects in Cape Verde face at this time and the proposed technical assistance and training will mitigate some immediate ones and contribute to long range solutions. While the emergent state of development institutions and limited technical skills of field personnel are obstacles, they may also be viewed as a challenge and an opportunity for the project to contribute to the development of effective institutions in Cape Verde.

Some specific issues which the project implementation staff should consider are listed below.

Local participation in the repair and maintenance of physical works -  
The participation of local institutions is presently limited to selection of the work force. The project calls for this to be expanded to include responsibility for the repair and maintenance of structures. This is a complex innovation which requires technical and material support from MDR, local resource contributions and local management skills. At present, the MDR has neither a maintenance program for the works nor a clear strategy to develop local participation. This issue requires discussions within MDR and between the GOCV and community groups.

Recruitment of extension auxiliaries and their role in the project -  
In the current project, extension activities are carried out by auxiliaries selected by, and responsible to the project staff. The proposed project recommends they be selected by local organizations which raises the issue of conflicting loyalties and shared responsibility. The challenge will be to strengthen the relationship between these auxiliaries and local groups and avoid having them be viewed, and see themselves, as permanent government employees.

Dependency on public works employment - Public works have been a major source of employment for 5 - 7 years in many parts of the project area. While this is a necessary and effective short term strategy, the project should give some consideration to the social and economic problems which may arise as these are gradually phased out in some localities.

The management of water distribution for irrigated agriculture - Present arrangements with existing technology are well-managed by individuals and local institutions such as Water Committees. The development of larger irrigation networks and the introduction of other irrigation technology would require adjustments in management procedures. The social implications of these interventions would need to be dealt with in the planning stage of such an endeavor. This would require the participation of social scientists but there are not, as yet, Cape Verdeans trained to deal with this issue. The danger is that all decisions and plans will be made on the basis of technical criteria and that the social problems will only be dealt with after construction is completed.

Land tenure arrangements - Two-thirds of the agricultural land in the project area is either rented or share-cropped. Project resources will make water available to more land and will result in higher rental charges. The GOCV should develop policies to prevent a small number of individuals from benefitting excessively from improvements which result from project interventions. These policies should be developed in close consultation with farmers, local government officials and farmers groups.

The sociological dimension of watershed management plans - Watershed management planning is viewed locally as multi-disciplinary, but technical task. There is a need for social science input into these plans.

## EXTENSION ANALYSIS

### Background

The Watershed Management Project called for the establishment of a "pilot agricultural extension program" and funded a technical advisor to "implement a pilot extension program and ensure the continuous training of counterpart personnel". The interim evaluation of the project (12/82) concluded that the progress towards the extension objectives was in the right direction but that the GOCV's inability to provide sufficient manpower was a major obstacle. The GOCV responded positively to the evaluation, and the extension component, called the Rural Assistance Program (RAP), now has an eight-person staff including a full-time coordinator and four full-time field agents.

An assessment of current operations carried out in connection with this design effort indicates that the program is operating well and has the support of the farmers. Most activities are closely linked to soil and water conservation and the production of vegetables on irrigated land. Specific activities include reforestation, congo bean cultivation, on-farm corn trials, water management, seed distribution, and vegetable production. The project has provided some training to local residents recruited as extension assistants (auxiliares) and has worked with several hundred farmers. Standard extension methods, including demonstration plots, on-farm trials and farm visits have been used and agents submit weekly activity reports.

The program has been successful in establishing ties to technical departments of the Ministry of Rural Development (MDR), and programs supported by international donors such as FAO, USAID and ICRISAT. Experts from these agencies provided technical training and some supplies to agents. They, in turn, have helped collect research data.

### Problems and Constraints in the RAP

In spite of the many achievements of the RAP to date, there are a number of obstacles and problems which can be cited:

1. Staff too small to provide adequate coverage of the project area;
2. Insufficient training of supervisory staff and field personnel;
3. Lack of training materials;
4. Lack of administrative and logistical support;
5. Lack of research-tested technical packages;
6. Limited ability to generate and analyze information for project planning, administration and evaluation;
7. Lack of female agents and women-oriented programs; and,
8. Potential problems in use of RAP personnel to distribute agricultural inputs and supervise credit.

The extension component of the proposed Watershed Development Project takes these obstacles and problems into account and recommends specific measures to improve the coverage and effectiveness of the rural assistance program.

#### Extension Policies and Programs in Cape Verde

Agricultural extension in Cape Verde currently operates within four separate projects under the MDR. They are:

- \* The Integrated Development Project of Fogo and Brava;
- \* PRODESSA;
- \* The Watershed Management Project; and,
- \* The Santo Antao Project.

These projects operate in discrete geographical locations using resources of different donors. They recruit, train, and supervise their own agents. In the near future, extension graduates of the Center for Agrarian Studies will become employees of the MDR and will be assigned to work directly as extension agents with existing projects as well as with the National Extension and Animation Service.\*

The new Department of Extension and Animation within the MDR is in the process of defining policies and programs and, as yet, does not have field extension personnel. Future activities include the coordination of extension programs and the establishment of training centers to support extension activities in other development projects. An eight-person team supported by FAO will arrive later this year to plan and conduct extension training at the Center for Agrarian Studies (CAS), and to assist the national service to develop extension-education programs.

The diversity of projects, each with its own approach to extension, should be viewed positively. They will provide Cape Verde with an opportunity to test and evaluate alternative approaches and gradually develop strategies adapted to local ecological, socioeconomic and project conditions.

#### Proposed Project Assistance

The principal objective is to continue to develop and implement activities to conserve soil and water resources in the target area. The project will also plan and carry out activities to manage and utilize natural resources for agricultural production, particularly food crops. Extension activities of the RAP will support and complement the physical SWC measures and be responsible for the implementation of biological conservation methods such as reforestation and congo bean planting. The RAP will continue to cooperate with GOCV agencies and develop working relationships with the Food Crop Research (655-0011) and the National Department of Extension and Animation.

---

\* Although national policies are under debate, projects will continue to have autonomy in planning field activities and supervising field agents.

Project support would include one long term technical advisor, short term technical assistance in technical areas and social sciences, overseas and in-country training to Cape Verdean staff, and commodities such as vehicles, office and training equipment, supplies, and a limited amount of agricultural inputs for demonstration and testing of new technologies.

#### Description of Objectives and Activities

Extension activities of the RAP are closely linked to soil and water conservation and the improvement of water utilization. The program emphasizes community participation, relying upon field agents to implement GOCV policies to strengthen the role of local institutions in the development process. The list below summarizes major objectives to be carried out in the project:

1. Design and implement a system of maintenance for soil and water conservation structures - help plan and organize community programs to repair and maintain retaining walls, check dams, storage tanks, etc.
2. To participate in the refinement of watershed development plans - collect baseline data in cooperation with scientists responsible for the preparation of plans. Topics include: analysis of social and economic conditions, meteorological monitoring, surveys of agricultural techniques and production.
3. Improve soil and water conservation practices - plan and implement reforestation programs, congo and dolicho bean planting, and soil fertility trials. Extension activities include the organization of demonstration plots, seed and seedling distribution, on-farm visits and school programs. Plan, promote and implement water harvesting for trees and food crops, and water use/management strategies.
4. Improve methods of agricultural production - preparation of seed beds, irrigated vegetable production, dry land crops, fruit trees, pest control and post-harvest storage. Extension methods include demonstration plots, cooperation with on-farm trials and school gardens.
5. Increase community participation - extension agents will work with community associations, youth clubs, women's groups, schools and individual farmers. They will conduct community surveys and may organize clubs and other types of associations to support development projects. Extension activities in soil and water conservation and agricultural production will be implemented among these groups.

### Institutional Linkages with other Agencies and Programs

The implementation of the present and future RAP involves coordination and cooperation with departments of forestry and agriculture, and with regional programs such as AGRHYMET, FAO, ICRISAT, Food Crop Protection, and Integrated Pest Management. Since the RAP is the only project in the project area with a fulltime, locally-based staff, it is often relied upon to diffuse information and technology to farmers. It has, in turn, benefitted from training provided by technicians in these programs and from the material resources they frequently supply.

In the proposed project, institutional linkages and cooperative efforts with other agencies will increase in scale and intensity. This is vital because of the severe shortage of trained manpower in Cape Verde, and the need to prevent the emergence of a plethora of specialized programs which could eventually overlap and compete with one another. The inter-departmental technical council proposed in this project is the mechanism through which cooperative actions will be organized. In addition to strengthening existing inter-departmental activities, the project will establish cooperative relationships with:

- \* Food Crop Research (655-0011);
- \* National Extension and Animation Service;
- \* The Center for Agrarian Studies;
- \* The two socioeconomic research and planning units within the MDR (GEP and GIR).

Food Crop Research - The co-director of the Food Crop Research Project prepared a report entitled "Agronomic Considerations" for this design. Areas of cooperation envisaged between the two projects include:

1. data collection - socioeconomic/agricultural baseline surveys and monitoring;
2. soil and water research; and,
3. food crop production - irrigated and dryland agriculture.

The role of the FCR project involves the institutional development of agricultural research, assistance in formulating and implementing a research strategy, technical assistance support to research and execution of certain design surveys and baseline studies. Technical specialists contracted under the FCR project may be asked to participate in technical training and conduct seminars funded through the proposed project. The role of the RAP in FCR would be to collect survey data, organize demonstration plots and on-farm trials and monitor results. As the FCR project develops improved technical practices, RAP extension agents will diffuse the information and technology to farmers.

### Center for Agrarian Studies (CAS)

The CAS is responsible for agricultural research and is the institution with which the FCR project is most closely affiliated. CAS trains technicians and extension agents, most of whom will eventually work for one of the many departments or programs (including the proposed project) of the MDR. A copy of the standard curriculum for the extension agents is attached to this report.

This project will direct and supervise students from the CAS during periodic field trips and in their six-month practicum. As one of the few operational extension programs in Cape Verde, the RAP's role is important to the preparation of future extension agents and to the development of national institutions for training and extension. Through their participation in the research and training activities of the CAS, the RAP staff will provide information and feedback needed to modify and improve these programs.

### MDR Socioeconomic Research Units

The FCR project will provide support to, and work closely with two research units within the MDR; the Office of Studies and Planning (GEP) and the Office of Rural Surveys (GIR). The RAP will cooperate by allowing field staff time to collect data in communities where extension agents work. The rapport which RAP field agents will have developed with farmers should facilitate these investigations and improve the quality of field data.

These MDR units will assist RAP in several ways:

1. The inclusion of research questions relevant to RAP needs on survey forms;
2. The design of forms and questionnaires for studies required by RAP;
3. The analysis of research results and their implications for RAP activities.

### The Department of Extension and Animation (DEA/MDR)

This department is in the process of organization and has neither field agents nor operating programs. It is involved in extension training at the CAS and will soon begin field activities and several types of training programs for other projects. Envisioned cooperation includes:

1. Formulation of national extension policies and programs;
2. The development of curriculum and training strategies adapted to the needs of the Watershed Development project;
3. The implementation of training programs for supervisory staff, agents, and auxiliaries; and,
4. The planning and implementation of baseline community surveys and project monitoring and evaluation.

CHART 2: RURAL ASSISTANCE PROGRAM ACTIVITIES

OBJECTIVE	ACTIVITIES OF RAP	CONTRIBUTION/PARTICIPATION OF OTHER PROGRAMS	
		AGENCY	ROLE
Conservation of soil and water resources	1.1. Plan and organize programs for community involvement in maintenance and repair of physical works	Soil and Water Conservation (SWC)	Train agents and community representatives, provide technical supervision, provide materials
Developed development plans	2.1. Collection of baseline, meteorological, agricultural, economic and social data. 2.2. Participate in monitoring, evaluation and research programs	Food Crop Research (FCR); Socioeconomic research unit of MDR; AGRHYMET.	Develop research, evaluate plans, prepare data collection forms, train agents, collect information, analyze data.
Soil and water conservation	3.1. Organize and direct reforestation programs: tree planting and care; technical assistance to communities and individuals 3.2. Congo bean and dolichos bean and cultivation (also part of agricultural production strategy) 3.3. Promote and direct farmer participation in soil fertility trials	FAO, National Forestry Service Dryland crops, FAO, ICRISAT, crop protection, FAP, FCR FCR, SWC	Provide trees, technical training of RAP staff Supply seeds, design and analysis of field trials Technical direction, training and data analysis
Efficient and effective use of land and water resources	4.1. Teach water harvesting methods for cultivation of congo beans, trees, establish field trials in communities 4.2. Promote, demonstrate new irrigation technology (drip, trickle, etc.) and construction/use of water storage/distribution. Provide equipment and supplies for demonstration plots 4.3. Organize and direct vegetable and fruit tree production on irrigated lands; test alternative water management strategies, monitor and evaluate results	SWC, FCR, Forestry FAP, SWC, FCR, crop protection, Agriculture	Technical training, evaluation of field trials, supply of some inputs Technical training, supervision of field trials, analysis of field trial results
Improved methods of agricultural production	5.1. Test and help develop and diffuse improved agricultural methods and technology. Includes testing of new and improved varieties of seeds 5.2. Demonstration and extension of irrigated agriculture, vegetable and fruit tree production, dryland crops	FCR Dryland Crops FAP SAC Dept. of Agriculture Food Crop Protection Integrated Pest Management	Technical training, some agricultural inputs and equipment supplies for irrigated agriculture, and pest control
Community participation in development activities	6.1. Technical assistance to water management committees, formation of village development committees, organization of school and Agricultural Extension, Youth, Women, Socio-economic groups	Department of: Rural, Agric., Education, Extension and Animation, MDR representative or other agents	Formulate and promote development plans, train agents, provide technical supervision, provide materials

The Department of Extension and Animation will have the technical expertise, equipment and materials to plan and implement extension training but may need technical input from the RAP and technical bureaus with which they cooperate. In addition to its training function, the DEA will provide logistical support and transportation for extension agents in all MDR projects. Each project will, however, develop its own work plans and support its own administrative, technical and supervisory staff. This includes office space, equipment and vehicles. Details of cooperation between the DEA and other programs will be worked out in the next few years and the RAP may be part of the dialogue to establish national policies and institutional linkages. There is a general agreement to maintain the integrity and autonomy of development projects such as PRODESSA and Watershed Development, with DEA supporting in their project areas.

The attached table summarizes the objectives and activities of the Rural Assistance Program and cooperating agencies.

#### Organization of the RAP

The project plans to support one extension agent for each two or three adjacent communities and from one to three auxiliary agents in each community. This system would allow auxiliaries to concentrate their efforts in zones where they have their farms. The auxiliary agents are chosen by farmer associations according to criteria established by MDR. These associations should assist by monitoring and evaluating the auxiliaries activities.

Listed below are the envisioned staff positions and descriptions of roles and responsibilities:

Director, Rural Assistance Program - Program planning and management, supervision of coordinators and field supervisors, coordination of activities with technical services of MDR, the CAS, Food Crop Research, the National Extension and Animation Services, and other development programs.

Coordinator for Administration - Office management, data collection and preparation of reports, supervision of secretarial staff, procurement of supplies, materials, logistical support and transportation.

Coordinator for Extension Education and Research - Works with training and research units of MDR to plan and implement training programs for supervisory staff, extension personnel and farmers. This person will be in direct contact with the DEA and CAS. He/she will also coordinate the planning and implementation of monitoring and evaluation activities.

Extension Supervisor - Day to day supervision of extension agents and auxiliaries, assists in program planning, training and evaluation. Direct responsibility for some research/demonstration activities. Assists in the procurement and distribution of soil and water conservation and agricultural inputs.

Extension Agents - Provide extension education to auxiliaries and farmers. The organization of demonstration plots, farm visits, participation in on-farm research activities, data collection, community organization and assistance to community associations. Assist in the distribution of inputs for agriculture and soil and water conservation.

Extension Auxiliaries - Represents local farmers committees and residents, assists extension agents in all activities which occur in his/her locale.

### Training/Extension Education Strategy

The most important output of the extension component will be the transfer of technical knowledge and skills to the farm population. Substantial training of the RAP staff will enable them to manage and implement extension education activities. This project will support several types of training and will work closely with programs which will soon be available through the DEA.

The training objectives of the RAP would be as follows:

1. reorganize and strengthen village level extension education programs;
2. develop effective training and continuing education programs for extension auxiliaries;
3. organize on-the-job and continuing education training for extension agents;
4. organize training programs for supervisory and technical personnel;
5. develop methods to evaluate the effectiveness of all training activities; and,
6. develop strong organizational ties among technical departments, research programs and training institutions.

Training activities coordinated by the RAP are particularly important in view of the limited educational and field experience of the RAP staff and the fact that all new extension agents will be recent graduates of the CAS. Effective working relationships among project personnel and the staff of other institutions are the key to the development of an effective training component.

The content of the training programs can be divided into five major areas:

1. soil and water conservation;
2. water use and agricultural production;
3. extension methodology/data collection;
4. community participation; and,
5. program management.

Soil and Water Conservation - This includes topics such as maintenance and repair of soil and water conservation structures, vegetative soil and water conservation methods, etc.

Water use and Agricultural Production - This may include training in water harvesting, design and management of small irrigation systems, and improved methods of dryland agriculture. These topics reflect the farmers' interest in increased access to, and more efficient use of water resources and agricultural land.

Extension Methodology/Data Collection - This includes training in extension methods such as demonstration plots, on-farm trials, farm visits, school programs and the organization of community-wide activities such as tree planting. Agents will also be trained by outside investigators on how to collect socioeconomic and agricultural information for research and evaluation, and to monitor agricultural trials.

Community Participation - Training will focus on the collection and analysis of basic social and economic data, the role of local organizations in development, the participation of existing institutions and the creation of new forms of associations.

Program Management - This training, directed at senior and supervisory personnel, will cover: program administration, the development of annual, monthly and weekly work plans and supervision of field staff. It will also deal with project monitoring and evaluation, and the coordination of research, training and extension activities.

#### Levels of Training

Senior Staff Training - The project will support an expatriate extension expert who will provide on-the-job training and assistance in areas such as program development and administration, technical coordination, supervision of field staff, project monitoring and evaluation. The staff would also participate in short term overseas and in-country training made available through this and other projects.

Supervisory Personnel - As supervisory positions are established, short term training in leadership, supervision of extension staff and reporting would be organized.

Extension Agents - These individuals will be graduates of the two and three-year training programs at the Agrarian Studies Center. They will receive additional training in the technical areas of the project and periodic short courses. Some may be sent overseas for specialized short term training.

Extension Auxiliaries - These locally recruited assistants will receive basic training in technical areas, extension methodology and community participation. A continuing education program closely tied to the agricultural cycle would be developed in cooperation with the DEA. Extension agents who supervise their work will also provide on-the-job training.

Farmers - Training and education of farmers, local leaders and village associations will be carried out by all levels of extension personnel. Training at this level includes both the transfer of technical information and guidance on how to analyze local problems, and make effective use of available technical and material resources.

CENTER FOR AGRARIAN STUDIES

Extension Training Curriculum

General Multidisciplinary Training

Subjects

Mathematics  
Portuguese  
Civics  
Physics/Chemistry  
Natural Sciences  
Accounting/Management  
General Agriculture  
Topography

Modules

Watersheds  
Agricultural Mechanics  
Reforestation  
Dryland Agriculture  
Irrigation Agriculture  
Animal Production  
Horticulture  
Rural Development  
Sociology

Complimentary Multidisciplinary Training

Subjects

Statistics  
Accounting/Management  
Portuguese  
Topography  
Agricultural Physics  
Civics  
Hidraulics

Modules

Soil and Water Conservation  
Crop Protection  
Animal Health  
Rural Economics  
Agricultural Extension  
Cooperatives  
Rural Youth Training  
Agrarian and Legislative Reform  
Rural Planning

Seminars

Subjects

Soil and Water Conservation  
Rural Planning  
Crop Protection  
Animal Health  
Rural Economics  
Extension  
Cooperatives  
Agrarian Reform  
Rural Youth Training

## AGRONOMIC CONSIDERATIONS

Integration and coordination of (FCR) Food Crop Research (655-0011) and (WSD) Watershed Development (655-0013) activities are within the mandate of the Center for Agrarian Studies, the agency under which FCR is supported. What follows is a discussion of ways to achieve this collaboration.

Although some priority has been given to dryland agriculture, the primary focus of FCR is to be in the area of irrigated agriculture. Research objectives are supportive of the WSD project, especially in the area of extension activities, which address the development of irrigated agriculture through soil and water management and conservation at the field level.

Such utilization of improved water and soil resources is a natural consequence of the purpose of the proposed project, whereby rural employment results in development of structures to conserve soil and water resources. Such utilization can be manifested in areas of reforestation, pasture and/or range development and food crop production. Obviously, these decisions will be based on environmental and physical limitations as well as economic ones.

The project area, as defined, is within the area to be included in FCR research activities. With the availability of technically competent extension personnel, transfer of research results should be facilitated rapidly. FCR activities are not, however, restricted to Santiago Island: depending on need and personnel available to carry on cooperative research, FCR activities on other islands has been encouraged.

Three areas of FCR are relevant to the proposed project. These include: 1, data collection, 2, soil and water analyses and 3, field and vegetable crop production. Current projections are made on existing practices, as well as projection of those with potential in the future.

However, it is important to note that data bases at all levels of project development are deficient, and therefore complicate attempts to evaluate and quantify on-going and future work.

### Data Collection

Under FCR, the implementation of a socio-economic study to provide comprehensive base-line data identifying island-wide (Santiago) problems in both irrigated and dryland agriculture is underway, with the cooperation of the Division of Rural Surveys (GIR) of MDR. In addition, in order to integrate with the Watershed Management Project (655-0006) team, some field workers are being trained as enumerators. These extension types could possibly benefit from the information solicited from farmers as well as from the contact such interviewing implies. The survey will take advantage of their knowledge of the watersheds and their people.

Constraints: FCR has no funds available for covering the extra costs involved in the participation of MDR personnel. If collaborative data collection is to be initiated and continued on a regular basis, funding must be allocated through the proposed project. In many instances a certain degree of isolation occurs between socio-economic, technical and extension personnel. Hopefully an integrative approach between the different units will be developed and maintained through some sort of coordination committee.

Equipment:

If data collection at the extension level is to be continued, there will be a need for:

- micro computer and accessories
- hand held calculators (solar)
- training in computer use

Soil and Water Research

Completion of the laboratory for soil and water analysis under FCR will facilitate processing of expediting samples collected at watershed sites. Since the laboratory at Sao Jorge will have a research and a service orientation, integration of project activities is a realistic goal. It is anticipated that a service charge to cover costs of chemicals and labor will be levied on development projects. However, since FCR will be conducting complementary research in the same watershed sites, it is possible that many analyses will be performed cooperatively.

Constraints: The functional capacity of the soil-water laboratory in the service area has yet to be ascertained. Quite conceivably, once research activities are initiated, service-oriented samples may not be processed as rapidly as desired.

The primary constraint to transfer of relevant applied soil-water research to extensionists and farmers is the lack of an irrigation/agronomy extensionist. It can not be expected that FCR technicians will have the time to train extension personnel. A link consisting of an extensionist with technical expertise to do extension research is necessary.

FOOD CROP PRODUCTION

Irrigated Agriculture

The goal of irrigated agriculture is to maximize productivity by more efficient utilization of soil and water resources in the watershed areas. Intensive agriculture which may involve the growing of 2-3 crops during the growing season necessitates development of more efficient production techniques.

Modification and introduction of new technologies appear to be necessary for stabilized productivity at a higher level than currently exists. In addition, as new irrigated land becomes available new crops and/or improved cultivars of existing germ plasm may need to be adopted. These can in some instances be provided by the FCR project.

However, considerable time and research need to be spent on identifying crops/cultivars with maximized potential under irrigation. Sweet potatoes and cassava, important traditional crops have practically no recent history of varietal improvement. In addition, seed of vegetable crops of considerable dietary and economic importance are being provided to farmers directly by the extension service. These crops include potatoes, tomatoes, onions, carrots, cole crops.

Although the FCR technicians can be valuable in providing applied research results that may be adopted by farmers, extension T.A. will be necessary to adapt and teach these methods to field workers and farmers.

For example:

<u>CAS - FCR</u>	<u>WSD Extension</u>	<u>Farmer</u>
Agronomists identify good varieties -----	Optimize cultural practices -----	
Soil fertility trials -----	Field trials farmer field -----	
Irrigation specialist with data on drip/trickle irrigation -----	farmer field trials -----	

With the technical assistance provided by FCR, short-term specialists and the MDR, decisions regarding crops to be planted in new land brought in to irrigation should be made early on. Hopefully, research regarding crops, method of irrigation (flood, furrow, drip/trickle) as well as appropriate cultural practices will have been developed concomitantly.

Dry-Land Agriculture

Research on traditional crops such as maize, pigeon pea, and dry beans is limited.

FCR can provide input on new and improved maize cultivars with higher yield potential under Cape Verde's severe climate. Possibly, maize germplasm more suited to the higher, cooler climates would be more productive. Sorghum/ millets with tolerance to cooler high altitudes may also have potential.

However, changes in productivity as a consequence of improved soil and water resources and effects of structures need to be evaluated. Plant densities under these new conditions need to be evaluated. Numbers of trained personnel to do this are a limitation. Emphasis is placed on technical assistance in the form of an extension agronomist.

Research begun in WSC on Cajanus cajan is encouraging, however, technical assistance is needed to assure that trials are set up so that results can be quantified and analysed statistically. Interestingly, in the congo bean, observation nursery planted at Flamingoes various genotypes were identified that had characteristics which would enable them for use as forage, soil conservation, or seed production. Exploitation of genetic variability of congo beans as well as the other pulse crops remains a valuable tool to be utilized.

Another pulse crop with potential for further work in WSD areas is Dolichos lab lab (feijan nuila). Although they do not appear to be promising as a fuel source, Dolichos appears to have tremendous amount of drought tolerance. During the end of March after 4 months of little or no rain they were still green and producing seed. They may be as valuable as the congo bean in soil conservation schemes in appropriate ecological zones.

Recommendations made in the WSC Evaluation on corn/bean planting practices would fall primarily in the area of extension research (planting density, planting method). However, certain applied research, i.e. evaluation of water harvesting systems on crops can also be conducted by competent extensionists.

### Fruit Trees

Rationale of planting fruit trees in newly available irrigated land must be established. Quite possibly - wind-breaks of fuel species could be used to protect fruit trees in windy areas if this appears to be a problem. Extension research to evaluate productive and adapted cultivars of avocado, mango, papaya, citrus, tamarind, coconut, dates, etc., ideally before long term commitments of land utilization are made. Proper cultural practices including pruning techniques to insure high quality fruit production need to be developed and transferred to farmers.

### Forestry

This project supports the Forestry Department (MDR) by supplying labor after plans are completed having determined priority, surface areas, land use classification, and local labor availability for vegetative soil and water conservation measures.

Technical assistance shall be supplied by the project to complete land use planning maps started under the Watershed Development project. New aerial photos will be taken to assist with this activity. These photos will also be a useful tool in determining the effectiveness and extent of soil and water conservation activities since 1979, when the last series of photos were taken. This assessment will assist the donor community and the GOCV coordinate future input in the area. The Sylvo/Pastoralist will refine the areas identified for those purposes on the land-use maps and prescribe specific treatments/activities best suited for these lands. He/she will estimate labor and materials requirements for each prescription and also suggest appropriate time frames for when the activities should be carried out. In association with the extension component, the Sylvo/Pastoralist should assess the demand and interest local farmers have in tree planting for their personal needs plus their understanding of planting techniques and plant care. If appropriate, he/she will design a training course for the project rural assistance workers to be conducted by the Forestry Department/FAO project.

He/she will also determine yearly demand for personal use of trees and the most cost effective method to deliver them to central locations (large forestry department-run nurseries or smaller local village/project operations). He/she should arrive 12 to 18 months after the team leader.

The following short-term technical assistance may also be useful:

#### Horticulture Crop Production

Conduct field and laboratory research on the principles and practices of vegetable crop production appropriate to Cape Verdean agriculture.

## WATERSHED MONITORING

### Introduction

One of the outputs of the project is to monitor the effectiveness of various soil and water conservation activities. This knowledge is necessary for future planning and design of existing and new project watersheds. The monitoring program will provide the necessary data and analysis to test and compare the different types and variations of land treatment, such as planting trees, terraces, contour basins, check dams, etc. The purpose of the conservation measures is to increase the potential of agricultural production by reducing soil erosion, reducing flood peaks, increasing the duration and quantity of dry season streamflow and increasing groundwater and soil moisture.

In addition to these direct objectives, collection and analysis of hydrologic data provides an invaluable base for all types of agricultural planning (irrigation, rainfed agriculture, flood risk), public works (bridge and culvert design, road construction and flood protection works) and water supply (potential dam sites, rural water supply, groundwater exploitation potential).

The primary strategy for watershed monitoring will be to establish the relationships between rainfall and runoff with time for project watersheds and subwatersheds and control watersheds. These will be established by direct observation of rainfall and the resulting streamflow. Rainfall will be measured in a network of recording and non-recording gages. Streamflow will be measured with water level recorders at locations where discharge can be related to water level using hydraulic theory or direct measurement.

Upon establishment of the rainfall-runoff relationship, a water-balance can be made for the watershed, since the difference between rainfall and runoff is infiltration (soil moisture and groundwater recharge). The aim of all project works is to increase infiltration, with the result of lowering flood peaks, increasing soil moisture and groundwater recharge and increasing the duration of streamflow.

Rainfall: Typical of arid climates, rainfall in Cape Verde is characterized by extreme variability. For example, during 30 years of records at Tarrafal the mean annual rainfall is 237mm, the maximum is 590mm, and the minimum is 3mm (after Logan). Most of the rain comes in showers from July through October.

Prevailing tradewinds and rugged mountains add a strong orographic component to rainfall, causing large variability with elevation and direction of slope. This makes it necessary to have a dense network of gaging stations on each watershed. This is demonstrated in Table I which shows average annual rainfall for rainfall stations in a radius of ten kilometers on the northern end of Santiago Island.

Due to the small size and large slopes of project watersheds, floods are caused by intense storms of short duration. For this reason it is critical to use some recording raingages to observe the time distribution of rainfall. For example, a non-recording gage read daily may indicate a rainfall of 50 millimeters. It will not be known if the 50mm fell in a slow drizzle for 24 hours or an intense one-hour storm, each of which will generate a totally different hydrograph. A recording gage will show exactly how the storm varied with time.

Required Raingage Network: At present there are four recording rain gage stations and perhaps 50 non-recording stations on Santiago Island. The non-recording stations are made of plastic and subject to vandalism. This array of stations does not have the density or flexibility to properly monitor project watersheds. At least one recording raingage should be placed in each project watershed and control watershed. This should be augmented by an array of non-recording gages to show the variation of storm depths with elevation, slope direction and aerial location. Time distribution in the non-recording gages can be correlated with the recording gage. Project watersheds vary from about 1,000 to 3,000 hectares. Each will require between five and ten non-recording gages to accurately monitor a storm.

There are three basic types of recording gages. Each has a clock-driven paper graph of continuous strip or wrapped around a cylinder. The depth of rain is transmitted with an ink pen. The pen is activated by either a scale which weighs the rain, a float which rises with rain depth, or tilting buckets which empty and reposition upon receiving a discrete quantity of rain. The tilting bucket type is used in Cape Verde.

Average Storm Depth: There are several accepted methods for estimating average storm depth on a watershed based upon point rainfall observations. These include Thiessen Polygons, isohyetal maps and orographic correlations. Some thought should be given to the most appropriate technique. Once a technique is chosen, calculations can be greatly simplified using a small computer. Some attempt should be made to correlate rainfall with elevation and direction of slope for each watershed. The subject is treated in depth in Chow's book, listed in the references.

TABLE I

Variations in Average Annual Rainfall

<u>Station</u>	<u>Elevation</u>	<u>Mean Annual Rainfall</u>
Tarrafal	20 meters	237 millimeters
Achada Carreira	156	250
Biscainho	300	274
Achada Langueira	304	302
Figueira das Naus	672	436
Serra da Malagueta	850	935

Streamflow: Runoff Hydrographs: Virtually all the surface runoff from project watersheds is characterized by rapid rise after a storm, high flood peaks, rapid recession, and little or no base flow. Project works are designed for flattening out and lengthening these hydrographs, (a hydrograph is a plot of river discharge versus time generated by a given storm). The rapid change of river levels and discharge with time, coupled with extreme velocities and sediment transport (perhaps boulders), pose some unique and challenging problems to stream gaging.

In order to measure runoff hydrographs, an appropriate gaging station must be set up at a suitable site. A relation between water level and discharge must be determined, which is called a rating curve. Gaging stations should be selected in sites where rating curves change as little as possible with time. Changes can occur due to modified channel geometry due to erosion or sedimentation, downstream work constricting conveyance, downstream tributary inflow, etc. Gaging stations are usually selected at a natural or man-made channel constriction, or control.

Rating curves may be established by any of several methods, including theoretical calculations from channel geometry, water level-area-velocity measurements during observed flow, and chemical tracers (benign, of course). At stations with reasonably stable flow the area-velocity method using a velocity meter is technique of choice. The rapid changes of flow and stage (water surface), extreme turbulence and sediment transport typical in project watersheds may prove other methods to be more feasible. Theoretical calculations are fairly accurate at sections where check dams have been constructed. The precision of low flow calculations can be greatly increased by constructing all or part of the dam crests into wide angle V-shapes to increase water level at low flow. Most project watersheds have some dams built on bedrock to capture and harvest groundwater. These sites are ideal for gaging stations as they are built in natural constrictions, have fixed crest geometry and no downstream control and allow means for measuring groundwater flow as well as surface.

Many watersheds have bridges at their outlets that provide a good section for measuring peak flows. The bridges are built across the floodplain with discharge through masonry arch bays. The high degree of constriction and outfall near sea level assure a critical section and well defined geometry. A crest gage\* on the upper bridge wall will allow accurate determination of peak discharges. Flood levels indicated by long time residents can be used to estimate floods of record at these sites.

The tracer concentration technique is a special way to measure discharge that may have merit in this unique hydrology. A benign chemical tracer whose concentration can be accurately determined is injected at a constant metered rate into the streamflow at some point above the gaging station. The injection point must be far enough upstream to assure complete mixing, which should not be a problem due to the extreme turbulence typical here. Concentration and water level are monitored with time at the gaging station. Flowrate can be calculated by knowing the tracer injection rate and concentration at the station. If the natural water contains any concentration of the tracer it must

be subtracted out.

Upon establishing the rating curve at stream gaging stations, runoff hydrographs may be obtained by observing the water level with time. Since flood peaks occur so fast after storms, and water levels change at such a rapid rate, direct observation of water levels is not feasible. Each gaging station must be equipped with a water level recorder.

There are two basic types of recorders available and two different types of water sensors. Recorders are either a paper graph and ink pen, or a digital tape punch. On the former, the graph paper is either a continuous strip or fastened to a rotating cylinder, and driven at a constant rate by a mechanical or battery operated clock for the time axis. The pen is moved up or down with water level to record water level with time. The second type of recorder punches number coded holes in a paper tape driven by an electric clock.

In both types of recorders different gears of cams can be inserted to give the desired time scale. The digital punch recorder has become fairly standard in the U.S. due to the ability to read data directly into a computer.

The simplest type of water level sensor is a float and counterweight connected to the recorder drive wheel with a steel tape or chain. The wheel and chain have teeth and perforations to assure continuous alignment. Changes in water level move the float up or down, resulting in turning the recorder drive wheel, which controls the graph pen or paper punch mechanism. The float must be housed in a stilling well directly connected to the stream with a pipe inlet, so the water level in the well will be the same as the stream

The second type of sensor is called a bubble gage and consists of a tube or small pipe whose outlet is in the streambed at the gaging station. The outlet must be at some elevation below the water level at minimum flow. Gas from a pressurized container is slowly bubbled out the end of the tube into the flowing stream. The hydrostatic pressure of water in the stream caused by its depth over the gas tube outlet determines the pressure of the gas in the tube. The gas line is also fitted to one end of a mercury manometer. Changes in the gas pressure result in a change in manometer reading, which is transmitted to the recorder with a float or servomotor. This system is considerably more complex than the float sensor, but has the great advantage of being able to move the recorder far away from the streambed. This becomes a necessity in many cases due to steep rock canyon walls and high flood levels.

---

\* A reliable, durable and cheap crest gage may be constructed using a vertical 50mm pipe capped at both ends and fastened to the bridge face. The top and bottom are vented to allow flood water to enter. A staff gage is left inside the pipe and ground cork is left in the bottom. The cork grains float to the highest flood level and stick to the staff, where it may be read at a later date.

At present there are two permanent stream gaging stations in Santiago Island, neither of which are on project watersheds. They all use paper strip graphical recorders and bubble gage water level sensors. They are built on flume-type constrictions and have a built-in overhead cable for using a velocity meter for direct measurement of flow.

It is estimated that about ten gaging stations should be set up on project and control watersheds. Bubble gages should be used at larger stations to avoid problems of stilling well construction and inlet pipe silting. Small sub-watersheds can use the float type sensors with stilling wells.

Groundwater: Groundwater may be divided into two domains with respect to use and conservation. The first is that which is stored and conveyed in the shallow, narrow aquifers made up of sediments in active stream beds. The second is that which is stored in deeper and older aquifers consisting of lava beds, old alluvial deposits or fracture zones. The Logan Report of 1979 gives a good description of groundwater resources and geology.

Most all water for agricultural and domestic use in the project watersheds is obtained from shallow dug wells in streambed aquifers. Some generalizations can be made by casual observations in these aquifers in the valleys of San Miguel and Flamengos. Dug wells less than ten meters deep are spaced every few hundred meters in the flood plains. Floodplain slopes vary between one and five percent. Many of the wells are pumped at rates approaching 10 liters per second for irrigation. Most wells are observed to still contain water at the end of the dry season. From this, it can be concluded that these streambed aquifers do not have significant connection or leakage to lower aquifers with relation to their own supply. It may also be concluded that they will be fully recharged annually due to stream flow. Except for the very lower reaches (discussed below) there is no danger of salinity intrusion due to over use. The very small change in water levels due to pumping from shallow wells has no significant effect on leakage or recharge to lower artesian aquifers. One may conclude that this shallow aquifer may be utilized to its maximum potential. It is like a sponge that should be emptied in order to receive and store the next years' runoff. There is little danger of depleting domestic supply from this aquifer because if a farmer is forced to quit using a motor pump due to excessive drawdown, the well will quickly recharge and supply the much smaller required domestic supply.

The exception for the shallow aquifers is where they approach the ocean outlets. Here, overuse, or lowering the water levels, can cause salt water intrusion and spoil the source. A possible way to assure that this doesn't happen is to prohibit or control motorized irrigation pumping on dug wells with bottom elevation less than a fixed height above sea level. This will assure retention of a fresh water head near the outlet for domestic supply.

As for monitoring of this shallow aquifer, water levels can be read and retained periodically on existing dug wells or shallow piezometers.

There is no need to use recorders since levels do not change so rapidly. Some estimates can be made of withdrawals by pumping. Horizontal flow can be estimated at catchment structures built to contain and use groundwater.

It should be noted that the project check dams greatly enhance the volume and recharge of the shallow aquifers by catching sediment, making them significantly deeper, and slowing and spreading runoff to increase recharge.

As for the deeper aquifers all project activities should serve to increase recharge and storage by increasing infiltration and the potential for deep percolation. Observation wells in deep aquifers are currently monitored by Aguas Subteranas and there is no need to add to their current network.

A detailed study to quantify the changes in recharge to the complex system of deep aquifers would be extremely difficult and beyond the scope of this project.

Data Analysis: So far we have discussed collecting and recording figures on rainfall, streamflow and groundwater levels. These numbers by themselves are meaningless until they are analyzed and interpreted. Analysis and utilization of this data will require the skills of an experienced and dedicated hydrologist.

Using the observed data, a watershed model (mathematical) should be made for the drainage area above each gaging station. This model should be able to reasonably predict the runoff hydrograph for any input of rainfall with time (hyetograph). Based on conservation of mass, a water balance can be made for the watershed showing infiltration (rainfall minus runoff), and how the relation changes with conservation works, and how it varies with control watersheds.

Small watersheds can best be modelled using some variation of the unit hydrograph technique. Observed hydrographs produced by discrete storms of medium or high intensity and short duration are used to define the characteristic shape of the unit hydrograph. Runoff volumes are the areas under the hydrograph. Infiltration and depression storage characteristics are evaluated as the difference between observed rainfall and runoff volume. The "unit" refers to a unit volume of runoff produced by a storm of the observed duration (less than the time of concentration, or rainfall to flood peak). Once the unit hydrograph and infiltration characteristics are determined for a watershed, a theoretical runoff hydrograph can be generated for a storm of any duration and intensity. Differences of intensity change the resulting hydrograph by proportional changes of discharge, but does not affect the hydrograph time base. Different storm durations are treated by dividing into discrete storms of the unit storm duration, and sequentially adding the resulting predicted hydrographs. A small computer is invaluable for watershed modelling and documenting differences and changes in the models with time and

between watersheds.

Once hydrologic models have been established for several watersheds using observed data, synthetic models may be developed for unengaged watersheds using similitude in size, shape, slope, ground cover and use. Techniques for developing unit hydrographs from observed data and synthetic hydrographs for unengaged watersheds are treated in depth in Chow's book listed in the reference.

Erosion and Sediment Transport: It would be difficult or impossible to make direct measurement of sediment transport at the outfalls of major watersheds. Volumes and gradation of bed load are so great during flood peak that standard sampling techniques are not suitable. It may be possible to estimate sediment transport from observed runoff hydrographs using tractive force theory and sampling of bed materials. Since sediment transport increases exponentially with discharge (the vast part of erosion occurs during flood peaks), a good qualitative estimate of erosion control over the watershed can be made by comparing runoff hydrograph modification after soil conservation measures are put into effect.

The check dams built in mid- and upper-watersheds provide some capability for direct measure of sediment transport by surveying the filled volume after each storm. It has been observed that most of the check dams (about 3 meters high) are completely filled with sediment after one year.

Some direct measurements of erosion and erosion control can be made on very small watersheds (say less than five hectares). In this case it is feasible to build a sediment trap or small reservoir to catch runoff and sediment. The trap could be a small pond or basin. Rainfall and runoff hydrographs should be made simultaneously for correlation.

Project Personnel and Training: By far the most important key to success in hydrologic monitoring is assignment of a full time qualified and dedicated Cape Verdean technician to this activity. This must precede other inputs in the monitoring component.

Hydrologic monitoring and studies are the responsibility of the Center for Agrarian Studies and AGRHYMET. They are carrying out some activities related to this project at present, and are the most appropriate agencies to carry out a more detailed study.

The Center has been in operation for four years. Considering this short time they have made an extremely impressive start in hydrological and climatological data collection and analysis. There are qualified hydrologists on the staff at present, but the work load called for in this project will greatly increase their responsibilities. For that reason it will be necessary to train a water resources engineer/hydrologist to replace the person who will be assigned full time to project activities. This training will require about six years (a B.S. in Water Resources Engineering and M.S.

In addition to the Cape Verdean project hydrologist, it would be very useful to provide technical assistance in the form of a series of short term advisors familiar with the problems which will be confronted. The U.S. Geological Survey is eminently suitable for this type of advice and should be able to provide PASA's to advise in stream gaging techniques, watershed modelling, data collection, recording and analysis, etc. This type of advice is extremely effective for a new agency which will be confronting problems which have been worked out over many years by the Geological Survey. Each technical advisor should be reviewed and approved by the GOCV and AID/Praia or REDSO/WCA. It is estimated that a total of 8 person months of short term T.A. will be needed during the project, requiring about six separate trips.

U.S. Geological Survey also conducts a large array of specific technical short courses that should be considered for the GOCV hydrologist. These courses are usually "hands on" type training in areas such as stream gaging and hydrograph analysis, watershed modelling, etc.

Commodities: The following items would be needed for watershed monitoring:

- a) 30 non-recording rain gages. They must be durable, in metric units, and have a capacity of 300 millimeters or greater.
- b) Ten recording raingages. They must be durable, in metric units, and preferably of the tilting bucket type. The clock should be mechanical unless otherwise specified by GOCV. Each recorder should come with a 5-year supply of chart paper and ink. (see State 77561 and CAS Memo).
- c) Five float-type water level recorders for stream gaging. They must be to metric specifications, durable and rugged. They should be strip-chart recorders with mechanical clocks, unless otherwise specified by GOCV. Each recorder should come with a 5-year supply of paper and ink, floats, counterweights and drive tape.
- d) Five bubble gage water level recorders, metric units, complete with gas tanks, recorder, servo mechanisms, etc. The units should be supplied with 5 years of chart and ink. The units must be operated with compressed air in bottles that can be refilled locally. An extra gas bottle should be supplied with each recorder.
- e) One automatic engineer's level with horizontal angle and stadia. The level should be supplied with an appropriate tripod and metric rod.
- f) One desk top scientific micro-computer, complete with CRT display, printer, disk drive, and 32k brainpower. USGS PASA should advise type and specifications for hydrologic calculations.

BIBLIOGRAPHY

1. Water Resources of the Tarrafal Area  
John Logan, Consortium for International Development, USAID, 1979.
2. Handbook of Applied Hydrology  
Ven Te Chow, editor and chief, McGraw Hill, 1964.
3. Measurement of Stage at Stream Gaging Stations  
U.S. Geological Survey Bulletin.
4. Estimation of Peak Discharge at Channel Constrictions  
U.S. Geological Survey Technical Bulletin.

The following was received from Mr. Luis Alves, Agroclimatologic Engineer at the Center for Agrarian Studies, MDR.

Work Plans and Needs of the Department of Agroclimatology and Hydrology of the Center for Agrarian Studies of Sao Jorge

1 - Work Plans

General: The goal of the Department of Agroclimatology and Hydrology is mainly to provide our country with an agroclimatological and hydrological network capable of gathering data which will be useful after treatment to define actions for better use of the climatic conditions for the fields of agriculture and livestock raising. Knowledge of these conditions will also be useful to calculate our hydraulic potential (hydraulic balance of altitude and hydrological balance of watersheds) to find economical ways for using water in irrigation which is rare in our country.

Therefore, our priorities are to: 1) install pluviometric networks on every island, and 2) gather, compile and analyze former and current pluviometric data.

The agrometeorologic and climatologic stations networks have been amplified, although the department capacity of workers and material does not permit extending to the two other islands (Fogo and Santo Antao). Therefore, only Santiago Island is covered by the agrometeorological service.

From a hydrologic point of view, there are four (4) stations with limnigraphs, one of them has one telepheric and still this year we plan to install four more stations and two telepherics. In addition, we have several dischargers with limnimetric scales.

1.2 - The Department Organization  
Available Personnel

The Department is divided into three (3) sections:

- agroclimatology
- hydrology
- instrument maintenance

The first two divisions take care of the stations networks, gather and analyze the data, which are published and diffused to users.

The maintenance division, with the other two divisions, installs the above-mentioned stations, and maintains them in perfect working order.

This department is staffed by:

- a) agrometeorologist engineer, M.S. in Science Environment, head of this department, and the hydrologic division (the hydrologist is studying in France).

- b) Three technical engineers/agrometeorologists, working at the agrometeorologist division.
- c) Three technical engineers/instrumentalists working at the maintenance division.
- d) Three hydrometrists assistants
- e) Two responsible agents for data analysis
- f) One electricity assistant
- g) One clerk-typist
- h) One agent to control the pluviometric network and gather the data
- i) Six assistant-observers
- j) A technician with a university degree in Mathematics appointed to go to the U.S. for training in computer software.
- k) An official taking care of the pluviometrics data analysis appointed to go to the U.S. to get a university degree.

### 1.3 - Future Actions

The amplification of the networks involve establishing 18 additional stations of agrometeorologic and/or climatologic equipment. The pluviometric network should be modernized and amplified, with the installation of new pluviometers. For this purpose, we need the following material:

### 1.4 - Material Needed

To determine hydrologic balances it is necessary to equip the watersheds with climatologic, pluviometric and hydrologic stations. In order to do this, we need the following instruments:

- a) One hundred (100) metallic pluviometers SIAP with four hundred (400) square centimeters (cm<sup>2</sup>)/section.
- b) Six precision pneumatic limnigraphs "TELMNIP 73" - NEYTEC.
- c) One mini-programable-electronic calculator for data analysis
- d) One gamma-radiation probe for soil density
- e) Necessary material for flow measurements by chemical processes.
- f) Necessary material to determine sediment content in stream waters

### 1.5 - Personnel Training

We verify that the hydrologic division needs a larger staff. We propose the training of 3 nationals in hydrology engineering and training for two more agroclimatology engineers.

### 1.6 - Some Considerations about the Equipment to be Ordered

Since most of the scientific equipment supplied by the AGRHYMET program, we would like that efforts be made to order the same type of equipment to avoid maintenance problems.

Luis Alves, Agroclimatologic Engineer  
(original signed)  
Sao Jorge, March 5, 1984.

NNNNVV PRO080EHV393  
RR RUFHPR  
DE RUEHC #7561 0760824  
Z NR UUUUU ZZH  
R 60653Z MAR 84  
FM SECSTATE WASHDC  
TO RUFHPR/AMEMBASSY PRAIA 9899  
INFO RUEHAB/AMEMBASSY ABIDJAN 2623  
BT  
UNCLAS STATE 077561

ACTION: CONS  
INFO: FMB RF CHRON

<i>[Handwritten initials]</i>	NAN	ADMIN
ACTION:		
INFO CIRC	<i>[Handwritten: Denny Roberts]</i>	

AIDAC - REDSO/WCA - ANDERS/JENKINS

E.O. 12356N/A  
SUBJECT: WATERSHED DEVELOPMENT (655-0013)

*[Handwritten: good advice]*

1. AFR/TR/ENG HAS DISCUSSED WATERSHED MONITORING INSTRUMENT OPTIONS WITH USGS AND USDA'S ARS SOUTHWEST RANGELANDS WATERSHED CENTER, TUSCON ARIZONA.
2. THE ADVICE PROVIDED BY BOTH USGS AND USDA IS "KEEP IT SIMPLE". FOR DEPENDIBILITY AND LOW MAINTENANCE REQUIREMENTS MECHANICAL EQUIPMENT IS RECOMMENDED OVER ELECTRICAL EQUIPMENT; I.E. SPRINGWOUND ANALOG RECORDERS RATHER THAN DIGITAL AND WEIGHING RAINGAGES RATHER THAN TILTING BUCKET. DIGITAL EQUIPMENT CAN BE JUSTIFIED WHEN LABOR COSTS ARE HIGH, LARGE QUANTITIES OF DATA MUST BE PROCESSED AND REPAIR FACILITIES ARE AVAILABLE. WE BELIEVE THIS TO NOT BE THE CASE IN CAPE VERDE.
3. WE ARE TRYING TO OBTAIN COPIES OF USDA'S "FIELD MANUAL FOR RESEARCH IN AGRICULTURAL HYDROLOGY" FOR REDSO USE. THE S.W. RANGELANDS OFFICE IS SENDING US INFORMATION ON SEDIMENT SAMPLERS WHICH THEY HAVE DEVELOPED AND ARE CURRENTLY USING ON THEIR EXPERIMENTAL WATERSHED. WE WILL POUCH THESE WHEN RECEIVED.
4. MISSION MAY WANT TO CONSIDER UTILIZING THE USDA'S AGRICULTURAL RESEARCH SERVICE, ARS, FOR TECHNICAL ASSISTANCE IN DEVELOPING PLANS FOR WATERSHED MONITORING. ARS IS PROBABLY THE FREEMINENT US GOVT. AGENCY IN THIS TYPE OF ACTIVITY. SHULTZ

BT  
#7561



MINISTÉRIO DO  
DESENVOLVIMENTO RURAL

CENTRO DE ESTUDOS  
AGRÁRIOS

DEPARTAMENTO DE AGROCLIMATOLOGIA  
E HIDROLOGIA

DESCRIPTION, SPECIFICATIONS, TYPE No, CATAL No., REMARKS, etc.	ESTIMATED COST
Thermomètres maxima T03 - 1124	35.42 FF
Thermomètres minima T03 - 2114	25.70 FF
Supports plastiques TBO - 1111 pour thermomètres maxima et minima	8.22 FF
Thermomètres ordinaires T03 - 1114	23.24 FF
Géothermomètres de 10 cm T03 - 1142	127.45 FF
Géothermomètres de 20 cm T03 - 1152	132.80 FF
Montures métalliques pour psychomètres fixes U01-4210	80.00 FF
Thermographes avec cylindre hebdomadaire T05 - 3120	672.00 FF
Hygrographes avec cylindre hebdomadaire U05 - 5120	770.25 FF
Anemomètre à main NG 5799	640.50 FF
Barographes P05 - 3111	
Héliographe campbell - stokes MK III AW 6000	250.00 £
Anemomètres électromagnétiques à main W03 - 1311	
Thermohygrographes M05-2112 avec cylindre hebdomadaire	
Tubes à eau, avec bouchon, pour psychomètres fixes	20.00 FF
Evaporomètre PICHE + fixe rondelle + agrafe pour fixation U03 - 1020	69.95 FF
Sachets de 50 rondelles pour évaporimètre PICHE	
Pluviomètres SPIEA modifié MN R01 - 2050 + pied métal- lique R01-2050-1700 et éprouvette R03-2040	324.00 FF
Pluviographes à angets basculeurs R05-3025 avec cylindre hebdomadaire + jeu diagrammes	18.35 FF
Geothermomètres 50 cm + support	250 FF
" 100 cm + support	250 FF
Baromètres TONNELLOT P03-1040 + planchette support PBO-1121 + éclairage PBO-1310 + meuble fonctionnel BMO 21014-0801	

DESCRIPTION, SPECIFICATIONS, TYPE No., CATALOGUE No., REMARKS, etc.	ESTIMATED COST
Théodolites MORIN FWO-1511 + trépied FWO-1511 1700	
Bac classe A - 1010	1770.00 FF
Cage de protection de Bac	874.00 FF
Sunshine Recorder CAMPBELL-STOKES MK III A W 6000	250.00 £
Evaporation hook gauge W 5822 micromètre	38.00 £
Floating Max-Min thermometer W 5832	16.00 £
Cup counter anemometer W 1208/1	125.00 £

## FINANCIAL ANALYSIS

### Introduction

The Financial Analysis examines the accounting procedures used by the GOCV in international donor projects, and the system used in the processing of PL480 commodities. From this, the project issue of late payment to workers is addressed and the fiscal competence of the project entities is appraised. Finally, modification of the accounting procedures are prescribed for implementation during this project.

### Summary of GOCV Accounting Procedures for International Donor Projects

Two general accounting procedures are used by the GOCV in handling of donor funds; For smaller projects, the use of a general account in which funds generated by the sale of donated commodities are commingled; and, for many larger projects, the use of separate accounts which are operated on either an advance basis or a reimbursable basis.

### General Accounts

The general account approach funnels local currency generated by the sale of PL480 and other donors' food commodities through one bank account (FND Account n°95 - Bank of Cape Verde), wherein all funds are commingled, and from which projects' expenses are paid. This bank account is used principally for the many small projects in the GOCV portfolio. Because of the small number of trained personnel at the Bank of Cape Verde and the large number of small projects, the Bank feels it makes sense to employ just one account. Separate accounting is maintained for each donor/project by sub-account and ledger by the Ministry of Economy and Finance, so that individual donor/project funds can be identified.

Under this procedure with a common account, local currency generated by the sale of PL480 commodities, because of the fungible "nature" of the common account, can be used to pay expenses incurred on non-US projects. On the other hand, local currency generated by the sale of other countries' commodities will at times be used to pay expenses incurred in USAID projects (both have occurred). From the standpoint of the GOCV, continuity in projects' activities is assured by the commingling of donor funds and therefrom availability, especially given the infrequent and inconsistent arrival of foreign food shipments into the country and the lag in receipt of funds generated by the sale of commodities locally.

### Separate Accounts

Many larger projects have separate bank accounts established. These accounts operate on one of two bases:

(a) Reimbursable - Activities are carried out on a particular project by the GOCV and costs incurred are billed to the sponsoring donor periodically. The main criticism of this procedure is the long time it takes to receive the reimbursement especially in the case of a multilateral donor wherein the bureaucratic approval process is very time-consuming. Reportedly, this procedure is currently being used with only approximately 20% of all projects - down from a high of 60%.

(b) Advances - Either the donor or the GOCV provides an advance to the implementing agency equivalent to the anticipated costs of, for example, a three month period. The costs incurred by a project for the ensuing three month period are then justified to the donor or GOCV to trigger the next advance. For example, the Fogo-Brava project (entailing German donated rice and cooking oil sold by EMPA for local currency) was started with a three month advance made by the FND. Monthly project expenses are submitted to the MEF for justification and FND payment. Receipt from EMPA sales are remitted to FND thus in theory continuously reimbursing the FND advance.

#### PL480 Program Accounting Procedures

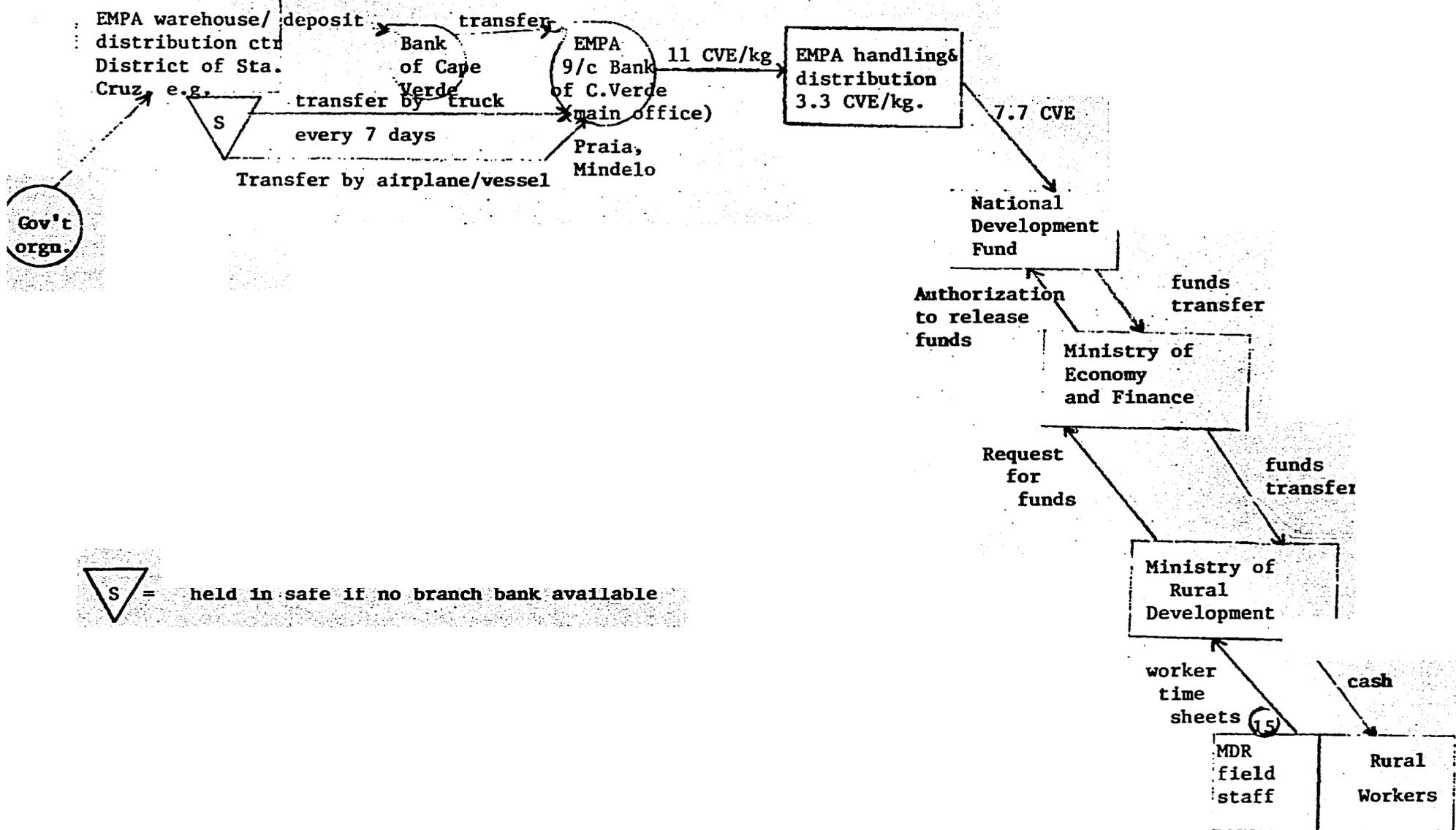
Concern has been expressed that, to date, the GOCV is unable to expend the funds generated by the sale of PL480 commodities in a timely fashion, that there are delays in the receipt of salaries by rural workers due to periodic shortages of funds in the Food for Development Account n°95 and that appropriate accounting procedures for handling funds generated by the sale of PL480 commodities are necessary.

Understanding of the current accounting procedures, coupled with information gained from discussions with GOCV officials should provide the basis for developing acceptable future accounting procedures for the Watershed Development/PL480 Project. It should also help discover where delays are occurring in commodity and financial flows, why, and what might be done to alleviate the delays.

Following are two flow charts with explanation which describe the movement of PL480 corn from its arrival in Cape Verde to EMPA's customers, and the flow of funds back through EMPA and the National Development Fund to the Ministry of Rural Development and the rural workers carrying out watershed management activities.

Merchants

FINANCIAL FLOW CHART



**S** = held in safe if no branch bank available

Current Accounting and Reporting Procedures for Movement and Sale of PL480 Commodities and Utilization of Local Currency Generated

1. Vessel discharges corn at Praia or at Praia/Mindelo in bulk at port silos to be bagged for transshipment to EMPA's central warehouses (thence to Santiago and Sao Vicente EMPA district distribution centers) or to other islands' distribution centers. EMPA sends USAID the report, "Auto de Recepcão de Ajuda Internacional" (Statement of Receipt of International Aid) - exhibit ①\*\*
  - a. origin and source of food aid
  - b. arrival and discharge information:
    - (i) product
    - (ii) quantity (manifest and actually unloaded)
    - (iii) losses from damage and shrinkage in transit
    - (iv) quality-moisture level (%), broken kernels (%), foreign matter (%), and
    - (v) net quantity in good condition

This document starts the inventory recording process of EMPA. Also, the usual shipping documents (bills of lading and inspection documents) are received by USAID.

2. Bagged corn is shipped from the silos by truck to EMPA's central warehouse (e.g. Achada Grande), by truck to EMPA's six retail outlets (Praia) and by vessel to the southern islands from Praia and to the northern islands from Mindelo. Bagged corn is shipped by truck from the Central Warehouse to district warehouse/distribution centers (e.g. Santa Catarina). Bagged corn is also shipped from closed and open storage on other islands by truck to those islands' respective distribution centers.  
Reports: - EMPA shipping and receiving documents - exhibits ② and ③
3. The distribution centers make cash sales to merchants for final sale to consumers, credit sales to government organizations and a small amount (1%) is donated to the very needy. Occasionally, grain is transferred from one center to another.  
Reports: - Cash sale - exhibit ④; credit sale - exhibit ⑤; donations - exhibit ⑥; transfers between centers - exhibit ⑦.
4. Centers may occasionally purchase from a third party (exhibit ⑧). They report inventory losses (exhibit ⑨) and inventory overages (exhibit ⑩) to EMPA.
5. EMPA develops a monthly sales and inventory report for each center (exhibit ⑪).
6. Quarterly, EMPA sends USAID the report, Relatorio Trimestral s/ Mercadorias Recebidas de Ajuda Internacional (exhibit ⑫). This quarterly report summarizes:

\*\* All exhibits are in project file for those interested

- (a) quantity of corn received at Praia and Mindelo (net into storage).
  - (b) quantity sold
  - (c) ending inventory (no beginning inventory is shown although it can be taken from the previous quarter's report ending inventory).
  - (d) amount of funds generated from quantity sold
7. Every six months, the National Development Fund sends USAID, the report "Ajuda Alimentar dos Estados Unidos da America a Cabo Verde em 198\_\_ : Relatorio Semestral." (exhibit 13). This report summarizes:
- (a) the quantity of corn received, sold and in inventory at the end of the period.
  - (b) the amount of local currency available at the beginning of the period plus the amount of local currency generated from sales during the period, giving the total funds available at the end of the period.
  - (c) how the funds were employed by project activity.
  - (d) expenditures by sub-project, e.g., Ribeira Seca, Ribeira Picos, etc.
8. EMPA recently (January 6, 1984) provided USAID with a detailed breakdown of its handling and distribution costs (exhibit 14). EMPA included its price build-up to arrive at its sales price to customers, and its overhead charge. Based on EMPA's historical experience of the expenses of running the silos, costs are imputed to each ton of grain throughput. The structure of handling and distribution costs appear reasonable relative to cost structures normally attributed to similar types of handling and distribution in other developing countries.
9. Cash from merchants and check payments from government organizations flow to the EMPA district distribution center for deposit in the EMPA account in a branch of the Bank of Cape Verde for subsequent transmittal to EMPA's headquarters account at the Bank of Cape Verde in Praia or Mindelo. In the case where there is no branch available, cash/checks are collected and held for seven days at the end of which time the monies are sent by truck to the Bank of Cape Verde (Praia, Mindelo). For the more remote islands, funds are remitted by vessel/airplane, e.g. Brava to Praia via Fogo; Santo Antao to Mindelo. As the funds flow into the main EMPA bank account, 3.3 CVE/kg are used to pay EMPA's handling, distribution and overhead costs. 7.7 CVE/kg are supposedly transferred to FND for subsequent transmittal to MDR to pay rural workers.
10. The utilization of funds starts with the transmittal of worker time sheets (exhibit 15) every two weeks from the project sites to the Ministry of Rural Development.
11. The Ministry of Rural Development submits a request for payment (exhibit 16) of all project expenses, (USAID and others) salaries and materials purchased, for any given two week period to the Ministry of Economy and Finance. After review the MEF authorizes the

National Development Fund to release the requested funds. The National Development Fund, in turn, requests the necessary monies from EMPA, in order for the MDR to be able to make timely payments of worker salaries. A payment order transfers funds to the MEF for the account of the MDR.

12. The funds are transferred to the Ministry of Rural Development which in turn delivers cash to the field with the worker time sheets (exhibit (15)) for initialing by foreman that the individual workers have in fact been paid. The initialed time sheets are returned to the MDR as are originals of invoices for materials purchased.
13. Copies of worker time sheets and materials' invoices are sent to the MEF and FND for budgetary control purposes.

#### Issue of Late Payments to Workers

One of the principal concerns of the Ministry of Rural Development and USAID is the delay (anywhere from six to 12 weeks) in payment of salaries to workers. There are several reasons for the delay:

1. The distance between the islands, the lack of an extensive banking system (sufficient branches) and slow communications/transmittal of receipts to Praia and Mindelo result in delays of receipt of funds by EMPA of up to 90 days (see exhibit (17) for average delays experienced by EMPA). Reportedly, EMPA has to wait until the money/checks physically arrive at the main offices (Praia and Mindelo) of the Bank of Cape Verde before it can remit to FND.

2. MDR requests funds bi-weekly from the Ministry of Economy and Finance for the totality of projects it is implementing, not just USAID activities (see exhibit (16)). Thus, FND requests the entire amount from EMPA, which, because of its cash flow problems, is slow in remitting. Because of being combined with expenditures on the accounts of other donors, payments on behalf of USAID subprojects suffer longer delays than would be the case under a separate accounting procedure.

3. EMPA reports that government organizations may buy grain on credit, but often only pay at the end of the calendar year, when by law they have to in order to clear the books for the GOCV fiscal year. (GOCV's fiscal year is the calendar year). Thus accounts receivable can be on average six months outstanding. This further aggravates EMPA's cash flow problem. While EMPA at present states (three EMPA officials were asked for this information) that it cannot determine the quantity of grain sold on credit to government organizations nor can it age its receivables by class of customer, it does report that 30-40% of its total yearly sales (2.8 billion CVE) of all goods are on credit. Thus, it is conceivable that a maximum of 840 million - 1.12 billion CVEs could be outstanding for six months on average. While this is most likely not

the case, if half this amount (400-500 million CVE) were 180 days overdue, there would certainly be adverse repercussions on EMPA's cash flow.

Indirectly, additional delays on financial flows are caused by inefficiencies in EMPA's supply system:

1. At present EMPA's stock (inventory) management department is able to exercise effective inventory control over Praia and Mindelo. EMPA is just now starting to compile data for each district's consumption of grain and other products. With this information, EMPA will institute an inventory control system and establish reorder points for each product, for each district distribution center. The inventory control system will be part of the computerization now on-going at EMPA (an Olivetti M-40 computer has been installed and is in the debugging phase).

2. Because of weak stock management, the scheduling and coordination of shipping is a problem -- resulting in "rule-of-thumb", over-conservative stocking and resupply of islands. EMPA also tends to ship grain (and other goods) when vessels are available. Both practices result in periodic oversupply of various islands.

3. EMPA's current stock management system does not give them the ability to closely coordinate the arrival of donated grain and their own purchases of grain.

4. EMPA reportedly holds inventories of all goods valued at 500,000,000 CVE at any given time. Balanced against a total annual sales volume of 1.8 billion CVEs, the inventory turnover rate is 3.6. Better stock management could improve the turnover and thus speed up EMPA's cash flow.

Indirectly, weaknesses and delays in reporting also cause delays in financial flows. For example,

1. EMPA does not always get timely supply reports from all islands. Reports are currently sent through the mails which can result in delays in receipt of information. In particular, delays occur in the information flow from Brava-via Fogo-to Praia, and from Santo Antao to Mindelo. Additionally, accurate information is difficult to obtain from Brava, thus forcing EMPA to estimate needs and timing of deliveries.

2. MDR reportedly suffers somewhat from insufficient numbers of field personnel adequately trained in handling salary and materials purchases reporting, which can slow down the request for and subsequent remittance of funds to pay workers.

3. MDR reports that it has little knowledge of how much local currency is available to pay salaries at any given time. Apparently, it does not receive this information from FND nor from EMPA. If MDR had this information, however, it is possible that it could "tailor" certain non-critical materials' purchases to the availability of funds, thus reducing a bi-weekly request for funds and then by making possible less delay in

salary payment. Knowledge of availability of funds could also help somewhat in the timing of hiring.

Finally, generally low individual purchasing power means small individual sales to consumers when money is available with the result that many small- and medium-sized merchants will only stock (and pay for) immediate needs, resulting in low turnover rates for those district distribution centers which are oversupplied. The cumulative net result of which is a slow movement of funds back to EMPA, hence to FND and ultimately to the rural worker. By provision of an advance from EMPA to the account, delays should be minimized.

#### Financial Management Competency of Project Entities

Review of the current accounting procedures and system of the pertinent GOCV agencies (EMPA, FND, MEF and MDR) shows them to be generally satisfactory for the GOCV's purposes as it sees them. Recording of receipts and expenditures, filing systems, cross referencing to trace both to some documents, and controls were found to be adequate. As noted earlier, reporting and flow of funds problems are largely caused by friction in the system rather than by lack of competence. The changes that will be required to meet USAID's needs for timely, accurate reporting are certainly within GOCV's competence. Elaborating on the suggested accounting procedure already described, changes would entail:

A. EMPA - accounting for inventory movements, shipments and flows of generated local currency by product and by donor (i.e., the U.S.). EMPA's present reporting system in large part accommodates this requirement. Their forms are well designed, indicate product sold, transferred, cost, etc. and would only have to have noted on the particular form that the sale was from U.S. furnished supplies. Only two products are involved -- principally #2 corn\* and beans (the anticipated May, 1984 shipment). EMPA does not handle that many products to make this requirement burdensome.

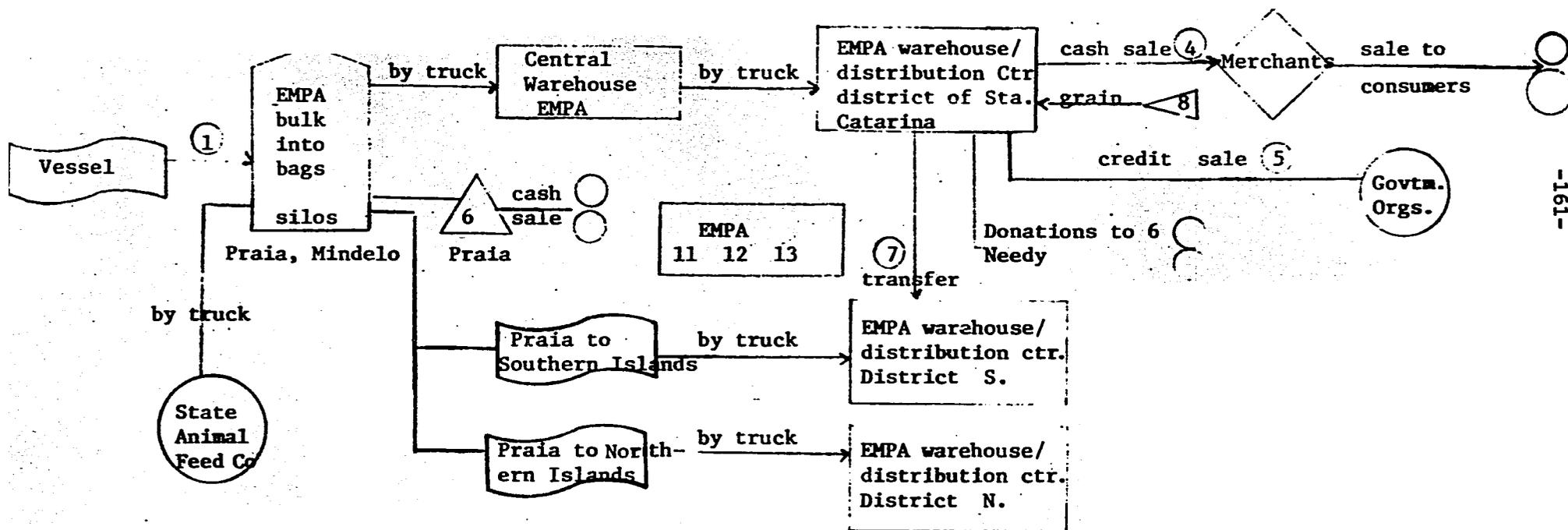
Moreover, with EMPA's Olivetti M-40 computer coming onstream and with the usual redesign of forms in a shift from manual to computerized accounting, the inclusion of product/donor indication on sales could be easily done. Finally, if sales are reported by product and by source (donor), proceeds from sales certainly can be reported in the same way.

B. FND-MEF - Both organizations are certainly competent and experienced in handling separate accounts for individual projects. Many large projects are handled on a separate account basis. The problems which FND-MEF have are those of any new developing country -- an inherited, highly detailed, somewhat cumbersome manual accounting system coupled with a general lack of sufficient number of well-trained middle and lower level staff able to meet timely reporting requirements -- both internal

---

\* All U.S. corn sold, transferred or given away is in bags marked with the AID logo.

CURRENT GRAIN AND FINANCIAL FLOWS



- ⑧ = purchase from third party
- ⑥ = EMPA's 6 retail outlets in Praia
- ① = Report

and external. While assistance in accounting and financial management is outside the scope of this project, the food monitor budgeted for under the Technical Assistance component could certainly be of some help in working closely with FND-MEF (as well as EMPA and MDR) to increase their understanding of the project reporting and flow of funds requirements.

C. MDR - Review of MDR's accounting procedures revealed that they are sufficient for timely reporting of salaries due and accounts payable for materials purchases. As the project expands (number of workers) there will be a need for more qualified field supervisory personnel. Qualifications of the personnel insofar as reporting is concerned will continue to be the responsibility of MDR with possible assistance by the food monitor.

#### USAID

The reporting requirements in the suggested accounting procedure, coupled with the work of the food monitor and the financial management/auditing specialist, should enable USAID to monitor the flow of project generated funds, to anticipate delays in the flow of funds, and to take early corrective action.

As part of the short term technical assistance, a financial management/auditing specialist has been budgeted for. He/she is scheduled for two months of in-country work at the end of FY85 - beginning of FY86. It was felt that the end of the first year of the project would be an appropriate time to evaluate the success of the new accounting procedures, to determine if local currency generated by the sale of PL480 commodities is flowing more rapidly and more smoothly to the intended recipients, and also to assist the GOCV in helping resolve funds flow problems which may have arisen.

#### Recommended Accounting Procedure

As noted, one of the principal concerns of the current PL480 program is the delay in the receipt of salaries by rural workers due to periodic shortages of funds in the FND Account #95 (that account into which PL480 generated local currency and local currency generated by the sale of other donor's food commodities flow). The shortage of funds induced delays in salary payments are caused by many factors ("friction") which slow up the movement of goods, subsequent sale, remittance of sales proceeds and transmittal to recipients (e.g. rural workers). The principal causes of "friction" have been outlined.

Following is a recommended accounting procedure which should help speed up the flow of funds to the ultimate recipients.

1) The establishment of a separate account for Watershed Development activities should alleviate the delays occasioned by the current

commingling in one account of local currency generated from sales of donors' commodities.

2. The periodic reporting to USAID by involved GOCV agencies should give USAID timely information on the status of the account and of project activities. This information should also permit USAID to anticipate serious delays and take appropriate action when necessary.

3. The availability of a three month advance deposit to the account and its maintenance should ensure the timeliness of payments to workers under the Watershed Development Project.

### Procedure

A separate bank account is established at the Bank of Cape Verde for the Watershed Development Project in the name of the National Development Fund to receive local currency generated from the sale of PL480 commodities and to be used only for specific project purposes, e.g. payment of rural worker salaries, material purchases related to sub-project activities, salary of a project food monitor. In order to alleviate the delays in payment of rural worker salaries which has characterized the current PL480 program, EMPA will deposit an amount of money equivalent to three months expected average salary and material purchases expenditures (approximately 30,000,000 CVE). It will be EMPA's responsibility to maintain this level of advance on average over each calendar quarter. At the end of the project, the amount of advance funds in the account will revert to EMPA.

1. When a vessel completes unloading its cargo at Praia or Mindelo, the receiving document, Auto de Recepcao, is sent immediately to EMPA's Sales Department with copies to EMPA's stock management and accounting departments as well as to USAID and FND.

2. Sales proceeds of U.S. commodities are deposited by distribution centers into branches of the Bank of Cape Verde (BCV) and then transferred to EMPA's headquarters account at the BCV. Where branches of the BCV are not available to the distribution centers, the center collects and holds sales receipts for weekly transfer to the EMPA headquarters account at the BCV.

3. On a weekly basis, EMPA transfers the sales proceeds, net of EMPA handling and distribution costs, to the FND Watershed Development Account. Upon receipt of funds, FND sends USAID a confirmed notice of transfer of funds to the Watershed Development Account.

4. The MDR field staff submits work time sheets to MDR.

5. MDR submits its bi-weekly request for funds to pay worker salaries and materials purchases to MEF with a copy to USAID.

6. MEF reviews and approves request for funds, and authorizes FND to release the requested funds from the Watershed Development Account.

7. Funds are transferred to MEF for the account of MDR.

8. MDR pays rural workers and accounts payable. In order that USAID be able to monitor the progress of the project effectively, it is suggested the following quarterly reports be required of the GOCV.

(a) EMPA provides USAID with quarterly Commodity Movement Reports.

A summary showing the physical movement of corn during the quarter in the following format:

- stock on hand at beginning of quarter by location (central warehouse, Praia, Santa Cruz, Santa Catarina, Fogo, etc.)
- shipments received during the quarter
- metric tons distributed to the various locations
- stock on hand at the end of the quarter, by location
- losses by location, quantity, value, explanation of loss and disposition

(b) FND provides USAID with a quarterly Flow of Funds Report:

A summary cash flow statement which ties into the physical movement of commodities during the quarter. The cash flow should reflect the following:

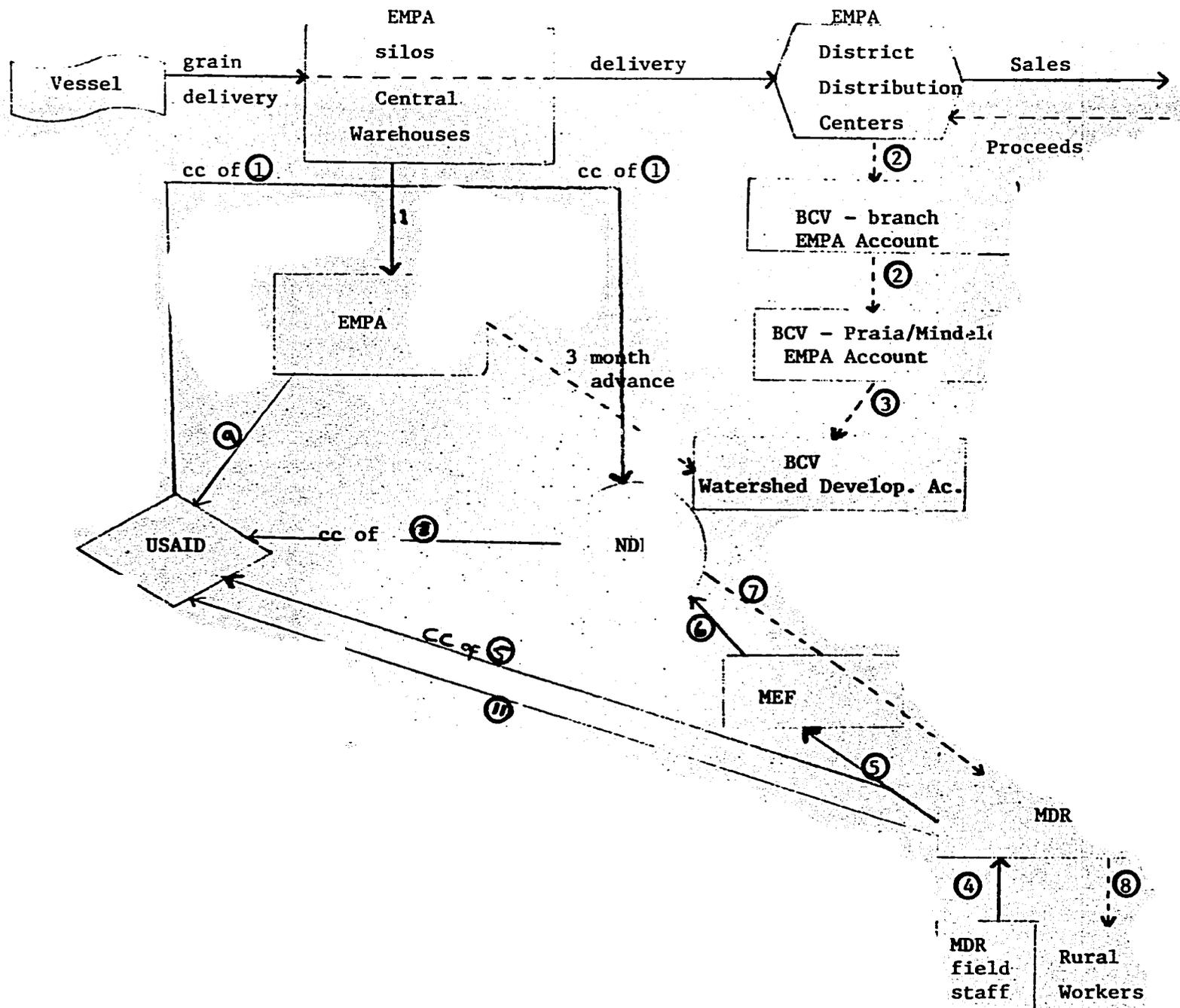
- Balance of funds at beginning of quarter
- Local currencies (net of internal transportation and distribution costs remitted by EMPA to the FND)
- Balance of funds at end of quarter.

(c) MDR provides USAID with a quarterly report of Operations.

A brief written summary, similar to the yearly report currently provided, for each project benchmark, describing accomplishments during the quarter. The report should be related to the summary cash flow statement required of FND. This section of the report should contain information such as numbers of dikes completed during the quarter, numbers of dikes begun, numbers of workers employed, appropriate costs, data, etc.

These reports would be submitted in lieu of the current 6-month report entitled "Ajuda Alimentar dos Estados Unidos da America a Cabo Verde; Relatorio Semestral".

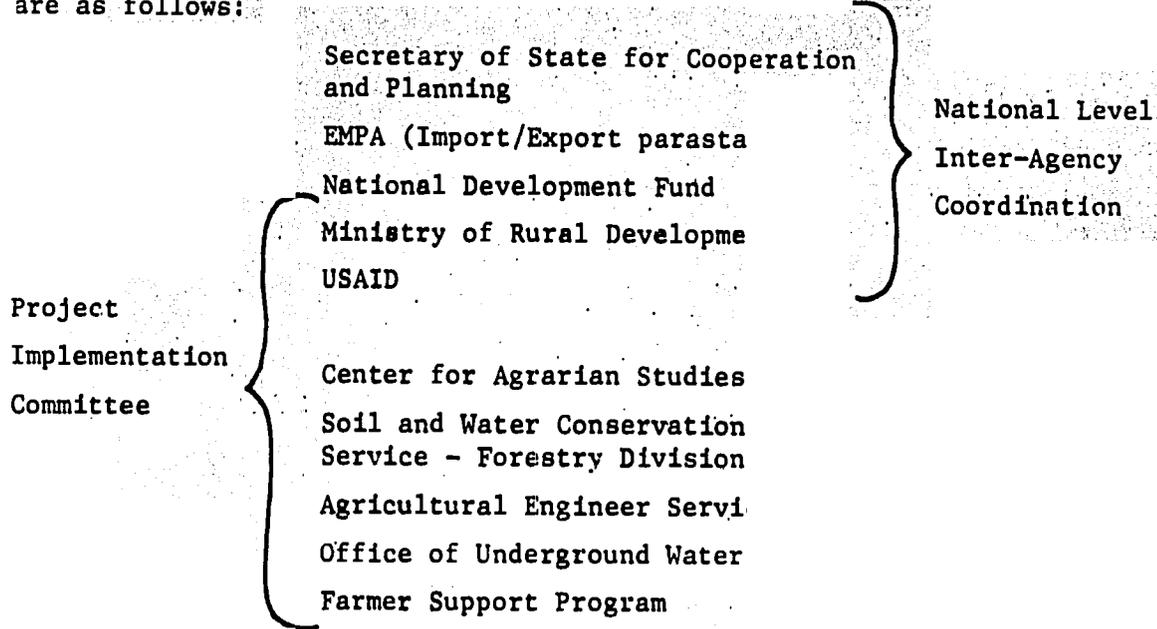
Following is a flow chart for the suggested accounting procedures.



ADMINISTRATIVE ANALYSIS

Introduction

The organizational entities involved in project implementation are as follows:



National Level Inter-Agency Coordination - The coordination of the various agencies listed above is expected to occur formally as a project covenant. The Title II, Section 206 Transfer Authorization must be signed by the GOCV before the funds may be disbursed. The inter-agency group will provide information and assistance to implement the food import component, upon which the remaining components are dependent. It will be the responsibility of USAID project management or his/her designate to monitor and ensure the coordinated effort of the various agencies. A semi-annual full-day conference is recommended where issues can be discussed frankly. An advance agenda will be submitted by all members for comments, and the opportunity to prepare materials. A sample agenda of obvious topics would be:

- 1) Individual agency reports
- 2) USAID-Report of Food import dates/quantities and expected revenues
- 3) EMPA - status of warehouses -- improvements, etc.
  - status of stocks
  - distribution reports
- 4) FND - balance of account

- 5) MDR - payment record/vouchering
- 6) Review progress toward self-help measures
- 7) Discussion of pricing policies for corn (if applicable)
- 8) Title II, Section 206 Evaluation Report

The meeting should be chaired by [redacted] and a list of actions to be taken generated, with individuals responsible. Ultimately, USAID project management will follow up on actions. It is only through the collaboration of this group that the Project Implementation Committee has anything to implement. Active support and interest by all the agencies is necessary.

Through the course of the PP Design, it was clear that these agencies are interested in cooperating and that USAID needed only request a meeting, information, guidance, etc. and it was given. The GOCV was most cooperative.

What follows is a description of each agency project responsibilities and when appropriate, its fiscal competence:

Secretary of State for Cooperation and Planning - The responsibility for inter-agency cooperation rests with Secretary of State for Cooperation and Planning (DGPE) or his designee. This person works with USAID project officer planning the semi-annual meetings and is the conduit for other agency reporting on the project. DGPE compiles the quarterly reports and presents one to AID.

EMPA - Will keep up-to-date records of inventory movements and flows of grain. Since their system is in the process of being computerized, this information should become available on a more timely basis. EMPA will provide quarterly reports to DGPE. For a more detailed description of EMPA refer to the financial analysis.

National Development Fund (FND) - FND is required to hold a separate account established by MEF for the local currencies generated under this project. They will pay MDR in response to approved vouchers from the account. EMPA will maintain at least a three-month advance of funds in the account, since it is understood that their accounting procedures, lack of telecommunications, and the distance between islands slows the system of trading grain for local currency. FND will present the account balance at

semi-annual meetings and may call upon the services of the project funded food monitor.

MDR - MDR capacity is described in the following section on Project Implementation Committee. As the project expands, they will be training more field supervision staff and present no issue in management.

#### USAID

The PID recommended the addition of a USDH Project Officer or PSC Project Manager; These recommendations remain. Finally, the USDH Project Officer position in the Mission is vacant. While REDSO/WCA may be able to provide limited interim assistance, and a local food monitor could assist, project start up activities, as shown in the implementation plan, are rather intense and coordination during the initial months of the project will be invaluable. Timely replacement of project officer is, therefore, recommended.

Project Implementation Committee - The Project Implementation Committee was established by the MDR in support of this project (see Organizational Chart). Its functioning is somewhat more complex, though it rests almost entirely within the MDR (with the exceptions of USAID and MEF, to which it vouchers for rural workers salaries. The Committee is charged with project management in the field and administration within the Ministry.

The actors and their functions are as follows:

- a) Directors - The directors (2) are the point persons within the MDR for all project activities and work most closely with USAID project officer. Directors will be appointed by the Minister of Rural Development and report directly to him. They will also meet regularly with AID. The Contract team leader will be their counterpart.
- b) Technical Council - Chaired by one of the Directors, the technical council consists of representatives of the relevant technical services. This is the operational group that plans the project field implementation. Contract technical assistance will work as members of this council and

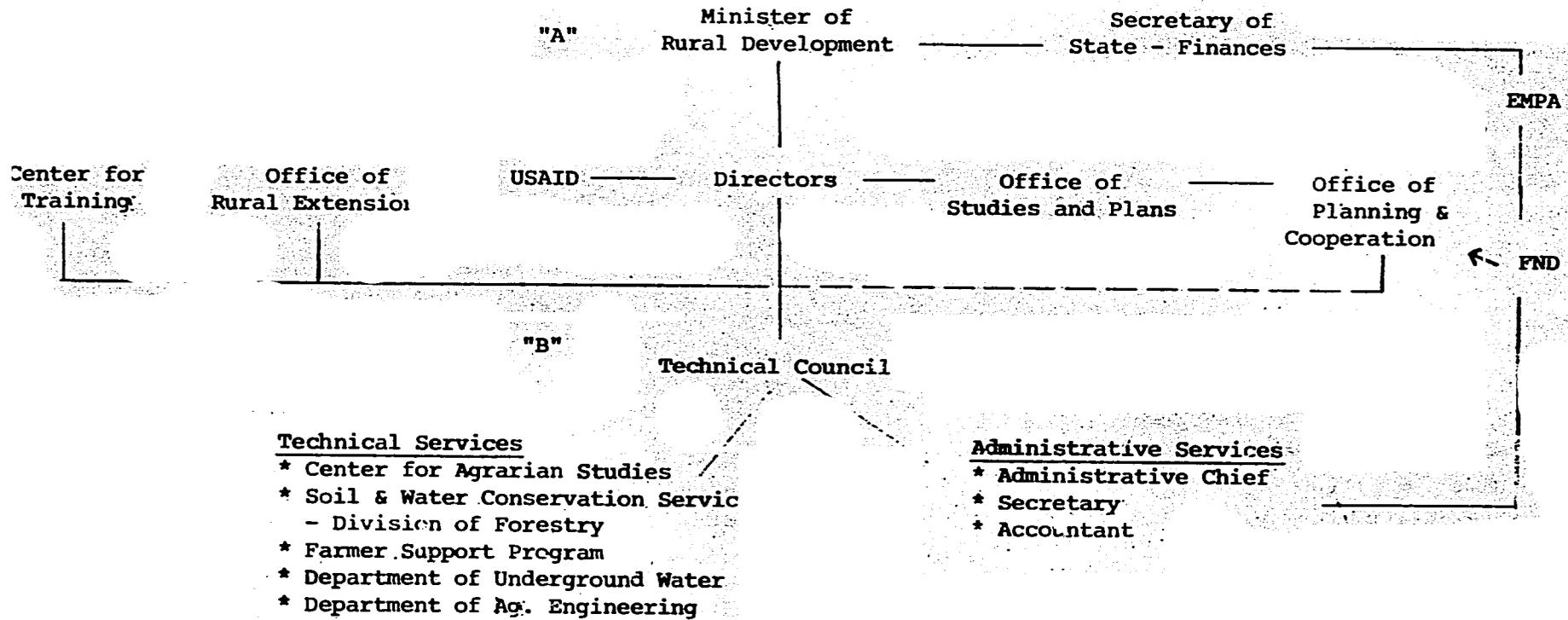
find their counterparts herein. Many of the representatives on the council will be provided short term training as a means of skill development in conjunction with the presence of contract f.A. It is also within the council that research and field extension links can be strengthened by cooperative project planning and decision making.

Administrative Services - Evaluations have recommended that MDR devise a system to both voucher more quickly and voucher AID projects separately from other donor efforts, to pay rural workers more quickly. The MDR has answered the recommendation by establishing an "administrative chief" for project activities. Hired locally, his salary will come from PL480 currency. He will have the following responsibilities (see full scope of work attached).

- Coordinate and process bi-weekly vouchers for submission to Secretary of State for Finances;
- Prepare basic materials for periodic, quarterly and annual reports as required by the project;
- Procure commodities, as authorized by Project Management;
- Maintain a system of stock inventory in project warehouses;
- Control the correspondence system for the project and assure appropriate distribution;
- Other duties as required by the technical council.

USAID - The USAID Project Officer will confer with the Directors and T.A. Team Leader for technical and policy concerns, and with the Administrator for other concerns. Because technical assistance will be through an AID Direct Contract, the Team Leader will report those contract-related concerns to USAID separately. It is hoped that USAID will provide T.A. that fits well into this framework.

CAPE VERDE WATERSHED DEVELOPMENT (655-0013)  
PROJECT IMPLEMENTATION STRUCTURE



"A" National Inter-Agency Coordination  
"B" Project Implementation Committee

TO MR JENNIS <sup>Hubertson</sup>  
-171-  
USAID - American Embassy  
Praia

SCOPE OF WORK FOR THE CHIEF ADMINISTRATOR PROPOSED  
FOR WATERSHED DEVELOPMENT PROJECT

- Organizar o Serviço Administrativo próprio do projecto tendo em atenção todas as normas e fichas já existentes na Direcção dos Serviços de Conservação do Solo e da Água e a legislação nacional aplicável ao caso.
- Coordenar a elaboração das folhas quinzenais de salários e relação das despesas em materiais que deverão ser enviadas aos serviços competentes da Secretaria de Estado das Finanças.
- Preparar todos os elementos que deverão servir de base para a elaboração dos relatórios periódicos, trimestrais e anuais, que deverão ser apresentados pela direcção do projecto.
- Proceder a aquisição de materiais próprios para o funcionamento do projecto depois de obtida a autorização prévia da direcção do projecto.
- Levar a despacho da direcção do projecto todos os assuntos de natureza administrativa.
- Proceder a desalfandegação de todos os materiais do projecto que são enviados do exterior e fazer-los encaminhar para os locais próprios de trabalho.
- Proceder a inventariação de todos os produtos armazenados e manter actualizado todo o sistema de gestão dos stocks.
- Controlar todo o sistema de entrada e saída de correspondência bem como dos relatórios procedendo a sua distribuição para os departamentos competentes.
- Efectuar todos os demais serviços de natureza administrativa de que for incumbido pela direcção e/ou conselho técnico.

## ENVIRONMENTAL ANALYSIS

### Introduction

A negative environmental determination is being recommended for Cape Verde Watershed Development (655-0013). The purpose of the project and the project activities further the soil and water conservation program in Cape Verde, and are viewed as positive steps toward increasing agricultural production potential.

Three activities in the proposed project may require risk/benefit analysis; they are road construction and repair, check dam construction, the purchase/utilization of pesticides for grain storage and overall development in a fragile environment.

### Road Construction and Repair

A major road from the mouth of Ribeira Flamengos to Santa Catarina (see map), a distance of 6 kilometers, is contemplated, using hand labor supplemented with heavy equipment furnished by project DA funds. Benefits resulting from this activity are:

- 1) An improved communication link with the project area which would enable the development of the upper watershed region and transportation of agricultural products to markets.
- 2) Road construction methods are such that the structure will act to increase rain water infiltration into the soil thereby reducing erosion and extending the life of the stream flow. Talus and slump can be controlled using congo beans or other vegetation. Observations of existing roads on the island point to no foreseeable damage to the environment.

### Check Dam Construction

Check dams are small stone and cement structures built on dry river bottoms for the purpose of soil and water retention, land reclamation and downstream farm field protection. These structures back-up soil from eroding slopes creating vegetable production areas and increase sub-surface water holding capacity. The dams, when properly constructed, slow overland runoff flow intensity thereby protecting downstream agricultural structures and land. The only risk which could be associated with this type of structure would be storing a large potential energy. If the structure failed and released this energy, downstream structures could be put in jeopardy. Loss of life in the higher elevations should not be a factor as rural people live on the slopes high above the river bottom. Potential damage to coastal villages and managed playas could be extensive. The project will provide technical assistance to ensure strong and safe design for these structures.

### Activity on Fragile Lands

Considerations for deciding whether developing a fragile watershed is better than doing nothing favors the developed/managed route. Soil loss, even on mildly sloping land (7%) and low rainfall (41m/n), has been measured at 1.6 metric tons per hectare per event. The erosion potential on steeper slopes with substantially higher rainfall in the project area is much more.

The project will construct rock barriers, dig trenches and plant vegetative cover to minimize soil erosion and maximize water retention. These structures slow surface runoff allowing rain water more time to percolate into the soil. Increasing water penetration in addition to decreasing surface runoff and erosive forces will extend stream flow time and continually recharge the upper level aquifers for longer periods. In marginal areas of the project watersheds, where total or erratic rainfall might not permit grain production, physical structures to collect water for smaller concentrations of plants will be tried in conjunction with the Food Crop Research project. This technique is successful in extremely arid zones for reforestation, and could significantly increase arable lands.

It is conceivable other activities requiring environmental assessment might eventually be funded. The following discussion will attempt to identify these activities and suggest procedures and caveats which should be included in the ProAg to minimize environmental degradation

### Large Scale Pumping for Agricultural Irrigation

The Tarrafal area has been subject to much study and speculation as to whether or not the water table can support this activity without damaging coastal village water supplies. As a result of discussions with REDSO/WCA engineers and after reviewing the reports by John Logan, a contractor with Utah State University, it is recommended that AID not support or purchase pumping equipment for wells without carrying out pumping tests and monitoring to ascertain that withdrawals at the design rate will not mine the aquifer or cause salt water intrusion. It is feared that extraction of groundwaters on a large scale, will allow salt water intrusion thereby destroying coastal village water supplies. By limiting the depth or pumping rate of irrigation wells in this area, salt contamination, which may require centuries to rehabilitate, should not occur. Certification of sites by both the USAID/Praia Project Officer and a Certified groundwater hydrologist should be made mandatory before installation of pumps on any deep wells in the project.

Irrigation/Pumping on Eastern Shore Watersheds is confined to using water from the shallow riverbed aquifers. All domestic supplies also come from this source. It is recognized that extensive pumping below the 5 meter above sea level mark could deplete this resource causing serious hardships on the local population due to salt water intrusion. The project will re-

inforce the rainfall/runoff/recharge cycle (see hydrology analysis).

#### Open Water Impoundments

As trained civil engineers return and are integrated into the project, increasing interest will be placed on construction of dams. Though the project lacks funds for any major construction activities, small farm-pond-like dams high in the watersheds may be tried using rural labor. As in the case of check dams, structural failure could cause major damage downstream. Certification of site, design construction and rainfall monitoring by qualified REDSO/WCA engineers or a private engineering firm, should be made mandatory.

Other risks normally associated with open water collecting structures are:

Malaria - though Santiago reportedly has no malaria problem, standing water will provide breeding grounds for mosquitos and therefore the likelihood malaria could become well established if/when introduced.

Animal fecal contamination of water - All water sources are used for domestic purposes also. Design should consider the effects of animal drinking directly from ponds.

#### Pesticides for Grain Storage

Empresa Publica de Abastecimentos (EMPA) is the GOCV organization responsible for importation, storage, wholesaling and some retailing of staple food commodities. This includes storage and distribution of corn under a PL480, Title II, Section 206 Food for Development Project.

Under a project on post-harvest problems, the Federal Republic of Germany, German Office of Technical Cooperation (GTZ) has provided EMPA recommendations for pesticide use and training in grain storage and pesticide application. Further, GTZ has supplied quantities of pesticides, application equipment, safety and monitoring equipment and some gas tight tarpaulins for grain fumigation for use at warehouses and storage facilities throughout the nine principal islands of Cape Verde.

Whereas USAID/Praia recommends the use of malathion, registered by the USEPA for unrestricted use in grain storage facility treatment and direct application to grain, GTZ chose to recommend and supply a pesticide, fenitrothion (Folithion, a registered trade name of Bayer), for storage facility treatment, exterior treatment of grain sacks and fogging of the space surrounding stored sacks of grain. Fenitrothion is not registered by the USEPA for the uses suggested by GTZ.

GTZ also recommended the use of aluminum phosphide containing fumigants, specifically Phostoxin for fumigation of stored grains in

EMPA facilities. USAID/Praia concurs in this recommendation. Phostoxin, and several other products containing aluminum phosphide, is registered by USEPA with a restriction based on user hazard, and must be used only by personnel trained in proper application methods and safety precautions.

The GTZ no longer furnishes pesticides to EMPA, requiring this project to do so. Malathion and Phostoxin will be supplied along with dispersing equipment where needed. Training for aluminum phosphide utilization was done and tight controls by senior EMPA technicians on its use exist. Malathion has never been used in Cape Verde for grain storage. Adequate training for two EMPA technicians can be done in the U.S. at Kansas State University, perhaps, under cooperative agreement AID/DSAN-CA-0256. In compliance with Title 22 CFR, Part 216, Section 216.3 (b)(1)(i)(ii) and (iii)(a), an evaluation of the economic, social and environmental risks and benefits of the pesticides is required to determine whether the use may result in significant environmental impact. The accompanying evaluation of risks and benefits is submitted for a Threshold Decision.

Evaluation of the economic, social and environmental Risks and Benefits of the use of Malathion<sup>R</sup> and aluminum phosphide (Phostoxin<sup>R</sup>) in conjunction with the PL480 Title II, Section 206 Cape Verde Food for Development Program.

#### The USEPA Registration Status of the Requested Pesticides

Malathion (premium grade) is registered by the USEPA without restriction for the intended use. Aluminum phosphide (Phostoxin and others) is registered by the USEPA for the intended use, but carries a restriction based on user hazard, requiring adequate training for fumigation crews as well as adequate safety equipment.

#### The Basis for Selection of the Requested Pesticide(s)

Malathion (premium grade) and aluminum phosphide were selected on the basis of USEPA registration for use in protection of stored grain.

#### The Extent to which Proposed Pesticides are Part of an Integrated Pest Management Program

The proposed pesticides will be used to treat and protect bagged grain inside isolated warehouses and bulk grain in silos. Efforts to protect stored grains from deterioration due to insects and other pests have commonly stressed an integrated approach to pest management. Frequent and thorough cleaning of storage facilities reduces the necessity for frequent pesticide applications and makes the pesticides applied more effective. Preventive treatments by pesticide treatment of storage facilities reduces the necessity for use of the restricted aluminum phosphide fumigants.

The Proposed Method on Methods of Application, Including Availability of Appropriate Application and Safety Equipment

Premium grade malathion is available as emulsifiable concentrates (EC) or dust formulations. EC formulations are diluted with water and then applied with backpack or pump-type sprayers to treat walls and floors of warehouses or silo storage facilities. Premium grade malathion EC and dust formulations are also registered for direct application to cereal grains. It is possible this form of treatment would be used when corn is received for storage in bulk in the new port silo in Praia. Application should be made according to label directions.

Aluminum phosphide is a fumigant in solid form which, when exposed to moisture in the atmosphere, generates hydrogen phosphide (phosphine) gas. Aluminum phosphide fumigant formulations are available as pellets, tablets or in paper sachets. Each pellet contains 0.2 grams of phosphine; each tablet 1 gram and each sachet 11 grams. Tablets or sachets are distributed over the surfaces of bags for fumigation of bags of grain in stacks. Gas tight tarpaulins are placed over the stacks of bags as the tablets or sachets are dispersed. Sand snakes seal the tarpaulin to the floor to form a gas tight chamber for 72 hours. After the exposure period tarpaulins are removed and the grain is aerated. Appropriate tarpaulins and safety equipment will be made available for fumigators including gas masks and canisters and gas detectors. Pellets will be applied by automatic applicator units in the new silos for bulk storage.

Any Acute and Long-Term Toxicological Hazards, Either Human or Environmental, Associated with the Proposed Use and Measures Available to Minimize such Hazards

There are no known long-term toxicological hazards associated with the pesticides.

Malathion has low mammalian toxicity both orally and dermally and is one of the safest pesticides available.

Hydrogen phosphide gas is acutely toxic when inhaled, however, delayed generation of the gas during application and training in the use of safety equipment prevents exposure to toxic concentration of the gas.

The Effectiveness of the Requested Pesticide for the Proposed Use

The pesticides proposed for use have been shown to be effective for their intended use through research and acceptance of them for protection of stored grain.

Compatibility of the Proposed Pesticide(s) with Target and Non-Target Ecosystems

The proposed pesticides are compatible with the target pests, and no non-target pests or ecosystems are involved.

The Conditions Under Which the Pesticide(s) is to be Used

The pesticides will be used inside grain warehouses and will not affect any flora, fauna, water sources, soil or other natural resources.

The Availability and Effectiveness of Other Pesticides or Non-Chemical Control Methods

The proposed pesticides are the most effective for the purpose, and no non-chemical control method is available for protection of bagged or bulk stored grain. Non-chemical means, such as housekeeping will be used to increase the effectiveness of the pesticides and minimize their use.

The Requesting Country's Ability to Regulate or Control the Distribution, Storage, Use and Disposal of the Requested Pesticide

All pesticides used by EMPA are controlled by the chief of the technical group of EMPA. He is assisted by four technicians trained in handling pesticides.

Separate storage areas are provided at warehouse locations for storage of insecticides. Fumigants are stored at some warehouse locations but transported to the small warehouses as needed.

Insecticides used for treatment of warehouses are applied by warehouse men who have been trained and are provided instructions in their use by the technical group of EMPA.

Fumigations of grain are conducted only by a trained team from the EMPA main office in Praia.

The Provisions Made for Training of Users and Applicators

The German agency for technical cooperation (GTZ) which has supplied pesticides and equipment for application and safety, conducted a training seminar in Praia in early 1981 and later in 1981 provided training at other warehouse locations in Cape Verde. Another training program was done in 1983 by this same agency. Further training in malathion utilization will be done by the project before actual use of the pesticide.

The Provisions Made for Monitoring The Use and Effectiveness

Monitoring the use of pesticides is accomplished by the technical group of EMPA. Monitoring the effectiveness of the pesticides is determined by warehouse manager requests for additional treatment.

B/G Request for Assistance

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. 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

2. 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

3. FAA Sec. 620(e)(1). Is 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
4. FAA Sec. 532(c), 620(a), 620(f), 620D; FY 1982 Appropriation Act Secs. 512 and 513. Is recipient country a Communist country? Will assistance be provided to Angola, Cambodia, Cuba, Laos, Vietnam, Syria, Libya, Iraq, or South Yemen? Will assistance be provided to Afghanistan or Mozambique without a waiver? No
5. ISDCA of 1981 Secs. 724, 727 and 730. For specific restrictions on assistance to Nicaragua, see Sec. 724 of the ISDCA of 1981. For specific restrictions on assistance to El Salvador, see Secs. 727 and 730 of the ISDCA of 1981. N/A
6. 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

7. FAA Sec. 620(l). Has the country failed to enter into an agreement with OPIC? Yes
8. FAA Sec. 620(o); Fishermen's Protective Act of 1967, as amended, Sec. 5. (a) Has the country seized, or imposed any penalty or sanction against, any U.S. fishing activities in international waters? No
- (b) If so, has any deduction required by the Fishermen's Protective Act been made?
9. FAA Sec. 620(q); FY 1982 Appropriation Act Sec. 517. (a) Has the government of the recipient country been in default for more than six months on interest or principal of any AID loan to the country? (b) Has the country been in default for more than one year on interest or principal on any U.S. loan under a program for which the appropriation bill appropriates funds? No
10. FAA Sec. 620(s). If contemplated assistance is development loan or from Economic Support Fund, has the Administrator taken into account the amount of foreign exchange or other resources which the country has spent on military equipment? (Reference may be made to the annual "Taking into N/A

Consideration" memo:  
"Yes, taken into account  
by the Administrator at  
time of approval of  
Agency OYB." This  
approval by the  
Administrator of the  
Operational Year Budget  
can be the basis for an  
affirmative answer during  
the fiscal year unless  
significant changes in  
circumstances occur.)

11. 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

12. FAA Sec. 620(u). What is  
the payment status of the  
country's U.N.  
obligations? If the  
country is in arrears,  
were such arrearages  
taken into account by the  
AID Administrator in  
determining the current  
AID Operational Year  
Budget? (Reference may  
be made to the Taking  
into Consideration memo.)

Unknown

13. FAA Sec. 620A; FY 1982  
Appropriation Act Sec.  
520. 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

No

abetted, by granting sanctuary from prosecution to, any individual or group which has committed a war crime?

14. 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

15. FAA Sec. 669, 670. Has the country, after August 3, 1977, delivered or received nuclear enrichment or reprocessing equipment, materials, or technology, without specified arrangements or safeguards? Has it transferred a nuclear explosive device to a non-nuclear weapon state, or if such a state, either received or detonated a nuclear explosive device, after August 3, 1977? (FAA Sec. 620E permits a special waiver of Sec. 669 for Pakistan.) No

16. ISDCA of 1981 Sec. 720. Was the country represented at the Meeting of Ministers of Foreign Affairs and Heads of Delegations of the Non-Aligned Countries to the 36th General Session of the General Assembly of the U.N. of Sept. 25 and 28, 1981, and failed Unknown

to disassociate itself from the communique issued? If so, has the President taken it into account? (Reference may be made to the Taking into Consideration memo.

17. ISDCA of 1981 Sec. 721.  
See special requirements for assistance to Haiti.

N/A

B. FUNDING SOURCE CRITERIA FOR COUNTRY ELIGIBILITY

. Development Assistance Country Criteria.

a. 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. Economic Support Fund Country Criteria

a. FAA Sec. 502B. Has it been determined that the country has engaged in a consistent pattern of gross violations of internationally recognized human rights? If so, has the country made such significant improvements in its human rights record that furnishing such assistance is in the national interest?

N/A

b. ISDCA of 1981, Sec. 725(b). If ESF is to be furnished to Argentina, has the President certified that (1) the Govt. of Argentina has made significant progress in human rights; and (2) that the provision of such assistance is in the national interests of the U.S.?

c. ISDCA of 1981, Sec. 726(b). If ESF assistance is to be furnished to Chile, has the President certified that (1) the Govt. of Chile has made significant progress in human rights; (2) it is in the national interest of the U.S.; and (3) the Govt. of Chile is not aiding international terrorism and has taken steps to bring to justice those indicted in connection with the murder of Orlando Letelier?

N/A

N/A

5C(2) PROJECT CHECKLIST

Listed below are statutory criteria applicable to projects. This section is divided into two parts. Part A. includes criteria applicable to all projects. Part B. applies to projects funded from specific sources only: B.1. applies to all projects funded with Development Assistance Funds, B.2. applies to projects funded with Development Assistance loans, and B.3. applies to projects funded from ESF.

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

A. GENERAL CRITERIA FOR PROJECT

1. FY 1982 Appropriation Act Sec. 523; FAA Sec. 634A; Sec. 653(b).

(a) Describe how authorizing and appropriations committees of Senate and House have been or will be notified concerning the project; (b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than \$1 million over that amount)?

(a) Congressional Presentation  
Congressional Notification

(b) Yes

2. FAA Sec. 611(a)(1). Prior to obligation in excess of \$100,00, will there be

(a) engineering, financial or 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?

No further legislative action is required.

4. FAA Sec. 611(b); FY 1982 Appropriation Act 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? (See AID Handbook 3 for new guidelines.)

Yes

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 to 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.
  
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.
  
8. FAA Sec. 601(b). Information and conclusions 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).

No

Because of the uniqueness of Cape Verde topography, no other African country has similar problem.

Approximately \$2.3 million in commodities will be purchased under this project; mostly in the U.S.

9. FAA Sec. 612(b), 636(h);  
FY 1982 Appropriation  
Act Sec. 507. 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.
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?
11. FAA Sec. 601(e). Will  
the project utilize  
competitive selection  
procedures for the  
awarding of contracts,  
except where applicable  
procurement rules allow  
otherwise?
12. FY 1982 Appropriation Act  
Sec. 521. 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 is such  
assistance likely to  
cause substantial injury  
to U.S. producers of the  
same, similar or  
competing commodity?
13. FAA 118(c) and (d).  
Does the project comply  
with the environmental  
procedures set forth in  
AID Regulation 16? Does

The GOCV will provide fuel and maintenance to project vehicles, and logistic support to technical assistance. Office space and personnel for project implementation are also being provided.

Yes

N/A

Yes

the project or program take into consideration the problem of the destruction of tropical forests?

N/A

- 14. FAA 121(d). If a Sahel project, has a determination been made that the host government has an adequate system for accounting for and controlling receipt and expenditure of project funds (dollars or local currency generated therefrom)?

Yes

**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

(a) The project will provide employment to the poorest of the poor at a level of 6,000 persons/year over the Life of Project. The income earned through the project provides direct access to the local economy, is of a labor-intensive nature, and will have 2 measurable 'spread effect'.

(b) The inclusion of an extension specialist in this project addresses the issue of community organization within the project area.

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?

b. FAA Sec. 103, 103A, 104, 105, 106. Does the project fit the criteria for the type of funds (functional account) being used?

c. FAA Sec. 107. Is emphasis 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)?

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 is the latter cost-sharing requirement being waived for a "relatively least developed" country)?

(c) The GOCV feels strangely that people, regardless of how poor, should earn and produce. Hence, the value of labor-intensive, employment-generating nature.

(d) Women are employed and paid on an equal pay for equal work basis.

(e)

Yes

Yes

Cape Verde is a RLDC and the cost sharing requirement is being waived, although the GOCV will finance as much as possible of project costs.

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"? (M.O. 1232.1 defined a capital project as "the construction, expansion, equipping or alteration of a physical facility or facilities financed by AID dollar assistance of not less than \$100,000, including related advisory, managerial and training services, and not undertaken as part of a project of a predominantly technical assistance character."

Yes

Cape Verde is a RLDC.

f. 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

g. 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

The vast majority of rural labor will be building structures to avert soil erosion, utilizing skills in masonry which are well developed in Cape Verde. A professional-training component, valued at \$750,000 over the LOP, will address the intellectual resources of their country.

institutional development;  
and supports civil  
education and training in  
skills required for  
effective participation in  
governmental processes  
essential to self-government.

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

c. ISDCA of 1981, Sec. 724  
(c) and (d). If for  
Nicaragua, does the loan  
agreement require that the  
funds be used to the  
maximum extent possible for  
the private sector? Does  
the project provide for  
monitoring under FAA Sec.  
624(g)?

N/A

3. Economic Support Fund  
Project Criteria

a. FAA Sec. 531(a). Will  
this assistance promote  
economic or political

N/A

- stability? To the extent possible, does it reflect the policy directions of FAA Section 102? N/A
- b. FAA Sec. 531(c). Will assistance under this chapter be used for military, or paramilitary activities? N/A
- c. FAA Sec. 534. Will ESF funds be used to finance the construction of the operation or maintenance of, or the supplying of fuel for, a nuclear facility? If so, has the President certified that such use of funds is indispensable to nonproliferation objectives? N/A
- d. 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

### 5C(3) - STANDARD ITEM CHECKLIST

Listed below are the statutory items which normally will be covered routinely in those provisions of an assistance agreement dealing with its implementation, or covered in the agreement by imposing limits on certain uses of funds.

These items are arranged under the general headings of (A) Procurement, (B) Construction, and (C) Other Restrictions.

#### A. Procurement

1. FAA Sec. 602. Are there arrangements to permit U.S. small business to participate equitably in the furnishing of commodities and services financed?
2. FAA Sec. 604(a). Will all procurement be from the U.S. except as otherwise determined by the President or under delegation from him?
3. FAA Sec. 604(d). If the cooperating country discriminates against marine insurance companies authorized to do business in the U.S., will commodities be insured in the United States against marine risk with such a company?
4. FAA Sec. 604(e); ISDCA of 1980 Sec. 705(a). If offshore procurement of agricultural commodity or product is to be

Yes

Yes

The Cape Verdean government does not discriminate against U.S. marine insurance companies.

N/A

financed, is there provision against such procurement when the domestic price of such commodity is less than parity? (Exception where commodity financed could not reasonably be procured in U.S.)

5. FAA Sec. 604(g). Will construction or engineering services be procured from firms of countries otherwise eligible under Code 941, but which have attained a competitive capability in international markets in one or these areas?

Unknown

6. FAA Sec. 603. Is the shipping excluded from compliance with requirement in section 901(b) of the Merchant Marine Act of 1936, as amended, that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and tankers) financed shall be transported on privately owned U.S. flag commercial vessels to the extent that such vessels are available at fair and reasonable rates?

No

Although, due to the competitive advantage of the Cape Verdean shipping company, most commodities will be shipped by the C.V. shipping company which has cheaper rates and faster (direct) service to C.V. from the U.S.

7. FAA Sec. 621. If technical assistance is financed, will such assistance be furnished by private enterprise on a contract basis to the fullest extent practicable? If the facilities of other

Yes

Federal agencies will be utilized, are they particularly suitable, not competitive with private enterprise, and made available without undue interference with domestic programs?

8. International Air Transport. Fair Competitive Practices Act, 1974. If air transportation of persons or property is financed on grant basis, will U.S. carriers be used to the extent such service is available?

Yes

9. FY 1982 Appropriation Act Sec. 504. If the U.S. Government is a party to a contract for procurement, does the contract contain a provision authorizing termination of such contract for the convenience of the United States?

Yes

B. Construction

1. FAA Sec. 601(d). If capital (e.g., construction) project, will U.S. engineering and professional services to be used?

Yes, to the extent that local C.V. firms (or government) are unable to provide the engineering and professional services.

2. FAA Sec. 611(c). If contracts for construction are to be financed, will they be let on a competitive basis to maximum extent practicable?

Yes

3. FAA Sec. 620(k). If for construction of productive enterprise, will aggregate value of assistance to be furnished by the U.S. not exceed \$100 million (except for productive enterprises in Egypt that were described in the CP)?

Yes

C. Other Restrictions

1. FAA Sec. 122(b). If development loan, is interest rate at least 2% per annum during grace period and at least 3% per annum thereafter?

N/A

2. FAA SEC. 301(d). If fund is established solely by U.S. contributions and administered by an international organization, does the Comptroller General have audit rights?

N/A

3. FAA Sec. 620(h). Do arrangements exist to insure that United States foreign aid is not used in a manner which, contrary to the best interests of the United States, promotes or assists the foreign aid projects or activities of the Communist-bloc countries?

Yes

4. Will arrangements preclude use of financing:

a. FAA Sec. 104(f); FY 1982 Appropriation Act Sec. 525: (1) To pay for performance of abortions as a method of family

N/A (yes)

planning or to motivate or coerce persons to practice abortions; (2) to pay for performance of involuntary sterilization as method of family planning, or to coerce or provide financial incentive to any person to undergo sterilization; (3) to pay for any biomedical research which relates, in whole or part, to methods or the performance of abortions or involuntary sterilizations as a means of family planning; (4) to lobby for abortion?

b. FAA Sec. 620(g). To compensate owners for expropriated nationalized property?

Yes

c. FAA Sec. 660. To provide training or advice or provide any financial support for police, prisons, or other law enforcement forces, except for narcotics programs?

Yes

d. FAA Sec. 662. For CIA activities?

Yes

e. FAA Sec. 636(i). For purchase, sale, long-term lease, exchange or guaranty of the sale of motor vehicles manufactured outside U.S., unless a waiver is obtained?

Yes

f. FY 1982 Appropriation Act, Sec. 503. To pay pensions, annuities, retirement pay, or

Yes

adjusted service  
compensation for military  
personnel?

g. FY 1982 Appropriation  
Act, Sec. 505. To pay  
U.N. assessments,  
arrears or dues?

Yes

h. FY 1982 Appropriation  
Act, Sec. 506. To carry  
out provisions of FAA  
section 209(d) (Transfer  
of FAA funds to  
multilateral  
organizations for  
lending)?

Yes

i. FY 1982 Appropriation  
Act, Sec. 510. To  
finance the export of  
nuclear equipment, fuel,  
or technology or to train  
foreign nationals in  
nuclear fields?

Yes

j. FY 1982 Appropriation  
Act, Sec. 511. Will  
assistance be provided  
for the purpose of aiding  
the efforts of the  
government of such  
country to express the  
legitimate rights of the  
population of such  
country contrary to the  
Universal Declaration of  
Human Rights?

Yes

k. FY 1982 Appropriation  
Act, Sec. 515. To be  
used for publicity or  
propaganda purposes  
within U.S. not  
authorized by Congress?

Yes