XD-ABB-818-A

FINAL PROJECT EVALUATION

THE SOUTH COAST AGRICULTURAL DEVELOPMENT PROJECT
No. 657-0010

Prepared for:

The U.S. Agency For International Development
Bissau, Guinea-Bissau

by

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EXPERIENCE inc.

ANNEX II. FAO, 1984 GENERAL DATA OF PROPOSED DAM SITES

Southern Region, Guinea Bissau

Site	Main Watercourse	Region	Catchment	High Lands	Low Lands	Bolanha	Mangrove
1 Gantumane	Manhima	Quinara	670	430	240	10	230
2 Gamamaduba	Caju	Embpada	710	440	270	40	230
3 Somba	Camaga	Embpada	1,070	670	400	180	220
4 Dartsatame *	Buguetim	Embpada	410	240	170	8	162
5 Marateba *	Marateba	Embpada	630	360	300	60	210
6 Pobresa	Tambual	Empbada	530	230	300	180	120
7 Cachobar	Buloba	Embpada	700	430	270	140	130
8 Ianque	Indaba	Embpada	950	590	360	180	180
9.1C de Baixo 1	Biama	Embpada	1,290	1,000	290	160	130
9.2C de Baixo 2	Biama	Embpada	590	430	160	90	70
10. Sao Miguel	Reminche	Embpada	1,620	1,180	440	250	190
11. Gandua B	Tomba	Catio	1,090	780	310	160	150
12. Catema B *	Cabasse	Catio	660	350	310	50	260
13. Cansala	Cansala	Catio	540	300	240	150	90
14. Santana	Caiche	Catio	590	280	310	110	200
15. Incomene 2	Cadecane	Catio	1,200	810	390	210	180
16. Gansona Chumgueque	Camere	Catio	760	220	540	310	230
17. Ganj. Porto	Cantolom	Catio	920	570	540	300	240
18. Cangalai	Cachombe	Catio	3,030	2,040	990	640	350
19. Cubaque	Cangula	Catio	630	360	270	110	160
20. Cachaque *	Catataque	Catio	1,023	400	620	270	350
21. Caduco	Malaba	Catio	1,070	440	630	230	400
22. BocheMende	Manterunge	Catio	1,140	430	710	180	530
23. Cabolol	Camaquebom	Catio	1,130	500	630	110	520
24. Chuque	Neganto	Catio	2,100	1,380	720	310	410
25. Cabedu 1	Ualche	Bedanda	2,170	1,150	1,020	140	880
26. Cabedu 2	Ualche	Bedanda	NA				
27. Cafal B.	Bom	Bedanda	640	320	320	160	160
28. S. Clara	Dem	Bedanda	1,170	600	570	20	550
29. Flaque Inja	Jufolel	Bedanda	1,830	750	1,080	310	770
30. Cabanta	Pachica	Bedanda	740	380	360	0	360
31. Cassaca	Tompere	Cacine	4,190	1,870	2,320	890	1,430
32. Cabonepo	Poxiuco	Cacine	780	430	350	0	350
33. Bonia 2	Tunfim	Cacine	650	420	230	0	230
34. Bonia 1	Lquebal	Cacine	290	180	110	10	100
		TOTAL (34 sites)	**37,513**	**20,960**	**16,740**	**5,968**	**10,772**

*Sites dropped during project design

Source: Soil survey of estuarium valleys for reclamation of rice fields in regions Tombali and Quinara, South Guinea Bissau.

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EXECUTIVE SUMMARY

Title: **Final Evaluation of the South Coast Agricultural Development Project (657-0010)**

For: **U.S. Agency for International Development, Bissau, Guinea-Bissau**

Date: **March 1990**

The problems of the South Coast Agricultural Development Project began with the failure in project design process to program architectural and engineering costs and continued with inadequate attention from project management until recently. The mission still lacks adequate personnel to support the activities of its current portfolio. The first recommendation of the evaluation team is that USAID close out direct involvement in the SCAD project as of the PACD in September, 1990.

Donor coordination among the three major contributors to the development of Catio Center and its dam construction activities has been poor. The net result is that GOGB has a very costly infrastructure in Catio which cannot be justified by dam construction alone. The number of potential dam sites is evidently lower than originally envisioned and hydraulic inefficiencies remain unresolved due primarily to lack of technical assistance. The TA programmed by USAID was delayed for lack of housing because planned construction fell behind schedule. Other donors and lenders and GOGB augmented the infrastructure of Catio far beyond original expectations. Had the scale of the project remained within bounds, perhaps it could have been justified by the dam construction and land reclamation activities as originally planned.

No dams have yet been completed, although five or six are lacking only final touches and installation of cutoff valves to check entry of brackish water at high tide. It does appear that benefits to dam construction will be positive, even from a strict financial point of view, if total Center investments are not charged to dam construction on a proportional basis.

The dilemma facing AID, GOGB and the other donors and lenders is how to justify the enormous investments already sunk in Catio Center. Without donor support, the Center is sure to fail, probably within a year. The evaluation team estimates that the Center could continue operations for an additional four to six years with unearmarked AID project funds if the other major donor, FAO/Kuwait, is willing to continue its participation with matching funds, technical assistance and project management. This implies gambling with remaining project funds. The team recommends taking the chance if GOGB is willing to face the

issues of recurring costs, adequate allocation of personnel and other resources, and if reasonable plans for the continued use of Catio Center beyond dam construction can be devised in the interim. Another critical condition is the predisposition of other donors and lenders to cooperate. As further AID direct involvement is not recommended, available funds should be granted to FAO for continuation of the project. Some funds could be set aside for training under the management of a PVO. It is conceivable that Catio Center could be converted in the next few years into a multipurpose regional development center which could more than justify its investment through service to future development activities.

FINAL EVALUATION OF THE SOUTH COAST AGRICULTURAL DEVELOPMENT PROJECT (SCAD) 657-0010

I. Introduction

A. Background

1. The Country

Guinea Bissau is a country of about 930,000 people and 35,000 square kilometers on the coast of West Africa. Per capita annual income is very low (US$170-180), infant mortality is high (about 180/1000) and life expectancy is variously estimated at from 38 to 45 years. A high proportion of the mostly rural (75%) population are subsistence farmers. Annual rainfall in Catio, the center of the project area, was 2560 mm between 1946-1967. Annual averages now are closer to 2000 mm.

Guinea Bissau gained independence in 1974 after a debilitating war which destroyed a substantial part of its infrastructure, dislocated a large portion of the population and reduced crop production by about one third. The economy suffered further declines after the war due to inappropriate pricing policies, mismanagement and an inefficient marketing system. After a largely ineffective recovery program launched in 1983, the Government of Guinea Bissau (GOGB) initiated a structural adjustment program in late 1986 which has been judged generally successful. GDP, exports and private consumption are up and the budget deficit has declined, due largely to economic liberalization and fiscal restraint.

Rice is the major crop in Guinea Bissau and the staple of the Guinea diet, with an annual per capita consumption of around 165 kilograms. Although Guinea Bissau was a net exporter of rice before the war, it has had to import about 30,000 tons annually in the past few years.

2. The Project

U.S. assistance to Guinea Bissau began with food aid in 1976. See Table 1 for a summary of recent and current projects.

The South Coast Agricultural Development (SCAD) project was initiated in July, 1983 as part of the AID strategy of increasing rice production. The original Project Paper (PP) was amended in November, 1988 to revise the Financial Plan (see Table 2) and extend the Project Activities Completion Date (PACD). The original PACD was 31 August 1989, Project Implementation Letter (PIL) No. 5 extended the PACD to 31 March 1990 and PIL No. 7 extended the PACD to 30 September 1990.

Table 1. USAID/BISSAU Portfolio

Project Number	Project Designation	PACD
	Ongoing Projects:	
657-0010	South Coast Agricultural Development	9/90
657-0011	Technical Skills	3/90
657-0012	Food Crop	9/90
657-7607	PL 480	NA
698 0433.57	AMDP	9/91
698-0455.57	AFGRAD	9/94
698-0462.57	Family Health	12/88
	1990 Planned Obligations:	
657-0013	Ag. Sector Assistance	
657-0014	Vocational Agriculture	
657-0016	Ag. Sector Assistance Monitoring	
698-0506.57	Peace Corps Small Projects Assistance	
698-0510.57	PD&S	
698-9801.57	Embassy Human Rights Fund	
698-9901.57	Embassy Self-Help Project	

Source: USAID Documents

The SCAD project underwent a mid-term evaluation in late 1987 which raised serious questions about the project but nevertheless recommended continuation and extension of the PACD from September, 1989 to September, 1990. Some of the concerns were:

- incompatibility of systems being installed with traditional systems.
- excessive recurrent costs.
- validity of technical design.
- ecological soundness vis-a-vis the mangrove swamp ecosystem.
- differences in the technical approach to water control by the various donors.
- economic/financial concerns regarding overestimated benefits and underestimated costs which could render the project unacceptable as an investment.

These concerns were quite legitimate and are addressed in this report. Overall mission strategy was reviewed in mid-1988 by REDSO/WCA.

The Strategy Review Team concluded that project management requirements for SCAD were more than the USAID could provide and that expected benefits would likely fall short of design projections. They recommended that project objectives be limited to establishing a fully-equipped and functioning Center at Catio and a fully-equipped soils laboratory in Bissau, and that the PACD not be extended except for participants already in training. The team recommended that "AID bring its involvement in the South Coast Rice project to an orderly end." They noted that SCAD provided more facilities in Catio and more training than originally called for in the project design, and that other donors were capable of providing the remaining technical assistance required. The recommendation regarding the soils lab was not implemented.

B. Goal Structure

1. Program Goals and Strategies

The FY 1983 Small Program Strategy Statement (SPSS) focussed on the rural poor with the stated objectives of (1) increasing food production and the attainment of food self-sufficiency including forestry management and artesanal fisheries and (2) human resource development. The current program strategy was expounded in the FY 1989 Congressional Presentation (CP) as promoting agricultural development and food production through policy reform, institution building, technology transfer and the development of the private sector. Specifically, the program aims to increase the local production of rice, raise producer prices and encourage exports. Evolution of program goals is discussed in the "Limited" Country Development Strategy Statement of December, 1989. A full-scale strategy review was under way at the time of this evaluation but results were not available.

The sector goal to which the SCAD project contributes is to increase rice production in the mangrove tidal lowlands of southern Guinea Bissau.

2. Project Objectives

The purpose of SCAD is to strengthen the institutional capacity of the Ministry of Agriculture and Rural Development (MDRA) and its Department of Agricultural Hydraulics and Soils (DHAS) to promote and facilitate the extension of south coastal rice production areas through improved water control structures and water management practices. SCAD is helping DHAS to establish a regional Center at Catio which is expected to facilitate construction of tidal water control structures for reclaiming land and improving water management techniques. The Logical Framework in the Project Paper for the SCAD project states the project purpose as:

> "To strengthen an institutional capability in the Department of Agricultural Hydraulics & Soils to promote & facilitate the extension of south coastal rice

production areas through improved water control structures & water management practices"

Project components of the original PP were to be:

- Construction of the Catio Regional Center which was envisioned as a support facility for limited construction activities.
- Organization of a maintenance/repair facility for vehicles and heavy equipment at the Catio Center.
- Improvement of water management technologies (technical assistance).
- Improvement of water control structures (technical assistance).
- Short and long term training.

As noted above, the technical assistance component was not carried through. Delays in housing construction pushed back the time-frame and the Strategy Review recommended that the TA component be scaled back considerably. See Section II.A.1. The original PP budget contained $2,227,000 for TA. The Comprehensive Pipeline Report shows that $500,000 has been earmarked and $380,533 committed for TA and that $178,861 had been disbursed as of end of February, 1989.

C. Evaluation Methodology

The evaluation was conducted by a three person team under Work Order #3 of REDSO/WCA IQC 624-0510-I-00-9039-00 with Experience, Inc. Efforts were made to comply with the USAID Mission request for a brief, concise report. The evaluators were Gerald P. Owens, economist and team leader; Robert Pierce, hydrologist and Harvel Sebastian, anthropologist. The team leader spent three days in Washington in consultation with AID personnel and collecting documents. The full team arrived in Guinea Bissau on 25 February, 1990. The evaluation Scope of Work laid out the topics for evaluation. A detailed report outline was developed in the first few days and reviewed by the USAID Project Manager. The first week was spent in Bissau City reviewing documents and interviewing GOGB officials, USAID employees and members of other short-term teams which were fortuitously in country at the time. The second week was spent at Catio conducting interviews with Center personnel, field trips to bolanhas and tabancas in the project area and on field impact surveys of the target population. The locations visited and their map site designations are as follows:

1. Cabolol - DHAS barrage
2. Cubaque - DHAS barrage
3. Matofarroba - village (tabanca)
4. Gandua - DHAS barrage

5. Ca Balanta - Pre project barrage built by DHAS in 1981
8. Ganjola - DHAS barrage under construction

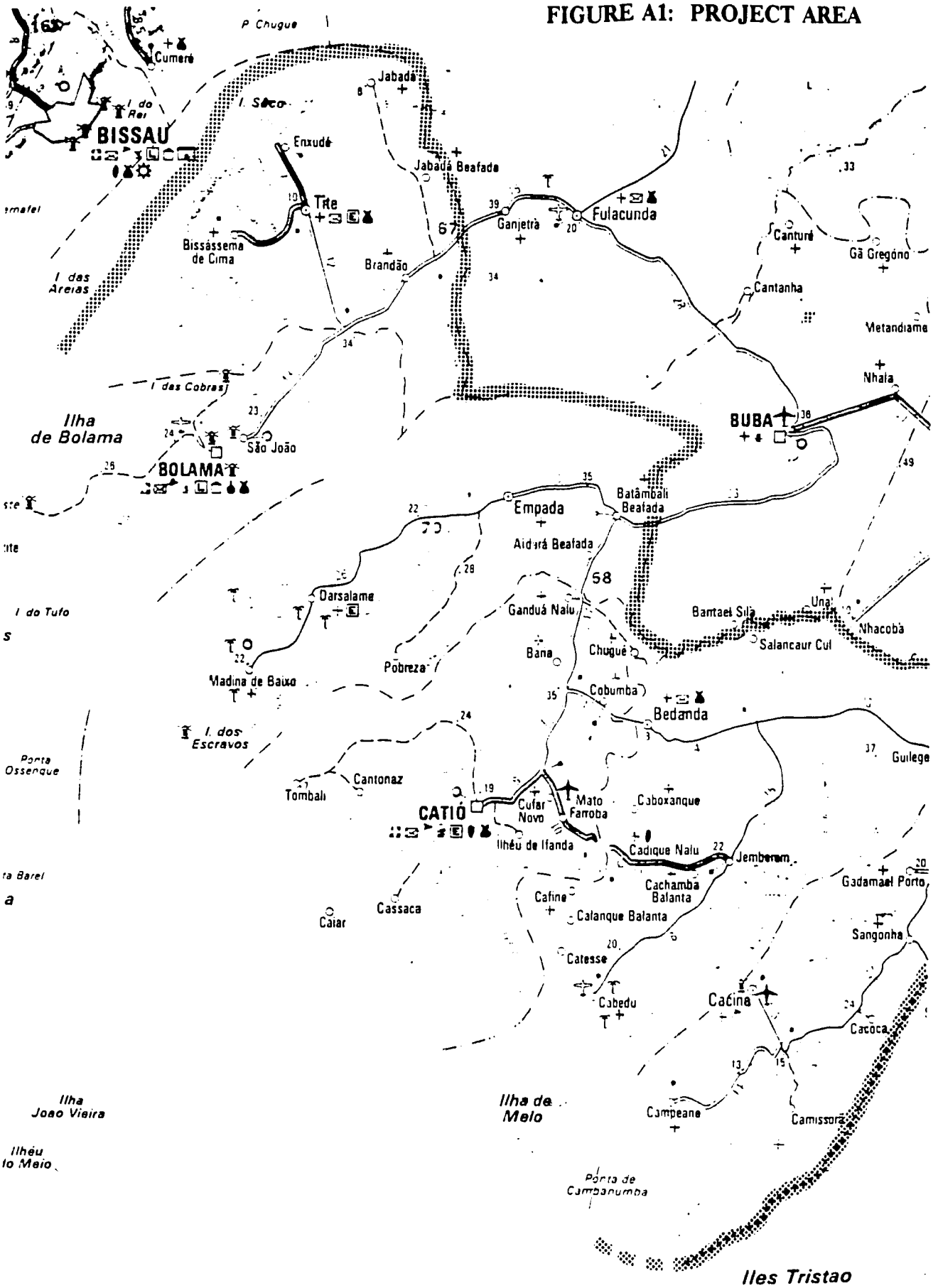
The project area is defined as the Catio, Cacine, and Bedanda, sectors of Tombali Region and the Tite and the Empada sectors of Quinara Region. See map, Figure A. The third and fourth weeks were spent in Bissau City on report writing and additional interviews. A draft report was presented to USAID four days before departure on 25 March 1990. The report was finalized in Washington, taking account of the USAID comments, and translated to Portuguese.

D. Physical Description and Background - Catio Center

The construction of the MDRA Center at Catio was financed by three different projects. USAID provided funding through an architectural and engineering contract to Louis Berger International, Inc. and a construction contract with the Portuguese firm SOMEC to build two office buildings, repair bays, a parts warehouse, a machine shop, and five housing units for DHAS employees and expatriate advisors. The FAO/Kuwait project contracted with a local construction cooperative to build two unit houses for their technicians and experts. IFAD/ADB has also provided funds under a loan to the GOGB for three equipment hangars and a warehouse to complement the repair shop. In addition, five houses each with two units, two guest houses, a cultural center, and a training facility are under construction to support extension and training activities and house MDRA employees and project technicians. Soares de Costa, a Portuguese construction company, is under contract through the ADB loan to build this large addition to the Catio Center. The overall scheme for Catio Center is shown in the engineering drawing General Layout Plan; Agricultural Center of Catio; Louis Berger International, Inc., which was updated for the evaluation team by DHAS to show recent changes.

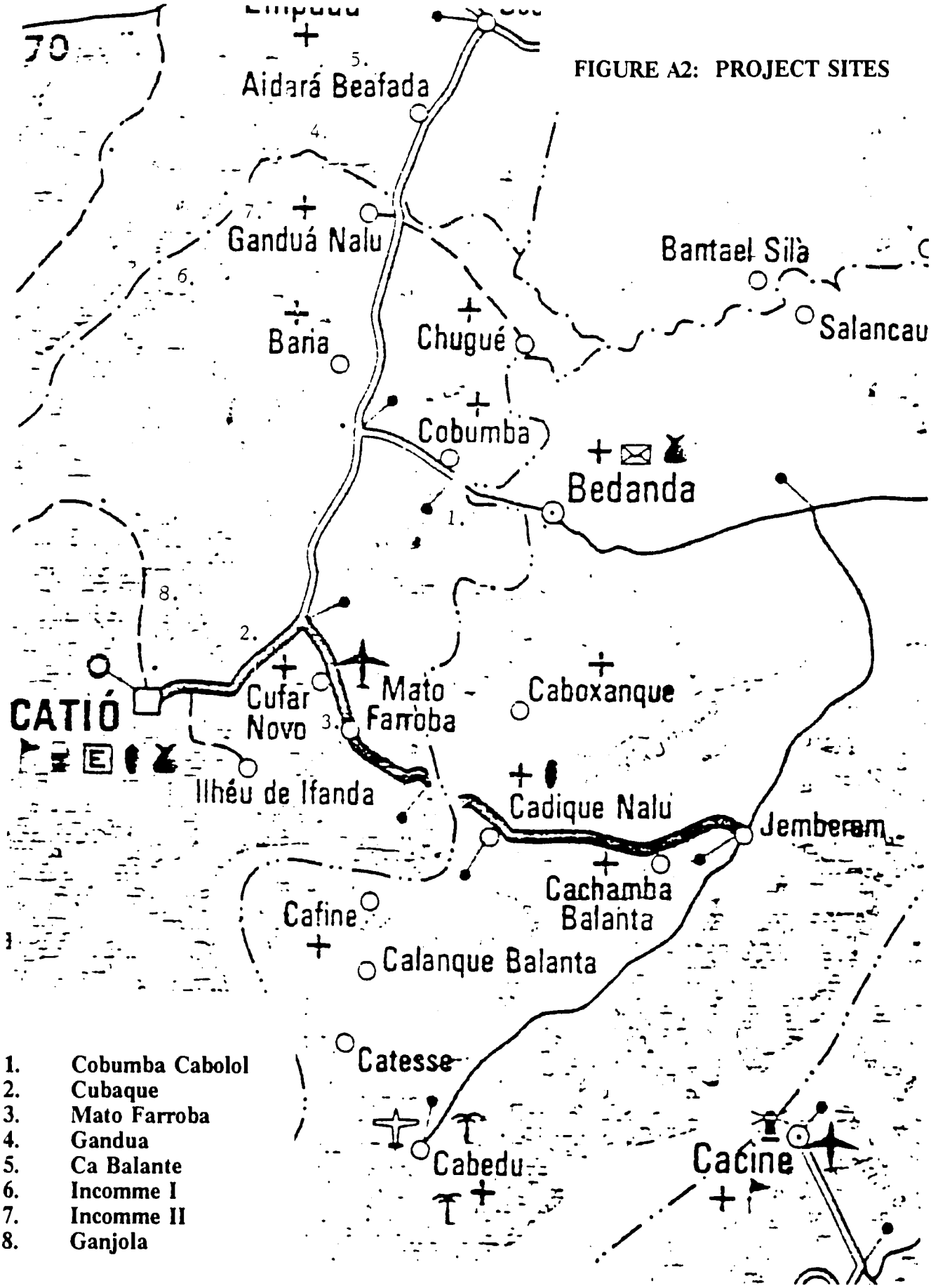
When completed the fenced-in Catio Center will thus have two office buildings, a guard post and gate, 19 family housing units, two large guest houses, a first class garage with multiple repair bays, a parts warehouse, a machine shop, three heavy equipment storage hangars, a warehouse, cultural center, an extension training center and three generator power houses. All of this construction has been a source of confusion and a cause for concern to USAID because it was not envisioned in the original conceptualization for the Center and decisions regarding expansion were not made cooperatively among donors and GOGB. The offices and houses are built to a high standard except for the fact that they require air conditioning for comfort. Electrical power will be supplied using 3 different generators and water will be supplied from one well which creates a situation in which the Center may be without water for some time in the event of problems with the single well. The GOGB on its own would be hard pressed to sustain even the USAID financed part of the Center much less the new addition still under construction. The Director of DHAS has given a great deal of thought to this problem nd has prepared a document with a few recommendations for recouping operational costs. See Section II.D., Recurrent Costs and Sustainability.

FIGURE A1: PROJECT AREA



Source: Mapa Administrativa Da República Da Guiné - Bissau

FIGURE A2: PROJECT SITES



1. Cobumba Cabolol
2. Cubaque
3. Mato Farroba
4. Gandua
5. Ca Balante
6. Incomme I
7. Incomme II
8. Ganjola

Source: Mapa Administrativa Da República Da Guiné - Bissau

II. Financial, Economic, Administrative and Institutional Aspects

A. Comparison of Inputs Planned and Implemented

Table 2 is a comparison of the original Project Paper (July 1983) budget with the budget as modified by the Project Paper Supplement (approved November 1988). Table 2 also shows obligations, commitments, disbursements and a summary of unliquidated and unearmarked balances as of February 28, 1990 according to the Comprehensive Pipeline Report for that date.

Major changes, communicated to the GOGB via PIL No. 4 of 12 December 1988, were a large reduction in the line item for Technical Assistance and the addition of $700,000 for architectural and engineering services which were overlooked in the original budget but noted in the Grant Agreement. The training budget was augmented significantly but only about half has been committed and even less disbursed. Four trainees have not yet returned from abroad. The commodity budget was increased from $1,032,000

Table 2. Financial Analysis South Coast Agricultural Development Project - Final Evaluation - March 1990

	BUDGETS		CPR 2/28/90		
ITEM	PROJECT PAPER	PROJ. PAPER SUPPLEMENT	OBLIGATED	COMMITTED	DISBURSED 2/28/90
Construction	1,330,000	2,188,000	2,188,374	2,161,131	2,146,064
Commodities	1,032,000	1,300,000	1,300,000	977,062	401,738
Tech. Assistance	2,227,000	500,000	500,000	380,533	178,861
Training	58,000	900,000	900,000	466,199	367,427
Evaluation	80,000	180,000	180,000	94,100	86,142
Audit		70,000			
Inflation	473,000	0	70,000	0	0
Contingency	300,000	215,000	214,775	3,431	1,022
	5,500,000	5,353,000	5,353,149	4,082,456	3,181,254

Disbursed	3,181,254
Unearmarked	1,065,233
Unliquidated	1,106,662
Total	5,353,149

[NOTE DISCREPANCY: PP HAS NO PROVISION FOR AUDIT BUT $473,000 FOR INFLATION
PP SUPPLEMENT ALLOWS $70,000 FOR AUDIT BUT $0 FOR INFLATION
CPR HAS $0 FOR AUDIT BUT $70,000 FOR INFLATION]

Source: USAID Documents; Project Paper, Project Paper Supplement and Comprehensive Pipeline Report Feb. 28, 1990

to $1,300,000. Only about $400,000 has been disbursed but a large parts and equipment order is pending. See Section II.A.2, below. Of the $2,171,895 unliquidated/unearmarked amounts, $1,065,233 is unearmarked and subject to reassignment or deobligation. An as yet undetermined portion of the unliquidated balance may also be available at end of project, leaving as much as $1,200,000. According to GOGB officials, the budget changes in the PP Supplement were made on a unilateral basis and they are unhappy about the overall reduction from $5.500 to $5.353 million.

1. Technical Assistance

Technical assistance planned for the project was delayed for lack of housing because the construction schedule fell behind. No long term TA was provided for hydrology or water management as originally programmed in the Project Paper. Table 3 shows that the TA budget was decreased drastically by the PP Supplement. A PASA contract with USDA, originally signed 1 November 1988, provided a few weeks of consultancy to identify causes of increased acidity in project soils and to suggest redesign of dams to resolve the problem. No trace of this consultancy remains as the report was lost by the mission. This was evidently not a serious concern as it was reportedly "unacceptable". An additional 20 weeks of TA is currently under consideration to assist in analyzing paddy field hydraulics and water management under the same arrangement. The project also provided short term TA for a management consultant to design an inventory system and paid for repairs to the DHAS landing barge. The major TA component provided by USAID was for John Burns, the Master Mechanic/Technical Advisor financed on a long term basis through FAO and recognized by all for his excellent contribution.

Of the $500,000 earmarked for Technical assistance, $380,533 was committed and $178,861 had been disbursed as of 2/28/90.

2. Commodities and Spare Parts

Table 3 shows only $401,738 disbursed for commodities from a total of $977,062 committed. The Table shows $1,300,000 committed for this purpose. About $520,000 of this will be spent for a large spare parts order sent to the purchasing contractor in October, 1989 and expected for delivery in mid-1990. The order for spares was drawn up for the most part according to manufacturers suggested parts lists. These lists do not and cannot anticipate unusual breakage or accident under extreme conditions. Unless the repair facility at Catio has the latitude to order parts on an emergency basis, machinery and equipment is likely to be idle for long periods for lack of minor parts. Reportedly, FAO can order up to $20,000 in parts or equipment at a time on authority of the local project manager, presumably for equipment and vehicles procured by AID as well as other donors and lenders (FAO, IFAD, ADB).

The most recent CPR reveals the following categories and approximate amounts for commodities and spares to date.

TABLE 3. Commodity Summary - SCAD Project - US$

ITEM	COMMITTED	DISBURSED	UNEXPENDED/ UNEARMARKED
Vehicles	85,584	45,719	42,067
Spares	101,699	100,362	1,444
Tools	367,555	6,014	363,986
Household furniture	91,084	85,445	5,640
Office furniture	26,000	19,977	6,023
Appliances	39,928	19,417	20,583
Field equipment	74,942	67,851	7,149
Seeds	20,879	20,879	
Proc. Services	11,670		40,000
Miscellaneous	157,721	36,074	411,370
Total	977,062	401,738	898,262

Source: Comprehensive Pipeline Report, 2/28/90

The USAID files agree reasonably well with the Comprehensive Pipeline Report, but some documents are missing and we foresee problems at audit time.

3. Training

Table 4, Training Summary, shows a total of 244.5 person months of long and short term overseas training financed by USAID under the SCAD project. Average cost was over $1,800 per month. Most of the candidates were trained in Portugal although the two degree slots were in the United States.

Training has a high priority in GOGB/DHAS. DHAS is seeking financing for their training plan (DHAS "Formacão"; bibliography) which includes about 675 person months of overseas training to 1995. Thirty three persons are programmed for a total of 91 trips abroad. The plan includes 14 degree programs for 385 person months and 48 trips of 3 months or less. The plan was reviewed by the evaluation team and found lacking in detail and prioritization. Although a study of GOGB training requirements is outside the purview of the final evaluation, a methodology was suggested to DHAS for improving the plan. AFRICARE/GUINEA BISSAU has the necessary expertise and interest to help refine the DHAS training plan if requested. Some aspects that should be taken into account in the DHAS training plan are 1) a more careful training needs assessment, 2) more flexibility to allow for delayed returns from abroad (slippage) and 3) a procedure to assure that a position is adequately covered while its holder is in training. DHAS's ranks are thin for the jobs they have mapped out and absences for training could negatively affect ongoing activities.

The evaluation team noted the lack of emphasis on in-country training. Catio Center will soon have facilities for this purpose. This type of training can be very cost-effective especially at the lower skills levels and where large groups of trainees are involved. Center facilities could probably be used by other GOGB entities or donor projects (e.g. health, literacy, handicraft industries, technical skills) as well if an adequate training staff, library, visual aids and proper didactic materials can be provided.

Table 4. - Training Summary
South Coast Agricultural Development Project 657-0010

TRAINEE	SUBJECT	LOCATION	PERSON/MONTHS
Djata, Rui Nene	BS Soil Sci.	UA USA	65
Co, Luis Antonio	BS Soil Cartography	Georgia USA	48
da Costa, Quintino	Soil testing/grnhse	Portugal	2.5
Silva, Adolfo C.	Irrigation	France	1
Pereira, José	Admin/Acct	Portugal	20
Nacia, Mario B.	Admin/Acct	Portugal	20
Soares, José João	Topography	Portugal	11
Baptista, Fernando	Topography	Portugal	11
Manuel, Francisco	Topography	Portugal	11
Vieira, Justino	Orientation	USA	1
Sani, Paulo C.	Admin/Acct	Portugal	12
Mam, Calle N.	Admin/Acct	Portugal	12
da Silva, Jeronimo	Admin/Acct	Portugal	12
Sanha, Alexandre	Admin/Acct	Portugal	12
Silva, Adolfo C.	Irrig. Mgmt.	Utah State USA	2
Vera Cruz, David F.	Nat. Res. Eval.	USA	1
Gomes, Pedro	Heavy Equipt. Mgmt.	USA	3

Notes- training summary:
- Approximately 245 pm for a total cost of $460,575; or $1,880/mo.
- Carlos Alberto Co went for training in the USA in soil hydrology but was repatriated before training was complete.

Source: USAID documents

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4. Construction

The original construction budget was increased by $700,000 to $2,188,000 in order to correct for an oversight in architectural and engineering costs. Most of this has been obligated, committed and disbursed. See Table 2. In addition, other participants in Catio Center development have constructed housing, equipment bays, etc. See Section I.D. The result will be a much grander facility than originally envisioned by AID. The implications of Center development costs on financial cost effectiveness will be discussed in Section II.C.

B. Institutional Capacity

1. USAID

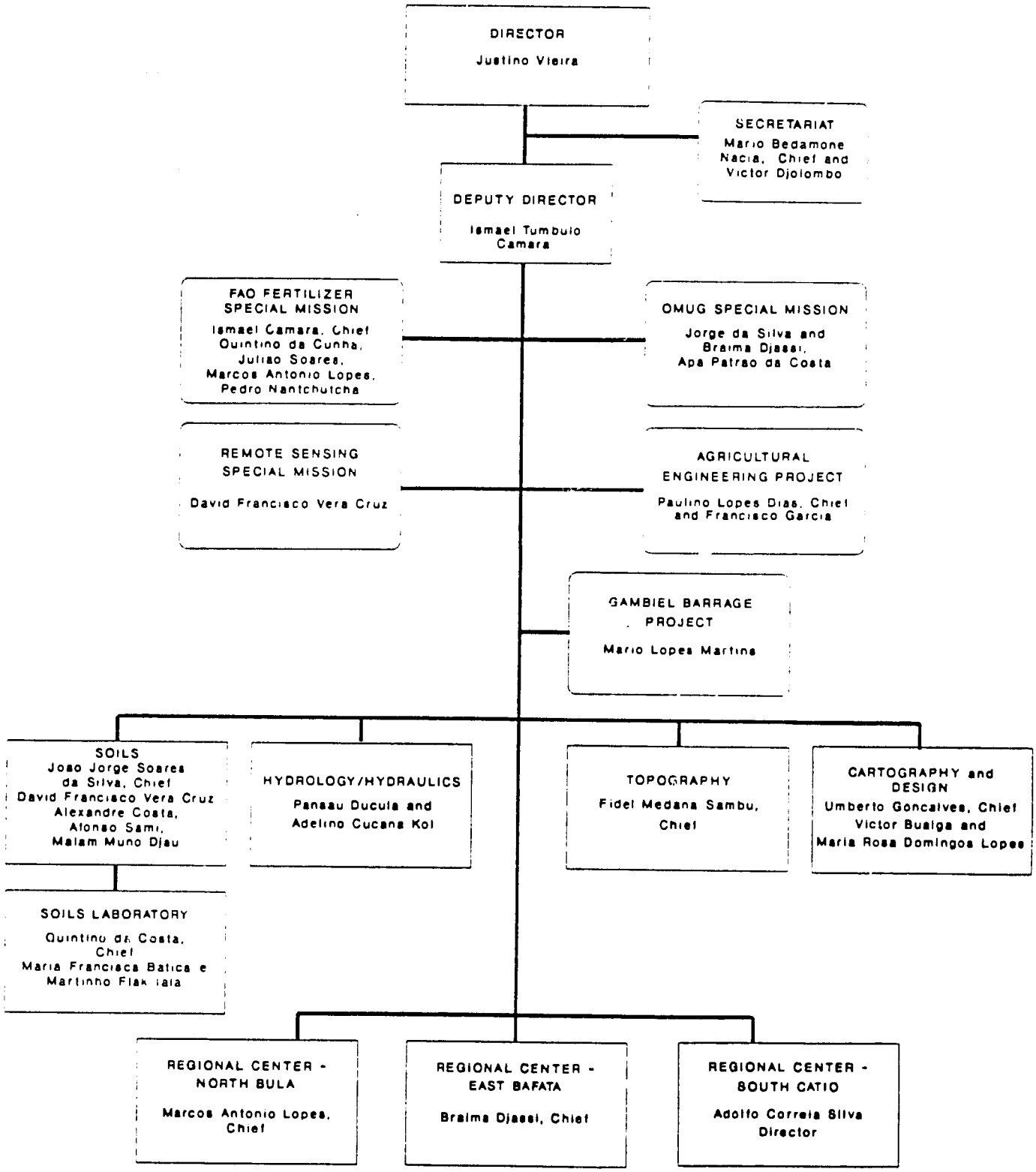
At present, OAR/Bissau is staffed by the Representative, her General Development Officer, a TDY Administrative Officer, and 14 local hires. OAR/Bissau has openings for two more direct hire positions which have remained unfilled for approximately one year. USAID/Bissau has been short handed during the past year with only one direct hire present for the majority of the time. At this level USAID can barely handle basic housekeeping chores. The situation has been much the same since the beginning of the project in 1983. There is a high level of frustration in USAID at not having sufficient human resources to adequately manage the SCAD project. The feeling that the mission is committed beyond its capability is shared by the evaluation team.

OAR/Bissau's problems have also been SCAD's problems. Construction of Catio Center was delayed for over two years. The Master Mechanic finally arrived in June, 1989, and only via a USAID grant to FAO to eliminate USAID administrative responsibility. No long term and very little short term technical assistance was provided in engineering and water management. See Section II.A.1. The history of commodity and spare parts procurement is hopelessly muddled due in large part to inadequate filing and record keeping. The team observed dozens of machines and vehicles out of service at Catio Center, most of which were awaiting spare parts. See Section II.A.2. Procurement files have recently been assimilated from the chron files into purchase order and PIO/T categories and summarized, which represents a giant leap forward since the mid-term review and the audit.

2. DHAS

The DHAS organization chart, Figure B, clearly illustrates the department's functional units but masks the lack of capability to carry out its mandate. The SCAD and other projects have addressed this weakness through a variety of training programs. See Table 4 for the list of participants trained under the SCAD project. At present DHAS's strength is in soil mapping. Its weaknesses are both administrative and technical. Technicians are neither directed to prepare programmed site studies nor do they file their work systematically. The Department is particularly weak in construction and hydraulic

FIGURE B. ORGANIZATION CHART
DEPARTAMENTO de HYDROLOGIA AGRICOLA e SOLOS - DHAS



Source: Evaluation Team, DHAS

engineering. Surveyors are being trained but they will need clear direction from project engineers to plan their work. Clearly programmed short term TA is needed here to walk project technicians through all the steps needed to plan the construction of a salt water intrusion dam. If the FAO/Kuwait project cannot provide this service directly, then other means must be sought. See recommendations, Section VI.

The DHAS/Catio Director, Adolfo Silva, manages a large staff and coordinates much of the dam construction work. See Figure C, Catio Organization Chart. The heavy equipment operators approach their jobs with confidence and the main body of the dam and access roads are well constructed. The Repair Facility is receiving good technical assistance from John Burns. He is setting appropriate procedures for repairing heavy equipment and is actively training local staff. Extending John Burns' contract will give USAID a presence in Catio and strengthen the base upon which the Center will sustain itself. The caveat in the scenario, however, is the impossibility of maintaining a fleet of heavy equipment in Tombali Region, Guinea Bissau without donor assistance. See Figures C and D.

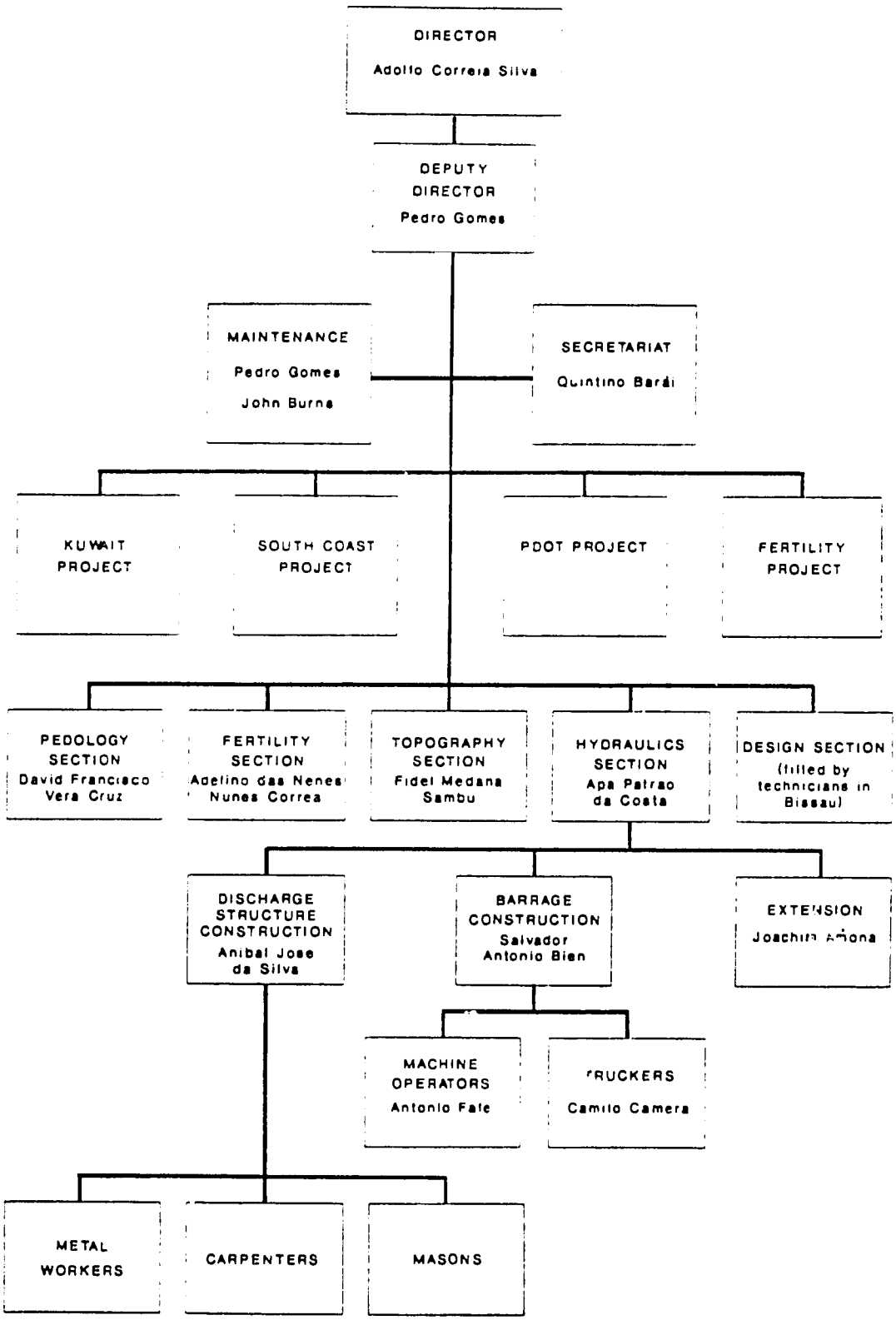
DHAS is fortunate, relative to government departments in other African countries with similar mandates, in that it has over a dozen technicians on staff with university training. They are spread about on isolated projects, poorly paid by any standard (about one tenth the pay of their Senegalese colleagues), but assiduously go to work and await instructions. Additional technical training, stronger administration, good engineering guidance, and credible salaries could well make this Department a viable administrative entity. Eliminating support to DHAS now because of hydraulic inefficiencies at the by-pass complex, or myopia as to Catio Center's future would assure its early demise. The USAID financed portion of the Center opened less than two years ago, and huge annexes are under construction. A critical mass of programmed training activity under clear direction is needed to both complement and supplement repair activities and dam construction. If the Center does not develop a focus through project support it will be unable to realize whatever potential it may have as a regional development center and will never justify the enormous investment already made.

3. Management of Catio Center

The skills and dedication of the DHAS Director and the Director and staff of Catio Center should be a source of pride to the government of Guinea Bissau and a consolation to USAID. The management problems noted by the team are caused in part by the isolated location, payroll problems and lack of a management system. The Director of Catio Center and some of his staff are frequently absent on business to the capital or for personal reasons. Work tends to slow down at times like this. Both Directors could benefit from training in institutional management and time to initiate changes based on these new skills. Trainees are due to return from Portugal in the near future with training in business management which may allow upper management more time to initiate needed reforms.

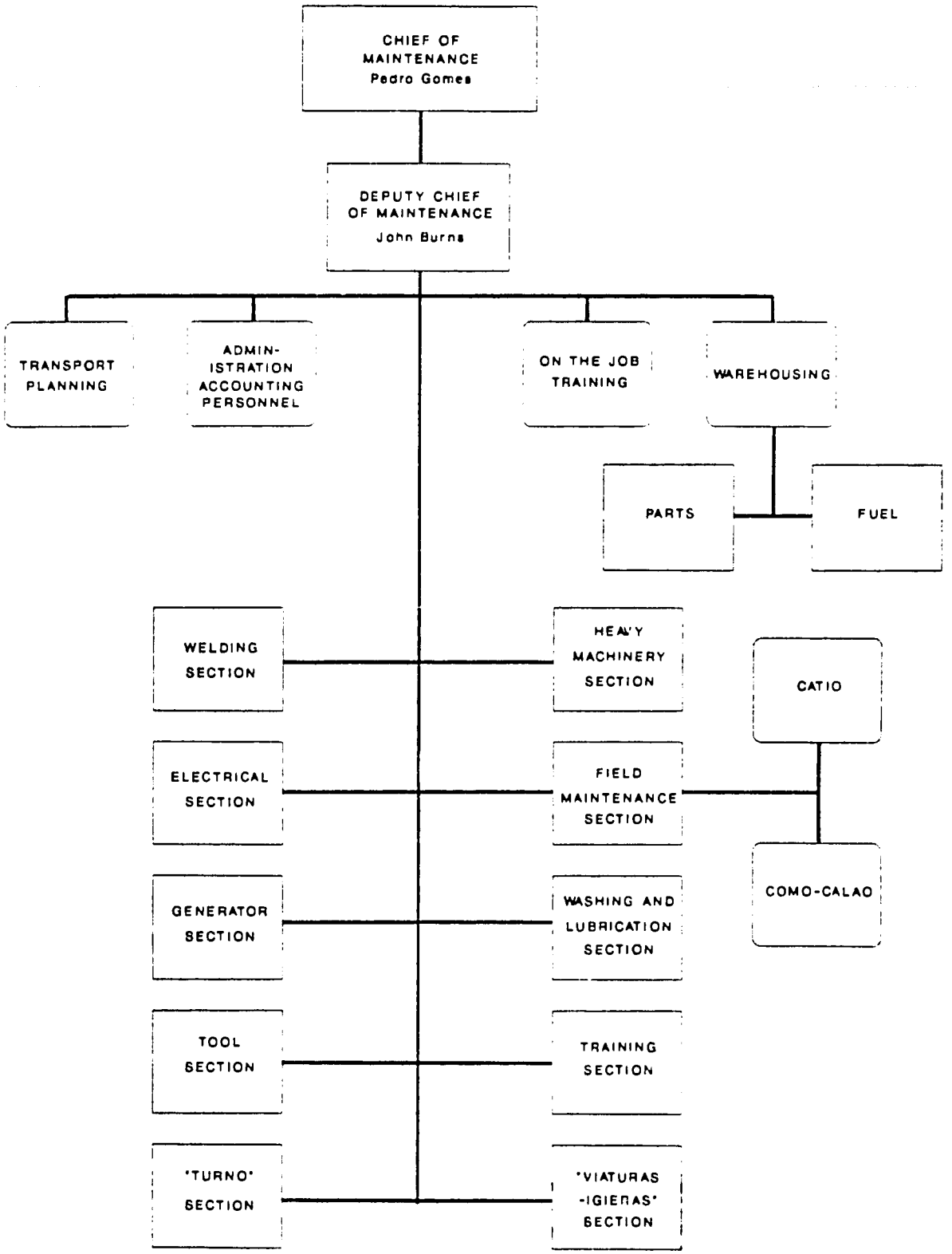
Low pay and slow pay cause serious morale problems at Catio Center. Although this problem cannot be addressed by USAID, the team understands that a proposal for production bonuses is being considered by FAO/Kuwait.

FIGURE C. ORGANIZATION CHART - CATIO CENTER



Source: Evaluation Team, DHAS

FIGURE D. MAINTENANCE FACILITY - CATIO CENTER



Source: Evaluation Team, DHAS

C. Cost Effectiveness

A study of the cost effectiveness of SCAD is beyond the scope of this evaluation, but estimates of costs and benefits were made on the basis of information obtained from documents and interviews.

Elements of cost are as follows:

- Construction of dam and control structure
- Proportional cost of Catio Center including TA, training, construction and commodities
- Maintenance costs of dam
- Costs of production including seed and the opportunity cost of labor

Elements of benefits are:

- Value of production on reclaimed land
- Value of increased production on traditional land due to improved water management and protection from salt water intrusion

Indirect benefits and costs, which probably exist but are not quantifiable, were not included. Minor elements of cost such as depreciation of hand tools and fertilizer (assumed to be nil in the earlier years of the project and minimal thereafter) were not included. The analysis was conducted for a typical bolanha, based on averages for the five constructed to date, which brings 170 hectares of new land into production and improves 60 hectares of traditional land already in production. A total of 16 dam sites has been identified so far and DHAS hopes to eventually construct a total of 30 or 40 saltwater intrusion dams. The evaluation team is concerned that the point of diminishing returns will be reached before thirty dams are built; that is to say there are probably not sufficient economically viable prospective dam sites in the project area. See technical considerations of soils and construction costs in Section III of this report. The model for benefit/cost analysis, built on Lotus 1-2-3 and shown in Tables 5 and 6, can be used to determine the point of diminishing financial returns which is about $2,500 per land unit. A land unit is one ha of land reclaimed or four ha of land improved or any combination thereof. See Appendix I. The typical bolanha (170 ha reclaimed and 60 ha improved) has a value of 185 for this formula.

Base year (four of the analysis when full production is first achieved) rice yields are assumed to be 2000 kg/ha in the absence of authoritative measurements. Yields on traditional land are assumed to be 1500 kg/ha but will improve to 2000 as a result of the dam. The model also assumes that farmers will gradually adopt improved methods which will result in yield increases over the life of the project. Paddy prices in the project area varied from about 300 to 700 pesos per kilogram in 1989. The figure $0.20 was used for this analysis which is 500 pesos at the current parallel rate of exchange.

Tables 5 and 6 compare major benefits and major costs discounted to take account of the time value of money. Benefit/cost ratio at 10% and DRR (Direct Rate of Return) are calculated. Scenarios are considered from 1) the strict commercial point of view (all costs included), from 2) the point of view of GOGB (only loan and counterpart funds for construction). See Table 7, Catio Center Financing. Conclusions, in brief, are as follows: Scenario 1) a complete disaster; only $0.38 returned per dollar invested, 2) not a bad deal; about $1.26 returned per dollar invested. If costs were considered to be $5.353 million, the current AID budget, the financial return would be $1.07 per dollar invested.

Table 5. Benefit Cost Analysis - SCAD Project

BENEFIT COST ANALYSIS
SCAD PROJECT

Price of rice -$/kg	0.20
Ha traditional land improved	60
Ha new land reclaimed	170
Base year yield - kg/ha	2,000
Number dams to be built	16
Center costs - 000,000 US$	21
TVM for B/C ratio - %	10
Labor requirements - md/ha	200
Opportunity cost labor - $/md	0.20
Construction costs - 000 US$	120

	COSTS					BENEFITS			
YEAR	CONSTR-UCTION US$	OVERHEAD (CENTER COSTS) US$	MAINT-ENANCE US$	COSTS OF PROD-UCTION US$	TOTAL US$	YIELD NEW LAND kg/ha	YIELD TRAD LAND kg/ha	TOTAL US$	CASH FLOW
1	120,000	1,312,500			1,432,500			0	(1,432,500)
2			250	11,500	11,750	1,000	250	37,000	25,250
3			500	11,500	12,000	1,500	375	55,500	43,500
4			500	11,500	12,000	2,000	500	74,000	62,000
5			500	11,500	12,000	2,000	500	74,000	62,000
6			500	11,500	12,000	2,000	500	74,000	62,000
7			500	11,500	12,000	2,000	500	74,000	62,000
8			500	11,500	12,000	2,000	500	74,000	62,000
9			500	11,500	12,000	2,200	550	81,400	69,400
10			500	11,500	12,000	2,200	550	81,400	69,400
11			500	11,500	12,000	2,200	550	81,400	69,400
12			750	11,500	12,250	2,400	600	88,800	76,550
13			750	11,500	12,250	2,400	600	88,800	76,550
14			750	11,500	12,250	2,400	600	88,800	76,550
15			750	11,500	12,250	2,400	600	88,800	76,550
16			750	11,500	12,250	2,400	600	88,800	76,550
17			750	11,500	12,250	2,200	550	81,400	69,150
18			750	11,500	12,250	2,000	500	74,000	61,750
19			750	11,500	12,250	1,800	450	66,600	54,350
20			750	11,500	12,250	1,800	450	66,600	54,350
TOTAL					1,650,250			1,372,700	(277,550)
NPV	10 %				1,392,004			535,757	
DRR									-0.0206
B/C RATIO								0.38	
Av. Cost per ha reclaimed $		7,616							

Source: Evaluation Team

Table 6. Benefit Cost Analysis - SCAD Project

BENEFIT COST ANALYSIS
SCAD PROJECT

Price of rice -$/kg	0.20
Ha traditional land improved	60
Ha new land reclaimed	170
Base year yield - kg/ha	2,000
Number dams to be built	16
Center costs - 000,000 US$	4
TVM for B/C ratio - %	10
Labor requirements - md/ha	200
Opportunity cost labor - $/md	0.20
Construction costs - 000 US$	120

	COSTS					BENEFITS			
YEAR	CONSTR-UCTION US$	OVERHEAD (CENTER COSTS) US$	MAINT-ENANCE US$	COSTS OF PROD-UCTION US$	TOTAL US$	YIELD NEW LAND kg/ha	YIELD TRAD LAND kg/ha	TOTAL US$	CASH FLOW
1	120,000	250,000			370,000			0	(370,000)
2			250	11,500	11,750	1,000	250	37,000	25,250
3			500	11,500	12,000	1,500	375	55,500	43,500
4			500	11,500	12,000	2,000	500	74,000	62,000
5			500	11,500	12,000	2,000	500	74,000	62,000
6			500	11,500	12,000	2,000	500	74,000	62,000
7			500	11,500	12,000	2,000	500	74,000	62,000
8			500	11,500	12,000	2,000	500	74,000	62,000
9			500	11,500	12,000	2,200	550	81,400	69,400
10			500	11,500	12,000	2,200	550	81,400	69,400
11			500	11,500	12,000	2,200	550	81,400	69,400
12			750	11,500	12,250	2,400	600	88,800	76,550
13			750	11,500	12,250	2,400	600	88,800	76,550
14			750	11,500	12,250	2,400	600	88,800	76,550
15			750	11,500	12,250	2,400	600	88,800	76,550
16			750	11,500	12,250	2,400	600	88,800	76,550
17			750	11,500	12,250	2,200	550	81,400	69,150
18			750	11,500	12,250	2,000	500	74,000	61,750
19			750	11,500	12,250	1,800	450	66,600	54,350
20			750	11,500	12,250	1,800	450	66,600	54,350
TOTAL					587,750			1,372,700	784,950
NPV 10 %					426,094			535,757	
DRR									0.1421
B/C RATIO								1.26	
Av. Cost per ha reclaimed $					1,873				

Source: Evaluation Team

The conclusion that the construction of only sixteen dams will not justify investments by all donors and lenders to date is inescapable.

It is up to a higher authority to decide if the project is successful or not (if this is important after the fact), and financial aspects are only one consideration. A realistic socio-economic determination of success or failure will not be possible for many years and then only with careful follow up studies.

The evaluation team feels that it would be a mistake to conclude that the project is a failure now from the results of scenario 1), the financial point of view. International assistance programs, be they loans or grants, are usually more humanitarian than commercial by nature. In the case of the SCAD project, an implied objective of both GOGB and AID is repayment of a social debt occasioned by population dislocation and damage to infrastructure brought on by the war for independence. Scenario 2), which is identical to scenario 1) except for the exclusion of grant funds, is a representation of project feasibility if the potential of the Catio Center for service beyond the construction of salt water intrusion dams can be realized; that is to say if seventeen million dollars of the investment are utilized for other development activities. From the farmers' point of view, the increase in benefits due to dam construction is most realistically indicated by the savings in labor (or the increased production with same amount of labor) as determined in the impact assessment by the anthropologist. See Section IV.

Table 7. Catio Center Financing
SCAD Project - Final Evaluation
000,000 $US

Source	Donation	Loan	Funds	Total
USAID	5.535		3.640	9.175
FAO/Kuwait	4.471		1.555	6.026
BAD/IFAD		14.130	1.210	15.340
WFP	1.080			1.080
TOTAL	11.0086	14.130	6.405	31.621

Source: USAID documents DHAS informants

Note that assumptions for the analysis are stated at the top of Table 5. The model is so constructed that changes in assumptions result in immediate recalculation of the body of the table and of the results below which allows for painless sensitivity analysis and the creation of alternate scenarios. Copies of the model were left with the USAID.

A criticism of the 1987 mid-term review by the USAID ADO at that time was that it did not answer the questions of feasibility of large dikes, economics of rice farming in mangrove swamps and whether it would be more effective to work on increasing yields than on increasing land for growing rice. The evaluation noted economic/financial concerns regarding overestimated benefits and underestimated costs which could render the project unacceptable as an investment. Definitive answers to these questions would require lengthy studies as reliable data was not and is not yet available. The model left with USAID can be used to answer these questions based on the best information available. As of this writing, it appears that dikes which provide land units at a cost of $2,500 or less are feasible. See discussion above. As to whether rice farming in mangrove swamps is economical, much depends on the opportunity cost of labor which is currently very low in the project area. True, rice can probably be produced more economically in other areas and countries; perhaps even imported at less cost than it can be produced locally. However, it seems that rice production in the project area is the best use of the resources available (there are few alternatives in the tidal swamps). As to whether it would be more efficient to work on increasing yields, the team notes the paucity of research results and extension services in the project area. The efficiency of an extension service in introducing modern rice farming techniques would depend to a large extent on the ability of farmers to manage water on bolanhas. Large dikes allow for better water management and provide better protection from salt water intrusion. At present, fertilizer and improved seeds are not available in quantity in the project area. Even if they were and it could be shown that their use was "economical", they would probably not be widely used because farmers could not afford the out-of-pocket expenses. Under the current production system, cash outlays for production are practically non-existent. DHAS opines that yields on traditional land can be increased by 50 percent by the barrier dams (barrages) but the team does not believe that *average* increases will be more than half that much. Research on swamp rice production is under way in the project area and an extension service is being developed under other projects. The effectiveness of research and extension will be due in part to the existence of the Catio Center facilities and potential yields will be higher on land with improved water management capability.

D. Recurrent Costs and Sustainability

Table 8, Projected Catio Center Costs - 1991-1995, shows estimated costs for operation for the period indicated. The implication is that between $600,000 and $700,000 will be required per year and that about 90% of this will be required from donors. About three million dollars will be necessary for DHAS to sustain operations and continue training during this five year period. These estimates have been made in consultation with DHAS officials and the USAID project manager. FAO has a slightly higher estimate. Sustainability after 1995 is a matter of great concern to both GOGB and USAID. A policy of charging rents for housing at the Catio Center has been instituted; ten percent of salary for GOGB employees and $300 per month for foreign advisors. This would result in less than $1000 per year if all housing units were to be occupied by GOGB employees and around $50,000 per year if all units were occupied by foreigners. At 50 percent occupancy by foreigners, the utility and maintenance costs of the housing units would hardly be covered.

Table 8. Projected Catio Center Cost - 1991-1995
SCAD Project - Final Evaluation - $US

Item	Donors Annual Cost	Yrs	Total No. Int'l Assist.	GOGB Counter-Parts Funds	Total Ctr. Cost
TA - mechanic	150,000	4	600,000		600,000
TA - engineer	150,000	4	600,000		600,000
Training - LT	150,000	3	300,000	20,000	320,000
Training - ST	100,000	4	400,000	20,000	420,000
Parts	70,000	4	280,000	10,000	290,000
Maintenance	15,000	4	60,000	20,000	70,000
Fuel	50,000	4	200,000	20,000	220,000
Salaries				100,000	100,000
Miscellaneous	50,000			200,000	250,000
Total	685,000		2,640,000	230,000	2,870,000

Source: Evaluation Team in consultation with USAID and DHAS officials

A reasonable scenario for 1995 and beyond is that donors and lenders interested in development of the area will utilize the housing and other Center facilities such as the repair shops, training and dormitories in their cooperative activities with GOGB. The facilities could be utilized by other assistance programs for activities such as research, extension, health programs, education and Center transport development. The ideal result would be the conversion of the DHAS Catio Center into a general regional development Center.

The existence of facilities such as those in place at Catio is important in planning and attracting international assistance. The absence of housing facilities was the main impediment to providing technical assistance under the SCAD project. The scenario for a general regional development Center is speculative and not well developed at present, but it is the vision of GOGB and the evaluation team believes it should be encouraged.

E. Assessment of Mid-term Evaluation Recommendations

Mid-term evaluation recommendations are shown in Chapter Eight of that document. See bibliography: DAI, 1987. Seven of the nine recommendations regarding project implementation refer to needed changes in project management and one to the need for improved donor coordination. Most of these recommendations have been acted upon to some degree in the recent past, but project management overall must be rated poor. USAID was unable to agree upon an overall Mission strategy during almost all of 1988. An initial movement was made to close down the USAID office, resulting in paralysis of project implementation. A tenuous decision was made in late 1988 to maintain OAR/Bissau operations, but AID/W has been unable to provide sufficient staffing levels to permit adequate project planning and control. Over the past year two U.S. direct hire positions remained unfilled. A formal meeting of donors was held while the team was in country under the chairmanship of the DHAS Director who appears to be assuming a leadership role with regard to donor coordination.

As recommended, studies have been done to refine site selection but systematic measurement of rice yields has not been done and recommended technical assistance for key water management issues has not been provided. The exhaustive ecological impact study recommended in the mid term evaluation was not done although ecological reviews gave the green light. The recommended socio-economic study was done. See bibliography: Birkholz, 1989. No formal assessment of effects on women's workload was done but provision of work-saving devices such as improved stoves and rice hulling machines is made through other projects. USAID has financed studies and seminars on rice marketing and policy, as recommended. See bibliography: Hugo, 1990 and Lea, 1989.

III. Technical and Engineering Aspects

A. Background

In addition to the first project objective which is to strengthen the institution of DHAS there are two other objectives which are more technical in nature 1) to reclaim land for rice production and 2) to increase rice production through improved water control structures and water management practices. For a number of reasons already cited, dam construction and water management elements of the project, as outlined both in the PP and PP Supplement, were orphaned and adopted informally by the two other major reclamation projects in Catio region (i.e. the IFAD/ADB project executed by Euroconsult, Arnhem, Holland; and the FAO project (GCP/GBS/017/KUW) financed by the Kuwati Fund and executed by FAO experts and DHAS). See Appendix II for the list of dam sites first proposed in the GCP/GBS/017/KUW project document.

Growing rice in the salt water estuaries in southern Guinea Bissau involves three steps: 1) isolating the land from tidal floods 2) eliminating the vegetation and 3) eliminating the salt in the soil.

Traditionally, land is isolated from tidal floods through the construction of perimeter dams ("dique de ceinture") which are built parallel to the stream banks. Smaller dikes or "ouriques" and canals are constructed to separate individual parcels or "periques". This irregular pattern of small parcels, dikes, and canals is determined by local topography and tenure patterns. This whole irrigated complex is called a "bolanha". The bolanha is traditionally drained through the individual "periques" down to the perimeter dam by a system of small drains or "bombas" which until recently were made from hollowed out logs. In addition to these types of structures which parallel the rivers and estuaries, farmers have also constructed small transversal dams across narrow stream reaches in order to block the twice daily tidal salt water intrusion to impound fresh water from upstream which can be flushed downstream at low tide. The whole process is tremendously labor intensive.

During colonial days, the Portuguese began constructing transversal salt water intrusion dams across estuarine reaches which were too wide to dam by traditional methods. These dams in turn allowed colonial farmers and their tenants to clear and desalinate land with far less labor. Normally, machinery was needed to build these 5-6 meter structures and they had to be designed and sited with care. Many of these older Portuguese dams were presumably destroyed during the colonial wars and after independence. "The Bolanha Recuperation Brigade" within the Commissariat for Agricultural and Animal Husbandry" was set up to use left behind equipment to continue construction activities (Project Paper; Annex 8).

Most of dams built during the colonial days were in the North and Central Regions. According to the 1987 Hesselink and Slobbe survey of these old dams, most of the by-pass structures are in poor condition. Inadequate rainfall and ignorance to the fact that potential acid sulfate soils were present has caused extensive acidification of bolanha land

which has resulted in their abandonment in some cases. Forced labor was used in the colonial days which probably contributed to poor workmanship. After independence the government focused more attention on the south. A large dam was constructed at Ca Balanta in 1981 as pay back to farmers who supported the colonial resistance and were dislocated because of very heavy fighting in the area. The dam has since been plagued by extensive scour at the by-pass, problems with the by-pass gates, land tenure disputes, and acidification of some reclaimed land. The by-pass is undersized and the intake canal and by-pass complex were probably improperly surveyed and cut. Lessons were learned from this and other projects.

B. Technical Evaluation of Structures

1. Technical Description and Design Criteria

The most striking feature of the estuarine environment in Southern Guinea Bissau is the tidal range. Twice a day the water rises and falls over a four meter range. This tidal regime in turn defines the ecological range of plants which can grow and methods which can be used to grow rice.

Since independence, seven or eight salt-water intrusion dams have been constructed in the project area, six under the FAO/Kuwait project. The project area is generally defined as the Catio, Cacine, and Bedanda Sectors of Tombali Region, and Empada and Tite Sectors of Quinara Region. See map, Figure A. The government built the first dam at Ca Balanta and several others have been completed with donor assistance. The South Coast Agricultural Development Project (SCAD) was designed to provide housing, office, and repair facilities for DHAS, train DHAS technicians in soil and water engineering, surveying, hydrology, etc., and provide a strong TA component in structural design and water management. After talking to a good cross section of technicians there is a consensus that DHAS is maturing as an institution, dams are planned with a bit more rigor but a great deal remains to be done.

A number of dams planned under the FAO/Kuwait and IFAD/ADB projects were dropped when soil tests revealed that sulfuric horizons or sulfitic material were found within 50 cm of the soil surface and thus prone to quick acidification (ph <3.5) when drained and aerated. These soils are classified as Sulfaquepts or Sulfaquents. The Tropaquept and Hydraquent soils have neither sulfitic material nor a sulfuric horizon within the top 50 cm and maintain a ph >3.5 when drained and aerated. This came as an "Ah Ha" since in the past dam selection was determined by farmer demand, political appeal, topography, or construction criteria. The use of pedological criteria in selecting appropriate dam sites was an important breakthrough and arose out of surveys financed under both the FAO/Kuwait and IFAD/ADB projects, and efforts by David Vera-Cruz who was trained at the University of Arizona. See Table 9 for results of a study on the appropriateness of soils for reclamation.

Table 9. Soil Aptibility for Various Dam Sites in the Project Area

Sites	Base Area	Cultv. Bolanna	Cultivation	Sugg. For Inapropr.
Sao Miguel	420	175	200	45
C. De Baixo	305	90	140	75
Cabolol	390	41	110	239
Gandua	244	25	159	60
Incomene	390	40	320	30
Ganjola Porto	296	37	117	142
Cubaque	221	124	69	28
Cassaca	2320	890	1110	
Total	4586	1422	2225	939

Note: This table is a result of a study conducted by the Department to short list appropriate Dam Sites. The possibly inappropriate soils have sulfuric material in the upper 50 cm of the soil horizon. The difference between column 3 and 4 suggests that at least 803 hectares could be brought under cultivation without great risk of acidification if there is sufficient rainfall

Source: USAID Documents, DHAS informants

The story of how Sulfaquept and Sulfaquent soils form and how they react differently from Hydraquent or Tropaquept soils when desalinated and cultivated is a good way to approach the technical evaluation of salt-water intrusion dam construction in Southern Guinea Bissau.

The geology of the Guinea Bissau estuarine environment is a history of major sea level changes, uplifting, erosion and deposition. A good English description is found in Annemie Standaert-Andries report "Soil Survey of Estuarium Valleys For Reclamation of Rice Fields in Regions Tombali and Quinara South Guinea Bissau". The sediments deposited in the area have been classified by L.J. Pons et. al. using the U.S. Soil Taxonomy System rather than the FAO system since it offers greater distinction of depth to sulfuric horizon or depth where sulfitic material occur. Pons made a distinction between Rhizophora clay deposited under Rhizophora mangrove vegetation (generally Sulfaquept and Sulfaquent soils) and Avicennia clay deposited under Avicennia vegetation (generally Tropaquept and Hydraquent soils). Rhizophora clay is richer in organic matter, was deposited slowly, and is rich in pyrite. These soils become quickly acidic when drained and oxidized. Avicennia clays were deposited quickly, and contain much less pyrite and organic material. This helps to produce a less acidic soil and a soil which needs to be identified

Under the FAO/Kuwait project six sites were mapped according to soil type, land use, and depth to the sulfuric horizons. Of the 29 dams originally identified in the project document 13 were dropped as inappropriate five dams have been partially completed and one is under construction. Two dams are planned for the 1990-1991 season. See Table 10. David Vera-Cruz and his staff are continuing to carry out soil surveys and short listings of appropriate dam sites.

Table 10. DHAS/FAO - Kuwait Salt Water Intrusion Dams Completed to Date and Plans for Next Five Years

Project	Years	Planned	Short List	Completed/ Under Construction	Site Name	Region	Sector
Kuwait/ FAO	85-90	29	16	6	Cubaque	Tombali	Catio
					Sao Miguel	Tombali	Catio
					Gandua	Tombali	Catio
					Cabolol	Tombali	Catio
					Incomene 2	Tombali	Catio
					Ganjola	Tombali	Catio
FIDA/BAD	85-90	23		1	Cactchil	Tombali	Catio
DHAS	90-91	2			Caur 1	Tombali	Empada
					Caur 2	Tombali	Empada
DHAS	91-92	1			Cassaca	Tombali	Cacine
DHAS	92-93	2			Santa Clara	Tombali	Bedanda
					Flakindjan	Tombali	Bedanda
DHAS	93-94	2			Botcheminde	Tombali	Catio
					Botchebissa	Tombali	Catio
DHAS	94-95	1			Cubisseco	Quinera	Empada
DHAS	after 1995				NA	Quinera	Tite

Source: Evaluation Team, DHAS

Pedological considerations now play a determining role in site selection. Sites where Sulfaquept and Sulfaquent soils are concentrated are dropped. In addition DHAS technicians recognize that sites with large upstream watersheds (e.g. >5000 ha for Ca Balanta) are inappropriate. Experience has shown that the sites with 2000 ha of contributing watershed are more appropriate than sites with much larger or smaller basins. This more systematic approach to site selection and design is a result of recent studies and experience gained from previous jobs.

The larger 5-6 meter high dams being built in the project area are distinguished by a by-pass canal and sluices built off to the side of the dam which controls the routing and storage of fresh water and brackish runoff upstream and the blockage of salt water tides downstream. The sizing of the bypass canal, the construction of the sluice housing, the installation of the 80 cm diameter pipes, and the construction and mounting of the cut off valves and downstream revetments require a good estimation of design flows, careful dimensioning and surveying of the approach canal, sluice pipes, and stilling basin, and solid construction. Valves must be designed to allow unobstructed evacuation of fresh water flood flows as well as blockage of salt water tides. See Figures E and F.

The SCAD project has provided virtually no technical assistance in solving these problems despite repeated appeals in the PP, PP Supplement, and the mid-term evaluation. DHAS has a weak handle on these technical problems for several reasons: 1) Calculating the design flood at these dam sites is ground breaking hydrology, 2) the hydrologic environment involves salt and fresh water mixing and four meter tides, 3) establishing good surveying bench marks is complicated and 4) good technical assistance is very difficult to find since living conditions are arduous albeit improving, both French and Portuguese language capability are needed and the more important hydrologic events occur only seasonally.

The approach canal, sluice pipes, and stilling basin must be sized and constructed so that when impounded water is released, flows are easily routed around the dam, through the array of 80 cm diameter 10 m long pipes, and past the stilling basin without causing deposition upstream and scour downstream. Several methods are being tried to dissipate this energy: 1) concrete stilling basins 2) riprap placed around the sluice outlet and 3) gabion cages placed strategically near pipe outlets. Signs of scour were noticeable at a few sites but none as bad as Ca Balanta where gabion cages and concrete slabs have been ripped apart. Of course these outlet channels must be designed to handle design flows to avoid scour and erosion which goes back to the problem of estimating design flood flows with minimal data and questionable analytical techniques. The SCAD project was never involved in this sort of question despite recommendations in the mid-term evaluation, and the Project Paper Supplement. DHAS did an adequate job in preparing a three month, two mission Scope of Work in September, 1989 for a USDA PASA hydrologist to look into this and other upstream water management problems but this has all been delayed until the 1990 rainy season beginning in June. If this person does arrive it will be the first real TA contribution under the SCAD project in the area of hydraulic structures and water management, and this approximately three months before the PACD. It is encouraging however that DHAS is slowly developing the capacity to look at these types of problems

on their own and with assistance from other donors. Analytical techniques developed by the Dutch to engineer polders in Holland have promising applications in Guinea Bissau. It would be a mistake to abandon DHAS at this critical period before the Department has a critical mass of expertise to examine watershed development problems from several conceptual perspectives.

2. The By-Pass Complex

In order to better understand the workings of the by-pass complex please refer to the photos in Figure E of a typical by-pass structure. The downstream one way flap valve which should in principle allow unencumbered fresh water flood flow out of the pipes and prevent high tidal seepage when closed are all poorly designed and constructed. They do not close properly when keeping high tides out, and they constrict and choke flood flows as fresh water is released after a storm. In some cases they are missing from some of the pipes or rotting. DHAS has 8-80 cm diameter PVC one way flap valves at the which will be installed at Sao Miguel dam. It will be interesting to see how these hold up and whether project management thinks they are worth the $1000/valve price tag. Engineer Pichel has studied these one way valves and has come up with some suggestions, based on a few calculations, that a counter weight be attached to the top of the flap valve forcing a tighter fit when closed and less choking when opened. These valves could be made in country using a very dense local wood (1200 kg/m3).

The upstream intake portion of the by pass box is designed to totally block fresh water from escaping during the dry season and later control the level of the upstream reservoir during the early rains. The level of the water during the wet season is strategically controlled to allow flooding of upstream riparian rice fields. At a certain point in the rainy season, after several consecutive days of rainfall, the flood flows are released by lifting up three or four planks which vertically block each 80 cm sluice pipe. See photo, Figure E. The problem with this is that the fresh water lens on top is released first because the top plank is removed first. This leaves the lowest plank to be removed last where all the salt water is. A pulley system or perhaps an A-frame type charuff which is strong enough to lift the planks from the bottom is needed. This would allow the heavier saline water to escape before the fresh water, and allow flow from the bottom to pass silt through the sluice pipes.

The sizing of the by-pass canal (ordinarily built by the farmers themselves as one of their contributions to the project), the depth of the cut, and the excavation, compaction, and construction of the sluice gate foundation all need careful engineering. Canals and sluices are occasionally cut too shallow to regulate flows as needed. Fortunately, the FAO/Kuwait project as well as the SCAD project have placed particular emphasis on the training of surveyors.

The problems in properly designing and constructing the by-pass complex means that there are no salt water intrusion dams in Guinea Bissau which are complete. Dams partially fulfill their function by blocking tidal flows downstream but they fall short in effectively regulating water levels upstream. This does not mean the dam is useless; it simply means it is less effective than it could be. The farmers are partially satisfied since

the dams reduce the amount of labor needed to reclaim land but are dissatisfied when land becomes acidic or when there are disputes as to when to release impounded flows. Farmers would also like to see the system fine tuned so that occasionally salt water can rerouted back upstream to kill weeds in the bolanha and restore the ph balance in acidic soils.

A very important advantage of these dams is that the land reclaimed in the salt water estuary theoretically reduces pressure to clear cut tropical rain forests to plant dry land paddy. Paddy yields in the rainforest are less than 800 kg/ha (compared to 2000 kg/ha in good salt water bolanha), slash and burn agriculture destroys the watershed, and habitats are lost. The government is very concerned about this and are aware of the effects of deforestation on their neighbors in the Sahel. The comparative advantage of concentrating rice production in the lowland salt water bolanha rather than the tropical uplands tends to compensate for losses due to by-pass hydraulic inefficiencies and undesirable ecological effects of a salt water intrusion dam. See Section IV for a discussion of the ecological impact of dam construction.

3. The Dam

The salt water intrusion dams in the South are constructed out of laterite and rocks excavated close to the site. The height of the dam (6-8 m) is a function of the highest expected tide, freeboard, and subsidence. The width of the main part of the dam is between 10-15 m, the wings or access part across the mangrove marches at the margin are 4 m wide. Lengths may vary up to 300 m. As laterite fill is dumped and graded with a bulldozer it is compacted . The mangrove tidal basin at the estuary margin is filled first after the access road is completed. As construction approaches the main stem of the estuary, the channel constricts as it is filled in, and rocks are dumped at the toe to slow down scour and erosion. Before the channel is sealed off, laterite is stockpiled and all available trucks, loaders and bulldozers are mobilized for the closure. Early one morning at low tide there is a flurry of activity to finish the job and shut off the stream before the tide rips out the new fill.

The dam at Cubaque was peculiar in that the central part of the dam blocking the main stream was significantly higher than the wings which sloped off in both directions. DHAS technicians explained this by noting the need to overdesign and that this section may settle more than the wings. It is possible that enthusiastic equipment operators built the dam up higher than necessary. It was at this site where a group of men from one tabanca were excavating the bypass canal as their contribution to the project. The bypass canal was entirely constructed by teams of men from different tabancas, working without pay. The canal is over 1.8 m deep and 3 m wide and 150 m long. The cut is straight and clean as if an excavator did the job. In fact it was all done by hand using a local tool, an "arado", which looks like an oar with a sharp straight edged metal blade on the end. The "arado" is used to cut brick size chunks of dirt and mud which are passed hand to hand to the embankment on the side of the canal. See photo, Figure E.

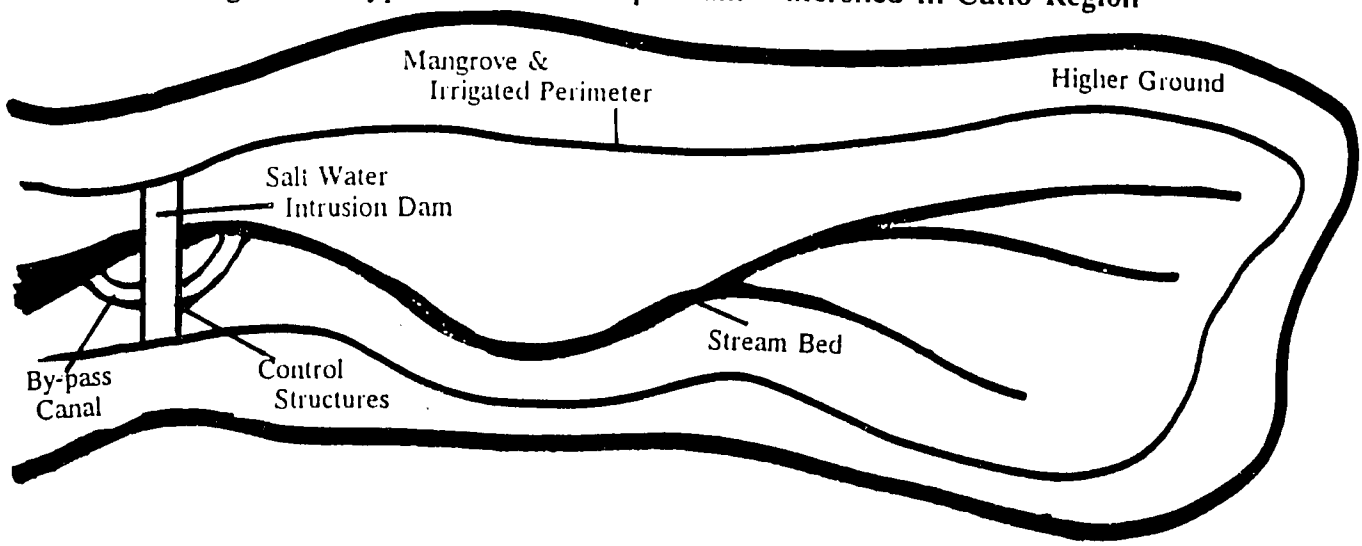
Figure E. Dam Control Structures & Bypass Canal

Gandua. Downstream Cut off

Gandua. Upstream Sluicegates

Gandua. Bypass Canal Construction

Figure F. Typical Dam and Upstream Watershed in Catio Region



Source: Pons, L.J. Rapport Sur La Coute Mission Pedalogique D'Appui au Projet de Developpement Rizicole de Tombali. Euroconsult, FIDA/ADB. October, 1987.

The truck drivers and heavy equipment operators at the Ganjala site were confidently doing their jobs explaining that they have considerable experience in this type of work. They complained bitterly, however, about their salaries (less than $20/month) but at least they have been paid on time recently and the villagers provide them with rice while on the job. A hunter is employed under the project to provide the meat. In previous years workers received a PAM supplement of rice, oil, sardines, and corned beef in addition to their salaries. PAM stock are low now and DHAS is insisting that the local villagers provide meals now that donors have reduced their food donations. The salaries are paid out of the National Development Fund which is fed through the monetization of food aid.

On site at Ganjala, one wheel loader and three DAF dump trucks were continuously running. Three 1.5 M3 scoops were placed into each dumper and the dirt was being used to build a two km access road to an old dam built during the colonial days which will later be repaired.

One fundamental problem with the dam and bypass construction is that the design lacks rigor. Either there are no technical studies used to calculate design flows, size the by-pass canal, and calculate the height and dimensions of the dam or they are calculated on an ad hoc basis by DHAS technicians or FAO experts and only published in the end of mission report. DHAS is particularly weak in hydraulics and construction engineering. Some well programmed training in these two areas would perhaps enable DHAS to prepare at minimum preliminary site surveys, peak flow estimates, and calculations for channel sizing and routing. If donor assistance continues, DHAS still needs the services of an engineer who is prepared to work more in the field than the office to supervise, in particular, the construction and design of the of the by-pass complex. If the institution does not grow up to the task then there will continue to be false starts and structures which are partially effective but do not measure up to their full potential.

4. Upstream Water Management

The construction of a salt water intrusion dam means nothing if land goes unreclaimed or traditional bolanha is unimproved. The difficult challenge comes after the structure is completed and the engineers have left to scout out new waters to tame. At present, after the land is divided up, the farmers use their considerable traditional skills to dig drainage canals and bund the land to impound fresh water runoff. Constructing this irregular system of dikes, ditches, drains, and cut off requires a wealth of local knowledge. The land is irregularly sloped, there are numerous depressions and it is not obvious during the dry season which way the water would flow after a big rain. Farmers upstream and downstream from each other have conflicting water needs though this is partially mitigated by tenure patterns which tend to apportion land to a family in a strip perpendicular to the estuary. Family groups thus enjoy land upstream and downstream of each other. DHAS recognizes that improving on the traditional methods of field water management is the next important step. They have plans to buy 200 mm and 400 mm PVC pipe to replace the traditional wooden "bombas" or drains made from tree trunks and are used to drain water out of bunded parcels and through the main traditional perimeter dikes. As DHAS gets into the business of selling PVC pipe to farmers and as technicians become skilled in the art of water management there may be some improvements in on-farm water management. The PP Supplement envisioned 20 person months of short-term technical assistance in the area of water management. None was provided and it would require someone with considerable experience, stamina, and communication skills to work steadily with farmers in the Tombali Region during the rainy season.

C. Economic Evaluation

The actual cost of the Gandua bypass complex and estimated cost of the dam are summarized in Table 11. Included in the cost of the dam in the economic analysis is a very rough estimate of the cost of replacing locally made "bombas" with PVC pipe. The GOGB has banned the logging of the trees used to make these drains. DHAS plans to sell PVC pipe to the farmers at an estimated cost of $85/ha or $20,000 per dam site. Note that this is very rough estimate. The Gallard study breaks down costs in much greater detail. This report is the only one found at DHAS with has any figures on construction costs. DHAS definitely needs improvement in this area. If time sheets, equipment usage and fuel reports, and material costs were cross filed by site could be more easily calculated and tracked more effectively.

D. Maintenance

To date dams have required little maintenance. The By-Pass complex and stilling basin are different stories as explained in previous sections. Since farmers are responsible for repairing their own water control dikes and canals DHAS is relieved of this responsibility. Trees should not be planted along the dam as was seen at Ca Balanta. As these dams age maintenance will become more of an issue and DHAS will have to take the appropriate actions.

Table 11. Cost Estimates for Dam and Bypass for Gandua

Dam Specifications:

Basin Size = 1090 Ha
Reclaimed Area = 255 Ha
Bypass Design Flow = 8.8 m^3/sec
Excavation for the Bypass = 1275 M^3

Length of Main Stem = 170 M^3
Length of Wing Sections = 810 M^3
Volume of Dam = 30,000 M^3
Volume of Dirt Excavated = 49,000 M^3
Avg Volume Transported/Day = 670 M^3

Actual Costs for Bypass Construction

Excavation Fuel Labor	$ 865
Construction Fuel Cement Steel Pipes, etc.	18,066
Stilling Basin Gabions Rip Rap Fuel, etc.	2,64€
Cut Off Valves Wood Fuel, etc.	1,697
Supervision	295
Labor	2,088
BYPASS TOTAL	**$25,657***

Estimated Costs for Dam Construction

Diesel Fuel	$24,370
Lubricants	6,275
Labor	3,528
DAM TOTAL	**$34,173**

DAM TOTAL	**$34,173**
BYPASS TOTAL	25,657
TOTAL DAM & BYPASS	**$59,831**

*Costs for excavating fill material and building dam are out-of-pocket expenses for operating the heavy equipment and paying workers. *Does not* include equipment maintenance costs or depreciation. Costs and estimates are from 1988. For economic analysis, assume current cost for a typical dam to be $120,00. Additional $40,000 was added to cover man\intenance, depreciation and misc. items. $20,000 was added for PVC pipe to replace traditional hollowed out logs used for drainage. The Gandua Dam is a typical example of dams to be planned and constructed.

Source: "La Construction de Barrage et Dechargeurs pour la Recuperation de Rizieree in Guinee-Bissua," Jean Gallard, August, 1988. Projet GCP/GBS/017/KUW FAO/Kuwait Fund

IV. Social and Cultural Aspects

A. Introduction

The anthropologist developed an informal interview guide for use with key informants in the bolanhas which was reviewed by a local sociologist with experience in the southern region and knowledge of bolanha rice culture. She was assisted by Gilberto Pouho of the USAID Mission. Informal interviews were also conducted with GOGB officials in Bissau city and in the project area.

B. Impact of Bolanha Development

1. Social Structure and Cultural Patterns

The SCAD project has made no visible changes to the authority roles in the villages or to decision modes as they pertain to land allocation. Likewise, there are no changes in traditional patterns of participation in community affairs which can be ascribed to dam construction. There appears to be an element of outmigration of young people which is not quantifiable at this time but which may result in changes in work roles at village level. See C.1 below.

2. Land Tenure Patterns

All land in the project area is conceived as "belonging", in residual ownership, to some named ethnic group. Project area bolanhas may be utilized by people from more than one tabanca (village), and the usufruct (land ownership) typically resides in the various "morancas" (extended family groups) of these villages. Territory, including crop land, is assigned according to size of household by the family elder, or Homen Grande (Big Man). Correlation does exist between size of household and number of parcels per household (Birkholz, 1989). Only in rare cases could land be "sold" such as when an entire household (moranca) outmigrates. Temporary reassignment of use rights occurs more frequently.

The concept of "ownership" and rights of inheritance, absent in some African cultures, is very important to bolanha rice culture as it permits the necessary incentive to improve land not found under more transitory African tenure systems. This tenure system also avoids centralization of ownership, or plantation type agriculture.

Birkholz found that opinion in the tabancas overwhelming favored ceding new land to resident families and to families and villages who participated in dam construction.

Contradictory claims on land reclaimed through the efforts of DHAS are sometimes beyond the ability of the village elders to settle. Village inputs to dam construction do not always match traditional claims to use rights, resulting in disputes and acrimony. The new government policy of registration of claims to land at the Land Office is a source of latent confusion on land rights issues. There appears to be no way of negotiating conflicting claims existing in customary law and tribal "ownership". Unless adequate legal or traditional clarification is brought to this ambiguous situation, there is potential for social disruption and economic loss.

C. Regional Impact of Catio

1. Demographic Changes

The 1979 Census gave the population of Catio as 5,170. The Governor's office estimates current population as between eight and nine thousand. This is an annual population growth rate of between 4.4 and 5.5 percent. Observation indicates that Catio and the area surrounding the is experiencing unusual population growth. The growth of service enterprises such as bicycle repair shops and new housing were observed.

Birkholz found that the major reason for immigration to the project area was the possibility of obtaining new land. Over 50 percent of the inmigrants were from neighboring villages, 15 percent from nearby towns (Catio or Buba), 14 percent from other regional capitals, 11 percent from Bissau city and two percent from Guinea Conakry. None were noted from Senegal. Only 15 percent of the outmigrants were destined for neighboring villages, over 70 percent to urban areas and 13 percent to Guinea Conakry. Heads of households and Committee chiefs cited the scarcity of working age youths in the project area.

2. Employment

Construction of the has had a major indirect impact upon Catio and vicinity. Construction of the has provided jobs. Services surrounding the and its personnel have brought activity money and goods into the Catio matrix. The market has expanded to service the increased population and increasingly does its business in money rather than barter.

3. Health

There is no indication that the dam building program will influence the incidence of malaria in the area. Neither is there any indication of onchocerciasis or schistosomiasis in the bolanha area although both exist to the north and west. An increase in the incidence of beri-beri is possible if village women have less time for vegetable gardens. See Gender Issues, below.

4. Ecology

Dam construction changes the brackish water regime above the dam with concomitant changes to flora and fauna in the affected area. Fishermen report new species of fish above the dam, which they exploit, and the demise of salt water species such as oysters. Wildlife habitat is also affected but the changes can be beneficial as well as detrimental. The area so far affected by dam construction is infinitesimal when compared to the total swampland area in southern Guinea Bissau and there is no evidence that any species is threatened with extinction as a result of the project. Serious ecological studies have not been done in the project area.

D. Gender Issues

There seems to be little visible change in the absolutism of male authority in the tabancas affected by the dams. However, the recuperation of new lands as a result of dam construction does create a major impact on women: more parcels for the household equals more labor in planting and weeding for women. This may impinge on the traditional activities of women in cultivating small truck gardens and trading activities which produce cash for clothing and other essential household items. The need for additional labor may lead to the taking of more wives by men who can afford to do so, thus causing changes in marriage patterns.

V. Lessons Learned

Although this is styled as the final evaluation of the SCAD project, several month remain to the PACD and it will be several years before results of the final examination wi be available. Nevertheless, some lessons are evident and others can be taken with a degre of confidence.

The most important lesson for USAID insofar as project management is concerne is "don't bite off more than you can chew". Some clever caveman probably figured that ou several million years ago but it seems appropriate to restate it here because of the hig degree of inefficiencies and frustrations associated with the SCAD project due t inadequate staffing and turnover in the USAID. Lack of coordination with other donor and lenders is at least *partly* due to inadequate staffing, on their part as well.

GOGB has invested a great deal of money and effort in an infrastructure comple with no clear vision of its future use or payoff, and donors and lenders did little t discourage this. It may be possible to pull the current situation out of the fire wit continued investment and prudent planning, but the fearsome specter of the large whit elephant is certainly present at this time. The lesson here is that newly emerging natior such as Guinea Bissau do not have the expertise in planning and establishing priorities t maximize their development resources. Consequently, they have little to say regarding th use of the loans, grants, training and technical assistance offered, frequently according t particular interests of donors without due regard to real needs of the country, which are nc properly defined. There should be more cooperation and coordination among donors an they should encourage infrastructure development at a higher level - development planning The evaluation team hopes that this will be taken into account in the upcoming strateg deliberations.

The SCAD project with its associated dam construction and land development components strikingly illustrates the participation principal in development. Villagers are involved to a high degree and are investing a great deal of the only resource they have their labor. See Figure E. This may well be the major strength of the project in the long run because it is "their" project with help from a respected government. Dams, dikes and other structures are much more likely to be maintained and properly utilized in this type projec than one which was conceived and built for them without direct participation. The mic term evaluation emphasized the importance of farmer participation and identified it absence as a potential problem. GOGB/DHAS should be complimented for thei successful efforts to involve farmers in the project.

VI. Recommendations

1) USAID should close out direct administrative involvement in the project by the current PACD date on September 30, 1990. USAID has never had sufficient resources to manage this project and the mission is already saddled with an overloaded portfolio which is beyond the capacity of two direct hires to manage.

2) Since there are substantial benefits from this project despite hydraulic inefficiencies, limited potential for dam construction and other problems, we recommend that USAID cofinance an extension of the project through a grant agreement with FAO on the condition that the Kuwait Fund continues its participation. All or part of the unearmarked funds could be dedicated to such an extension. See Section II.D and Table 8 for a discussion of requirements to 1995. John Burns' contract should be extended for at least another year. USAID should work very closely with FAO, the Kuwait Fund, and other donors in redesigning this project to ensure that practical long-term technical assistance is provided in the fields of engineering construction, open channel hydraulics and water management. A joint USAID/FAO project design team, with input from IFAD/BAD, if possible, and close working relationships with GOGB, would be a fine way to get the extension off on the right foot and promote donor coordination which has been so sadly lacking heretofore. USAID should negotiate any points it feels strongly about with FAO/Kuwait because it will have no further direct influence on the project. As bureaucracies sometimes move ponderously, decisions must be made as soon as possible, and design activities and negotiations initiated without delay if the project is to be extended.

   If the FAO Chief Technical Advisor is unable to work in a technical capacity, short-term technical assistance should be provided through the USAID grant to FAO. This person should be responsible for preparing site studies for one or two proposed dams and training DHAS technicians for this type of study.

4) We recommend that USAID finance one or two long-term participants for advanced training in hydraulic engineering, and soil and water resource planning. DHAS has developed an ambitious training plan which still needs refinement. Training responsibilities, including substantial in-country training financed directly by USAID and professional assistance in developing a viable training plan, could be turned over to a PVO such as AFRICARE.

5) The operation and maintenance of the Catio Center, continuation of watershed development activities, and the delivery of in-country training at the Center are all impossible without donor support. DHAS has begun work on a plan to recoup some of the recurring costs of operating the , but these funds will scarcely cover the electric bills. We recommend, however, that before anyone moves into the new houses at the Catio Center has clear procedures for collecting for rent and utilities.

6) MDRP, DHAS and GOGB should be assisted and encouraged, during the project extension, to develop Catio Center into a regional development center which would serve DHAS and other donors and lenders for general development activities in the region.

ANNEXES

ANNEX I.

STATEMENT OF WORK

BACKGROUND

The purpose of the South Coast Agricultural Development Project (657-0010) is to strengthen the institutional capacity of the Government of Guinea-Bissau (GOGB) Ministry of Agriculture's Department of Agricultural Hydraulics and Soils (DHAS), and to promote and facilitate the extension of south coastal rice production areas through improved water control structures and water management practices.

The project was originally authorized on July 5, 1983 at a funding level of $5.5 million. It was planned that the project would take six years to implement. However, due to problems experienced during project implementation as well as management changes in the Office of the A.I.D. Representative/Guinea-Bissau, project implementation was delayed. The project was further delayed when the alarm was sounded regarding potential negative environmental impacts caused by water structure construction. There were also concerns that there was lack of donor coordination in the project area. Consequently, the decision was made to suspend project activities until a project evaluation could be conducted. The evaluation took place in December 1987. Although the individual findings were critical, the evaluation nevertheless recommended that the project be allowed to be implemented as planned. A determination was also made that the proposed project activities would not have a significant negative environmental impact.

In mid-1988, A.I.D. conducted a strategy review of the overall OAR/GB project portfolio. The purpose of this review was to take a detailed look at Guinea-Bissau and A.I.D.'s development portfolio there, with the objective of making recommendations on the most efficient and effective means to deliver U.S. Economic Assistance. Following an A.I.D./W review of the strategy exercise, the decision was made to effect an orderly phase out of certain ongoing projects, including the South Coast Agricultural Development Project.

In July 1988, the new A.I.D. Representative arrive at post. Given the investment that had already been made in physical facilities in Catio, the project's headquarters, and given the availability and willingness of another donor (FAO) to undertake contracting activities for a Master Mechanic to work at the newly built facility, the decision was made to execute a grant to FAO to hire a Master Mechanic. This was seen as a way to protect the investments already made and entirely consistent with the directive to effect an orderly phase out of project activities.

The evaluation described herein represents the final evaluation for this project.

At this present time, A.I.D. is developing its strategy for the next 5 years in Guinea-Bissau. As part of this strategy it is taking a final look at this project in order to see how the remaining funds could best be used in Guinea-Bissau. OAR/Bissau is particularly interested in enabling DHAS to be a key player in the development or implementation of a policy on water-use in Guinea Bissau. Whether or not this can be done by restructuring the existing project is one of the questions OAR/Bissau wants answered.

The evaluation described herein represents the final evaluation for this project.

ARTICLE I - TITLE

Financial Evaluation: Guinea-Bissau South Coast Agricultural Development Project

ARTICLE II - OBJECTIVE

To procure the services of an IQC contractor to provide the services of an evaluation team to conduct a final evaluation of the South Coast Agricultural

Development Project (657-0010). To the extent practicable, the evaluation team shall also make an assessment of the project's impact in the project area, using existing project development documents, interim reports, evaluations, and other documentation, for baseline data.

The evaluation team shall consist of the following individuals:

A. Agricultural Economist/Team Leader
B. Hydrological Engineer
C. Sociologist/Anthropologist

The general purpose of the evaluation is to examine whether or not project objectives were met, to determine where problems may have existed, and to recommend a course of action for the project to follow for the remainder of the project's life. The evaluation team shall also make a recommendation regarding whether and how this activity could be continued beyond the present PACD, taking into consideration the remaining project funds as well as the existing and planned staffing levels of the OAR/GB to continue to manage such an activity. The recommendation should also take into consideration other alternative courses of action (e.g., deobligation of undisbursed project funds and reobligation to another project, new project activities, etc.).

ARTICLE III - STATEMENT OF WORK

A. AGRICULTURAL ECONOMIST/TEAM LEADER

1. General:

The Agricultural Economist/Team Leader (Team Leader) shall be responsible for managing the overall evaluation effort and for preparation of the final evaluation report. The Team Leader, working with the appropriate project officers (A.I.D./W and OAR/GB), will identify and assemble (or cause to have assembled) required reading materials (project development documents, PID, PP,

trip reports, evaluation reports, cables, other correspondence, etc.) for use by the evaluation team. The Team Leader will also be responsible for establishing individual work plans for each of the other team members and for ensuring that work is accomplished according to the workplan timetable.

2. Specific:

The Team Leader will be responsible for reading relevant background documents, project development reports/papers, trip reports, project implementation reports, the interim evaluation, correspondence, etc., for visiting the project site, and for interviewing relevant A.I.D., GOGB, and other donor-financed technicians. Based on this preliminary work, the Team Leader, incorporating input from other evaluation team members, will provide the following (to be included in the evaluation report):

A. An assessment of whether project was implemented as planned. If so, what aspects of the project contributed to project success? If not, what were the primary reasons why not?

B. An assessment of whether problems identified in the interim evaluation were rectified, and how.

C. An assessment of the institutional capacity of DHAS to carry out its mandate, and if and how A.I.D.'s assistance contributed to that capacity.

D. An assessment of whether this activity, inclusive and exclusive of other donor activity in the project area, it cost effective. This assessment should take into consideration the costs of the various project interventions, the actual and planned agricultural yields and values resulting from projected-financed water structures, and other constraints that are preventing the full impact of these structures to be realized.

E. An assessment of the viability of the Catio Center in terms of financial, economic and institutional sustainability. In particular, the issue of

recurrent costs should be addressed, and/or cost recovery if the Catio Center is used to provide maintenance services to other GOGB entities or privately. The assessment should make recommendations as to the future of the Catio Center and how A.I.D. might become involved in any proposed courses of action.

F. To the extent possible, and to the degree baseline and other quantitative data exist, the Team Leader shall also make an attempt to gather additional information in order to measure the impact of the project's interventions on the project area. If this is not possible during the timeframe planned for the evaluation, recommendations should be made regarding the resources, skills and methodologies required to make such measurements. This recommendation should also provide insight on how best to attribute the impacts to individual donor projects.

G. A recommendation on whether some or all project activities should be continued beyond the present planned PACD, including an appropriate justification to support the recommendation. This recommendation should also consider a restructuring of some of the activities. The recommendation should take into consideration the projected management requirements on the OAR/GB staff, how it will fit into A.I.D.'s present strategy in Guinea-Bissau.

3. Level of Effort:

The Team Leader will be required for a total of six weeks. This will be broken out as follows:

Three days (U.S.): Background reading/interviews with A.I.D./Washington staff; mobilization of team.

Four weeks (Guinea-Bissau): Preparation of work plans for other team members, travel to project areas, meetings with project personnel, .A.I.D. project officer and Mission staff, other donors, GOGB officials, etc., drafting of evaluation report.

Seven days (U.S.): Finalization of evaluation report and executive summary.

The remainder of the item will be devoted to travel to/from Guinea-Bissau. A six-day workweek is authorized.

4. Minimum Qualifications: Minimum M.S. or M.A. in Agricultural Economics, Development Economics, or a related field. Minimum five years of work experience as an agricultural economist working in developing countries, preferably Sub-Saharan Africa.

Portuguese reading and speaking (FSI S-3/R-3) highly desirable. French reading and speaking (FSI S-3/R-3) a less desirable alternate language, but acceptable.

B. HYDROLOGICAL ENGINEER:

1. General:

Hydrological Engineer (Engineer) will be one member of a multidisciplinary team conducting the final evaluation of the Guinea-Bissau South Coast Agricultural Development Project. The purpose of the evaluation is to examine whether project objectives were met, to identify where problem exist, and to recommend a remedial course of action for the project to follow for the remainder of the project's life. The evaluation will also make a recommendation regarding whether this activity should be continued beyond the present PACD, taking into consideration the remaining project funds as well as the existing and planned staffing levels of the OAR/GB to continue to manage such an activity. The recommendation should also take into consideration other alternative courses of action (e.g., deobligation of undisbursed project funds and reobligation to another project activity, new project activities, etc.).

The evaluation methodology will be to read existing project and background

documents (PID, PP, trip reports, the interim evaluation, correspondence, etc.), interview relevant A.I.D. and host country individuals, and visit the project site, in order to make the analyses and recommendations described below. The Engineer will work under the general direction o the evaluation team's Agricultural Economist, who will be functioning as Team Leader.

2. Specific:

The Engineer will be responsible for evaluating the project from an engineering and technical perspective. In particular, the Engineer will undertake the following tasks:

A. Make a technical assessment of the water control structures developed, planned, and constructed by DHAS. To the degree possible, the technical assessment should include, but not necessarily be limited to, an evaluation f the surveying techniques employed by DHAS, dam design methologies, construction techniques, quality control, etc. The engineer should also make an assessment of the quality and effectiveness of floodgate design to prevent salt water intrusion into the dammed sites.

B. Analyze the costs of water control structure design, construction, and maintenance, to assist in the development of an assessment of the cost effectiveness of project interventions and those of other donors in the project area (this work to be completed by the Agricultural Economist).

C. Provide technical input into the team's assessment of the institutional capacity of DHAS, including an assessment of the degree to which A.I.D. inputs (training, technical assistance, commodities, construction, etc.) have contributed to that capacity.

D. Assist in the development of specific and general evaluation recommendations.

E. Provide a written report of the findings of the above analyses and

assessments of use in the overall evaluation report. Also, draft summaries of the analyses for use in the evaluation report's executive summary.

F. Provide other technical inputs as requested by the Team Leader and within the evaluator's range of expertise that can be reasonably conducted in the evaluation timeframe.

3. Level of Effort:

The Hydrological Engineer will be required for a total of four weeks, all of which will be spent in Guinea-Bissau. It is anticipated that approximately half the time will be spent in the project area, and the remainder of the time in Bissau.

A six-day workweek is authorized.

4. Minimum Qualifications:

Minimum M.S. or M.A. in Civil Engineering, Hydrological Engineering, or a related field. Minimum five years of work experience as a civil engineer working on water control structures, preferably in developing countries and preferably in Sub-Saharan Africa.

Portuguese reading and speaking (FSI S-3/R-3) highly desirable. French reading and speaking (FSI S-3/R-3) a less desirable alternate language, but acceptable.

C. SOCIOLOGIST/ANTHROPOLOGIST

1. General:

The Sociologist/Anthropologist will be one member of a multidisciplinary team conducting the final evaluation of the Guinea-Bissau South Coast Agricultural Development Project. The purpose of the evaluation is to examine whether

project objectives were met, to identify where problems exist, and to recommend a remedial course of action for the project to follow for the remainder of the project's life. the evaluation will also make a recommendation regarding whether this activity should be continued beyond the present PACD, taking into consideration the remaining project funds as well as the existing and planned staffing levels of the OAR/GB to continue to manage such an activity. The recommendation should also take into consideration other alternative courses of action (e.g. deobligation of undisbursed project funds and reobligation to another project activity, a new project activities, etc.).

The evaluation methodology will be to read existing project and background documents (PID, PP, trip reports, the interim evaluation, correspondence, etc.), interview relevant A.I.D. and host country individuals, and visit the project site, in order to make the analyses and recommendations described below. The Sociologist/Anthropologist will work under the general direction of the evaluation team's Agricultural Economist, who will be functioning as Team Leader.

2. Specific::

The Sociologist/Anthropologist will be responsible for evaluating the project form a social/anthropological and institutional perspective. In particular, the Sociologist/Anthropologist will undertake the following tasks:

A. Make an assessment of the social impact, both positive and negative, of the water control structures developed, planned, and constructed by DHAS. To the degree possible, the assessment should include, but not necessarily be limited to, an evaluation of the impact dam construction had on the existing social structure, land tenure patterns, cultural patterns, or in other ways unforeseen during the project design.

B. Evaluate the institutional capacity of DHAS in order to determine its capabilities to carry out its mandate. This should include an assessment of

the degree to which A.I.D. inputs (training, technical assistance, commodities , construction, etc.) have contributed to that capacity. Technical inputs for this evaluation will be provided by the evaluation team's engineer.

C. Determine whether there have been any demographic changes, i.e., composition of the population living in the project area (numbers, ethnic composition, etc.), sources of income, activities, etc. in the project area and how this has impacted, either positively or negatively, on the project.

D. Evaluate the degree to which gender issues were considered during project design and implementation, and whether project success could have been affected if gender issues had been taken into greater consideration.

E. Assist in the development of specific and general evaluation recommendations.

F. Provide a written report fo the findings of the above analyses and assessments for use in the overall evaluation report. Also, draft summaries of the analyses for use in the evaluation report's executive summary.

G. Provide other inputs as requested by the Team Leader and within the evaluator's range of expertise that can be reasonably conducted in the evaluation timeframe.

3. Level of Effort:

The Sociologist/Anthropologist will be required for a period of four weeks, all of which will be spent in Guinea-Bissau. It is anticipated that approximately half the time will be spent in the project area, and the remainder of the time in Bissau.

A six-day workweek is authorized.

4. Minimum Qualifications:

Minimum M.S. or M.A. in Sociology, Anthropology, Public Administration, African Studies, or a related field. Minimum five years of work experience as a practicing anthropologist/sociologist working in developing countries, preferably Sub-Saharan Africa. Experience working on institutional analyses also desirable. Demonstrated ability to work in unstructured environment and under difficult physical conditions required. Ability to communicate effectively in rural African environment required. Ability to write well required.

Portuguese reading and speaking (FSI S-3/R-3) highly desirable. French reading and speaking (FSI S-3/R-3) a less desirable alternate language, but acceptable.

ARTICLE IV - REPORTS

The Contractor will be responsible for providing a final draft evaluation report three working days prior to departure of the evaluation team. This report, to be submitted in English, should not exceed 50 pages (exclusive of annexes) and should conform with evaluation guidance contained in A.I.D. Handbook 3, Chapter 12 and the A.I.D. Program Design and Evaluation Methodology Report No. 7 (A.I.D. Evaluation Handbook). After the final draft has been reviewed, the contractor will be responsible for having the executive summary of the evaluation report translated into Portuguese. The evaluation report will contain the following sections (described in greater detail in the A.I.D. Evaluation Handbook):

Executive Summary
Project Identification Data Sheet
Table of Contents
Body of Report
Appendices

Within six weeks of departure of the evaluation team, the contractor shall incorporate comments provided by OAR/GB and produce the final evaluation report, in English, and with the Executive Summary translated into Portuguese. Submission of the report shall be in fifteen (15) English versions, and ten (10) Portuguese versions (Executive Summary only), directly to the OAR/GB, Guinea-Bissau. Internal A.I.D. distribution will be made subsequently by OAR/GB.

The OAR/GB will be responsible for conducting the final evaluation review and for accepting the final report.

ARTICLE V - RELATIONSHIPS AND RESPONSIBILITIES

The contractor will be represented by the Team Leader (Agricultural Economist/Team Leader), who will be directly responsible to the A.I.D. Representative, Guinea-Bissau, or her designate. The A.I.D. Representative will be responsible for providing general guidance to the evaluation team, and for ensuring that appropriate contacts are established between the evaluation team and the host country counterparts. Technical guidance will be provided to the team by the Project Officer/General Development Officer resident in the Mission.

On the evaluation team, the Hydrological Engineer and the Sociologist/Anthropologist will report and be directly responsible to the Agricultural Economist/Team Leader.

ARTICLE VI - TERM OF PERFORMANCE

The term of performance for this work shall be four weeks beginning o/a the second week of January 1990. In addition to this, the Agricultural Economist/Team Leader will be required for an additional three days prior to

initiation of the evaluation, plus an additional seven days following the field work, in order to complete the final evaluation report.

ARTICLE VII - WORK DAYS ORDERED

The total number of workdays ordered is 96 (estimated).

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ANNEX II. FAO, 1984 GENERAL DATA OF PROPOSED DAM SITES

Southern Region, Guinea Bissau

Site	Main Watercourse	Region	Catchment	High Lands	Low Lands	Bolanha	Mangrove
1 Gantumane	Manhima	Quinara	670	430	240	10	230
2 Gamamaduba	Caju	Embpada	710	440	270	40	230
3 Somba	Camaga	Embpada	1,070	670	400	180	220
4 Dartsatame *	Buguetim	Embpada	410	240	170	8	162
5 Marateba *	Marateba	Embpada	630	360	300	60	210
6 Pobresa	Tambual	Empbada	530	230	300	180	120
7 Cachobar	Buloba	Embpada	700	430	270	140	130
8 Ianque	Indaba	Embpada	950	590	360	180	180
9.1C de Baixo 1	Biama	Embpada	1,290	1,000	290	160	130
9.2C de Baixo 2	Biama	Embpada	590	430	160	90	70
10. Sao Miguel	Reminche	Embpada	1,620	1,180	440	250	190
11. Gandua B	Tomba	Catio	1,090	780	310	160	150
12. Catema B *	Cabasse	Catio	660	350	310	50	260
13. Cansala	Cansala	Catio	540	300	240	150	90
14. Santana	Caiche	Catio	590	280	310	110	200
15. Incomene 2	Cadecane	Catio	1,200	810	390	210	180
16. Gansona Chumgueque	Camere	Catio	760	220	540	310	230
17. Ganj. Porto	Cantolom	Catio	920	570	540	300	240
18. Cangalai	Cachombe	Catio	3,030	2,040	990	640	350
19. Cubaque	Cangula	Catio	630	360	270	110	160
20. Cachaque *	Catataque	Catio	1,023	400	620	270	350
21. Caduco	Malaba	Catio	1,070	440	630	230	400
22. BocheMende	Manterunge	Catio	1,140	430	710	180	530
23. Cabolol	Camaquebom	Catio	1,130	500	630	110	520
24. Chuque	Neganto	Catio	2,100	1,380	720	310	410
25. Cabedu 1	Ualche	Bedanda	2,170	1,150	1,020	140	880
26. Cabedu 2	Ualche	Bedanda	NA				
27. Cafal B.	Bom	Bedanda	640	320	320	160	160
28. S. Clara	Dem	Bedanda	1,170	600	570	20	550
29. Flaque Inja	Jufolel	Bedanda	1,830	750	1,080	310	770
30. Cabanta	Pachica	Bedanda	740	380	360	0	360
31. Cassaca	Tompere	Cacine	4,190	1,870	2,320	890	1,430
32. Cabonepo	Poxiuco	Cacine	780	430	350	0	350
33. Bonia 2	Tunfim	Cacine	650	420	230	0	230
34. Bonia 1	Lquebal	Cacine	290	180	110	10	100
		TOTAL (34 sites)	**37,513**	**20,960**	**16,740**	**5,968**	**10,772**

*Sites dropped during project design

Source: Soil survey of estuarium valleys for reclamation of rice fields in regions Tombali and Quinara, South Guinea Bissau.

ANNEX III. ACRONYMS AND ABBREVIATIONS

ADB(BAD)	African Development Bank
AID	Agency for International Development (int'l level)
BAD(ADB)	African Development Bank
CP	Congressional Presentation
CTA	Chief Technical Advisor
DEPA	Department of Extension and Agricultural Research
DHAS	Department of Agricultural Hydrology and Soils - GOGB
FAO	Food and Agriculture Orgganization (United Nations)
FY	Fiscal Year
GAPLA	Planning Cabinet, Ministry of Agriculture
GDP	Gross Domestic Product
GOGB	Government of Guinea Bissau
ha	Hectare(s)
IFAD	International Fund For Agricultural Development
IQC	Indefinite Quantity Contract
kg	Kilogram(s)
MDRA	Ministry of Rural Development and Agriculture
PACD	Project Activities Completion Date
PAM/WFP	World Food Program
PASA	Participating Agency Service Agreement
PDOT	Tombali Rice Development Project (IFAD/ADB)
PP	Project Paper

PVC	Polyvinyl Chloride (pipe)
REDSO/ WCA	Regional Economic Development Services Office/ West Coastal Africa
SCAD	South Coast Agricultural Development (project)
SPSS	Small Program Strategy Statement
TA	Technical Assistance
UNICEF	United Nations Childrens Fund
USAID	United States Agency for International Development (mission level)
USDA	United States Department of Agriculture
WFP/PAM	World Food Program

ANNEX IV. PERSONS CONTACTED

Archie Hogan	AFR/TR/ANR/FS
Vara LaFoy	AFR/PD/CCWAP
Paul Niefert	USAID/BISSAU
J.D. Zack Lea	Rice Marketing Specialist, KSU
Cornelius Hugo	Rice Marketing Specialist, KSU
Justinho Vieira	Director, DHAS
Gerard Pichel	Dutch Consulting Engineer, DHAS
Ann Williams	USAID/Bissau Representative
Curtis Reed	Africare Representative
William Noble	Project Manager, AFRICARE
Adolfo Silva	DHAS Director, Catio Center
Carlos A. Schwartz Da Silva	Director, DEPA
Daniel Beaumont	Program Officer, FAO
Carlos Rui Ribeiro	Guinean Sociologist, INEP
David Vera Cruz	Chief, Soils and Mapping, DHAS
John Burns	FAO/USAID Master Mechanic, Catio
Issam Taima	Chief Technical Advisor, FAO GCP/GBS/017/KUW
Bill Seeger	Administrative Officer, USAID/Bissau
Frank Correl	Strategy Review Team, REDSO/WCA
Mary Ann Reigeilman	Strategy Review Team, REDSO/WCA
Scott Allen	Strategy Review Team, REDSO/WCA
Dennis Johnson	Tropical Research and Development
Manuel Saturnino D. Costa	Governor: Southern Region, Guinea-Bissau

Nick Bakker	Stenaks Trading and Shipping
Nelson Dias	Director, GAPLA
Gary Oba	AmEmbassy/Bissau Political Officer
Catherine Villeneuve	Canadian Volunteer at WFP
H. E. Mrs. Francisca Perreira	Minister for Women's A[illegible] and President of UDEMU (W[illegible]nen's Union)
Ibrahim Dieme	Director General of Planning, Ministry of Planning, GOGB
Nancy Benson	Quaker Service Regional Director
Mamadou Seka	Quaker Service
Sama Sambu	Aide de Camp for Gov. Saturnino
Mudina Nasum Sacoche	Farmer, Cabolol Village
Ndite	Elderly woman, Cantone Village
Elders of 5 Morancas in Cantone Village	
Kinda, Inasia, Sabadu, Kinta Ngoing	Women of Biya Lineage in Kabumba Village.
Feliz NaLama	School Administrator, Catio
Neniya	Woman of Mattofaruba Village
Doctors Andreoni	Husband/Wife Medical Team directing Catio Hospital, Italian technical assistance
Kate Chapman	Brit. VSO Volunteer in Catio (Marketing Studies)
Henri Sellies	Director, PDOT in Catio
Michel Servignant	PDOT Financial Administrator
Van Look	Engineer, FAO Kuwaiti Project
Rogerio Caetan Barros	Secretary, Tombali District
Abbe Jose	Priest at Bissau Catholic Seminary

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