

EVALUATION

**BICOL INTEGRATED AREA DEVELOPMENT II
(BULA - MINALABAC LAND CONSOLIDATION)**

JULY, 1982

MANILA, PHILIPPINES

BICOL INTEGRATED AREA DEVELOPMENT II
(Bula-Minalabac Land Consolidation)

Project No. 492-0310
(Bicol IAD II)

PROJECT EVALUATION REPORT

By:

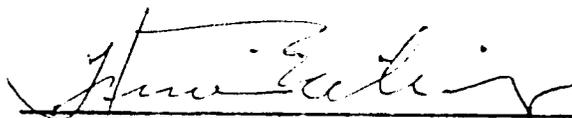
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July 11, 1982

EVALUATION TEAM MEMBERS SIGNATURE PAGE

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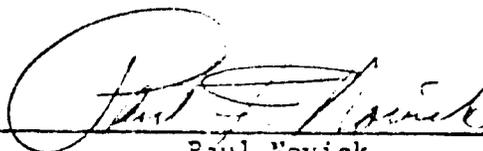
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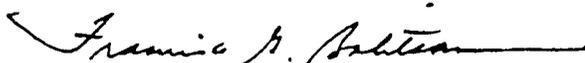
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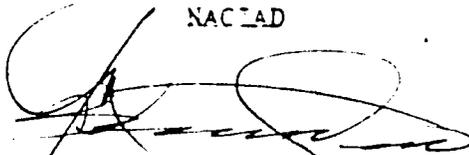
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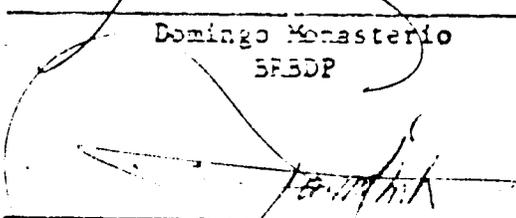
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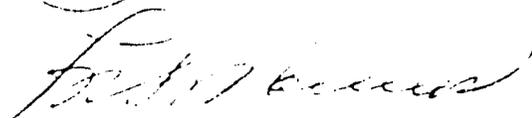
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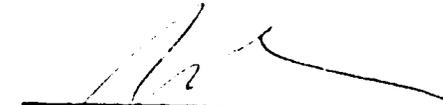
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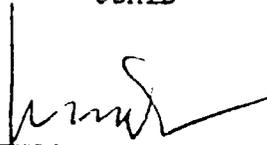
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PREFACE

Twelve persons contributed written drafts on one or more sections of this report. Of those twelve, nine were directly involved in the preparation of the 1981 Evaluation Report and, of those nine, four are senior members of the Project Management Staff. Three of the authors represent other GOP offices; MAR/Marila, NACIAD, and BRBDPO. Jerry Silverman served as Team Leader and was responsible for integrating and editing the various contributions. Those persons who provided initial drafts for each section are identified in the Table of Contents and under the heading of each section or appropriate subsection.

A first draft was presented to staff members of the BRBDPO and to the Regional Director of MAR, the Program Officer of the BRBDPO, and representatives of MAR, OBM, and NEDA in Deputy Minister Benjamin Labayan's office on July 9, 1982.

This final draft was rewritten by Jerry Silverman based on the discussion during that July 9, 1982 meeting. The team takes this opportunity to thank GOP officials and project beneficiaries interviewed during the preparation of this Report. Special thanks are due to staff who typed the first draft report by working overtime under difficult conditions: Vicky Nepomuceno, Aida Aguilar, Cris Moraleda, and Lilia Carpina (BRBDPO) and Carmen Jamito (USAID).

I. EXECUTIVE SUMMARY (Jerry Silverman)

OVERVIEW. Between 1951 and 1979, the U.S. Government, through AID, has obligated approximately \$132.7 million towards helping the Government of the Philippines (GOP) increase agricultural production and the income of the rural poor through a wide variety of Programs (e.g., Rural Electrification, Provincial Development Assistance and Rural Roads). A major emphasis among those Programs has been, since 1974, support for a GOP integrated area development (IAD) program in the Bicol River Basin in Southern Luzon, an area characterized on the one hand by abundant natural resources and on the other hand by extensive rural poverty. To date, USAID has obligated \$28.4 million for five separate loan projects and two grant technical assistance projects in the Bicol River Basin. Obligations totalling \$46.8 million have followed from the Asian Development Bank and European Economic Community. The subject of this Evaluation Report, the Bula-Minalabac Integrated Area Development (BIAD II) Project is but one component of this overall effort.

The Loan Agreement provides for the establishment of a Pilot Land Consolidation Project; the AID-financed component of which includes the construction of road access, drainage and pump irrigation facilities within the 2,400-hectare project area, as well as the procurement of O & M equipment. Related project components, including homesite development, land consolidation and tenure reform, organizational development, training, and applied agricultural research, are provided by the GOP.

COSTS. The total budget for BIAD II was originally estimated in 1977 at \$5.65 million. AID has obligated \$3 million. However, the current revised estimate in current dollars is \$10.1 million. As of June 30, 1982, the GOP had already spent \$7.7 million; AID has disbursed a total of \$319,976 to date. The estimated accrued expenditures of AID loan funds against physical work accomplished is \$1.4 million.

DELAYS. Because of the complexity of the Project, substantial delays occurred through June 1981. However, in the twelve-month period since the last evaluation, extensive progress has occurred. An extension of the PACD from December 31, 1982 to December 31, 1983 is recommended.

EFFECTIVENESS OF AID SUPPORT. The GOP project staff judges AID technical assistance and monitoring/evaluation efforts to have been adequate and appropriate. However, a conclusion in this Report, as in 1981, is that USAID should have devoted some additional attention to problems in the organizational development component of the Project.

PERFORMANCE OF THE GOP. GOP performance has shown considerable and significant improvement since the 1981 evaluation. With reference to the

physical infrastructure component, it is currently very good. However, only marginal progress has been made in the institutional and agricultural development component; wholly funded by the GOP. Earlier problems with the budget preparation/funds disbursement process and the supervision of contractors involved in construction work have been resolved.

MAJOR RECOMMENDATIONS FOR IMMEDIATE CONSIDERATION. A total of 29 recommendations are provided in the Report. The 7 most important of these are summarized here: (i) USAID should approve a request from the GOP for an extension of the PACD to December 31, 1983; (ii) The PMO, with technical assistance by external consultants, should design a detailed implementation plan for the organizational development of the Irrigators' Associations and water management training of farmers; (iii) at the request of the GOP, USAID should approve the use of Bicol IRD Project grant funds for additional short-term technical assistance to help the PMO in the design of an effective strategy for Irrigators' Association organizational development and training; (iv) USAID should assign explicit responsibility to a specific person in ORAD to provide some TA and monitoring of the Institutional Development component of the Project; (v) a new organizational structure for the PMO should be established in order to provide for a smooth transition from the construction phase to the operation of the system and beyond; (vi) at least three additional staff members should be assigned to the PMO with full time responsibility for organizational development of the Irrigators' Associations and the training of their members; and (vii) the GOP should decide no later than November 30, 1982 what specific proportion of systems amortization and O & M expenses the Irrigators' Association will be required to pay, and then establish an appropriate and equitable Water Users Fee.

PROJECT IDENTIFICATION FACTSHEET

1. COUNTRY: The Philippines
2. PROJECT TITLES: "Bicol Integrated Area Development II
(Bula-Minalabac Land Consolidation)"
3. BILATERAL PROJECT NUMBER: 492-0310 (Aid Loan Number 492-T-046)
4. PROJECT IMPLEMENTATION
 - a. First Project Agreement: FY 78
 - b. Final obligation: FY 78
 - c. Final Input Delivery: Ongoing
5. PROJECT FUNDING
 - a. A.I.D. Bilateral Funding \$3,000,000 (loan, FY 78-83)
(\$2,250,000: Original: FY 78)
 - b. A.I.D. Disbursements to date
(June 30, 1982): \$319,976
 - c. Other Major Donors: None
 - d. Host Country Funding
Original Budget: \$2,651,000
Cost to date (June 30, 1982): \$7,738,568 (P61,908,542)
Allocated Through December 31, 1982: \$8,627,122 (P69,016,982)
Estimated Costs Through Completion
(December 31, 1983): \$10,090,242 (P80,721,982)
6. MODE OF IMPLEMENTATION
 - a. Project Loan Agreement between USAID/Manila and National Economic and Development Authority; Government of the Philippines (January 13, 1978)
 - b. Project Loan Agreement Amendment (August 18, 1978)
7. PREVIOUS EVALUATIONS AND REVIEWS:
 - a. 1979 Evaluation Bula Integrated Area Development Project (June 22, 1979)
 - b. Project Evaluation Summary (PES) covering period 2/78 to 6/79 (August 30, 1979)
 - c. Memorandum Audit Report No. 2-492-81-1 (October 6, 1980)
 - d. 1981 Evaluation Bula Integrated Area Development Project (June 18, 1981)
8. RESPONSIBLE MISSION OFFICIALS:
 - a. Mission Directors: Peter Cody (77/79)
Anthony Schwarzwaldner (79-present)
 - b. Responsible Proj Officers: C. Stuart Callison (76/77), Design
Ralph Bird (78/81), Implementation
David Heesen (81-present),
Implementation
9. HOST COUNTRY EXCHANGE RATES:
 - a. Name of Currency: Peso (P)
 - b. Exchange Rates:

At Project Inauguration (1/78): P7.5 = \$1
At January 1980 : P8.0 = \$1
At Evaluation (6/82) : P8.4 = \$1
Average to date (6/82) : P8.0 = \$1

ABBREVIATIONS

AID	Agency for International Development
ARBA	Agrarian Reform Beneficiaries' Association
BIAD II	Bicol Integrated Area Development II Project (Bula-Minalabac Land Consolidation) --AID designation
BIDA II	Bicol Integrated Development Area II - GOP designation
BRBDP	Bicol River Basin Development Program
CCC/IRDP	Cabinet Coordinating Committee for Integrated Rural Development Projects
CF	Compact Farm
CLT	Certificate of Land Transfer
CMG	Composite Management Group
COA	Commission on Audit (Government of the Philippines)
CON	Contract or Casual Employee
FAP	Farm Access Path
FAR	Fixed Amount Reimbursement
FARA	Fixed Amount Reimbursement Agreement
FSR	Farm Service Road
GOP	Government of the Philippines
IA	Irrigators' Association
IAD	Integrated Area Development
IADD	Institutional and Agricultural Development Division (Project Management Office)
LBP	Land Bank of the Philippines
MA	Ministry of Agriculture
MAR	Ministry of Agrarian Reform
MARCO	Ministry of Agrarian Reform Central Office
MLGCD	Ministry of Local Government and Community Development
MOH	Ministry of Health
MPW	Ministry of Public Works
MSSD	Ministry of Social Service Development
NACIAD	National Council for Integrated Area Development
NEDA	National Economic and Development Authority
NIA	National Irrigation Administration
OBM	Office of Budget & Management
O&M	Operations and Management
OJT	On-the-Job Training
OLT	Operation Land Transfer (The Land Reform Program)
ORAD	Office of Rural and Agricultural Development (United States Agency for International Development/The Philippines)
PAC	Private Advisory Committee
PACD	Project Assistance Completion Date
PIDD	Physical Infrastructure Development Division (Project Management Office)
PIL	Project Implementation Letter
PMO	Project Management Office (Bula-Minalabac Land Consolidation)
PP	Project Paper (USAID)
RIC	Rural Improvement Club
SN	Samahang Nayon (Barangay Level Farmers' Association)
TA	Technical Assistance
USAID	United States Agency for International Development/The Philippines

II. CONCLUSIONS AND RECOMMENDATIONS

The findings and conclusions of the evaluation are provided here. Each is followed, where appropriate, by one or more recommendations derived from the respective conclusions or "findings".

The 1981 evaluation report provided comprehensive and detailed background information on the history, design, and place within the Bicol development strategy of the Project. Therefore, no attempt is made to repeat that information here. Rather, this report focuses on progress during the last twelve months of project implementation, current status, and recommendations for future action.

1. OVERVIEW: INTRODUCTION TO BIAD II (Jerry Silverman)

The Bula-Minalabac Land Consolidation Project is an Integrated Area Development (IAD) project that includes a major land consolidation and tenure reform program encompassing seven barangays in Southern Luzon.

a. Scope of the Project

The project is multi-sectoral and requires a significant level of integration at the management level. This is illustrated by the fact that nine distinct sub-sector activities involve the direct participation of 15 GOP agencies.

b. Decentralization and Coordination

Management is decentralized vertically to the Regional and Project levels. Coordination is effected through a Composite Management Group (for policy) composed of the Regional Directors of the 15 government agencies involved and by assigning personnel from various agencies to a Project Management Office (PMO). The PMO is under the leadership of the Regional Director of the Ministry of Agrarian Reform (MAR), the lead agency, and is managed on a day-to-day basis by a Project Manager assigned by MAR.

c. Design Changes

The original Project Design has been modified to a significant extent on a number of occasions at the PMO level with regard to phasing and infrastructure engineering and design. The most significant changes have been in the number and location of pumping stations and the subdivision of Phase III into two parts; with USAID withdrawing support for Phase III-B.

d. Delays

The original Project Implementation Plan is behind schedule. The original Project Assistance Completion Date (PACD) of December 31, 1982 cannot be met. The GOP intends to submit an official request to USAID/Philippines, through NEDA, for an extension of the PACD to December 31, 1983. A major purpose of this evaluation is to provide a recommendation in that regard.

e. Costs

To date, the GOP has increased its current financial commitment to the Project through December 31, 1982 over the original 1978 GOP Implementation Plan estimates by 112%. The PMO's current estimate is that through project completion on December 31, 1983, the total increase will equal 167%.

2. PROPOSED EXTENSION OF PROJECT ASSISTANCE COMPLETION DATE (PACD)

The 1981 evaluation report recommended that "USAID should approve a request from the GOP for an extension of the PACD to June 30, 1984 if . . . 9 (nine) preconditions are met by the GOP prior to June 30, 1982." The figure below summarizes the current status with reference to those nine "preconditions".

Figure 1

1981 RECOMMENDED PACD EXTENSION PRECONDITIONS: CURRENT STATUS

<u>PRECONDITION</u>	<u>CURRENT STATUS (June 30, 1982)</u>
* A specified percentage of all scheduled irrigation and drainage construction work is completed.	* <u>Accomplished</u> ; percentage established January 1982 and essentially on schedule on schedule.
* All PIDD budget requirements continue to be expeditiously released by OBM and MARCO.	* <u>Accomplished</u> ; disbursements adequate and timely.
* The GOP has made a final decision concerning whether or not Phase III will be deleted from the Project.	* <u>Accomplished</u> ; Phase III not deleted but divided into Phase III-A and III-B (USAID support withdrawn from Phase III-B).
* The PMO has prepared a new revised budget (including cash flow projections) for the extension of the IADD component of the Project and for O & M of the PIDD component until June 30, 1986 and that budget has been approved by the OBM, Budget Technical Services.	* No longer relevant because of new recommendations in this report.
* The PMO has prepared a revised implementation plan for the effective operation of Irrigators' Associations and the phasing out of the PMO by June 30, 1986.	* <u>Accomplished</u> ; although revised during this evaluation.
* The PMO has prepared an estimated budget (in 1981 prices) for an adequate annual O&M subsidy by the GOP to the Irrigators' Associations following completion of the Project (i.e., June 30, 1986).	* <u>Accomplished</u> during this evaluation.
* The GOP has decided how it will finance and administer the O&M subsidy to Irrigators' Associations; including the designation of responsible agencies.	* Currently under discussion.

<u>PRECONDITION</u>	<u>CURRENT STATUS (June 30, 1982)</u>
* The GOP has explicitly identified the principal agency responsible for providing long term support and backup to the farmer controlled Irrigators' Associations in the BIAD II project area following completion and operation of all Phases of the Project (i.e., June 30, 1986).	* <u>Accomplished.</u>
* MAR/PMO has identified the type of additional Technical Assistance required for successful completion and operation of the project by June 30, 1986 and has submitted a request to USAID for additional grant support for that purpose.	* <u>Accomplished</u> during this evaluation.

Seven of the eight relevant pre-conditions have been adequately accomplished. Action on the remaining pre-condition is in progress and is highlighted in this Report. The progress on the Physical Infrastructure Development Component during the last twelve months has been sufficiently good that completion of the Project by December 31, 1983 (rather than June 30, 1984 as suggested in the 1981 Report) can reasonably be expected.

Recommendation: USAID should approve a GOP request to extend the PACD to December 31, 1983. The low level of AID disbursements to date should not be considered as a valid criteria for measuring progress in this Project (refer to discussion in subsection 6 of this Report).

3. EFFECTIVENESS OF GOP MANAGEMENT (Jerry Silverman)

The structure of GOP project management remains the same as described in the 1981 report. The two areas of concern identified in that report -- (i) cash flow problems which placed limits on budget allocations and releases and (ii) very strong Central Government control over the contracting process -- have been satisfactorily resolved during the last twelve months.

According to the PMO, the CY 1982 Budget Allocation was equal to the amount requested and releases have been timely. All contracts required for completion of the project have already been approved and signed. The

evaluation team's finding is that the PMO staff has improved on the level of performance already judged adequate last year and can achieve effective completion of the project by December 31, 1983.

However, the major management issue now facing the GOP with reference to BIAD II is not current effectiveness. Rather, the critical management issue is what GOP agency or agencies will be responsible for the operation and maintenance of the completed irrigation system and supporting subsystems beginning in January 1984.

Although some forward planning has occurred within the PMO towards developing the capacity of Irrigators' Associations, no substantive actions have yet been taken with reference to the explicit designation of an agency or agencies to provide overall management of the irrigation system beyond 1983.

It is now clear that the expectation (articulated in the 1981 evaluation report) that Irrigators' Associations (IA) would be able to assume primary responsibility for the O & M of the Irrigation System by June 1986 cannot be met. The assumption in 1981 that transition to IA control would involve only an interim 2-year period (June '84 to June '86) and, thus, would only require an extension of the PMO for that period can no longer be sustained. Therefore, MAR will assume long term responsibility for system O & M for the indefinite future project completion (i.e. from January 1984). What the Management System for the Bula-Minalabac irrigation system will be within MAR following project completion is an important unresolved question at this time. For the system to be in operation in 1984, timely decisions and an appropriate budget request will be necessary.

Recommendations:

- (i) MAR should design as soon as possible the specific organizational structure within Region V for the continued management of the system beyond the PACD.
- (ii) MAR should complete the preparation of its 1984 budget request no later than February 1983.

4. PHYSICAL INFRASTRUCTURE DEVELOPMENT

(Herminiano Echiverre, Jaime Abonita, and Oscar Bermillo)

Several problems contributed to some further delays in meeting the implementation schedule revised in January 1982. These problems included: (i) adverse effects of weather; (ii) irregular supply of cement; (iii) standing crops and improvements within the right-of-way; (iv) inadequate flexibility of some contractors in carrying out field activities; (v) occasional inadequate forward funding by some contractors; and (vi)

inability to find acceptable aggregates for concrete within 15-kilometers from the project site (aggregates are now coming from Albay province). However, the resultant delays have not been serious and the implementation of the physical infrastructure component is essentially on (revised 1982) schedule.

What follows is a summary of the current construction status of the Project's irrigation, drainage, road access, and barangay water system components by phase. Progress towards completion is reported in terms of a percentage figure. That figure reflects a formula which weights the components of each phase according to the amount of earth works required. For a detailed description of the status of each component by phase -- what the aggregate percentage figure actually reflects -- refer to Annex C of this Report.

a. Phase I (610 Has.)
Pilot Project (100 Has.)

Construction has been implemented as planned. The Project Management Office (PMO) is undertaking efforts to complete the project before the end of 1982. This is a wholly GOP-funded portion of Phase I.

Phase IA (200 Has.)

Construction is being implemented as originally planned. NIA began construction in February 1981 after being contracted by the PMO to replace R. B. Barbers. However, it withdrew in December after accomplishing approximately 94%. At present, completion of the remaining construction is being undertaken directly by the PMO. To date this portion of Phase I is approximately 99% complete (June 1981 - 19%).

b. Phase IB (310 Has.)

Construction is being implemented as originally planned. Agno Construction, the Contractor, continued working beyond the expiry date of the contract on May 27, 1981 until notified that its request for a contract extension was not approved. At the time Agno demobilized, approximately 80% of the work had been completed. The Project Management Office (PMO) subdivided the remaining work to be done into three small packages. On March 3, 1982, all packages were awarded to locally-based small-package contractors, Package I to King Construction, Package II to A. C. Builders and Package III to F. H. Amosco. Construction was resumed in May 1982. As of June 25, 1982, overall accomplishment is approximately 86% (June 1981 - 68%).

c. Phase II (207 Has.)

F. R. Ignacio's construction contract was approved in July 1981. As a result of improved weather conditions, full physical implementation was

resumed in February 1982. Since standing crops and other improvements obstructed many sections of the right-of-way, initial progress on embankment formation was slow, Construction of irrigation and drainage structures, however, progressed with fewer interruptions, except where ROW problems existed and access to sites for construction materials was difficult. Flexible scheduling of work was undertaken in order to cope with problems caused by the weather, right-of-way, equipment, accessibility and field personnel. As of June 25, 1982, accomplishment was approximately 76.82% (June 1981 - 1.2%).

d. Phase III (310 Has.)

Development of the first three wells in Phase III was completed in June 1981. After several meetings between MAR, the PMO and USAID, a decision was reached to subdivide Phase III into Phase III-A (where the first 3-wells are situated) and Phase III-B. Phase III-B has been deleted from the USAID Loan.

(i) Phase III-A (175 Has.)

The PMO request for local procurement of the three pumps for Phase III-A was approved by USAID on May 28, 1982. Bidding for the supply of the three pumps and motors has been scheduled for July 31, 1982, under the "Shelf Item" category. Construction of Civil Works for Phase III-A is in progress now with a total accomplishment of 24% as of June 25, 1982 (June 1981 - .0%).

(ii) Phase III-B (135 Has.)

MAR, having promised the people throughout Phase III that it would provide them with the benefits of the project, has decided to proceed with the drilling of the other 3-wells in Phase III-B. Preliminary findings on two of the production wells indicate a favorable underground water supply. In early June 1982 the PMO awarded contract to F. R. Ignacio for the construction of Phase III-B irrigation, drainage and road system. Construction of Civil works for Phase III-B is in progress now with a total accomplishment of 15% as of June 25, 1982 (June 1981 - .0%). Drilling of three-deep wells in Phase III-B is 67% completed. Preliminary test pumping results obtained on well #6 gave a discharge of 1700 GPM. Development of well #5 has been in progress. Construction of an access road to well #4 has been in progress.

e. Phase IV-A (500 Has.)

Marosa's contract was approved in July 1981. Construction was immediately resumed with priority given to completing irrigation and drainage structures crossing underneath the secondary road before the road contractor

began work. Construction progress has been significant due to effective scheduling of personnel and equipment. Flexible work schedule were established in order to minimize delays due to weather and right-of-way. Earthmoving and compaction of embankments for canals and service roads extended beyond the eight-hour work day in the summer. As of June 21, 1982, accomplishment was approximately 75%. (June 1981 - 8%).

f. Phase IV-B (521 Has.)

J. Romero's construction contract was approved in July 1981. Mobilization began soon after that date. Construction of embankments for canals and roads continued day and night in summer. Construction of canal structures was concentrated on the supply canal and began at peripheral sites as soon as they were accessible. However, the effects of weather caused construction delays even during summer. Aside from weather-related problems, a vehicular accident and a labor dispute, together resulting in two fatalities, caused considerable delays. To date, accomplishment is approximately 62.85% (June 1981 - .0%).

g. Phase V (248 Has.)

HG & B's construction contract was approved in July 1981. During the rest of 1981 until most of the first quarter of 1982 the contractor had not mobilized appropriate equipment and personnel. Construction progress was slow until the contractor received equipment assistance from the Project Management Office (PMO). Management and financial difficulties have been recurring problems and have negatively affected progress.

Physical implementation progressed on embankment formation for irrigation canals and roads, and construction of irrigation and drainage structures along the supply canal. Structures in peripheral areas were started as soon as they became accessible. To date accomplishment is approximately 47.8% (June 1981 - 2%).

The Figure below summarizes the current status of the Physical Infrastructure Construction component of the Project:

Figure 2

CONSTRUCTION:CURRENT STATUS

PHASE	CONTRACTOR	DATE BID	S T A T U S	
			REMARKS (April 15, 1981)	REMARKS (June 25, 1982)
I - Irrigation Drainage and Road Networks				
I - A	a. R. B. Barber Construction	a. May 16, 1978	a. Approximate 15% completed before the contract was cancelled July 31, 1980.	
	b. N I A	b. Dec. 1980 (Memo of Agreement)	b. Began construction February 1981. Approximately 39% completed.	b. NIA ceased to be co-implementor in December 1981.
	c. MAR/PMO			c. Work began by Administrator in February 1982 to continue remaining irrigation and drainage canals, structures and land formation. Approximately 98.11% completed.
I - B	a. Agno-Construction	a. Nov. 23, 1978	a. Contract expired May 27, 1981 at which time approximately 80% was completed.	
	b. Small package contractors		b. IFB for new contractors not yet issued	b. Began construction of remaining works May 1982. Approximately 86% completed.

Figure 2 - continuation

PHASE	CONTRACTOR	DATE BID	S T A T U S	
			REMARKS (April 15, 1981)	REMARKS (June 25, 1982)
II -	a. -	a. June 15, 1979	a. For production wells. All bids too high; Resulted in design change.	
	b. F. R. Ignacio Construction	b. Jan. 28, 1981	b. Approximately 1.2% completed. Work halted March 1981, pending approval of contract, Office of the President.	b. Contract approved July 1981. Contract duration 365 calendar days. Full operation resumed February 1982 when weather improved. Approximately 76.82%
III - A	a. AGB Construction	a. Nov. 23, 1979	a. Drilling of investigation/production wells completed; Development incomplete.	a. Development and test pumping completed June 1981.
	b. Marosa Enterprises	b. March 5, 1982		b. Contract approved by Minister May 19, 1982. However construction started May 13, 1982 at contractor's risk. Approximately 14% completed.
	c. MAR/PMO			c. GOP-funded. Nov. 23, 1981 work by administration started to be funded. Rehabilitation of damaged dam in barangay San Isidro serving approximately 85 has; drawing water from Anayan creek.

Figure 2 - continuation

PHASE	CONTRACTOR	DATE BID	S T A T U S	
			REMARKS (April 15, 1981)	REMARKS (June 25, 1982)
III - B	a. AGB Enterprises	a. March 10, 1980		a. Contract for 3 additional production wells. Development of 1-well completed May 1982. Development of second well ongoing. Drilling of last well scheduled in July 1982. Approximately 67% completed.
	b. F. R. Ignacio Cons-	b. April 16, 1982		b. Contract approved June 1982. Construction civil works just started.
IV - A	a.	a. Nov. 23, 1979	a. All bids for Phase IV as whole too high; resulted in design change.	
	b. MAROSA Enterprises	b. Nov. 11, 1980	b. Approximately 5% completed. Work halted March 1981 pending approval of contract, Office of the President.	b. Contract approved July 1981. Contract duration 480 calendar days. Work resumed immediately. Approximately 75% completed.
IV - B	a. -	a. Nov. 23, 1979	a. All bids for Phase IV as whole too high; resulted in design change.	
	b. J. P. Romero Enterprises	b. Jan. 28, 1981	b. Not yet started pending approval of contract, Office of the President.	b. Contract approved July 1981. Contract duration 480 calendar days. Work resumed August 1981. Approximately 62.85% completed.

Figure 2 - continuation

PHASE	CONTRACTOR	DATE BID	S T A T U S	
			REMARKS (April 15, 1981)	REMARKS (June 25, 1982)
V	a. HG & B Construction	a. January 28, 1981	a. Completed approximately 2%. Work halted pending approval of contract Office of the President.	a. Contract approved July 1981. Contract duration 330 calendar days. Work resumed August 1981. Approximately 47.79% completed.
II - <u>Pumping Stations</u>				
I	a. B. L. Cervantes Construction	a. Dec. 6, 1978	a. Completed January 1981.	
II, IV & V	a. LGH Construction	a. Nov. 11, 1980	a. Approximately 24% completed. (Approved by Office of the President April 13, 1981; Approval received by MAR May 1981)	a. Completed March 1982.
II & IV-B (Boosters)	a. LGH Construction			a. Negotiated with LGH. Awarded May 18, 1982. Not started pending approval of contract by Minister.
III - <u>Pumps & Motors Procurement</u>				
I	a. Rockford Industries and Chemicals	a. March 8, 1979	a. Awarded May 18, 1979. Foreign acquisition completed.	

Figure 2 - continuation

PHASE	CONTRACTOR	DATE BID	S T A T U S	
			REMARKS (April 15, 1981)	REMARKS (June 25, 1982)
II, IV & V	a. Rockford Industries & Chemicals	a. Nov. 23, 1981		a. Notice of Award for supply, delivery and installation and test run, signed May 15, 1982.
IV - <u>Barangay Water Supply System</u>				
I	a. BENSIA Const.	a. Dec. 2, 1980		a. Completed January 1982.
III				
San Agustin	a. -	a. -		a. In-house design in progress.
San Isidro	a. -	a. -		a. In-house design in progress.

Progress during the last twelve months suggests that the PMO and Technosphere Consultants Group, Inc. have assigned adequate personnel to monitor and supervise the project. In each phase, two resident engineers (one from the PMO and one from Technosphere) are assigned to work full time and have been available for night work in summer. Technosphere has a materials' engineer with its laboratory in a multi-purpose building centrally located in the project areas. The PMO management has been successful in promoting good working relationships among its staff, Technosphere, the contractors, and other agencies concerned. For instance, the PMO extended equipment assistance to Phase V during the early stages of mobilization. Its survey team has worked closely with Technosphere and the contractors' teams in laying out various phases of the system and rectifying survey problems arising in the field. As a result of closer field supervision, implementation has been well coordinated and has resulted in an improved quality of work.

However, in addition to routine monitoring and supervision tasks, Technosphere, under terms of its contract, has been responsible for preparing preliminary and detailed engineering designs, construction plans, specification, detailed estimates and work schedules. In addition, it provides construction supervision and inspection; tests for materials quality control; notifies PMO of construction deficiencies and recommends solutions; evaluates and provides MAR with recommendations for approval of time extensions; estimates and recommends change orders and extra work orders; prepares reproducible "as-built" plans; and conducts on the job training of MAR/PMO counterpart engineers.

The project field staff of Technosphere has been adequate in the performance of construction supervision, materials quality control services, project evaluation for contractors' progressive payments, "as-built" plans preparation and on the job training of MAR/PMO counterpart engineers. However, whenever critical field decisions and redesign work have been necessary due to discrepancies between approved design and actual field conditions, those decisions have been referred to its Manila Office for action. The urgent requirements for action on field problems requires that Technosphere base its BIAD II Project Manager in Bicol and not in Manila -- as is now the case.

Technosphere's local office is not adequately staffed to perform decision-making functions nor preparation of documents specifying quantities, cost estimates, and time schedules, and bidding documents. Thus, such documents are often submitted to MAR behind schedule.

Recommendations:

(i) The Technosphere project manager should reside in the project area as required by its contract, instead of in Manila.

(ii) Given the current capacity of the PMO, augmented by the technical assistance provided by MARCO and the USAID civil engineer assigned to the Bicol Regional Office, the services of Technosphere can be reduced for the CY 1983 period to two persons; a materials engineer and their project manager, who should serve as their field engineer.

(iii) The PMO requests that USAID reconsider its decision to withdraw completely its support for Phase III-B and to agree to purchase the three additional pumps and motors required for completion of that Phase (the Evaluation Team offers no recommendation -- either positive or negative -- in that regard).

5. ORGANIZATIONAL DEVELOPMENT AND TRAINING

(Jerry Silverman, Rodolfo Undan, Gregorio Beluang, Huberto Villaraza, and Francisco Ramos)

The 1981 report concluded that "the PMO does not at present have the knowledge required to design a water management plan and organize Irrigators' Associations with sufficient capability to exercise complete responsibility for the management, operation, and maintenance of the irrigation and drainage systems provided by BIAD II.... The most serious problem is the appropriateness of content in terms of the specific farmer organizational structures created, and the technical and managerial skills farmers will need to operate the systems for which they will be responsible."^{1/}

Thus, it was recommended that: (i) the PMO should be provided appropriate technical assistance as soon as possible; (ii) On-Farm Water Management training should be postponed until the organization of Irrigators Associations have been determined and assessment of management and technical skill requirements had been completed; and (iii) the PMO should continue to manage the organizational development and training effort until at least June 30, 1986.

- * The PMO has prepared a revised implementation plan which, in general terms, identifies categories of training and provides a schedule of activities through 1988.
- * USAID has provided technical assistance on a short-term, intermittent basis; consisting of a few two or three day visits by two American irrigation specialists during the last twelve months and visits averaging two days each by a Filipino Water Management expert. Those visits resulted in a rotational water plan for Phase I-A.

^{1/} 1981 Report, p. 10.

- * The PMO has decided to subdivide farmers into two irrigator Associations; one for Phases I and III and another one for Phases II, IV, and V.
- * With the initial operation of the pump system for partial irrigation of Phases IA and IB, the PMO has organized the San Ramon Irrigator's Association (IA) composed of farmers from San Ramon and San Agustin.
- * The PMO has assigned six of its staff to supervise the operation of the system by the Association.
- * Several training sessions were conducted during the last twelve months (compact farm, youth leadership and organization, SN reactivation, etc.); however, as recommended last year, water management training has been postponed pending the establishment of prior conditions.

The San Ramon Irrigators' Association has 250 members and holds regular scheduled meetings once a month. There is some participation of IA leaders in systems operation. However, they have not yet been involved in the preparation and implementation of an irrigation plan.

Pumping Station No. 1 has been operating for almost a year and is serving some areas in Phase I-A. About 80% of the area expected to be irrigated in Phase I-A has received water from the system. The reasons why the remaining 20% has not yet received irrigation water are: (i) the physical facilities are still incomplete; (ii) some canals are not located at the proper elevations; and (iii) land levelling is still in progress. The PMO is completing adjustments on the relocation of some canals and structures and has commissioned small contractors to complete the physical structures in this area. However, until the Phase I-A system is completed, the rotational water plan designed by the consultants cannot be implemented. Thus, in the meantime, farmers with access to irrigation water are using the system without following a definite irrigation plan and cropping calendar.

Current conditions and plans are not adequate to justify last year's assumption that the IA's will be capable of operating the system by June 30, 1986. The plan prepared by the PMO is inadequate; primarily because it did not receive technical assistance at levels adequate to meet the strong recommendation in the 1981 report. The need for a detailed plan -- which specifies the activities to be carried out and which synchronizes those activities -- still remains.

As pointed out in last year's Report, the PMO does not now have the capacity to design and implement such a plan by itself. Further, the organizational structure of the local office of whatever agency will

operate the system following completion has not yet been determined. Thus, how the IA's should be structured in order to interface with the responsible GOP agency's structure can not yet be determined.

It is now the Evaluation Team's view that it will be approximately ten years following completion of the system (i.e., 1993) before the IAs can be primarily responsible for irrigation and drainage system O & M (refer to Annex D of this report).

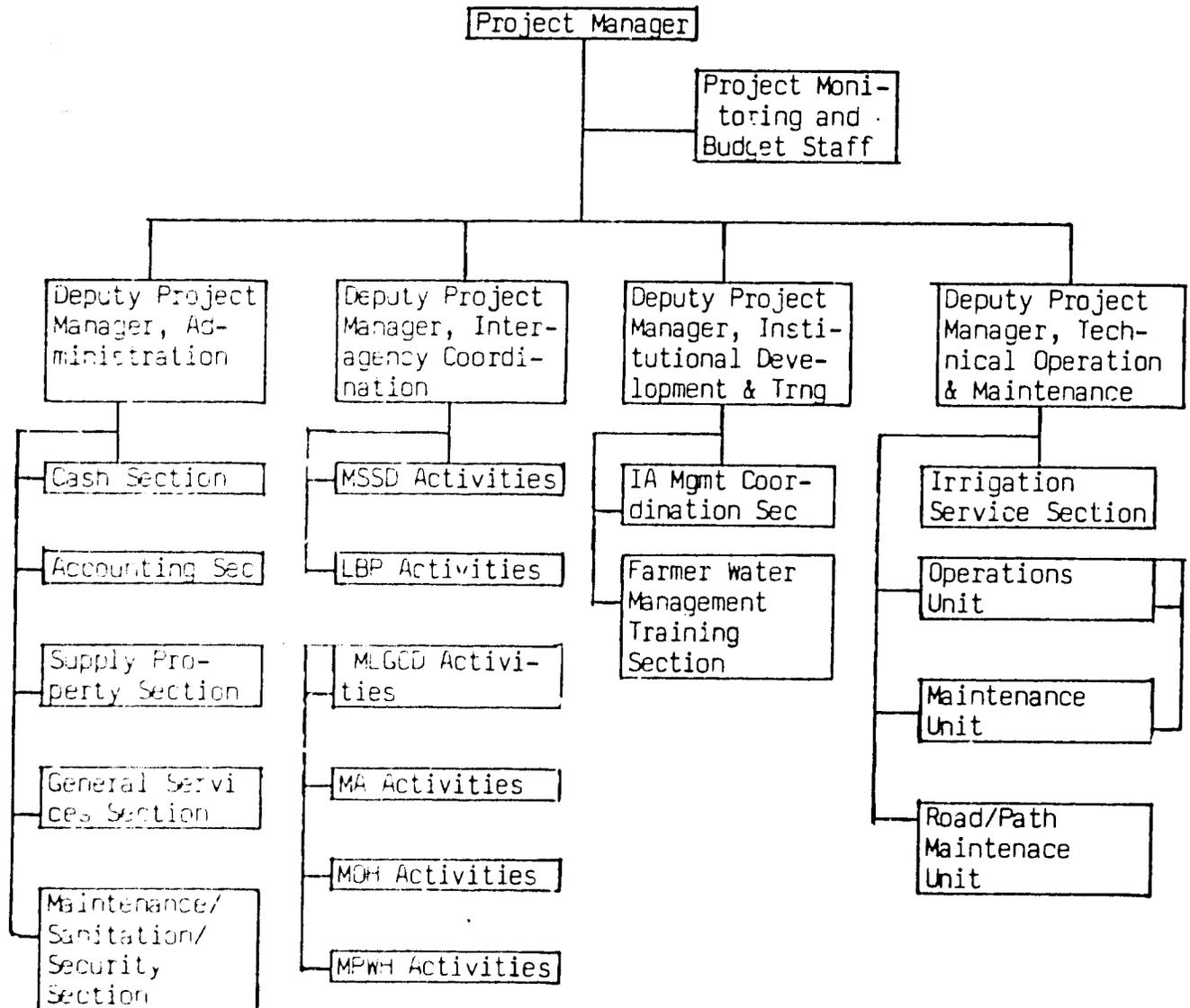
Recommendations:

(i) A detailed implementation plan should be designed which will (a) place more emphasis on the training needs of farmers for efficient and effective Water Management, (b) synchronize the conduct of training with the overall activities in the system, and (c) allow for increasing responsibilities of the IA's as their capacity increases. The training plan should include detailed specification of the following: (1) title of the training components; (2) their objectives; (3) who will be trained and how many; (4) the duration of the training component and its scheduling; (5) the specific content of the training module; (6) the methods to be used; (7) who will do the training, what qualifications should the trainers have, and from what sources can they be recruited; and (8) how much will it cost (Refer to Annex D of this Report for further details).

(ii) A new organizational structure for the PMO should be designed which will provide for a smooth transition from the construction phase to the operation of the system and beyond. Consideration should be given to the following revised PMO structure:

Figure 3

Suggested New Organization Chart
Project Management Office
(PMO)



In the implementation plan prepared for the effective management of this Project's irrigation system no serious consideration was given to the operation and maintenance of that System. There should be an organization for the effective maintenance of all completed infrastructure components, which include the road, irrigation and drainage networks. Consideration should be seriously given such organization, considering that CY 1984 is only the start of the Test Run for the Minalabac portion of the project. As of today, on the Test Run of Main Pumping Station No. 1, ₱1.0 million have been earmarked for CY 82 to maintain the system. Roads and canals are eroded; some portions need to be changed to ensure the workability of the scheme as constructed.

Suggestion therefore is that in the organizational set up there should be a separate organization for the operation and maintenance of the system for at least (2) years. This organization shall be directly under the Project Manager.

(iii) The farmers should be involved in designing the detailed internal structure of the IAs. As a starting point and example only, consideration should be given to the following:

Figure 4

Possible Internal Structure of the Irrigators Association (IA)

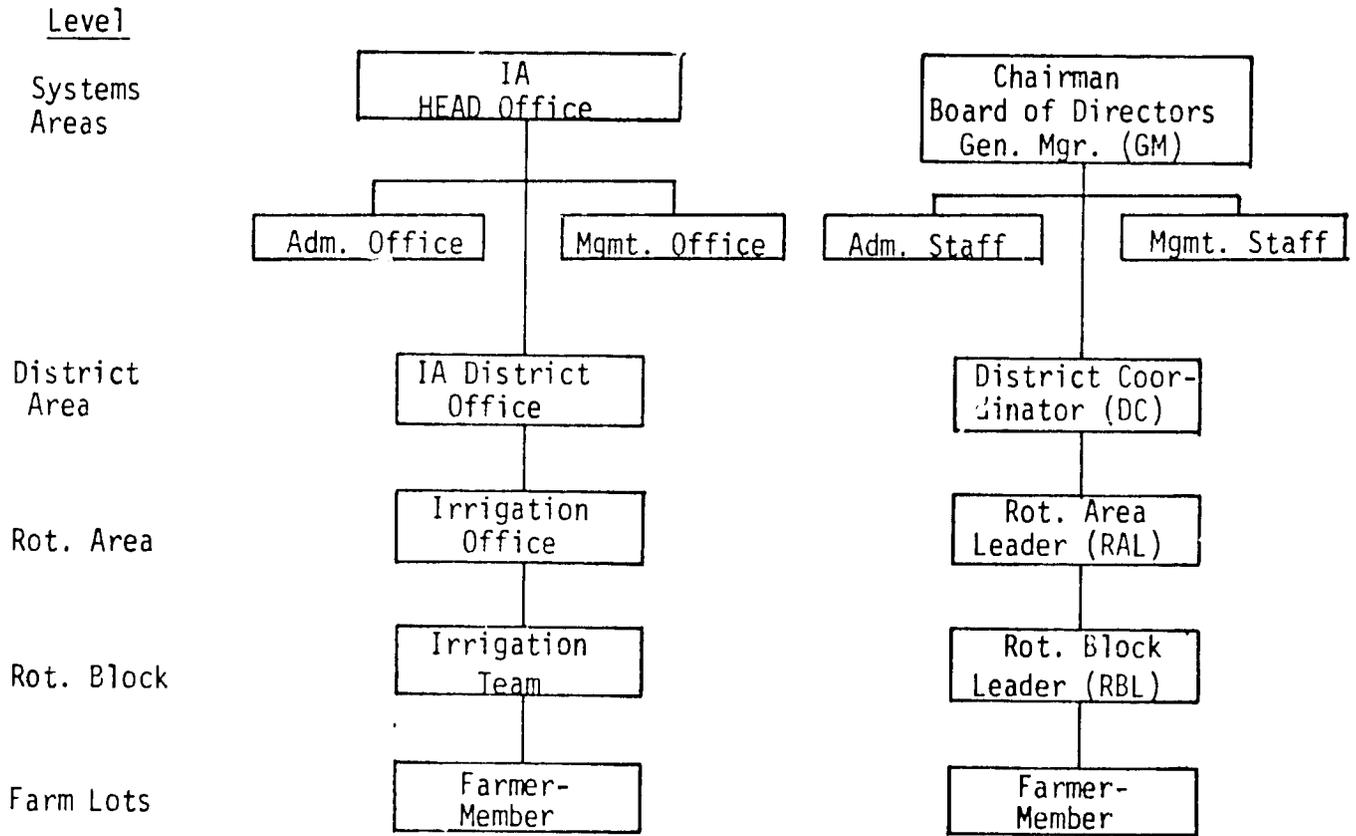


Figure 4 (continued)

Proposed Internal Structure IA

<u>Level</u>	<u>Description</u>	<u>Functions</u>
1. Farm Lots	Farmer-member: the farmers tilling the land served by the irrigation system with one source.	Association member and user of water; operates and maintains the farm ditches and structures within his farmplot; cooperates with other users in his block regarding proper water management; pays irrigation fee.
2. Rot. block	Irrigation Team; group of farmers in one block served by one division box; led by a Rot. Block Leader; approximately 50 farmers.	Responsible for the equitable distribution of water within the rotational block; cooperates with other irrigation teams in the rotational area refuse of water; assists in collection of fees.
3. Rot. Area	Irrigation Group: Composed of irrigators within one rotational area served by one turnout, approximately 100 farmers; headed by the Rot. Area Leader.	Manages the irrigation system within the rotational area served by the main farm ditch; coordinates with other irrigation groups covered by the same lateral; assists in fee collection.
4. District Area	Composed of irrigation groups headed by a District Coordinator. In the Bula District there are approximately 800 farmers represented while in Minalabac there are 1300 farmers.	Coordinates the work of the irrigation groups; provides the management of the system within his district with the help of management staff; represents the farmers in the IA Board.

Figure 4 (continued)

Proposed Internal Structure IA

<u>Level</u>	<u>Description</u>	<u>Function</u>
5. Systems Area	Management Staff: composed of Irrig. Operations Staff (Water Master, Ditch Tenders) and Maintenance Staff (Pump Operator, Maintenance Farmer).	Provides backstop management in the operational plan and management function (operations and maintenance) of the District Office for the System.
	Adm Staff: Personnel, finance, accounting, security.	Perform administrative functions for the IA.
	General Manager: Appointed by the Board; may be one of the Board Members; the implementing arm of the IA Board.	Manages the operation and maintenance of the entire system in accordance with the policies and guidelines set by the IA Board; assists in formulating policies and in making decisions.
	Board of Director: composed of District Directors headed by the Chairmen; at least 5 members.	Policy-making body of the IA; controls the IA activities.

(iv) MAR should assign or allow the PMO to recruit at least three additional persons with IA institutional development and water management experience to work full time on farmer training. For this purpose, MAR should include a request in its budget for CY 1983.

(v) Full completion of Phase I-A and I-B should be given the highest priority so that the comprehensive implementation of the irrigation plan can begin before farmers have too much experience with current negative precedents.

(vi) The Irrigator's Association in San Ramon and San Agustin should now be fully organized and registered and initial training should be given to the members regarding the duties and responsibilities of the IA with respect to operations and maintenance of the system.

(vii) Appropriate experts should be identified and contracted with in order to provide technical assistance to the PMO and train PMO and related GOP agency personnel as trainers. For this purpose, MAR should include a request in its budget for CY 1983 and should request an allocation from BRBDP and USAID from the Bicol IAD Grant.

6. ECONOMIC AND FINANCIAL ANALYSIS OF THE SYSTEM
(Paul Novick and Jerry Silverman)

The following presents a detailed analysis of what it will cost to amortize, operate, and maintain this irrigation system into the indefinite future. The primary reason for the analysis is to provide policy makers with a set of figures that they can use in determining the amount of GOP financial support that will be required for the effective operation of the system. There is absolutely no question that the GOP will have to assume responsibility for much of the future operating costs. The Bula-Minalabac Project represents a very expensive undertaking. Its massive land consolidation and reorganization, coupled with the development of an irrigation system powered by electricity, could not be done cheaply. For this reason some form of GOP financial support will have to be continued if the operation of the system is to be sustained.

The following discussion will cover in detail all of the expected costs under a variety of financial arrangements. While there might be some disagreement over the electricity operating costs, all of the other cost categories are fairly certain and based on solid data.

a. Amortization (For detailed supporting data, refer to Annex E, Figures E1-E4)

This component is based on the PMO estimates of total physical infrastructure costs through 1985. If provision of initial inputs run

beyond that date, the estimates will have to be revised upward. The components to be amortized, as suggested by the PMO, include the following: (i) A & E detailed engineering design, (ii) A & E construction supervision, (iii) Irrigation, drainage and roads, (iv) Imported pumps, (v) Multi-purpose and school buildings, (vi) Homesite development, (vii) Farmlot subdivision survey, (viii) R.O.W. and damages, and (ix) Test runs.

No decision has been made yet on the time period for amortizing the system. MAR suggests that this be 25 years. USAID has suggested 40 years; the normal repayment period of AID loans. For this reason a breakdown of costs has been made for both time periods. (See Figure 5, page 31).

Because these costs are substantial, there is considerable doubt that project beneficiaries can repay 100 percent of the amortization. The evaluation team recommends that some type of sharing arrangement be adopted whereby the COP would continue to provide financial support for some percentage of amortized costs. This is consistent with ideas expressed by Minister Estrella of MAR. Therefore, computations (in Figure 5) have been made for four (COP: Farmer) sharing arrangements: 100:00, 50:50, 60:40 and 70:30.

b. OPERATIONS AND MAINTENANCE (for detailed supporting data, refer to Annex E, Figures 5-15)

This component represents by far the most expensive cost incurred by the project. It comprises the following six elements:

- (i) Pump Electricity (Annex E, Figures 6-10)
- (ii) Infrastructure O & M (Annex E, Figure 11)
- (iii) Personnel Expenditures (Annex E, Figure 12)
- (iv) Vehicle O & M (Annex E, Figure 13)
- (v) Major Repairs (Annex E, Figure 14)
- (vi) Cost Escalation (Annex E, Figure 15)

Estimated costs for elements (ii) through (vi) are based on fairly solid data and actual costs will probably not be less than those estimated here. Pump electricity estimates, however, are not as firm. They are based on the 1978 Pre-feasibility Survey conducted by the Taiwan Team. The team did only a marginal hydrological analysis of the project area, relying on data supplied from sources outside of Bula-Minalabac. There is some question within the PMO as to the validity of some of the crucial soil and meteorological data, given observed characteristics of the Bula area. This argument was raised in the 1981 evaluation and a recommendation was made at that time that a new hydrological survey be conducted at Bula. This was not done.

Nevertheless, the Taiwan survey remains the best source of information currently available. As such, the PMO and evaluation team agreed to use this data for recalculating O & M costs.

Updating O & M estimates this year has resulted in a noticeable reduction from last year's figures, despite the addition of Phase III in the analysis. This is due to a revision in irrigable area estimates and the incorporation of actual CASURECO electrical charges from Phase I operations during the last year.

- c. SINKING FUND (For detailed supporting data, refer to Annex E, Figures 16-17).

This represents a financial account that will be utilized to replace pumps and vehicles at the end of their useful life. Annual collections are put into an interest-bearing account (estimated at 12%). Compounded annually, the sinking fund will provide the necessary financial cushion to replace worn equipment over the long term.

This component is particularly important and crucial for assuring continued, uninterrupted operation of the project. Without this, the integrity of the system will be in doubt 10-15 years from now.

The estimates of this fund have been revised upward this year because of the incorporation of Phase III into the analysis.

IRRIGATION FEE

Figure 5 which follows provides information on what the farmers' IRRIGATION FEE should be if the system operates at 100% efficiency using any one of eight formulas: a repayment of 100%, 50%, 40%, or 30% amortization over either a 25 or 40 years period. It is derived from the calculated amortization costs of figure E-1 to E-4, the operation and maintenance cost of figure E-5, and the sinking fund cost of figure E-16.

Figure 5

ESTIMATED ANNUAL FARMER IRRIGATION FEE
By Percentage Sharing Arrangement
PER HECTARE

	100%		50%		40%		30%	
	25 Years	40 Years	25 Years	40 Years	25 Years	40 Years	25 Years	40 Year
Amorti- zation	P2310	P1963	P1155	P 982	P 924	P 785	P 693	P 598
O & M	P2596	P2596	P1298	P1298	P1038	P1038	P 779	P 779
Subtotal A	P4906	P4559	P2453	P2280	P1962	P1823	P1472	P1368
Subtotal A	P4906	P4559	P2453	P2280	P1962	P1823	P1472	P1368
Sinking Fund	P434							
Total Farmer Irr Fee (Pesos)	P5340	P4993	P2887	P2714	P2396	P2251	P1906	P1802
Total Farmer Irr Fee ^{1/} (cavans)	82 (41) season	77 (38) season	44 (22) season	42 (21) season	37 (18) season	35 (17) season	29 (15) season	28 (14) season

^{1/} While the official NFA palay support price is P1.70/kg., data and interviews suggest that few farmers in the project area actually receive this ceiling price. In fact, most receive a significantly lower price. Therefore the price of P1.30/kg. or P65.00 per cavan has been chosen as a representative figure for the Bula-Minalabac Area.

Unfortunately, however, the system cannot be expected to operate at 100% efficiency. Experience with other similar systems suggests that an extremely well run system will eventually operate at approximately 80% efficiency. Thus, it is wise to assume that, during the first two years of systems operation, efficiency will be 50% and, during subsequent years, it will be 80%. Factoring those assumptions into the calculations for O & M, the same formulas used above result in the following estimated Farmer Irrigation fees:

Figure 6

REVISED ESTIMATED ANNUAL FARMER IRRIGATION FEE
By Percentage Sharing Arrangement
PER HECTARE

	100%		50%		40%		30%	
	25 Years	40 Years	25 Years	40 Years	25 Years	40 Years	25 Years	40 Years
<u>First</u> <u>Two Years</u> (50% efficiency) Pesos	7936	7589	4185	4012	3434	3295	2685	2368
Cavans	$\frac{122}{(61)}$ season	$\frac{117}{(58)}$ season	$\frac{64}{(32)}$ season	$\frac{62}{(31)}$ season	$\frac{53}{(26)}$ season	$\frac{51}{(25)}$ season	$\frac{41}{(21)}$ season	$\frac{36}{(18)}$ season
<u>Subsequent</u> <u>Years</u> (80% effi- ciency) Pesos	5989	5642	3212	3039	2656	2517	2101	1997
Cavans	$\frac{92}{(46)}$ season	$\frac{87}{(43)}$ season	$\frac{49}{(25)}$ season	$\frac{47}{(23)}$ season	$\frac{41}{(20)}$ season	$\frac{39}{(19)}$ season	$\frac{32}{(16)}$ season	$\frac{31}{(15)}$ season

Based on the figures above, it is obvious that the cost of inefficiencies are very high. If, for purposes of illustration, we assume that without adequate preparation, the IAs will operate the system at only 50% efficiency over the long term and that an efficiently operated system will run at 80% efficiency, the costs of inadequate IA organizational development and training would be approximately ₱4,246,400 (= \$530,138) per year (at the 1982 Peso

equivalent). Thus, investments by the GOP in the adequate preparation of IA farmer members should pay handsome dividends by reducing the significant cost of inefficiency.

Recommendations

(i)

A decision concerning the specific formula to be adopted for the determination of GOP and IA shares of the O & M costs for systems operation must be made as soon as possible -- but in no case later than November 30, 1982 -- so that the appropriate GOP budget request for CY 1984 can be submitted by February 1983.

(ii) The budget of the organizational development and training component should be significantly increased for CY 1983 and CY 1984 in order to save costs due to future operational inefficiencies.

7. EFFECTIVENESS OF USAID SUPPORT (Jerry Silverman)

Because of cash flow problems resulting, in part, from the terms of the FARA in force, the 1981 report recommended that the FARA should be revised. The USAID project officer has prepared a draft amendment to the FARA, which has not yet been discussed with the GOP. The draft, if approved, would take into account changes in (i) the cost structure of the project (i.e., peso/dollar exchange rates, the cost of pumps), the design of the irrigation system in phases II, III, and IV (described in the 1981 Evaluation), and (iii) the decision to withdraw USAID financial support for Phase III-B.

The terms of the original FARA are still in force. Under those terms, no additional USAID disbursements have been made since the last evaluation 12 months ago (cumulative total - \$319,976). However, in April 1982, MAR/PMO submitted to NEDA a request for additional reimbursement of \$20,119 (=P169,000) for the San Ramon Water System. If approved, that request would result in cumulative reimbursement of \$340,095 (=11.3% of the \$3,000,000 USAID loan). However, because the current FARA requires that construction work in each phase must be completed and operational before reimbursement can be made for expenditures on construction, the level of current USAID disbursements does not accurately reflect actual progress in project implementation. In fact, GOP disbursements to June 30, 1982 is equal to approximately \$7,738,568 (=P61,908,542); 76.7% of the currently estimated total project cost of approximately \$10,090,242 (=P81,722,000). That current estimated GOP obligation represents a 16% increase over original Project Paper estimates. The GOP has, during 1981 and 1982, made timely disbursements to the PMO in spite of the extremely low level of USAID reimbursement and has, thus, demonstrated its commitment to the Project.

The structure of the FARA when combined with the delays in finishing construction of each Phase has penalized the GOP because of its effect on cash flow. The revised draft amendment does not resolve that problem as recommended in the 1981 evaluation report. However, 1981 and 1982 GOP disbursements to the PMO have not been negatively affected; GOP disbursements have been timely and adequate.

USAID should clearly understand that the low level of USAID disbursements for this Project to date should not be used as a measure of implementation progress. Depending on which alternative disbursement criteria might have been used, perhaps as much as \$1,462,332 (=48.7%) could legitimately have been reimbursed to date under a different FARA structure.

With reference to staffing, USAID continues to assign one direct hire officer to the Bicol Task Force and a Filipino civil engineer; both resident in Naga City.

The Filipino USAID/Naga Civil Engineer's personal services contract was amended and approved on May 16, 1982 by the USAID Executive Officer. The amended contract reflects a promotion of the incumbent from the position of Civil Engineer to Program Coordination Specialist with corresponding increase in salary and a new position grade. A new scope of work was appropriately prepared that reflects increased responsibilities. Among others, the new position binds the incumbent to serve as Assistant Project Officer of Bicol IAD II (Bula).

Contrary to a recommendation in the 1981 report, specific responsibility for providing some TA and consistent monitoring focused especially on organizational development and training has not been assigned to a specific person in USAID/ORAD. However, a Filipino water management consultant has had contract with USAID extended in order to provide a total of 80 days of TA to the PMO over the next 15 month period.

Recommendations

(i) USAID's Filipino water management consultant should be scheduled so as to provide a few visits to Bula of at least a week each; rather than several visits of only one or two days.

(ii) We repeat last year's recommendation that a specific person in USAID/ORAD should be assigned explicit responsibility to provide consistent monitoring and some TA on organizational development and training matters, as well as coordinating the scheduling of other consultants provided by USAID.

(iii) Given the GOP's positive financial performance in spite of delays in reimbursement and the short time remaining until expected project completion, it is probably unnecessary to change the draft FARA amendment so as to include those features recommended in 1981. However, both USAID and the GOP should stress the importance of designing FARA's for future projects which do not have unnecessary negative effects on project financial management.

8. LAND CONSOLIDATION AND TENURE REFORM

(Gregorio Beluang, Herminiano Echiverre and Francisco Balitaan)

Soon after the 1981 evaluation, the PMO hired an additional survey team. In addition, the PMO has concluded an agreement with the Bureau of Lands, Region V, to do the final subdivision survey activity. The Bureau of Lands has already earmarked an amount for this activity but is still awaiting the release of the Cash Disbursement Ceiling (CDC). To increase the pace of surveys and mapping, additional funding for surveys has been included in the 1983 budget and has been accepted by M&B Technical Staff; subject to the extension of the PACD.

To date, all data needed for the computation and calculation and reallocation of lots has been gathered. The data include present individual farm-size land holdings, location of each parcel, share of each beneficiary taken out of his land holding for public use such as for roads, plazas and other purposes. Based on these criteria for land allocation, the scheme for subdividing the land has been prepared. Following the procedures and guidelines set by the PMO, this plan will be presented to the beneficiaries concerned through the Land Consolidation Promotion Committee (LCPC). Once the plan has been approved (with possible revisions) by the farmer-beneficiaries and approved by MAR, the ground layout will be prepared.

The PMO foresees some problems. If the PACD is not extended, the project (BIAD II) will be considered by the DBM to be a lesser priority for budget allocation and, therefore, completion of civil work will be delayed. A further delay would have significant negative consequences for land consolidation, since the actual ground layout can only be accomplished after completion of civil works in order not to disturb the technical accuracy of the geographic coordinates of lot corners. In addition, if the cadastral survey is not completed, titles cannot be issued and thus, the actual reallocation of lots to the farmer-beneficiaries cannot occur.

As regards the 1981 recommendation that some type of non-official preliminary but detailed title-description should be issued to the farmers following completion of the survey, computation, mapping and assignment process in each phase, MAR has already instructed PMO through MAR Region V, to issue certificates of allocation based on an approved scheme of farm lot allocation. This certificate will state the Lot Number, Block Number

assigned, and the approximate area. Land appraisal has already been undertaken for Phases I, II, and III (in Lirag and Silverio estates). Land appraisal is a precondition to the issuance of Certificate of Allocation.

To date, the scheme for the land allocation subdivision has already been prepared for presentation to the farmer-beneficiaries through the LCPC by July 1982. Forms for Certificate of Allocation have been formalized and are now ready for reproduction. Also, a MAR/PMO Allocation Committee has been organized and is ready to undertake field assignments following approval of the scheme by the farmers.

Some difficulties, however, are anticipated. The issuance of preliminary title (Certificate of Allocation) will probably not satisfy those farmers who have had portions of their lots used for right of ways and for other public use; such as roads and plazas. Another problem is that, based on earlier MAR experience, Certificate of Allocations could induce impatient^{2/} farmers to sell their rights to speculators. Thus, the PMO's assessment is that issuance of these certificates might disrupt the program in the near future.

Recommendations

(i) Upon completion of civil works construction, the Bureau of Lands should immediately undertake a cadastral survey so that issuance of titles can begin and reallocation of lots to the farmer-beneficiaries can be accomplished.

(ii) Considering the magnitude of survey work being undertaken by the BL with a limited number of Geodetic Engineers, PMO should hire the services of private contractors to do the actual subdivision survey by February 1983. That should result in the necessary approvals by December 1983.

(iii) Issuance of title of ownership should be prepared by January 1984 and be completed by June 1984. This would solve once and for all possible land disputes and would also enable the farmers to use the titles as collateral for loans.

(iv) Beneficiaries should be required to submit a copy of Tax Declaration of lots to be allocated before the issuance of TLTs. Real Estate Tax Collection is expected to increase upon completion of the final lot survey and issuance of titles which, in turn, will facilitate the repayment of the USAID loan by the GOP.

^{2/} Impatient farmer-beneficiaries are those farmers who cannot immediately possess or cultivate the land to be allocated to them.

9. HOMESITE DEVELOPMENT
(Sulpicio Roco and Gregorio Beluang)

To date, approximately 205 households have been relocated within the project area. Most of these households (170) have been among farmers in Phase I-A (San Ramon). Others have been those affected by Right-of-Way.

As of June 1982, no formal studies have been conducted on farmer beneficiaries' attitudes towards relocation. However, the PMO's present awareness of major problem issues related to relocation indicate that an informal feedback mechanism exists. This mechanism is generally utilized to pinpoint problem areas needing immediate attention.

Interviews of farmer beneficiaries conducted by an evaluation team member in Phase I-A, IV-B and V lead to two conclusions on current status regarding their willingness to relocate.

First, in general, farmer beneficiaries are either willing or resigned to relocate to new homesites for the following reasons:

(i) The PMO's campaign emphasizing the positive aspects and benefits of relocation, such as proximity to transport, security, electricity, potable water, proximity of children to school, and so forth;

(ii) the effect of seeing San Ramon as the model situation and as a positive result of relocation; and/or

(iii) the belief that there really is no choice.

Second, however, resistance to relocation might result at least in the case of residents in Upper Anayan -- in their refusal to move to the Homesite designated by the PMO and a movement across the nearby project boundary instead.

Potential issues related to relocation might result in major problems if not carefully considered. The result of the interviews indicate that throughout the project area some pockets of resistance exist. Nevertheless, such resistance varies in degree. Resistance to relocation appears to be a function of the following:

(i) Perceptions and actual observation of the proposed barangay site. There are instances where the promised improvements are not yet present. Thus, the farmers have adopted a wait-and-see attitude.

(ii) Perceived material losses attributable to relocation. Relocation will definitely entail expenses in terms of labor, materials destroyed, loss of additional income sources (i.e., fruit trees left behind) and so forth.

(iii) Social disincentives. Three types of disincentives exist. The first of which occurs when part of an existing community is asked to transfer to a new site. That entails separation from friends and relatives and to some extent severs existing social bonds. Compounding the first is the second; that is when the transfer entails, not only separation from friends; but worse, relocation to a place inhabited by the people with whom they have not had very peaceful relations in the past. In such a situation, people are quite reluctant to move and would prefer, if relocation is insisted upon by the PMO, to move across the nearby boundary. The third disincentive which appears to exist in portions of Phase IV-A and V results from the fact that the new site will be inhabited by two different Bicol subcultural groups.

Present residents of the dispersed farm lots are mostly immigrants or children of migrants from the Rinconada municipalities who speak the Rinconada dialect, while those who are the majority around the new sites are generally Naga-Bicol speakers. Owing to differences in their regional dialects and social roots, combined with past antagonisms between the two groups, the proposed transferees are apprehensive over the relocation.

Recommendations

(i) Delay actual relocation until after the new barangay site has been improved and the promised benefits are already present.

(ii) The PMO should study the actual material losses of the transferees and determine whether some costs should be reimbursed. Immediately after the transfer, the family suffers from having incurred a sizeable expense, loss of a few working days, and loss of some additional income sources. These losses should be considered and a reimbursement scheme should be established to help farmers get started again.

(iii) The PMO should continue with the practice of providing bulldozers, trucks, and skilled labor to the transferees.

(iv) Where the expected losses far exceed the proposed benefits, the PMO must weight the factors and not simply enforce a transfer. The evaluation team, for instance, agrees with the PMO's decision not to relocate the relatively few Upper Anayan residents to Sagrada, since their social and material losses would far exceed the proposed benefits.

10. APPLIED AGRICULTURAL RESEARCH (Gregorio Beluang)

Applied agricultural research activities are mostly trials to determine the extent of soil fertility depletion in land excavation

areas. Several experiments in Phase IV-A & B and I-A excavation areas are in progress to test the varying effects of fertilizers in restoring soil fertility.

11. FARM LEVEL INCOME AND CREDIT
(Francisco Balitaaan and Domingo Monasterio)

The formula chosen to determine what percentage of the system's costs should be borne by the farmer over what period of time must depend ultimately on what the farmer is able to pay. An irrigation fee which exceeds the farmers' ability to pay will, most likely, not be paid. Thus, the determination of what farmers can pay is an essential pre-condition to establishing the irrigation fee. One method of determining ability to pay is a household incomes study.

The 1981 report recommended that such a study be conducted. Up to that time, no data had been collected which could be used to determine either the impact of the project on incomes or what farmers could reasonably be expected to pay for irrigation water. Furthermore, it was recommended that a scope of work should be written and the type of technical assistance be identified for the assessment of the Project's impact on income through December 1981, and that the analysis should be reported to the PMO no later than June 30, 1982.

As of this date, very little action has been taken by the PMO on these recommendations. Some data collection has been started in the project area. However, that effort has not been completed and no analysis been made.

PMO data collection stands at only 20% complete and, as such, no assessment of impact can be expected to be completed by December of 1982. There is, however, adequate data on incomes of the beneficiary households in the area which can serve as baseline data for any assessment of impact on incomes. In February, 1974, the Social Survey Research Unit (SSRU) conducted a survey of households in the area. A follow-on survey was conducted jointly by BRBDP/MAR in June of the same year to determine the socio-economic profile of the project beneficiaries. Both of these surveys placed major emphasis on household incomes prior to the project and can provide the needed baseline for any intended assessment. What will be required is hard data on current income levels.

The BRBDP, as part of its evaluation function, has undertaken a panel survey covering the area which will provide current data on incomes. Data collection was completed on May 31, 1982 and is currently being collated and tabulated prior to interpretation and analysis. The PMO survey, when completed, should provide additional data. Those two surveys together can serve to validate each other.

The question is, however, if the data collected in the two surveys, independent of each other, are in fact compatible and are adequate for the assessment required. The BRBDP could collect both sets and generate the analysis. Further, USAID could provide needed assistance during the analysis phase through current consultants. Therefore, additional Technical Assistance for the purpose of impact assessment is probably not necessary.

With reference to credit, the involvement of the LBP in the project is concentrated on extending financial assistance on agricultural production, purchase of agricultural machinery and other types of equipment, and inputs such as fertilizers, chemicals, and seeds. As of June, 1982, about 250 farmer beneficiaries have availed of the LBP loans. Those farmers already receiving credit account for an irrigable area of 540.33 hectares in five barangays.

The total amount of credit released as of June 30, 1982 is about P721,189.50; P340,744.33 (47.25%) of which has been repaid. The following figure summarizes the current status of project sponsored credit.

Figure 7

Project Sponsored Credit

Barangays	No. of Farmer Beneficiary	Area (has.)	Amt. Released (in Pesos)	Amt. Required (in Pesos)	Percent of Repayment
Mataoroc/ Baliuag/ Viejo	31	60.7	₱82,284.00	₱19,086.82	23.19%
San Agustin	66	157.88	212,693.00	102,466.50	48.17%
San Ramon	63	155.75	210,262.50	80,937.45	38.49%
San Isidro	84	160.00	215,950.00	138,253.56	64.02%
TOTAL	250	540.33	₱721,189.50	₱340,754.33	47.25%

LBP has not considered the inclusion of financing individual housing construction on new homelots in its credit program for project beneficiaries. The MHS Provincial Manager has been invited twice by the PMO to discuss the possibility of MHS involvement in the MAR-BIDA II project through the KKK program, but has not discussed the extension of financial assistance in the construction of new houses.

To date, MHS has not been substantively involved in the project. During one of the training seminars conducted for the farmers, a MHS representative was invited as a resource speaker on the possibility of MHS involvement through KKK projects. The PMO and the farmer organization, however, have not yet submitted any proposals to MHS for financing of viable livelihood projects.

With respect to housing, the MHS does have the mandate to extend assistance through the rural BLISS Program. BLISS is a low-cost housing program consisting of about 50 units intended for the "poorest of the poor" in rural areas who have no houses and desire credit. Recently, however, due to problems in loan repayment rates, only those who are PAG-IBIG members can avail themselves of the program. The monthly amortization for a BLISS loan is in the range of ₱97.78/month to ₱144.03/month payable in 25 years.

There are no existing BLISS loan programs in either of the two municipalities of Bula and Minalabac; although the MHS has identified a possible site for a BLISS Office in the municipality of Minalabac. Moreover, that office would not be located within the project area.

One reason for including a recommendation in the 1981 report for the inclusion of financing of home construction was that the farmers had no resources to be used in relocation and construction of their houses. However, it has been determined that the LBP and MHS may not be able to include housing construction in the project area because some of the canals in the area are not yet operational and actual land consolidation has not yet occurred (except in Phase I-A) and, therefore, most farmers cannot yet apply for a loan. In addition, about 50% of the farmers in the project area are still indebted to other financing institutions like the FNB and the Rural Banks of Bula and Nueva Caceres. Thus, they are not eligible for additional credit from the LBP.

Recommendations

(i) The PMO should try to negotiate an agreement with the MHS to provide BLISS financing for housing units at the new homelots.

(ii) If the PMO is able to secure support from MHS for housing loans, repayment schedules should be determined with full consideration of land amortization costs, Sampang Bay dues, IA fees, and LBP and other agricultural loan requirements of the farmers.

(iii) The completion of data collection and analyses of the PMO's Household Profile Survey should receive high priority and should be completed as soon as possible.

(iv) BRBDPO should assume responsibility for providing a report which integrates the data from both the PMO and BRBDP household income surveys; that report should be made available as soon as possible.

III. CONCLUSION (Jerry Silverman)

The progress of project implementation during the last twelve months has significantly improved. This is especially the case in construction of irrigation and drainage infrastructure. However, the inadequate emphasis on farmer organizational development and training highlighted in the 1981 report has not changed significantly. Partially as a result, serious issues remain concerning the sustainability of project benefits beyond the revised recommended PACB of December 31, 1983.

Two reasons appear to account for the lack of adequate progress in the organizational development and training component.

1. with the threat of USAID deobligating a substantial percentage of the loan unless dramatic progress occurred during the last twelve months, the PMO appropriately placed the highest priority on the physical infrastructure component; and
2. as pointed out in the 1981 report, the PMO did not have the capacity to take appropriate action in the farmer development field without significant technical assistance and that technical assistance was not provided.

Therefore, this report contains specific, detailed recommendations concerning the structure, content, and process of an appropriate organizational development and training strategy. These recommendations can--if additional TA is provided--assist the PMO improve its performance in that field.

The resolution of another issue has been identified as critical for the sustainability of the project beyond December 31, 1984: what proportion of total systems costs will the farmers be required to pay and, therefore, what will be the amount of the irrigation fee.

Formal JOP decisions in that regard must be made no later than November 30, 1982 in order that appropriate 1984 budget requests can be submitted by February 1983.

**MISSING PAGE
NO. _____**

Five of the members of the 1982 evaluation team were also members of the 1981 team. All have been very much impressed by the progress that has been made during the last year. Based on the team's assessment, we are confident that a one year extension of the PACD is both appropriate and sufficient.

ANNEX A
SCOPE OF WORK, METHODOLOGY
AND
RECOMMENDATIONS ON THE EVALUATION PROCESS
(Jerry Silverman)

INTRODUCTION

The evaluation of the Bicol Integrated Area Development Project II (BIAD II) described in the body of the Main Report was conducted as a joint exercise by USAID/Philippines and the Government of the Philippines (GOP)^{1/}

Jerry Silverman, a Senior Development Specialist of Development Alternatives, Inc. (DAI) was engaged by USAID under the terms of the Organization and Administration of Integrated Rural Development Project (#36-5300) of AID/US/RAD to serve as the Team's Leader and external member. The Team Leader was responsible for overall coordination of the evaluation effort and the integration and editing of the Report. However, eleven other persons participated in data collection efforts and drafted specific original contributions; those persons were all considered members of the Team and share authorship and final editing of this Report. In addition, valuable assistance was provided by David Heesen (USAID). This Report could not have been written without the strong support and cooperation of Director Salvador Pejo, Project Director and Regional Director, MAR Region V.

SCOPE OF WORK

The objectives of the evaluation were to "critically examine and measure progress or lack of progress based on actual versus planned inputs, outputs, purpose, and goal level indicators" and "comment on the degree outputs have been achieved and are likely to achieve project purposes, and the degree to which progress has or is likely to contribute to higher level sub-goal and goal achievement." In order to arrive at such conclusions, the joint GOP-USAID Team was instructed to "address general project management, status of physical construction and reason for delays, and an assessment of institution/farmer organizational activities."^{2/}

In addition to the more general terms of the Scope of Work described above, the Evaluation Team was specifically instructed to determine and offer a recommendation concerning the appropriateness of an extension of the Project Assistance Completion Date (PACD) based on the degree of improvement, since July 1981.

^{1/} This evaluation was the third evaluation of a series; the first of which was conducted in June, 1979; the second in June 1981.

^{2/} USAID/Manila, Program of Work.

With those instructions in mind, it was decided that this evaluation exercise should have two other important objectives: (1) provide GOP counterparts at the PMO project implementation level with experience in the design and implementation of an appropriate evaluation process and (2) direct the findings of the evaluation toward recommendations which would be of value to those GOP decision-makers and managers responsible for the on-going implementation of the Project. Thus, this type of evaluation did not take an "auditing approach." Rather, a conscious effort was made by the team to develop an improved strategy for the further implementation of the project (i.e., formative evaluation). In order to do so, the team engaged in a process of interaction with GOP officials which demonstrated appropriate evaluation techniques.

Twenty-one calendar days were devoted to the evaluation process as a whole. Jerry Silverman (DAI) arrived in Manila on Wednesday, June 23, 1982 and met with USAID/Manila officials on Thursday, June 24, 1982. All members of the team visited the Project site for periods varying in length from three to fourteen days. Work was completed on the draft evaluation report by Thursday, July 8. The final report was completed in Washington, D.C. by August 3, 1982.

The evaluation team relied on three types of information sources:

1. Documents accumulated by USAID/Manila, USAID/Naga and the GOP in Naga;
2. Interviews with a wide variety of USAID and GOP personnel and beneficiaries; and
3. Observations of various project activities.

ANNEX B

SCHEDULE OF EVALUATION TEAM ACTIVITIES
(Jerry Silverman)

<u>23 June</u> (Wednesday)	Arrival Jerry Silverman in Manila
<u>24 June:</u> (Thursday)	Meeting: Silverman with USAID/Philippines officials Travel to Naga City
<u>2 July:</u> E/ (Friday)	Meeting at PMO to review sub-section drafts. Attended representatives of NACIAD.
<u>3-5 July:</u> (Saturday-Monday)	First draft of report written.
<u>6 July:</u> (Tuesday)	Review of first draft report by team.
<u>7 July:</u> (Wednesday)	Review of first draft report by at BRBDPO. Travel to Manila.
<u>9 July:</u> (Friday)	Review of first draft report at MAR/Manila.
<u>10 July:</u> (Saturday)	Silverman departs Manila.
<u>5 days between</u> <u>19 July-3 August:</u>	Revision of first draft report.

ANNEX C:

PHYSICAL INFRASTRUCTURE DEVELOPMENT:
CURRENT STATUS BY PHASE

by

Herminiano Echiverre
(MARCU)

Jaime Abonita
(MAR/PMO)

Oscar Bermillo
(USAID)

FIGURE C-1

PHASE 1-A

ASPECTS	PROGRAMMED	ACTUAL ACCOMPLISHMENT	REMAINING	REMARKS
I. ROADS: (KM)				
a) FSR	3.050	2.80	0.25	Expected Completion July 1982.
b) FAP	6.250	6.250	0	
II. IRRIGATION: (KM)				
a) M.C.	2.056	2.056	0	
b) LAT.	4.031	4.031	0	
c) SFD	10.561	10.561	0	
III. DRAINAGE: (KM)				
a) MD	1.568	0.894	0.674	Canalization could be undertaken even during rainy days, hence can be completed by August 1982.
b) SD	2.385	2.385	0	
c) D	6.243	4.918	1.325	
IV. STRUCTURES: (Units)				
a) Irrigation	59	59	0	
b) Drainage	16	16	0	

Note: The total accomplishment is 98%. This includes work completed in Items I, II, and III based on volume of earthworks.

FIGURE C-2

PHASE I-B

ASPECTS	: PROGRAMMED	: ACTUAL ACCOMPLISHMENT	: REMAINING	: REMARKS
I. ROADS: (KM)				
a) FSR	2.482	2.482	0	In progress, expected completion July 1982.
b) FAP	8.379	8.079	0.300	
II. IRRIGATION: (KM)				
a) MC	0.882	0.882	0	In progress. Expected completion July 1982.
b) MFD	5.281	5.281	0	
c) SFD	17.077	16.288	0.789	
III. DRAINAGE: (KM)				
a) MD	2.344	2.344	0	In progress. Expected completion August 1982.
b) SD	2.194	2.194	0	
c) D	17.863	14.369	3.494	
IV. STRUCTURES: (Units)				
a) Irrigation	55	55	0	
b) Drainage	27	27	0	

Note: The total accomplishment is 86%. This includes work completed in Items I, II, and III based on volume of earthworks.

FIGURE C-3

PHASE II

ASPECTS	PROGRAMMED	ACTUAL ACCOMPLISHMENT	REMAINING	REMARKS
I. ROADS: (KM)				
a) FSR	1.050	1.050	0	
b) FAP	3.050	3.050	0	
II. IRRIGATION: (KM)				
a) S.C.	3.253	3.253		Concrete-lining in progress.
b) MFD	1.220	1.220		In progress.
c) SFD	7.945	6.945	1.000	Expected completion July 1982.
III. DRAINAGE: (KM)				
a) SD	2.280	2.23	0.050	In progress. Expected completion July 1982.
b) D	5.040	3.690	1.350	
IV. STRUCTURES: (Units)				
a) Irrigation	44	24	20	In progress. Expected completion July 1982.
b) Drainage	8	8	0	

- Notes: 1. The total accomplishment is 76.82%. This includes work completed in Items I, II and III.
2. The construction of structures is being affected by the shortage of cement.

FIGURE C-4

PHASE III-A

ASPECTS	PROGRAMMED	ACTUAL ACCOMPLISHMENT	REMAINING	REMARKS
I. ROADS: (KM)				
a) FSR	3.360		3.360	
b) FAP	7.956	1.480	6.476	In progress.
II. IRRIGATION: (KM)				
a) RAPW-MFD				
CC	4.360	0.460	3.900	
b) SFD	7.956	1.400	6.556	
III. DRAINAGE: (KM)				
a) SD	2.264	0.250	2.014	In progress.
b) D	3.690		3.690	
IV. STRUCTURES: (Units)				
a) Irrigation	28	1	27	
b) Drainage	7		7	

Notes: 1. Contract approved by the Minister May 19, 1982.
Construction began May 19, 1982.

2. The total accomplishment is 14%. This includes work complete in Items I, II, and III based on volume of earthworks.

FIGURE C-5

PHASE III-B

ASPECTS	PROGRAMMED	ACTUAL ACCOM- PLISHMENT	REMAINING	REMARKS
I. ROADS: (KM)				
a) FSR	2.784		2.784	
b) GAP	4.120		4.120	
II. IRRIGATION: (KM)				
a) RAPW, MED CC	3.393		3.393	
b) SFD	7.685		7.685	
III. DRAINAGE: (KM)				
a) SD	3.018		3.018	
b) D	4.657		4.657	
IV. STRUCTURES: (Units)				
a) Irrigation	25		25	
b) Drainage	8		8	

Note: Contract approved June 1982. Construction just started.

FIGURE C-6

PHASE IV-A

ASPECTS	PROGRAMMED	ACTUAL ACCOMPLISHMENT	REMAINING	REMARKS
I. ROADS: (KM)				In progress.
a) FSR	3.097	2.180	0.287	
b) FAP	9.598	6.675	2.923	
II. IRRIGATION: (KM)				In progress.
a) MC	4.898	3.450	1.448	
b) MFD	5.610	1.600	4.010	
c) SFD	24.010	5.900	18.110	
III. DRAINAGE: (KM)				
a) MD				
b) SD	7.971	6.150	1.821	
c) D	21.500	3.600	17.900	
IV. STRUCTURES: (Units)				In progress.
a) Irrigation	93	33	66	
b) Drainage	21	3	18	

- Notes: 1. The total accomplishment is 75%. This includes work done in Items I, II and III based on volume of earthworks.
2. Work on structures has been affected by short supply of cement.

FIGURE C-7

PHASE IV-B

ASPECTS	PROGRAMMED	ACTUAL ACCOM- PLISHMENT	REMAINING	REMARKS
I. ROADS: (KM)				In progress.
a) FSR	4.928	4.068	0.860	
b) FAP	11.417	10.217	1.210	
II. IRRIGATION: (KM)				In progress.
a) SC	3.987	3.987		Concrete lining in progress.
b) LAT/MED	6.030	1.590	4.440	
c) SID	23.466	13.083	10.383	
III. DRAINAGE: (KM)				In progress.
a) SD	2.950	1.320	1.630	
b) D	29.358		29.359	
IV. STRUCTURES (Units)				In progress.
a) Irrigation	85	7	78	
b) Drainage	50	3	47	

Note: The total accomplishment is 62.95%. This includes work completed in Items I, II and III based on volume of earthworks.

FIGURE C-8

PHASE V

ASPECTS	PROGRAMMED	ACTUAL ACCOMPLISHMENT	REMAINING	REMARKS
I. ROADS: (KM)				In progress.
a) FSR	4.200	3.780	0.420	
b) FAP	4.610	2.950	1.660	
II. IRRIGATION: (KM)				In progress.
a) SC	0.750	0.750		
b) LAT/MFD	3.970	2.290	1.680	
c) SFD	13.430	6.700	6.73	
III. DRAINAGE: (KM)				In progress.
a) SD	1.000	1.214	0.656	
b) D	9.710	0.940	8.770	
IV. STRUCTURES (Units)				
Irrigation	63	15	48	In progress.

NOTE: The total accomplishment is 47.79%. This includes work completed in Items I, II, and III based on volume of earthworks.

ANNEX D:

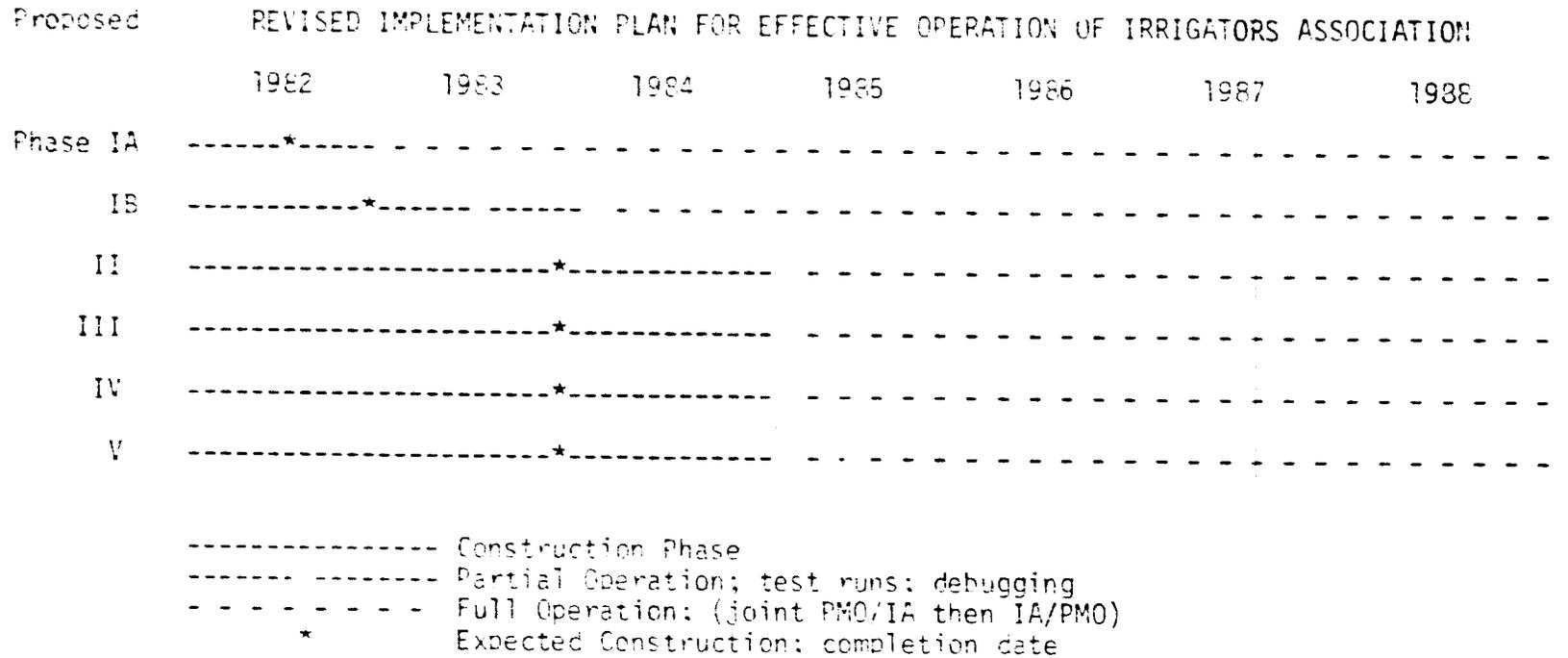
ORGANIZATIONAL DEVELOPMENT AND TRAINING:
FORWARD PLANNING

by

Rodolfo Unsan
(Central Luzon State University)

Jerry Silverman
(Development Alternatives, Inc.)

FIGURE D-1



Activities Required Prior to and During Systems Operation and Maintenance with respect to IA:

- | | |
|--|---|
| <p>A. Before Completion</p> <ol style="list-style-type: none"> 1. Organization <ol style="list-style-type: none"> a. Staff b. IA 2. Training <ol style="list-style-type: none"> a. Staff b. IA 3. Development Irrigation Plan (Staff and IA) 4. Land Reallocation (Staff) 5. Setting Hydromet Station | <p>B. During Operation</p> <ol style="list-style-type: none"> 1. Detailed Irrigation Plan (Staff and IA) 2. Training (IA) 3. Implementation of Plan (Staff and IA) 4. Systems Maintenance of Plan (Staff and IA) 5. Research/Monitoring, Evaluation 6. Fee Collection/Land Title Transfer |
|--|---|

FIGURE D-2

SUGGESTED PHASING FOR THE TURNOVER OF RESPONSIBILITY OF THE IRRIGATION SYSTEM:
OPERATION AND MAINTENANCE*

Subsystem	Function	Operation/Maintenance Personnel	Suggested Group Responsibility**				
			Yr. 1/2	3/4	5/6	7/8	9/10
1. Pump/Booster Pump System	Draws water from source and controls water release to main canal	Pump Operator mech./ electrical engineer	PMO	PMO/IA	PMO/IA	IA/PMO	IA/PMO
2. Main Canal System	Conveys/distributes water to the laterals/sublaterals	Water Master/ Ditch Tender	PMO	PMO/IA	PMO/IA	IA/PMO	IA
3. Lateral/sublateral canal system	Conveys/distributes water to the farm ditches/supplementary ditches	Water Master/ Ditch Tender	PMO	PMO/IA	IA/PMO	IA	IA
4. Farm Ditches/ Supplementary Ditches	Distributes water to individual farm	Irrigators Group c/o Rot. Area Leader Irrigators Team c/o Rot. Block Leader	IA/PMO	IA	IA	IA	IA
5. Farm Lots	End user of water; drains excess water to wasteway	Irrigators Team c/o RBL Individual Farmers	IA	IA	IA	IA	IA

* A 10-year transition period is suggested. The Implementation Plan provides for only a 5-year transition period.
** First group in the slash takes the lead role.

FIGURE D-3

Proposed Content of a Detailed Irrigation Plan

1. Name of Canal System
2. Name of LA District
3. Name of Irrigation Groups (IG) and Irrigation Team (IT)
4. Estimated amount of water from sources
5. Kinds of Crops and Areas to be Planted
6. Cropping Calendar
7. Water Requirements
 - a. Seedbed
 - b. Land Preparation
 - c. Crop Maintenance
8. Conveyance Losses
9. Irrigation Methods and Interval
10. Water Delivery Schedule
11. Operational Procedures and Management Required

FIGURE D-4
TRAINING NEEDS AND SCHEDULE

Training Area	Trainee	Approx. : :No./batch:	Location/Phase	Duration: : (days) :	Cost : : (₱) :	Schedule of Training :							Trainers	
						82	83	84	85	86	87	88		
1. On-Farm Water Management (technical) (see 4)	Staff	20	PMO I	3	2,700	x								Staff + invited
		30	PMO II to V	3	4,500				x					-do-
2. Project Management Skills	Staff	30	PMO	2	2,700		x							Invited + Staff
a. Planning														
b. Leadership/Organization														
c. Coordination/Control														
d. Monitoring/Evaluation														
3. Adaptive Research/Trials	Staff	20	PMO	2	1,800		x							Invited
4. On-Farm Management (non-technical)	Farmers	30	PMO/on-site	5	37,500	x	x	x	x	x				Staff + 1-2 inv.
a. Duties/Responsibilities of IA	IA Leaders (10 batches)													
b. Developing Irrig. Plan	Farmers													
c. Irrigation Efficiency/ Cost Reduction														
d. Water Measurement														
e. Systems Maintenance Procedures														
5. Ag. Support	Farmers, 40		On-site	1-3	60,000	xx	xx	xx	xx	xx	xx	xx	xx	
a. Project Orientation - Land Consolidation Scheme	Housewives, Youth 20 batches													
b. Agrarian Reform - Rights/Duties														
c. Coop. Dev./SN														
d. New Ag. Technology														
e. Credit Acquisition/ Repayment														
f. Compact Farms														
g. Health/Nutrition														
h. Leadership: Income General Projects														
					109,200									

ANNEX E

ANNEX E FINANCIAL ANALYSIS: IRRIGATION FEES

By

PAUL F. NOVICK
(USAID)

AMORTIZATION

Physical Infrastructure Development Cost:	₱64,403,000 ^{1/}
Interest Rate	: 6 percent per annum
Repayment Period	: 25 years
	: 40 years
Palay Price Per Cavan	: ₱65.00 ^{2/}

FIGURE E-1

100% FARMER PAYMENT (100:00 share)

	<u>25 Years</u>	<u>40 Years</u>
Annual Payment Per Hectare	₱2,310	₱1,963
Cavans Per Hectare	36	30
	(18/season)	(15/season)

^{1/} This includes all of the same infrastructure components detailed on Table 2, page 50 of the 1981 Bula IAD II evaluation report. This cost figure represents the latest PMO estimation of total cost through 1985 - the extended PACD.

^{2/} The present official BFA support price for palay is ₱1.70/kg. However, research and data indicate that few farmers receive this ceiling price and most receive significantly less than this amount. The price of ₱1.30/kg. or ₱65.00 per cavan has been chosen as a representative figure for the B&B-Miralatan area.

FIGURE E-2

50% FARMER PAYMENT (50:50 Share)		
	25 Years	40 Years
Annual Payment Per Hectare	₱1,155	₱982
Cavans Per Hectare	18 (9/season)	15 (7.5/season)

FIGURE E-3

40% FARMER PAYMENT (40:60 Share)		
	25 Years	40 Years
Annual Payment Per Hectare	₱924	₱785
Cavans Per Hectare	14 (7/season)	12 (6/season)

FIGURE E-4

30% FARMER PAYMENT (30:70 Share)		
	25 Years	40 Years
Annual Payment Per Hectare	₱693	₱589
Cavans Per Hectare	11 (5.5/season)	9 (4.5/season)

FIGURE E-5OPERATION AND MAINTENANCE^{1/}

Once the system is operating annual O & M will be required to assure its continued operation throughout project life.

This category comprises the following components:

1. Pump Electricity
2. Infrastructure O & M
3. Personnel Expenditures
4. Vehicle O & M
5. Major Repairs
6. Cost Escalation

All cost calculations for each component are displayed in Tables 1-6. A summary of those calculations for the system follows:

1. Pump Electricity	₱2,712,457
2. Infrastructure O & M	1,657,814
3. Personnel expenditures	326,148
4. Vehicle O & M	201,409
5. Major repairs	250,000
6. Cost Escalation	514,783

TOTAL ANNUAL O & M COSTS	₱5,662,611
--------------------------	------------

Cost Per Hectare :	₱2,596
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Cavans Per Hectare:	40
---------------------	----

^{1/} Supporting tables and calculations found in Appendix Tables E6-E15.

FIGURE E-6

PHASE - ANNUAL OPERATING EXPENSES
per HECTARE

(549 has.)*	PHASE I	<u>₱1,059</u>	<u>16 cavans</u>
(1338 has.)	PHASE II		
	IV		
	V		
		<u>₱1,225</u>	<u>19 cavans</u>
(294 has.)	PHASE III	<u>₱1,671</u>	<u>26 cavans</u>

* The hectarage figures are net and represent only the irrigable areas.

FIGURE E-7

SYSTEM - Annual Operating Expenses Per Hectare

1. Total Electrical Costs of System		₱2,712,457
Phase I	₱ 581,453	
Phase II } Phase IV } Phase V }	₱1,639,625	
Phase III	491,397	
2. Total Hectares of System		2,181 has.
Phase I	549	
Phase II, IV, V	1338	
Phase II	294	
3. Annual Operating Expenses per hectare		₱1,244 or 19 cavans

NOTE: All calculations of cavans are made at palay prices of ₱65 per cavan.

FIGURE E-8

DERIVATIONS FOR ANNUAL ELECTRICITY COSTS

PHASE 1

- 549 has. coverage
- 2 (200 HP) main pumps
- 19,694 gal/min total pumping capacity
- 298.28 KW total pumping energy^{1/}

(1) Total Average Annual Diversion Requirement

$$= 7,365,896 \text{ gal/ha}^2/ \times 549 \text{ has.}$$

$$= 4.0439 \times 10^9 \text{ gal.}$$

(2) Annual Operation Time of Pumps

$$= (1) \times \text{Total Pumping Capacity}$$

$$= 4.0439 \times 10^9 \text{ gal} \div 19,694 \text{ gal/min}$$

$$= 205,335 \text{ minutes}$$

$$= 3,422 \text{ hours}$$

(3) Annual Electricity Consumption (KWH)

$$= \text{Pump Operation Time (Hrs)} \times \text{Pumping Energy (KW)}$$

$$= 3,422 \text{ hrs} \times 298.28 \text{ KW}$$

$$= 1,020,791 \text{ KWH}$$

(4) Energy Charge

$$= (3) \times \text{Base Energy Charge}^3/$$

$$= 1,020,791 \text{ KWH} \times \text{P}0.55/\text{KWH}$$

$$= \text{P}561,435$$

(5) Demand Charge^{4/}

$$= \text{P}5.00/\text{HP}/\text{mo} \times 400 \text{ HP} \times 10 \text{ mos}$$

$$= \text{P}20,000$$

(6) Annual Electricity Cost (Phase I)

$$= \text{P}581,435$$

(7) Annual Cost Per Hectare (Phase I - 549 has.)

$$= \text{P}1,059$$

$$= 16 \text{ cavan} \text{ @ } \text{P}65 \text{ per cavan}^5/$$

1/ 1 HP = .7457 KW

2/ Figure derived in Table 10.

3/ Rates from Table 9.

4/ Pumps are operational only 10 months of the year due to cropping schedule.

5/ While the official BEA palay support price is P1.70/kg., data and interview show that few farmers receive this price and most get significantly less. The prices of P1.30/kg. or P65.00/cavan has been chosen as a representative figure for the Surab-Analabac area.

FIGURE F-8
(Continued)

PHASE II, IV, V

A. MAIN PUMPS (Phase IV)

- 4 (200 HP) main pumps
596.56 KW total pumping energy^{6/}
46,753 gal/min total pumping capacity

Total area served by pumps

$$1338 \text{ has.} \left\{ \begin{array}{l} 137 \text{ has. (Phase II)} \\ 928 \text{ has. (Phase IV)} \\ 273 \text{ has. (Phase V)} \end{array} \right.$$

B. BOOSTER PUMPS (Phase IV-B)

- 1 (150 HP) booster pump
1 (125 HP) booster pump
205.07 KW pumping energy^{6/}
26,200 gal/min total pumping capacity

Total area served by pumps

$$646 \text{ has.} \left\{ \begin{array}{l} 137 \text{ has. (Phase II)} \\ 459 \text{ has. (Phase IV-B)} \end{array} \right.$$

C. BOOSTER PUMPS (Phase II)

- 2 (15 HP) booster pumps - Upper Booster Phase II
2 (30 HP) booster pumps - Lower Booster Phase II
67.11 KW total pumping energy^{6/}
9,716 gal/min total pumping capacity

Total area served by pumps

187 has. (Phase II)

^{6/} 1 HP = .7457 KW.

FIGURE E-8
(Continued)

A. MAIN PUMPS

(1) Total Average Annual Diversion Requirement

$$= 7,365,896 \text{ gal/ha}^{7/} \times 1,338 \text{ has.}$$

$$= 9.8556 \times 10^9 \text{ gal.}$$

(2) Annual Operation Time of Pumps

$$= (1) \div \text{Total Pumping Capacity}$$

$$= (9.8556 \times 10^9 \text{ gal.}) \div 46,753 \text{ gal/min}$$

$$= 210,801 \text{ minutes}$$

$$= 3,513 \text{ hrs.}$$

(3) Annual Electricity Consumption (KWH)

$$= \text{Pump Operation Time} \times \text{Pumping Energy}$$

$$= 3,513 \text{ hrs.} \times 596.56 \text{ KW}$$

$$= 2,095.922 \text{ KWH}$$

B. BOOSTER PUMPS

(1) Total Average Annual Diversion Requirement

$$= (1) \div \text{Total Pumping Capacity}$$

$$= 7,365,896 \text{ gal/ha}^{7/} \times 646 \text{ has.}$$

$$= 4.7584 \times 10^9 \text{ gal.}$$

(2) Annual Operation Time of Pumps

$$= (1) \div \text{Total Pumping Capacity}$$

$$= 4.7584 \times 10^9 \text{ gal} \div 26,200 \text{ gal/min.}$$

$$= 181,617 \text{ minutes}$$

$$= 3,027 \text{ hrs.}$$

(3) Annual Electricity Consumption (KWH)

$$= \text{Pump Operation Time} \times \text{Pumping Energy}$$

$$= 3,027 \text{ hrs.} \times 205.07 \text{ KW}$$

$$= 620,737 \text{ KWH}$$

^{7/} Figure derived in Table 10.

FIGURE E-8
(Continued)

C. BOOSTER PUMPS (Phase II)

(1) Total Average Annual Diversion Requirement

$$= 7,365,896 \text{ gal/hr.}^{8/} \times 187 \text{ has.}$$

$$= 1.3774 \times 10^9 \text{ gal.}$$

(2) Annual Operation Time of Pumps

$$= (1) \times \text{Total Pumping Capacity}$$

$$= (1.3774 \times 10^9 \text{ gal}) : 9,716 \text{ gal/min}$$

$$= 141,768 \text{ minutes.}$$

$$= 2,363 \text{ hrs.}$$

(3) Annual Electricity Consumption (KWH)

$$= \text{Pump Operation Time} \times \text{Pumping Energy}$$

$$2,363 \text{ hrs.} \times 67.11 \text{ KW}$$

$$= 158,568 \text{ KWH}$$

D. TOTAL ELECTRICAL COSTS (Phases II, IV, V)

(1) Total Annual Electrical Usage

$$= A(3) + B(3) + C(3)$$

$$= \text{for all pumps} = 2,875,227 \text{ KWH}$$

(2) Energy Charge (CASH) (0.11)

$$= 2,875,227 \text{ KWH} \times P0.55/\text{KWH}$$

$$= P1,581,375$$

(3) Demand Charge^{9/}

$$= P5.00/\text{HP/mo} \times \text{Total HP} \times 10 \text{ mos.}$$

$$= P5.00/\text{HP/mo} \times 1165 \text{ HP} \times 10 \text{ mos.}$$

$$= P58,250$$

(4) Annual Electrical Costs (Phases II, IV, V)

$$= P1,639,625$$

(5) Annual Cost Per Hectare (Phases II, IV, V - 1,338 has.)

$$= P1,225$$

$$= 19 \text{ cavan} @ P65 \text{ per cavan}$$

8/ Figure derived in Table 10.

9/ Pumps are operational only 10 months of the year due to the cropping schedule. No demand charge when pumps are inoperative.

FIGURE E-8
(Continued)

PHASE III

		<u>TOTAL PUMPING ENERGY^{10/}</u>	<u>TOTAL PUMPING CAPACITY</u>
PW #1	30	22.37 KW	900 GPM
PW #2	30	22.37 KW	900 GPM
PW #3	50	37.29 KW	1650 GPM
PW #4 ^{11/}	30	22.37 KW	900 GPM
PW #5	30	22.37 KW	900 GPM
PW #6	30	22.37 KW	900 GPM

Total area served by pumps --- 294 has.

(1) Total Average Annual Diversion Requirement

$$= 7,365,896 \text{ gal/ha}^{12/} \times 294 \text{ has.}$$

$$= 2.1656 \times 10^9 \text{ gal.}$$

(2) Annual Operation Time of Pumps

$$= (1) : \text{Total Pumping Capacity}$$

$$= 2.1656 \times 10^9 \text{ gal.} : 6150 \text{ GPM}$$

$$= 352,126 \text{ minutes}$$

$$= 5,869 \text{ hours}$$

(3) Annual Electricity Consumption (KWH)

$$= \text{Pump Operation Time} \times \text{Pumping Energy}$$

$$= 5,869 \text{ hours} \times 149.14 \text{ KW}$$

$$= 875,267 \text{ KWH}$$

(4) Energy Charge

$$= (3) \times \text{Base Energy Charge}^{13/}$$

$$= 875,267 \text{ KWH} \times \text{P}0.55/\text{KWH}$$

$$= \text{P}481,397$$

(5) Demand Charge^{14/}

$$= \text{P}5.00/\text{HP/month} \times 200 \text{ HP} \times 10 \text{ months}$$

$$= \text{P}10,000$$

10/ 1 HP = 0.7457 KW

11/ PW #4, 5, 6 specifications have not yet been established. The figures presented here represent the best estimates of the PMO engineers.

12/ Figure derived in Table 10.

13/ Rates from Table 9.

14/ Pumps are operational only 10 months of the year due to the cropping schedule. There is no demand charge when pumps are not operating.

FIGURE E-8
(Continued)

(6) Annual Electricity Cost (Phase III)

= ₱491,397

(7) Annual Cost Per Hectare (Phase III - 294 has.)

= ₱1,671

= 26 cavans @ ₱65 per cavan.

FIGURE E-9

ELECTRICITY CHARGES

	<u>CASURECO II</u>	
Base Energy Charge	₱0.55 per KWH	
Fuel Adjustment	₱0.04-0.12 per KWH	
Demand Charge	₱5.00/HP/month	400 HP Phase I
Base Rate ^{16/}	₱5,000/month	

^{15/} This factor varies from month to month depending upon the cost of imported fuel and the amount of electricity the power company purchases from thermal power sources.

The PMO and CASURECO II have agreed that fuel adjustments will not be charged to the project.

^{16/} A minimum base rate of ₱5,000/month is normally charged to the user even if actual electricity consumption is less than this amount. However, an agreement between the PMO and CASURECO has resulted in the deletion of this charge.

FIGURE E-10

DERIVATION OF AVERAGE ANNUAL DIVERSION REQUIREMENT PER HECTARE^{17/}

	1 Agronomic Water Requirement (mm)	2 Average Effective Rainfall (mm)	3 On-Farm Water Requirement (mm)	4 Turnout Requirement (Col 3+20%) (mm)	5 Diversion Requirement (Col 4+33%) (mm)
Jan	330	-	330	414	552
Feb	330	8	322	404	539
Mar (1st 10 days)	55	-	55	75	100
Apr (last 20 days)	130	-	130	162	216
May	330	16	254	394	525
June	330	240	90	114	150
July	330	183	152	183	186
Aug (1st 10 days)	55	33	22	28	37
Sep	-	-	-	-	-
Oct	-	-	-	-	-
Nov (last 20 days)	130	50	60	80	132
Dec	330	120	210	266	351
				Total	2788 mm

Average Annual Diversion Requirement Per Hectare

$$= \frac{2788 \text{ mm}}{1000 \text{ mm/m}} \times 10,000 \text{ m}^2/\text{ha}$$

$$27,880 \text{ m}^3/\text{ha}$$

$$7,365,896 \text{ gal}/\text{ha} \dots^{18/}$$

^{17/} Feasibility Study of Bula-Minalabac Project, BRBDP, 1977. Some team members have disputed these findings and recommendation has been made that an updated hydrological study be done.

^{18/} 264.2 gal = 1m³.

FIGURE E-11

<u>INFRASTRUCTURE</u> ^{1/}	<u>₱1,657,814</u>
<p>This category comprises irrigation and drainage structures, roads and imported pumps. Wear and tear on these items will require annual maintenance to keep them operating properly.</p>	
(a) Irrigation, Drainage, Roads	: ₱42,542,930
(b) Imported Pumps	: ₱ 8,440,530
Annual Maintenance ^{2/} on (a)	: ₱ 1,489,003
Annual Maintenance ^{3/} on (b)	: <u>₱ 168,811</u>
Total Infrastructure	₱ 1,657,814
Annual Maintenance	

^{1/} The costs of these components represent the latest PMO estimates through 1985 -- the extended PACD for construction.

^{2/} PMO engineers have estimated annual maintenance to be about 3.5% of the total costs of (a). This was made with the assumption that farmer cooperators will provide free labor in maintaining the system. This was the agreement originally worked out between farmers and the PMO at the beginning of the project. In fact, this agreement has been operational in Phase I for the past year.

^{3/} PMO engineers estimate this annual expense to be approximately 2% of the total imported pump cost. This represents only technical labor costs. All necessary spare parts have already been procured by the PMO.

FIGURE E-12

ANNUAL PERSONNEL COSTS₱326,148

The component represents the costs of backup personnel who will be needed to operate and maintain the irrigation system throughout its life.

1. Salaries

1	-	Operator Engineer	@ ₱24,110	₱24,110
1	-	Irrigation Engineer	@ 16,240	16,240
4	-	Water Management Technologists	@ 12,365	49,459
4	-	Pump Operators	@ 7,027	28,106
1	-	Asso. Elec. Engineer	@ 14,220	14,220
10	-	Water Tenders	@ 6,563	65,631
2	-	Clerk Typists	@ 7,027	14,054
3	-	Security Guards	@ 7,490	22,470
1	-	Sr. Mechanic	@ 10,819	10,819
5	-	Drivers	@ 5,590	27,949
				<u>₱273,058</u>

2. Fixed Charges

(a)	GSIS Life and Retirement Insurance Premium (3.5% of total annual basic salaries)	₱ 23,210
(b)	Medicare (# of Personnel x ₱7.50 Premium x 12 mos.)	<u>2,880</u>
	Sub-Total	₱ 26,090

3. Travel and Per Diem

2	Engineers	@ ₱500/mo.	₱ 12,000
5	Staff	@ ₱250/mo.	<u>15,000</u>
	Sub-Total		₱ 27,000
	TOTAL		₱326,148

FIGURE E-13

ANNUAL VEHICLE O & M₱201,409

This category comprises the annual expenses incurred in operating and maintaining the project vehicles. These vehicles are required to transport PMO staff, community development officials, farm leaders, maintenance and technical personnel working on project support activities.

Fuel

10 Isuzu vans x 0.083 ltr/km x 40 km/hr x 2 hrs/day
x 260 days/yr x ₱5.34/ltr = ₱92,190

₱ 92,190

Lubricants (10% of fuel cost)

9,219

Spare Parts100,000

TOTAL

₱201,409

FIGURE E-14

MAJOR REPAIRS

P250,000

This item is intended to build-in financial support for the system in the event of major damages caused by typhoons and other natural phenomena. In the absence of hard data PMO engineers have estimated an arbitrary figure of P250,000 should be allocated to this category. As reliable data comes available this figure should be adjusted accordingly.

FIGURE E-15

COST ESCALATION₱514,783

Inflation is a fact of life in any project. Given the long term nature of this project, annual inflation will certainly affect all of the O & M estimates. It must be taken into account to insure adequate funding for properly maintaining the system throughout project life. USAID economists and PMO engineers have estimated an annual inflation rate of 10 percent. This figure should be adjusted upwards if necessary in the future as more reliable data comes available. This is especially true for electricity, fuel and cement costs which have historically escalated at a higher rate than the average national inflation rate.

Cost escalation is calculated to be 10% of estimate O & M costs as follows:

1. Pump Electricity	₱2,712,457
2. Infrastructure O & M	1,657,814
3. Personnel Expenditures	326,148
4. Vehicle O & M	201,409
5. Major Repairs	<u>250,000</u>
O & M Subtotal	₱5,147,828
10% Cost Escalation	₱ 514,783

FIGURE E-16

SINKING FUND

Annual Sinking Fund Payment (Pumps)	₱862,000
(Vehicles)	83,484 (See next page)
Per hectare	₱434

Table Subsystem	Sinking Fund for Pumps (Pesos)						
	Original Cost		Replacement Cost		Semi-Annual Sinking Fund Req't.		
	Large ^{1/}	Small ^{2/}	Large ^{3/}	Small ^{4/}	Large ^{5/}	Small ^{6/}	Total
Phase I	1,442,000	-	15,624,000	-	54,000	-	54,000
Phase II, III, IV	2,940,000	1,341,000	31,854,000	4,209,000	110,000	83,000	193,000
Phase IV-A	-	1,633,000	-	5,125,000	-	101,000	101,000
Phase III-B	-	1,336,000	-	4,193,000	-	83,000	83,000
							₱431,000
							Annual Sinking Fund Payment
							₱862,000

1/ 200 HP pumps

2/ Less than 200 HP pumps

3/ 25 years @ 10% annual inflation rate, compounded

4/ 12 years @ 10% annual inflation rate, compounded

5/ Payments made semi-annually, at 25 years @ 12% interest on balance, compounded semi-annually.

6/ Payments made semi-annually, 12 years @ 12% interest on balance, compounded semi-annually.

FIGURE E-17

Sinking Fund for Vehicles

<u>Original Cost</u>	<u>Replacement Cost</u>	<u>Semi-Annual Sinking Fund Req't.</u>
₱592,000	₱1,535,496	₱41,742
		<hr/>
	Annual Sinking Fund Req't.	₱83,484

1/ 10 Isuzu vans

2/ 10 years ₱ 10% annual inflation rate, compounded.

3/ 10 years ₱ 12% interest on balance, semi-annual payments.