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PROJECT PAPER

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

1977 - 1982

Food and Nutrition Category

Office of Regional Development

USAID/Philippines

Revised October 1977

BICOL INTEGRATED AREA DEVELOPMENT II PROJECT

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* Printed separately in the Annex B Supplement to this PP, available in ASIA/PD, ASIA/EAA/P, and SER/ENG, as well as in USAID/Manila.

**PART I
PROJECT SUMMARY AND FACESHEETS**

A. Facesheets

AGENCY FOR INTERNATIONAL DEVELOPMENT PROJECT PAPER FACESHEET		1. TRANSACTION CODE A A. AID C. CREDIT D. DEBT/LE	PP DOCUMENT CODE 3
3. COUNTRY ENTITY Republic of the Philippines		4. DOCUMENT REVISION NUMBER	
5. PROJECT NUMBER (7 digits) 492-0310	6. BUREAU/OFFICE A. SYMBOL ASIA B. CODE 04	7. PROJECT TITLE (Maximum 40 characters) Bicol Integrated Area Development II	
8. ESTIMATED FY OF PROJECT COMPLETION FY 82		9. ESTIMATED DATE OF OBLIGATION A. INITIAL FY 77 B. QUARTER 4 C. FINAL FY 78 (Enter 1, 2, 3, or 4)	

10. ESTIMATED COSTS IN EQUIVALENT \$1 7.72 (average)						
A. FUNDING SOURCE	B. FY	C. L/C	D. TOTAL	E. FY	F. L/C	TOTAL
AID APPROPRIATED TOTAL	330	1820*	2150*	530	2370*	2900*
OTHER	330	1820*	2150*	530	2370*	2900*
HOST COUNTRY		280	280		2561	2561
OTHER FUNDS						
TOTALS	330	2100*	2430*	530	4931*	5461*

11. PROPOSED BUDGET APPROPRIATED FUNDS (\$5000)										
A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. GRANT	D. LOAN	E. TOTAL	77	H. OTHER	78	I. TOTAL	J. DATE	K. VALUE
(1) FN	B 213		210	2150*			750**			
(2)										
(3)										
(4)										
TOTALS				2150*			750**			
A. APPROPRIATION	B. DATE	C. QUARTER	D. LIFE OF PROJECT	E. DATE	F. VALUE					
(1) FN			2900*							
(2)										
(3)										
(4)										
TOTALS				2900*					6 7 8	

13. CHANGE INDICATOR: WERE CHANGES MADE IN THE PID FACESHEET DATA, BLOCK 12? IF YES, ATTACH CHANGED PID FACESHEET.

2 NO
YES

14. ORIGINATING OFFICE CLEARANCE		DATE DOCUMENT RECEIVED IN AID/W OR FOR DISBURSEMENTS, DATE OF OBLIGATION	
SIGNATURE <i>Don F. Wadley</i>	SIGNATURE <i>C. Stuart Callison</i>	MM	DD
TITLE Don F. Wadley Asst. Dir. for Regional Dev.	TITLE C.S. Callison Project Mgr.	MM	DD
		7 2 8 7 7	

**** Authorization and obligation of this tranche depends on favorable ground water survey.**

*** Increased by \$100,000 at suggestion of AID/W. See footnote p. 4**

AGENCY FOR INTERNATIONAL DEVELOPMENT PROJECT IDENTIFICATION DOCUMENT FACESHEET <i>To Be Completed By Originating Office</i>				1. TRANSACTION CODE <input checked="" type="checkbox"/> A = Add <input type="checkbox"/> C = Change <input type="checkbox"/> D = Delete		PID <hr/> 2. DOCUMENT CODE 1																						
3. COUNTRY/ENTITY Republic of the Philippines				4. DOCUMENT REVISION NUMBER 2																								
5. PROJECT NUMBER (7 digits) [492-0310]		6. BUREAU/OFFICE A. Symbol ASIA		B. Code [04]		7. PROJECT TITLE (maximum 40 characters) Bicol Integrated Area Development II																						
8. PROPOSED NEXT DOCUMENT A. <input type="checkbox"/> 2 = PRP <input type="checkbox"/> 3 = PP				B. DATE MM YY [] []																								
9. ESTIMATED FY OF AUTHORIZATION/OBLIGATION a. INITIAL FY [77] b. FINAL FY [78]				10. ESTIMATED COSTS (\$000 or equivalent, \$1 = P7.72 (aver.)) <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th colspan="2">FUNDING SOURCE</th> <th>Life of Project</th> </tr> <tr> <td colspan="2">a. AID Appropriated</td> <td style="text-align: right;">2900*</td> </tr> <tr> <td>b. OTHER U.S.</td> <td>1.</td> <td></td> </tr> <tr> <td></td> <td>2.</td> <td></td> </tr> <tr> <td colspan="2">c. Host Country</td> <td style="text-align: right;">2561</td> </tr> <tr> <td colspan="2">d. Other Donor(s)</td> <td></td> </tr> <tr> <td colspan="2" style="text-align: right;">TOTAL</td> <td style="text-align: right;">5461*</td> </tr> </table>				FUNDING SOURCE		Life of Project	a. AID Appropriated		2900*	b. OTHER U.S.	1.			2.		c. Host Country		2561	d. Other Donor(s)			TOTAL		5461*
FUNDING SOURCE		Life of Project																										
a. AID Appropriated		2900*																										
b. OTHER U.S.	1.																											
	2.																											
c. Host Country		2561																										
d. Other Donor(s)																												
TOTAL		5461*																										
II. PROPOSED BUDGET AID APPROPRIATED FUNDS (\$000)																												
A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH CODE		E. FIRST FY		L.I.E OF PROJECT																						
		C. Grant	D. Loan	F. Grant	G. Loan	H. Grant	I. Loan																					
(1) FN	B253		210		2150*		2900*																					
(2)																												
(3)																												
(4)																												
		TOTAL			2150*		2900*																					
12. SECONDARY TECHNICAL CODES (maximum six codes of three positions each)																												
300	400	500	600	820	968																							
13. SPECIAL CONCERNS CODES (maximum six codes of four positions each)							14. SECONDARY PURPOSE CODE B 143																					
BR	INTR	PART	COOP	EQTY	NUTR																							
15. PROJECT GOAL (maximum 240 characters) [To improve the socio-economic situation and the quality of life of the rural poor residing in the project area.]																												
16. PROJECT PURPOSE (maximum 480 characters) [1) Farmers practicing modern, double-crop technology, utilizing and maintaining new irrigation and road systems. adopting backyard vegetable and livestock projects 2) Reduced home-to-farm travel time 3) Improved land tenure security 4) Increased family planning 5) Improved sanitation, meal planning and preparation 6) Improved access to primary education 7) Irrigation and other organizations functioning effectively]																												
17. PLANNING RESOURCE REQUIREMENTS (staff/funds)																												
18. ORIGINATING OFFICE CLEARANCE Signature: <i>Don F. Wadley</i> <i>C. Stuart Callison</i> Title: Don F. Wadley C.S. Callison Asst. Dir. for Regional Dev. Project Mgr.				19. Date Document Received in AID/W, or for AID/W Documents, Date of Distribution Date Signed: MM DD YY [7] [2] [8] [7] [7]																								

* Increased by \$100,000 at suggestion of AID/W. See footnote p. 4

B. Recommendations

The Mission recommends approval and authorization of a \$2.9 million loan fund to implement the Bicol Integrated Area Development Project II (IAD II, Bula-Minalabac Land Consolidation Project) under the following terms and in the following amounts:

LOAN: (Terms: 40 years, 10-year grace, 2% interest during grace, 3% thereafter) to finance:

-- Irrigation pumps and other equipment (foreign exchange)	\$ 530,000
-- <u>AID fixed amount reimbursement (FAR)</u> to cover approximately 60% of engineering design (A&E) and construction local currency costs (foreign exchange con- verted to pesos using the <u>Direct Reim- bursement Authority (DRA) mechanism</u>)	<u>2,370,000</u>
TOTAL	\$ 2,900,000*

TIMING: It is recommended that the first \$2,150,000* of the loan be authorized and approved in the 4th quarter FY 1977 for disbursement over a five-year period. This would allow early completion of design, bid and contract award procedures so that construction can begin by January 1978, the beginning of the next Bicol dry season.

The second tranche of \$750,000 should be authorized in FY 1978, subject to the availability of funds in accordance with A.I.D. allotment procedures and subject to a favorable determination of ground water availability for irrigation purposes in relevant portions of the project area (Phases II and III), as required by Section 611(a) of the FAA.

* An additional AID loan contribution of not to exceed \$100,000 is to be included in the loan agreement, at the suggestion of AID/W and concurrence of NEDA and USAID/Manila, to support further study of the household water requirements of the project area barangays and, if both the GOP and USAID agree, to support the design and construction of improved central water system facilities in those barangays. This amount will be in addition to and combined with the P987,000 (\$131,600, including cost escalation and contingencies) originally planned for the purchase of hand-operated household water pumps as part of the GOP counterpart contribution. In those cases where agreement is reached between USAID and the GOP that central water systems are more desirable than the planned hand-pumps, such systems will be substituted for the hand-pumps and funds substituted accordingly. If any part of the \$100,000 AID contribution for improved barangay water facilities is not required for the prescribed purposes over and above the planned GOP contribution, it will be deobligated and not used for general project funding. See cable traffic at Annex H.

For Philippine currency funding, the GOP will provide to the DAR Project Account Fund an amount designated for this project and equal to or greater than the first year's estimated expenditures of the project and will, before the beginning of each succeeding year, add to the account the estimated amount required to finance the project for that year. In addition, the GOP will supplement the account if necessary during the project to prevent unnecessary delays. With the concurrence of DAR and BRBDPO, the Project Manager will withdraw funds from the Project Account for engineering and contract construction services and make payments directly to the respective A&E firm and construction contractors based on invoices and supporting documents submitted as follows:

- (1) The A&E firm will submit monthly (or final) A&E payment vouchers with supporting documents to the PMO for review and approval, DAR and BRBDPO concurrence, and payment for services rendered.
- (2) The A&E firm will also prepare monthly (or final) payment vouchers for payment to construction contractors. The vouchers will be accompanied by a work accomplishment report prepared by the A&E firms and countersigned by the construction contractor; and they will be submitted along with any necessary supporting documents to the PMO for review and approval, DAR and BRBDPO concurrence, and payment.

In order to disburse the fixed-amount-reimbursement funds of the AID loan, AID will utilize the Direct Reimbursement Authority (DRA) mechanism, to be spelled out in a letter of implementation following normal Mission practices. The amount of reimbursement will be determined as follows:

- (1) During the first project year the eligible reimbursement amount will be dollar equivalents of up to 65% of the Philippine currency costs of the A&E and irrigation construction work AID agrees to share and approves for implementation.^{1/}
- (2) For the second and each succeeding project year AID reimbursement will be based on a fixed amount for each useable segment of irrigation, drainage and service or access road facilities completed as jointly agreed by AID and the borrower to prorate the remaining loan funds over the remainder of project A&E and construction costs equitably, with due allowance given to expected cost inflation affecting the later years. The GOP will be responsible for all cost overruns.
- (3) All local currency costs will be calculated in Philippine pesos and converted to dollar equivalents for reimbursement at the selling rate for U.S. dollars set by the Central Bank of the Philippines on the date USAID/Manila acknowledges receipt of an application for reimbursement from the GOP.

^{1/} 65% will represent the approximate AID share of total construction costs (excluding imported equipment) less R.O.W. damages, first-year operations and maintenance, buildings and homesite development. The AID share of total project costs will be approximately 53%.

3. Monitoring

DAR Regional Office and BRBDPO representatives will be designated to monitor and inspect the project both independently and through the PMO to assure acceptable performance by A&E firms, construction contractors, training, field extension, applied research and other implementing personnel. Monthly, quarterly and annual reports covering all project components will be prepared by the Project Manager and transmitted to the DAR Regional Office, the BRBDPO and the USAID Project Officer, containing all information the three monitoring agencies may require. In addition, the three monitoring agencies will invite independent quarterly progress reports from the Land Consolidation Promotions Committee (LCPC) and the newly formed Irrigators' Associations (IA's), as discussed in more detail below.

USAID will work closely with the PMO during project implementation. USAID will conduct independent monitoring of construction work as required to assure compliance with agreed plans and specifications for reimbursement purposes. An AID direct-hire planning-engineer, presently on-board, will be assigned part-time as the AID project officer under a USAID Assistant Director. He will be assigned professional local-hire staff as required to assist in the inspection and monitoring of the project in accordance with AID procedures and audit regulations.

Following the completion of the AID-funded portion of the project, DAR and BRBDP monitors will continue to monitor the remaining training and field extension activities and the operations and maintenance of the irrigation, drainage and road systems both before and after their turnover to the Irrigators' Associations, to include the effectiveness of the IA's in managing, operating and maintaining the systems under the tutorship and guidance of the FSDC, as described above. Any problems identified will be brought to the attention of appropriate NIA authorities and, if necessary, the BRBCC, for resolution and/or remedial action.

The monitoring agencies will expect the PMO to work closely with project beneficiaries to obtain feedback and suggested solutions to any problems that might arise during implementation, particularly through the LCPC and the IA's, and they (the monitoring agencies) will carefully consider any issues and problems brought to their attention by those organizations. DAR and the BRBDPO will continue to invite quarterly or semi-annual reports from the LCPC and the IA's after the initial construction phase of the project is completed.

4. Beneficiary Participation

One of the explicit objectives of this project is to increase farmers' participation and leadership in social and economic development activities, primarily by the creation of five cooperative Irrigators' Associations (IA's) to manage, operate and maintain the irrigation and road systems constructed, with the expectation that successful cooperative efforts in these matters will lead to other cooperative endeavors in other matters of mutual concern to the membership. The IA's will be democratically controlled by the Compact Farm members themselves on a representative basis, as described in Part II. B. above, and their Boards of Directors

C. Summary Background and Project Description

Project Description

The proposed GOP/USAID project will finance inputs in five major categories in a 2300-hectare project area farmed by 1230 farmers:

- 1) the construction and installation of major physical facilities, namely irrigation and drainage canals, electric turbine and other pumps and pumphouse, all-weather service roads and farm access paths^{1/} sufficient to irrigate 2062 hectares all year, a multipurpose community building for each of seven barangays that will serve as the Project Management Office and training center during project implementation, and one elementary school,
- 2) new community homesite development and the relocation of farm houses and households from scattered field locations to planned community homesites,
- 3) land consolidation and tenure reform,
- 4) a series of inter-related organizational development, training and extension activities to transmit modern agricultural and irrigation technology and some basic principles of cooperative organization, leadership, preventive health, nutrition, family planning and backyard garden and livestock project possibilities, and
- 5) applied agricultural research to determine optimum rice production technological packages for extension effort in the Project Area.

The AID loan proceeds will be applied only to the direct foreign exchange costs of imported equipment (approximately \$530,000, or 19% of the AID loan) and to the design and construction of the irrigation, drainage, and road facilities (the latter on a fixed-amount reimburseable basis). The GOP will advance peso funds for the estimated project cost each year.^{2/} CY 77 funds have already been released to the pilot project as part of the GOP FY 77 budget. It is estimated the AID loan will finance approximately half of total estimated project costs. Any cost overruns will be borne by the GOP and cost estimates do not include the basic salaries of the Project Management Staff to be funded out of regular line agency budgets. The proposed financial inputs are summarized by source in Table 1.

An interagency Project Management Office (PMO) will be established by BRBDP and the Department of Agrarian Reform (DAR), the latter as the lead implementing agency that will appoint and supervise the project manager. The PMO will be staffed with full-time technicians detailed from the various line agencies and bureaus involved in implementation. The National Irrigation

^{1/} The farm access paths will be two meters wide and surfaced with gravel, to provide farm machinery access.

^{2/} See letter from the Department of Agrarian Reform at Annex H.

Table 1. PROJECT FINANCIAL INPUTS BY SOURCE (\$1000)^{1/}

<u>Project Component</u>	<u>AID LOAN</u>			<u>GOP</u>	<u>TOTAL</u>
	<u>FX</u>	<u>LC</u>	<u>TOTAL</u>	<u>LC</u>	
I. Physical Facilities	356	1721	2077	1294	3371 ^{2/}
a. Imported Equipment	(356) ^{2/}		(356)		(356)
b. Construction Costs		(1721)	(1721)	(1294)	(3015)
II. Homesite Development				337	337
III. Land Consolidation & Tenure Reform				22	22
IV. Organizational Development & Training				115	115
V. Applied Agricultural Research				13	13
VI. Project Ops. & mgt.	45		45	152	197
a. Imported Equipment	(45) ^{3/}		(45)		(45)
b. Local Costs				(152)	(152)
SUB-TOTALS	401	1721	2122	1933	4055
15% Contingency	60	258	318	290	608
SUB-TOTALS	461	1980	2441	2222	4663
Cost Escalation Factor ^{4/}	69	390	459	339	798
GRAND TOTALS	530	2370	2900 *	2561	5461
			53%	47%	

^{1/} Derived from peso estimates, Table 13, Annex B, using an exchange rate of ₱7.5/\$ for 1976-9, ₱8.0/\$ for 1980-2.

^{2/} Pumps and spare parts

^{3/} Vehicles, spare parts & typewriters.

^{4/} 1977 base year. Imported equipment escalated 15%/yr., all local costs 7%/yr. before conversion to dollars.

^{5/} Of this total about \$3.09 million represents pumphouse, irrigation and drainage canal and service road construction, pump and motor equipment, A&E final design and construction supervision, and right-of-way damages, for an average of \$1,500 per hectare (\$600 per acre) irrigated, in 1977 prices. This per unit cost is due to high infrastructure requirements in a previously neglected, isolated area; and it should be measured against the relatively high incremental benefits (described on pp. 14 and 73-78) made possible by irrigated double-cropping in a previously low-yield area.

* Increased by \$100,000 at AID/W suggestion, See footnote p. 4.

Administration (NIA) would provide the deputy project manager for physical development to supervise physical construction activities. The supervisory board of the PMO will be a subcommittee of the Bicol River Basin Coordinating Committee (BRBCC)^{1/} and will be composed of the regional directors of the primary participating line agencies and chaired by the regional director of DAR.

The proposed input activities funded by this project are expected to result in the successful achievement of the project outputs summarized in Table 2 on the next page, subject to the availability of ground water in one-fourth of the project area (see discussion under "Project Issues", Section E, below), timely budgetary releases by the GOP, priority implementation of the Bicol Secondary and Feeder Roads sub-projects in the area, normal weather and other conditions.

The socio-economic and behavioral impact of these outputs will combine with the effects of the following complementary activities planned for the project area, but not funded by this project:

- 1) Sufficient agricultural credit will be made available to finance required production inputs.
- 2) The National Grains Authority (NGA) and the Area Marketing Cooperative will help assure a satisfactory floor price for rice at farmgate.
- 3) The Department of Education and Culture (DEC) will assign qualified teaching staff to the new San Jose elementary school.
- 4) The Camarines Sur Electric Cooperative II (CASURECO II) will provide electric power for the project area to drive the irrigation pumps.
- 5) All-weather roads will be constructed into the Project Area by 1979 under the Bicol Secondary and Feeder Roads Loan Project.
- 6) The proposed Bicol Integrated Health, Nutrition and Population Project would reinforce, augment and sustain the related activities of this project.
- 7) The BRBDP plans to conduct a study of rural housing prototypes and ways to facilitate rural household investment in better housing, as rural incomes rise, in an effort to improve rural consumption incentives and family welfare.

The first three and the last of these are recommended as covenants to the proposed loan agreements of this project. The combined effects of this project and these complementary activities are expected to lead directly to the behavioral changes identified in the Logical Framework (Annex D) as the Project Purposes. They will be indicated by the following conditions, expected to be achieved by 1982 (the "End-of-Project Status"):

^{1/} The BRBCC is the supervisory board of the BRBDP and is composed of the regional directors of all GOP line agencies and the governors of Camarines Sur and Albay Provinces.

Table 2

<u>PROJECT OUTPUTS</u>	<u>MAGNITUDE OF OUTPUTS</u>						
	YEAR:	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>TOTAL</u>
<u>Physical Facilities</u>							
- Pumphouses built		1	5	4	1	-	11
- Pumps installed		3	5	8	3	-	19
- Irrigation canals (km)		24	38	59	33	-	154
- Drainage canals (km)		25	23	44	-	-	92
- Service roads and paths (km)		10	22	29	15	-	76
- (Hectareage irrigated)		(283)	(611)	(763)	(405)	-	(2062)
- Multipurpose buildings		4	3	-	-	-	7
- Elementary schoolhouse		-	1	-	-	-	1
<u>Homesite Development</u>							
- Homesites completed		2	2	3	-	-	7
- Homelots developed and distributed ^{1/}		31	220	469	-	-	1010
- Households relocated ^{1/}		188	272	367	183	-	1010
- Hand pumps installed		188	380	479	183	-	1230
- Water-sealed pit privies constructed or approved		188	380	479	183	-	1230
<u>Land Consolidation and Tenure Reform</u>							
- Farmlots consolidated		908	403	349	1008	-	2668
- Consolidated farms demarcated		425	237	145	446	-	1253
- New CLT's, leases & titles issued (or old ones confirmed)		321	328	145	436	-	1230
<u>Organizational Development and Training</u>							
a. <u>Organizations formed</u>							
- Compact farms		32	33	34	24	-	123
- District Irrigator's Assoc.		12	11	11	8	-	42
- Irrigators' Associations (IA)		-	3	1	1	-	5
- Homemakers' Clubs		5	9	6	7	5	32
- Youth Clubs		9	11	15	23	9	65
b. <u>People trained</u>							
- Project Implementors		34	-	-	-	-	34
- Promotion Committee Members		18	-	-	-	-	18
- Barangay Leaders		18	19	33	-	-	70
- Compact farm members ^{2/}		-	161	375	476	218	1230
- Compact farm leaders		96	99	102	72	-	369
- District IA officers ^{2/}		-	24	22	22	16	84
- IA Board Members ^{2/}		-	12	11	11	8	42
- IA watermasters ^{2/}		-	-	2	2	1	5
- Ditchtenders ^{2/}		-	16	38	40	29	123
- Farmers (in health, etc.)		205	305	259	265	196	1230
- Homemakers		205	305	259	265	196	1230
- Youth		306	414	540	840	366	2460
<u>Applied Agricultural Research</u>							
- Applied Agricultural Crops		1	2	2	2	3	10

^{1/} 82% of 1230 total families expected to relocate.

^{2/} Completion of both classroom and on-the-job training, to include intensive extension assistance for up to one year.

- 1) 100% of the Project Area farmers are using high-yield varieties, modern technology and appropriate inputs.
- 2) 2062 hectares effectively irrigated and producing at least two crops annually and all irrigation and drainage systems are in operation and satisfactorily maintained.
- 3) All-weather service roads and access paths reaching every farmlot utilized by farmers and maintained by Irrigators' Associations (IA).
- 4) Farm-to-market transport costs per cavan of rice palay reduced from ₱4.50 to ₱1.20 (1974 prices).
- 5) Average round trip home-to-farm travel time reduced from ___ minutes (to be determined in the 1977 Bicol Multipurpose Survey) to 25 minutes.
- 6) 50% of the households are implementing backyard poultry, livestock and/or garden projects.
- 7) 1200 former tenants and squatters are recipients of Certificates of Land Transfer (CLT's) of consolidated farms and are making their annual amortization payments towards full ownership.
- 8) 40% of women of reproductive age motivated to adopt a recommended family planning method.
- 9) 100% of households in the planned homesites equipped with and using sanitary toilet facilities; no open drainage ditches will contain fecal matter or untreated sewage.
- 10) 100% of households in the planned homesites have access to and use safe water for household purposes.
- 11) 70% of households with children using recommended meal planning and food preparation procedures.
- 12) New 3-room schoolhouse in Barangay San Jose staffed and fully operational by June 1980.
- 13) Five Irrigators' Associations (IA's) are controlled and managed by the farmer-members themselves to operate and maintain irrigation and road facilities by the end of CY 1982.

Given a few general conditions that are expected to be favorable, successful achievement of the above purpose-level conditions should lead to the attainment of the sub-goals of the project:

- 1) increased agricultural production and productivity per hectare,
- 2) increased productive employment opportunities,
- 3) reduced crude population growth rate (before migration),

- 4) improved health and nutritional status,
- 5) elementary education made available to all Project Area children, and
- 6) increased farmer participation and leadership in social and economic development.

Sub-goal achievement, in turn, is expected to improve the socio-economic situation and the quality of life of the rural poor residing in the Project Area, the overall goal of this project.

Background

The 2300-hectare project area is in the heart of the Bicol Region, an economically depressed area characterized by a declining real income per capita, already the lowest of the eleven Philippine regions, high rates of unemployment, serious maldistribution of income, a high rate of outmigration (mostly to metropolitan Manila), and a low ratio of manufacturing activity.

Constraints to more rapid economic development in the region include:

- physical and economic isolation
- a hostile physical environment
- rapid (3.3%) rate of natural population growth
- inefficient technology
- inequitable land tenure and fragmented farms
- poverty and technological ignorance in the home affecting nutrition and health status
- ineffective government coordination and low revenue collection, and
- a general scarcity of both public and private capital

Recent studies indicate the Bicol River Basin, the heart of the Bicol Region, has immediate and high growth potential, particularly for irrigation, agribusiness and basic infrastructure investments. The Bicol River Basin Development Program (BRBDP) of which this project is a component, represents an integrated area development (IAD) approach to developing this potential. It is based on three basic precepts:

- 1) that development efforts targeted on the rural sector should focus on delimited geographic areas of high growth potential and recognized socio-economic need.
- 2) that such development planning should be integrated, cross-sectoral and interagency in nature.

3) that project planning and management should be decentralized to maximize participation from all sectors, especially from the intended beneficiaries.

The basic thrusts of the BRBDP and of this project component are in direct response to the Philippine development strategy outlined and recommended by the Government of the Philippines (GOP), USAID, World Bank and an International Labor Office team of the United Nations (the "Ranis Report"). The Bicol development strategy is the result of a long history of development planning within and for the Bicol Region itself, dating back to 1967.

Planning for this (Bicol IAD-IIA) project began in 1973.^{1/} Two socio-economic surveys of the project area were conducted in 1974 to provide base-line data. USAID funded a visit by eight GOP officials to successful land consolidation projects in Taiwan in late 1974 and a return visit by Republic of China consultants to help plan and design the 300-hectare DAR-BRBC Pilot Land Consolidation Project in Bula, which was launched in 1975 jointly with a Pilot On-Farm Water Management Project, partially funded with PL 480 peso funds under the grant Bicol Project.^{2/} Seven Chinese consultants returned for a second period from November 1975 to March 1976, again with USAID funding, to conduct a training course and help design and start a feasibility study for the entire 2300-hectare project.

Of the 1230 farmers who have acknowledged tillage rights^{3/} in the project area, 76% were tenants before the land reform decrees, 22% are squatters, 1.5% are registered leaseholders and 1% are small owner-cultivators. About 720 of these families presently reside in the project area and 510 in areas immediately adjacent to it. These people are all extremely poor, farming an average 1.5 hectares each at an average annual yield of 2.85 metric tons of rice palay per hectare.^{4/} Some 77% reside in houses made mostly of light materials such as nipa, which is a fair indicator in the Bicol of abject poverty. Average family size is 6.3.

Prior to the pilot project, which constructed the first all-weather access road, only about 10% of the farms in the area were accessible by unimproved dry-weather roads. Transport costs are still high. Nearly 80% of the farmers till more than one parcel of land, often geographically separated from each other and long distances from the farmer's home.

The pilot project, although still incomplete and presently undergoing redesign, has provided valuable experience and cost data and has generated considerable enthusiasm among local farmers for the proposed expanded project. In fact, it has resulted in official resolutions by two neighboring village councils and a cooperative (Samahang Nayon) petitioning the Department of Agrarian Reform (DAR) and the BRBDP for inclusion in this or a similar project.

1/ This was the second in a series of ten or more site-specific Integrated Area Development Projects.

2/ FY 75 ProAg, Bicol River Basin Development Project.

3/ Including recognized "squatters", without legal tillage rights.

4/ This average yield includes harvest of two crops per year.

D. Summary Findings

Technical

The rotational block, pump irrigation technology selected for the project is suitable for the Bicol Region and will provide the desired improvements to the project area at minimum cost. The designs are simple and can be constructed by local contractors using their normal labor-intensive methods of construction. Imported equipment and material is kept to a minimum. The completed project can be operated and maintained by the local irrigators' organization with a minimum of training.

The cost estimates are based on detailed preliminary engineering designs and unit cost analyses and show that the project is reasonably priced.

The project is technically sound; the cost estimates are reasonably firm and adequate planning has taken place. The project meets the requirements of FAA Section 611 (a) and (b), except for the lack of a satisfactory ground water survey and analysis for Phases II and III, which leaves the feasibility of about one quarter of the project in question. This will be remedied before planned implementation in those areas by the GOP survey presently underway and the USAID consultancy proposed under the FY 77 grant Bicol Project. If the survey and analysis should, unexpectedly, prove unfavorable, those portions of the proposed project would simply be dropped. The remaining 3/4 of the project utilize surface water of proven availability and comprise three separate and independently viable irrigation systems.

The initial loan authorization request includes sufficient funds for the surface water portions of the project alone, for which all Section 611 requirements have been met. Authorization for the second tranche will be requested only if and after the ground water availability has been satisfactorily assured and Section 611 requirements have thereby been satisfied for the relevant phases.

Environmental

Most of the adverse environmental effects (decreased water quantity and quality) will result from the construction of irrigation facilities and their use to intensify rice cultivation. Their combined environmental cost is small compared with rice production and income benefits. The other adverse effects (concentrated waste disposal problems) are small compared with the expected gains from better health, education, transport and other social and economic services for each family.

Financial

It is the opinion of the Mission that this project is financially sound. This judgement is based on (1) the formal GOP letter of loan application indicating GOP commitment to provide the required local currency for construction and other project-related activities (see Annex H), (2) the use of the fixed-amount reimbursement method for AID local currency inputs, after construction is completed to satisfactory design standards and accepted by AID, (3) the GOP agreement to fund approximately 50% of estimated project costs plus all of any cost overruns, (4) the capability of the GOP to budget and to release funds specifically for this project, (5) the apparent reasonableness of the estimated required water fees to be charged participating farmers by the Irrigators' Associations in order to fund loan amortization and annual irrigation operation and maintenance costs, and (6) the apparent capability of participating farmers to pay the assessed water fees out of incremental net farm returns and still have a sizeable income increment left for themselves.

There should be no substantial adverse impact on the U.S. balance of payments.

Social Soundness

The Bicol class system and the social alliance groupings are viewed as instrumentalities or means by which the individual's and household's human requirements are met. The rural Bicol farmers aspire to have a secure and better life than they have now. A general market orientation indicates that the cultural traditions of the Bicol are not significant constraints to development, but rather that the prevailing opportunity structures, which this project proposes to improve, are significant constraints.

There is also good reason to believe the farmers will accept and adapt to the proposed compact farm pattern, which appears to blend two long-standing traditional patterns of cooperation found in the Bicol. While it is less certain that the move to new homesite areas will be acceptable to 100% of the farmers, much of the available evidence suggests the likelihood that the acceptance rate will be high. Household relocation will be on a voluntary basis, and, while refusal on the part of some households might reduce their own accessibility to planned social services in the new or improved community centers, it would not seriously reduce the economic benefits of the project.

Significant spread effects will include 1) partial confirmation of the appropriateness and suitability of the cooperative approach to small farmer rural development and of the systematic and integrated project design and implementation strategy employed, 2) successful development involving extensive small-farmer participation for neighboring communities to learn from and emulate, 3) the increased employment opportunities created in processing and marketing the Project Area's expanded production and 4) the higher level of effective demand for urban and other domestically produced goods and services by Project Area households.

This project represents bottom-up development, the major effort being directed at changing the lives of poor, small-scale farm families, who are

thereby the primary beneficiaries, by improving their socio-economic situation and quality of life. The development of the area proposed by this project and consequent improvements have been framed in a systems context to insure that the behavior changes resulting from the specific project effort will be sustained and even expand beyond the life of the project.

Much of the training is specifically designed for women in an effort to improve their knowledge about and efficiency in managing household activities, particularly in the fields of preventive health, nutrition, food preparation, family planning, backyard projects, community organization and leadership. This should give women a greater role in family decision-making and should help, along with higher household incomes, to relieve them of the emotional and physical burdens of living in poverty, ignorance, disease and isolation. In addition, the increased economic and social integration with and accessibility to urban centers resulting from the project will reduce the isolation of the rural women and improve their opportunities for education and employment.

While some uncertainties still exist in a pilot effort of this type, a great deal of evaluative assessment effort is built in to make modifications as the project proceeds and to maximize the chance of success.

In view of these considerations, the Mission has concluded that the project as presently proposed is socially sound.

Economic

The economic cost-benefit analysis conducted on this project indicates a high degree of viability with an internal rate of return (IRR) of 37%, an economic benefit/cost ratio at a 15% annual discount rate of 2.0, and a net present value at the same discount rate of US \$5.0 million, calculated over a 25-year period on rice-production-related costs and benefits.

In the sensitivity analyses, calculations based on assumed cost increases of 20% and benefit reductions of 20% produce an IRR of 23%. Calculations including all project costs and no shadow prices, but still counting only rice production benefits, indicate a monetary IRR of 19%.

Employment effects are significant, with rice farm demand for productive labor increasing in the project area by 35% in terms of workdays and 66% in terms of wages. This means an increase from an average of 477 workdays per household per year to 645.

Income effects of the project are even more striking, with net household income in the project area from rice production activities arising from its current annual average of ₱3254 (\$434) to ₱11,166 (\$1489) by 1986, or an increase of 243%. The entire income benefit will accrue to former tenants, squatters, leaseholders, and small owner-cultivators now living in isolated rural conditions of abject poverty; and it should enable them build equity in their land, by making their land transfer amortization payments, and still enjoy a sizeable increment in current consumption expenditures.

Legal Criteria

Applicable statutory criteria of the Foreign Assistance Act are satisfied by this project proposal, except for Section 611(a) and (b), as discussed in the Technical subsection above. (See Annex F for the Project Checklist of statutory criteria. Reference is also made to the Mission Director's certification that the Philippines has the capability to implement, maintain and utilize the project effectively at Annex G.).

Summary Judgement

In view of the analytical findings summarized above and discussed in detail in the rest of this Project Paper and its Annexes, it is the conclusion of the Mission that this project as currently proposed is suitable for and worthy of AID financing and is ready for implementation.

E. Project Issues

The remaining significant issue is whether to proceed (as proposed in this PP) with three-quarters of the project loan to be authorized in FY 77 and with the remainder to be authorized in FY 78, the latter if and when the ground water in those two phases proves feasible. An alternative is to delay the whole project until FY 78; another is to drop the whole project.

The Mission believes that the surface-water portion (three-quarters of the project) would comprise an independently viable and justifiable project, even if the ground water portion were dropped, and that there are no valid reasons to delay implementation in those phases. On the contrary, the loss of momentum and the unfavorable reaction of project area residents resulting from such a delay are social and political costs that argue against further delay.

Furthermore, the ground water survey and its analysis are expected to be completed by the end of CY 1977. If they are favorable, the second tranche loan authorization can be requested immediately and the proposed project implementation schedule can be followed virtually without change. Present expectations, based on preliminary work and the first 250-meter test well presently being cased and prepared for testing (May 1977), are that the water is available and construction will be able to proceed as planned.

PART II

PROJECT BACKGROUND AND DETAILED DESCRIPTION

A. Project Background

The Development Problem

The Bicol Region includes six provinces, four of which form the southwestern tip of Luzon Island and two of which are smaller nearby islands. The region includes 6 percent of the Philippine landmass and supports 7.9 percent of the national population, or 3.5 million people in 1976. An economically depressed area, the Bicol Region is characterized by:

- a high rate of natural population growth (3.3%) coupled with a high rate of outmigration (1.0%)
- the lowest per capita production and income compared with other regions (only 49% of the national average in 1974) and declining (1.5% real decline annually 1972-74)
- serious maldistribution of income (The Gini concentration index for income was .73 in Camarines Sur in 1974, compared with .48 nationwide in 1971.)
- low rate of savings and investments
- a lower than average ratio of manufacturing activity
- physical and economic isolation from Manila and other markets, high transportation costs due to bad roads, a dilapidated railroad, and inadequate port facilities and shipping^{1/}
- lack of employment opportunities, resulting in high unemployment, underemployment and out-migration.

Several major constraints to the more rapid economic development of the region have been identified. These are:

Physical and economic isolation itself is a major constraint to securing intermediate inputs and marketing final products in competition with other regions of the country, due to the additional time and costs involved.

Rapid population growth results in a high dependency ratio per able-bodied worker, and this is exacerbated by out-migration of predominantly able-bodied adults.

Hostile physical environment - periodic typhoons, flooding, poor drainage, salinity intrusion, soil erosion and silting--the cumulative effects adversely affecting production.

^{1/} The Manila South Road to Bicol was not fully paved until late 1976 and secondary or access roads are poor or non-existent.

Inefficient production, storage, and marketing technology.

Inequitable land tenure arrangements and fragmented farm holdings.

Poverty and technological ignorance in the home, resulting in a very high level of malnutrition, disease, infant-child mortality, etc.

Low revenue collection and ineffective government coordination to support development efforts.

Capital scarcity, lack of public infrastructure and private investments.

The classical development problems are all present. Addressing these problems falls clearly within the Congressional Mandate to AID.^{1/}

The results of three recent years of intensive studies and planning activity^{2/} indicate that the Bicol River Basin Area has immediate development potential, particularly for (1) irrigated riceland and upland areas that can be double cropped, (2) private sector investment, especially agribusiness and rural manufacturing, and (3) basic infrastructure, highly complementary to the above. Analysis of increased health and social services suggest that in addition to improving the quality of life, work productivity can also be increased significantly. Improved village water systems, for example, are both socially and economically feasible.

Prior to the current BRBDP effort there were other attempts to address the development problems in the Bicol, both on a sectoral basis and through coordinated efforts. Earlier coordinating organizations lacked adequate authorities, scope of coverage, and resources to do the job. Accelerated growth has not occurred and in real terms the downward transitional trend has continued. Clearly, a new development strategy was required in the Bicol incorporating intensive investment in productive capital stock and human skills, appropriate technological transfer and adaptability, an effective institutional planning framework, and an action program.

Integrated Development Approach

The Bicol River Basin Development Program (BRBDP) represents an integrated area development (IAD) approach to attack the above problems and constraints simultaneously and in a coordinated, decentralized manner. It is based on the following precepts:

- that development efforts targeted on the rural sector should focus on delimited geographic areas of high growth potential and recognized socio-economic need, where incremental investments in infrastructure, agriculture and social services will yield maximum social and economic benefits.

^{1/} Foreign Assistance Act, Sec. 102.

^{2/} See BRBDP Framework Plans, USAID PROP and ProAg (1974-76), Part II, Bicol Integrated Rural Development (BIRD) Project Paper, Oct. 1976, and SSRU socio-economic survey reports, water resources studies listed in Annex C(4), BIRD Project Paper, Oct. 1976. Reports are on file in AID/W.

- that development planning within the defined geographic areas of high potential should be integrated, cross-sectoral and interagency in nature.
- that project planning and management should be decentralized to the greatest extent possible in order to maximize participation from all sectors, especially among beneficiaries, in the development of the area.

The BRBDP development strategy is to build up the physical infrastructure, improve essential social services, improve land tenure arrangements, increase agricultural productivity, and encourage private investment in agribusiness and rural-based industries. The strategy also takes into account urban-rural linkages, spatial integration and how urban functions support rural development. In operational terms, the strategy has been to undertake a comprehensive appraisal of Bicol River Basin resources and how these resources can be fully developed. Studies and planning to date have addressed the area's physiography, weather, land, water, human and institutional resources. Alternative solutions are being posed and the positive and negative effects calculated. Water resources and transportation have been analyzed the most rigorously to date. Private sector investment, social services and other sectors are in the process of being analyzed. From this analysis, projects are identified and subjected to feasibility tests to determine their technical, economic, financial and social viability. The next step, which is the focus of the Bicol Integrated Rural Development (BIRD) Project^{1/}, is to package the viable projects for external donors and GOP financing and move into physical implementation at an accelerated pace.

An essential component of the BRBDP strategy, working together with the Department of Local Government and Community Development and provincial governments, is to expand and develop the organizational and coordinating structure at the sub-basin level. Camarines Sur and Albay provinces have been divided into ten development areas for this purpose. (See Map #1). The boundaries of multi-municipality areas are determined by homogenous geographic features and rural-urban linkages. The purpose is to maximize local government and popular participation and also to relate the sub-basin project area to the province, region and national levels. Built on the foundation of existing government organizations, the strengthened structure includes Area Development Teams (ADT's) and Area Development Councils (ADC's). The ADT's are made up of the various line agency personnel operating at this level. They are or will be involved in the planning and implementation of coordinated line agency programs (e.g., integrated extension) and the major BRBDP Integrated Area Development (IAD) projects.^{2/} Area Development Councils are made up of the local, political

^{1/} The reader is referred to the project paper dated Oct. 1976, on file in AID/W for additional background.

^{2/} See Project Paper and loan agreement for Libmanan-Cabusao IAD I (Loan No. 492-T-037) now under implementation for an example of IAD structure and operations.

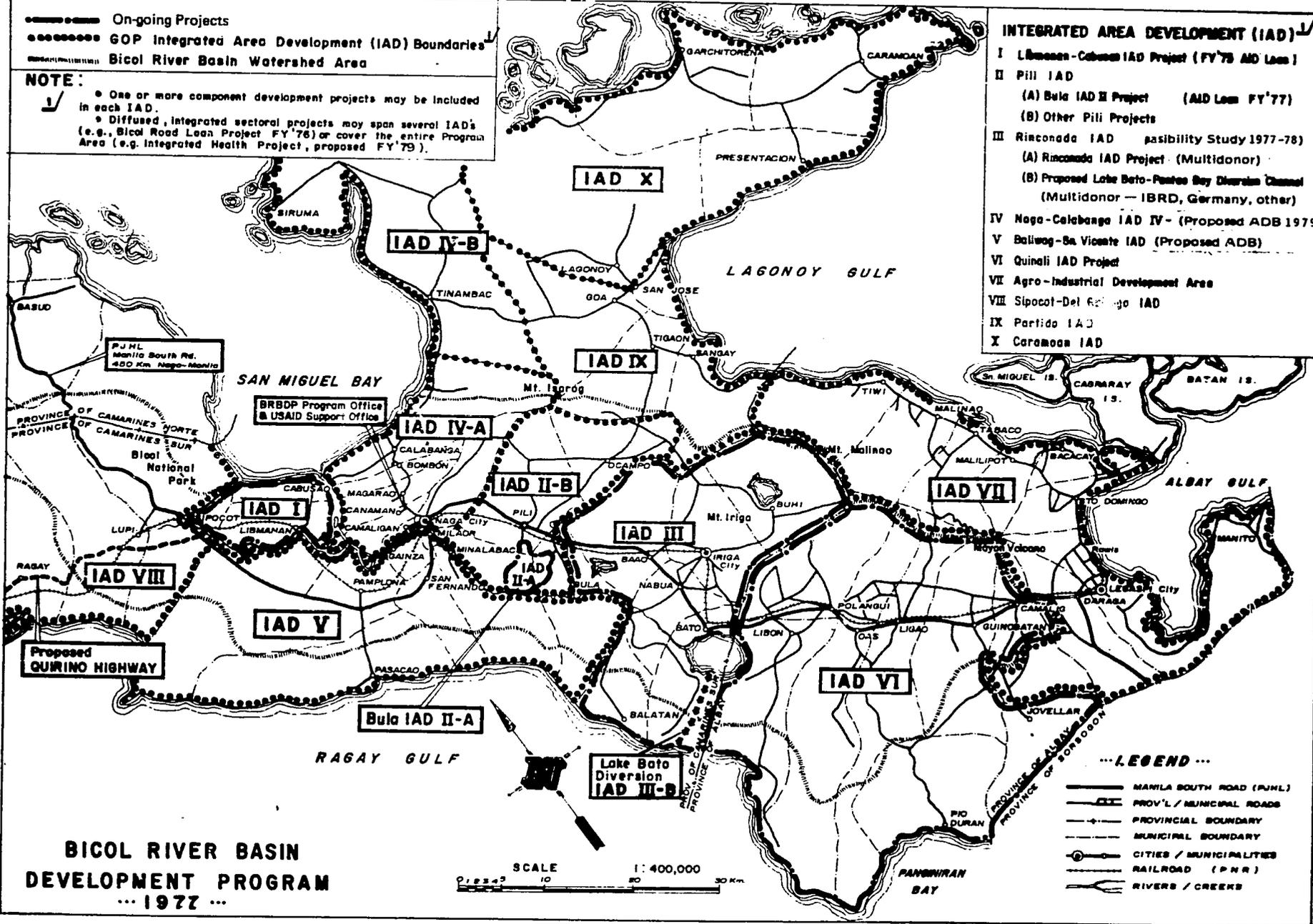
- On-going Projects
- GOP Integrated Area Development (IAD) Boundaries
- Bicol River Basin Watershed Area

NOTE:

- 1/ One or more component development projects may be included in each IAD.
- 2/ Diffused, integrated sectoral projects may span several IADs (e.g., Bicol Road Loan Project FY '76) or cover the entire Program Area (e.g., Integrated Health Project, proposed FY '79).

INTEGRATED AREA DEVELOPMENT (IAD)

- I Linaoan-Cabanatuan IAD Project (FY'79 AID Loan)
- II Pili IAD
 - (A) Bula IAD II Project (AID Loan FY'77)
 - (B) Other Pili Projects
- III Rinconada IAD Feasibility Study 1977-78
 - (A) Rinconada IAD Project (Multidonor)
 - (B) Proposed Lake Bato-Panabo Bay Diversion Channel (Multidonor — IBRD, Germany, other)
- IV Naga-Celebanga IAD IV - (Proposed ADB 1979)
- V Balingog-Sa Vicente IAD (Proposed ADB)
- VI Quinali IAD Project
- VII Agro-Industrial Development Area
- VIII Sipocot-Del Rosario IAD
- IX Partido IAD
- X Caramoran IAD



**BICOL RIVER BASIN
DEVELOPMENT PROGRAM
... 1977 ...**



- ... LEGEND ...**
- MANILA SOUTH ROAD (PNRL)
 - PROV'L / MUNICIPAL ROADS
 - PROVINCIAL BOUNDARY
 - MUNICIPAL BOUNDARY
 - CITIES / MUNICIPALITIES
 - RAILROAD (PNR)
 - RIVERS / CREEKS

civic, church and other leaders; businessmen, and the supervisory level of line agencies. They are headed by elected local mayors. ADC's formulate policies, determine priorities and articulate the development needs within their communities and larger development areas. They also provide critical feedback to the ADT's, provincial government and to the BRBDP Program Office.

In the process of addressing the development needs in the Bicol, the Bicol River Basin Development Program strategy will be tested as an operational model of integrated rural development for the Philippines.

The development strategy adopted and represented by the BRBDP is an innovative approach in full support of the basic goals of national development plans announced by the GOP and described in Regional Development Projects, Supplement to the Four-Year Development Plan, FY 1974-77, National Economic and Development Authority (NEDA), pp. 117-131, and in the USAID Development Assistance Program (DAP) for the Philippines (revised June 1975). It is also in line with the major recommendations of economic advisors from the World Bank and the United Nations.^{1/}

The principal recommendations of the "Ranis Report," the report of an inter-agency team financed by the United Nations Development Programme, organized by the International Labor Office (ILO), and led by Professor Gustav Ranis, Director of the Yale University Economic Growth Center, were directed toward the mobilization of the rural sector.^{2/} Their second major thrust was toward labor-intensive, decentralized, and export-oriented industry. Much of their report is concerned with unemployment and the maldistribution of wealth and income:

"...income inequality in the Philippines is closely related to regional differences in the use of modern technology and inputs, in investments in feeder roads and irrigation works, and so on. The mission's strategy includes reducing those differences through rapid improvements in the low income regions...The Government should encourage irrigation vigorously in Bicol..."^{3/}

. . .

"...Although the (Bicol) region has substantial water resources (seven major rivers pass through it), irrigation is, paradoxically, one of the main deficiencies; moreover, inadequate transport and communications have virtually isolated Bicol from the rest of Luzon. Irrigation and

^{1/} For a detailed discussion of these overall goals and recommendations see Bicol Integrated Rural Development Project Paper, Oct. 1976, Annex C(1). See also International Labor Office, Sharing in Development, A Programme of Employment, Equity and Growth for the Philippines, ILO, United Nations, and NEDA, Manila, 1974, pp. 35, 104-5, 463-4, and 30, and State-AID Cable OECD Paris 17786 dated June 76, "Philippine Consultative Group Meeting--June 15-16, 1976."

^{2/} International Labor Office, op. cit., p. 35.

^{3/} Ibid., pp. 104-5

infrastructure could clearly provide a main impetus to development; land reform measures could further enhance its prospects. Much is expected from a multi-purpose project for the Bicol River Basin which is supported by the United States Agency for International Development and focused on a concentrated rural development effort for the region."^{1/}

Planning for Bicol development has a long history. Key documents include the following:

1. Economic Survey Report of the Bicol Region 1967, National Economic Council, Manila, 1967.
2. Report on the Province of Camarines Sur and the Lower Bicol River Basin, Camarines Sur Interagency Survey Team, Sept. 1972.
3. Bicol River Basin Development Program, Framework Plan, February 1973.--This is the early "Blue Book" framework plan, upon which the USAID/Philippines "Bicol River Basin Development Project" (No 492-55-199-260) Non-Capital Project Paper (PROP) of May 1973 (Revised in 1974) was based.
4. Regional Development of Bicol, The Philippines, United Nations Centre for Regional Development, Nagoya, Japan, 1974 (4 volumes).
5. Comprehensive Development Plan for the Bicol Region 1975, Regional Development Council, National Economic and Development Authority (NEDA), Legazpi City, 1975 (4 volumes).
6. Comprehensive Development Plan 1975-2000, Bicol River Basin Development Program (BRBDP), Baras, Canaman, Camarines Sur, 1976 (draft).
7. Bicol River Basin Comprehensive Water Resources Development Study, Tippetts-Abbett-McCarthy-Stratton/Trans-Asia Engineering Associates, Inc., Joint Venture (TAMS/TAE) and BRBDP, Baras, Canaman, Camarines Sur, August 1976 (5 volumes).

All of these planning documents stress the need for more and improved irrigation and drainage facilities. Regarding the Pili-Bula IAD, of which the proposed project is a part, TAMS/TAE concluded, "It is believed that the irrigated areas can be substantially increased if groundwater development, whose exploration appears promising is confirmed, or by pumping from the Bicol River." (Reference No. 7 above, Vol. 1, Summary, p. 29)

Bicol Integrated Area Development II-A (Bula-Minalabac) - Project History

Two of the first planning activities of the Bicol River Basin Council (BRBC), after its establishment by Executive Order in May 1973, was the collection of baseline survey data and the convening of an interagency task

^{1/} Ibid., pp. 463-4.

force to develop an integrated development plan for the proposed Bula-Minalabac Pilot Land Consolidation Project, or, as it later came to be known, the Bicol Integrated Area Development II-A Project, area. After the 1972 inauguration of the new land reform program (Presidential Decree No. 27) the Department of Agrarian Reform (DAR) found itself responsible for redistributing over 2000 hectares of mostly contiguous rice land in the Project Area, most of which were formerly parts of four large estates rented to small sharecroppers.

DAR policy-makers recognized that land transfer alone, although important for political and social reasons and even though it replaced former rents or landlord crop shares with smaller amortization payments, would be insufficient to cause significant improvement in the economic situation of the impoverished farmers in the project area; and it could even result in a worsening of their position if important landlord-provided services, such as credit, the sharing of costs and risks, and technical advice, were withdrawn in the process. DAR accepted a share of the GOP responsibility to develop agricultural services and infrastructure to improve these areas in a more comprehensive manner, with due regard to social and humanitarian considerations in addition to the purely economic.

The then new BRBC was asked by DAR to help plan an integrated development program for the Project Area, linked to the ownership redistribution responsibility of DAR under "Operation Land Transfer." An initial survey of Project Area residents was commissioned by the BRBC and conducted by the Social Survey Research Unit (SSRU), Ateneo de Naga, under the supervision of the Institute for Philippine Culture (IPC), Ateneo de Manila, in February 1974. An abstract of the SSRU report follows:^{1/}

"In February 1974, SSRU personnel interviewed 475 household heads living on five landed estates in the municipalities of Bula, Minalabac, and Pili, Camarines Sur. ... Of the estimated 625 households located there, 85 percent are farmers working riceland parcels that average less than two hectares in size. Fewer than half can raise two crops a year; further, even the average wet-season, irrigated harvest compares unfavorably with the corresponding figure for the entire Bicol River Basin. The average weekly income is about ₱33 (\$4.71). Despite their obvious poverty, four out of five of the project area's residents currently express disinterest in any land-consolidation scheme that would entail their moving to a new site.

^{1/} Frank Lynch, S.J., and Robert C. Salazar, "Farmers of the River Basin's Land Consolidation Project Area: Nowhere to Go But Up--And in no Hurry to Get There," SSRU Research Report Series No. 6, SSRU and BRBDP, Ateneo de Naga, May 1974 (Revised Feb. 25, 1975). The whole of this report was annexed to the PRP of this project. SSRU had been asked to conduct the survey in 5 estates: Lirag, Hernandez, Silverio, Sabino, and Alvarez. Since then the last two and part of the Hernandez estate have been excluded from the proposed project area, while more recently a decision was made to include most of Barangay Baliwag Viejo, downstream along the Bicol River from the Hernandez estate.

Reasons that might account for this reluctance are explored. In view of the findings, it is concluded that for the area's residents, there is "nowhere to go but up," and land consolidation may provide the needed ladder. Suggestions are made for reducing the people's resistance to the government's plan in this regard."

In May 1974, the Secretary for Agrarian Reform invited barangay leaders and residents from the six barangays of San Ramon, San Agustin, San Isidro, Mataoroc, Sagrada and San Jose to discuss the proposal to include the three estates of Lirag, Silverio and Hernandez in a comprehensive land consolidation, pump irrigation, road construction and agricultural extension project. The response of those in attendance was positive.

Local DAR and Department of Local Government and Community Development (DLGCD) officials have continued to meet with barangay residents to discuss project proposals and obtain their reactions and suggestions. A Land Consolidation Promotions Committee was formed in Lirag estate composed of barangay captains, Samahang Nayon presidents, Kabataang Barangay presidents, farmers' representatives, local religious leaders, and representatives from DAR, DLGCD, the National Irrigation Administration (NIA), and the Bureau of Lands, the latter four to provide technical guidance.^{1/} Its duties include:

- Provide advisory assistance in project implementation.
- Assist in land value appraisal.
- Review the reallocation of consolidated lands.
- Assist the identification and selection of farmer-tillers.
- Assist in resolution of conflicts between farmers.
- Assist in project-related information campaigns.
- Motivate farmers to participate in project-related activities.
- Consider resolutions relative to the project and, if adopted, pass them on to the Project Management for consideration.

The Promotions Committee has held numerous meetings to inform residents about project plans and projected benefits and to obtain opinions and make recommendations about various details of planning and implementation. Some of their suggestions have been built into the project design.

^{1/} This project was conceptualized and its planning was initiated before the province was divided into 8 IAD's and the Area Development Councils (ADC's) and Teams (ADT's) were established. The Promotions Committee of this project was established to perform many of the same functions as the later ADC's and ADT's, but for a much smaller area; and it combines the two, with local representatives and government technicians serving together in the same group to assist and advise project planners and implementers.

DAR and BRBC conducted a second survey of the Project Area in June 1974 to obtain more detailed information about current farming operations. Below is a summary of their subsequent report:^{1/}

"The second of the series of socio-economic surveys for the Pilot Land Consolidation Project (PLCP) was conducted on June, 1974 by the Farm Management Technicians of the Department of Agrarian Reform, Region V... Eighty-eight percent of the total households in the project area were interviewed. The residents in the landed estate in Bula were a mixture of amortizing owners, lessees and squatters, whereas, in Minalabac all were amortizing owners. Of 548 respondents altogether, 77% were amortizing owners, 6% lessees and 17% squatters. Only forty-one percent of the total area owned or rented by the respondents was irrigated. Seventy-one percent of the total area owned or rented by respondents in Bula was irrigated, and only eighteen percent in Minalabac. Due to flooding during the wet season and drought or insufficiency of irrigation water during the dry season, some areas suffer total loss of the standing crops, resulting in zero harvest. The average yield per hectare in irrigated riceland areas was higher in the wet season than in the dry season, which is contrary to the normal yield behavior. This was attributed to the insufficiency of irrigation water during the dry season.

"Non-adoption of the recommended modern farming practices contributed to the low palay yield and subsequently to low family income. Application of fertilizer was used as a gauge to determine the degree of farmers' receptivity to modern farming techniques. The farmers applied less than half the optimum amount.

"The proposed Project site may be considered as one of the more depressed localities in the Bicol River Basin Area. This was evidenced by the economic conditions of its people. If house materials and state of repair can be used to classify households by socio-economic status, seventy-seven percent of the respondents belong to the very poor, lower class. Sixty percent of household expenditure went for food, also reflecting a low level of living. Not a single farmer who availed himself of production loans was able to fully pay his loan at the time of the survey.

^{1/} Napoleon De Sagun, Tomas Sementela and Mario Aureaus, Jr., "Socio-economic Study on the Pilot Land Consolidation Project," BRBC, Baras, Canaman, Camarines Sur, 1974. Since this survey the proposed project area has been changed to include Barangay Baliwag Viejo and to eliminate part of the Hernandez Estate not subject to Operation Land Transfer. Baliwag Viejo includes a few leaseholders and small owner-cultivators (see Table 6b, Annex B).

"Sixty-one percent of the respondents were agreeable to the project. However, 63% preferred that their residence be retained in their present locations."

Later in 1974 USAID funded a trip for a group of eight GOP technicians and planners to Taiwan's Land Consolidation Projects, in operation for 15 years. In December 1974, a team of Taiwanese consultants travelled to the Bicol to assist GOP planners in the preparation of a program of work, a preliminary plan and detailed engineering designs for a 300-hectare portion of the Lirag Estate. This became the DAR-BRBC Pilot Land Consolidation Project.

A team of seven Taiwanese consultants returned in November 1975 to conduct a 4-month training course for key GOP officials (from the Bicol and other regions) and to assist in the preparation of a preliminary plan with detailed engineering designs for the entire 2500-hectare expanded project area.^{1/}

Meanwhile, the BRBC and NIA Pilot On-Farm Water Management Project, launched in 1975, included training, irrigation facility rehabilitation, development of farmers' associations and water management organizations, and applied research in water management. The area covered was later expanded from the original 4,400 hectares in four separate irrigation systems to include 5,100 hectares in 5 systems, all in the Lake Buhi-Iriga-Bula area. The DAR Pilot Land Consolidation Project was included as the Lirag Estate Pump Irrigation System, and irrigation rehabilitation efforts were merged with DAR plans to develop a pilot irrigation and loan consolidation project on the Taiwanese model. As of May 1977 the first 100 hectares of irrigation works are almost complete and excavation for a new pump site on the Bicol River is underway. The new Barangay San Ramon homesite area has been completed, an On-Farm Water Management Project field office and a new 7-room elementary schoolhouse^{2/} have been constructed in San Ramon, and about 70% of the barangay households have already moved their own houses onto the homesite.

The experience gained, including that of some mistakes made, in the course of this project has been invaluable in planning the present project proposal. One miscalculation was the initial cost estimate of the construction work as designed by the Taiwanese team. Experience on the ground in the pilot area and cost estimation work done for this Project

1/ "R.O.C. Consultants Terminal Report for Land Consolidation Feasibility Grade Study with Training Components," 29 February 1976. Copies have been pouched to ASIA/EAA/P, ASIA/CCD and the AID Reference Center for reference.

2/ The schoolhouse was funded by the Department of Public Works, Transportation and Communication as a special project to help an impoverished area. (Normally schoolhouses are built with real property tax funds earmarked for education.)

Paper proved the original design to be too expensive for such undulating terrain, primarily due to the inordinate amount of common borrow required to construct level canals and roadways, much of which had to be brought in from outside the project area. Work on the site slowed down due to lack of funds, and the submission of this PP was delayed 6 months while a team of NIA, DAR and BRBDP engineers prepared a preliminary redesign for the whole system, including the pilot 300 hectares. In view of the design difficulties encountered in the pilot project and the necessity to redesign all of Phase I (including the pilot 300 hectares) for irrigation from the same set of river pumps, the GOP is proposing a revised project of 2300 hectares, to include the original pilot area, salvaging as much of the completed work as possible and building on it to complete the project. The technical details of the initial engineering design and redesign are discussed in Part III, Section A, below.

Additional feasibility study efforts made after the Taiwanese team left in March 1976 merged with the preparation of this PP. Drafts of portions of this effort have been revised and condensed for the PP, including the additional background discussed below.

Much difficulty is encountered in transporting farm produce to the market and bringing farm supplies and equipment to the fields. Even if a barrio has road access, vehicle owners are charging high rates due to the poor road conditions. More often farmers must carry their products on their shoulders or use primitive carts to get to the nearest highway where the fare is low. It cost most farmers ₱4.50 in 1974 to transport a cavan (50 kg.) of rice to the market, whereas the cost near a good road was only ₱1.00. Farmers who are near the Bicol River use small motorized "bancas" to bring their products to the nearest market. Within the project site, about 10% of the farms are accessible by dry-weather roads, 90% not by any.

A dirt road, usually impassable during the wet season, connected Phases I & III to the provincial road linking Bula to the national highway. Another dry-weather road traverses Phases II & IV to the town proper of Pili. (See Map #2, page 29, for a view of the Project Area before the pilot project began.)

At present nearly 80% of the farmers in the Project Area operate more than one parcel of land, each one small and geographically separated from the others, and in most cases at least one parcel is more than 2 kilometers walking distance from the farmer's house.

With the Pilot Project survey and planning efforts underway, news of the proposed project has spread throughout the project area and into surrounding barangays. Area leaders report increasing enthusiasm about its prospects and some impatience that actual construction has been delayed. In addition, the barangay councils of neighboring Fabrica and Santo Domingo, in Bula Municipality, and the Samahang Nayon of Barangay Baliwag Viejo, in Minalabac, have passed resolutions asking DAR and BRBDP to include them in this project, or in a similar one, as soon as possible. (Copies of these resolutions are included in Annex K.) When it became clear (in August 1976) that part of the Hernandez Estate would be legally exempt from redistribution under Operation Land Transfer (it had been

legally converted ten years earlier into a sugar cane plantation), DAR and BRBDP decided to exclude it and to include the area of Baliwag Viejo, as requested earlier by its Samahang Nayon, thus keeping the total project area almost the same size.

Related Projects

Local experience in the Project Area itself with the 300-hectare combined DAR Pilot Land Consolidation Project and NIA On-Farm Water Management Project in Barangay San Ramon, on the former Lirag Estate, has been discussed above. For DAR this project is also a follow-on to an earlier Land Consolidation Pilot Project on the Jacinto Estate in Talavera, Nueva Ecija Province, north of Manila in Central Luzon, financed by a World Bank loan in 1974. Construction was completed in mid-1975. The project consolidated farmlots for 427 farmers, all land-reform beneficiaries, on a total of 989 hectares (856 hectares cultivated). It converted 895 hectares of single-cropped, poorly or non-irrigated riceland to 856 hectares of well-irrigated, double-cropped riceland. The shapes, sizes and locations of family farmlots were regularized, and irrigation, drainage and access road facilities were constructed. Like the proposed project in Bula-Minalabac, the Taiwanese model was followed and Taiwanese engineering consultants were utilized to help plan and supervise design and construction. The project was one of the first successfully integrated development projects, jointly undertaken in 1973 by NIA (for infrastructure and physical development), DAR (for land administration, tenure reform and management), DLGCD (for farmer organization development), the Agricultural Credit Administration (for credit assistance), the Bureau of Agricultural Extension services) and the Bureau of Lands (for re-parcellary mapping). The Talavera project has much in common with the proposed project in Bula-Minalabac. Its successful completion and current operation argue well for the viability of present plans in the Bicol. The one outstanding difference between the two is in the topography of the two locations--the Jacinto Estate being virtually flat before the project as opposed to the graded and slightly rolling nature of the terrain in the Bula-Minalabac Project Area. The high cost of applying the same level irrigation and road design to the latter area has led to an expensive beginning and to a delay for redesigning.

Other related activities in the Bicol River Basin include two USAID-funded projects now underway:

1. The Libmanan-Cabusao Integrated Area Development Project is also a multi-agency effort planned and coordinated by the BRBDP, currently underway on the west side of the mouth of the Bicol River. It involves several interrelated subprojects in irrigation, drainage, road construction, land reform, compact farm organization, extension service development and applied research. This project will irrigate and drain almost 4000 hectares utilizing water from the Sipocot River, a tributary of the Bicol downstream from the Bula-Minalabac project site.

2. The Bicol River Basin Secondary and Feeder Roads Project, planned by a BRBDP inter-agency and provincial team and being implemented by the Department of Public Highways (DPH), consists of 14 subprojects, each of which includes a secondary road as a trunk line with feeder roads branching

out into rural farm areas. The 14 secondary roads will comprise 200 kilometers and the feeder roads will equal 254 kilometers, for a total project of 454 kilometers of farm-to-market roads. The secondary roads end, in all cases, either at a market center or at an intersection with a national highway which leads to a nearby market center. The feeder roads from agricultural areas complete the farm-to-market road links.

All project secondary roads currently exist but will require improvement or reconstruction. Work on these roads will include all-weather surfacing (asphalt or concrete, depending on traffic density), 5 meters wide with 1.5-meter shoulders of gravel. Feeder roads, in most cases, will be constructed to replace trails and cart tracks and can properly be called penetration roads. Construction of feeder roads will utilize gravel for 5-meter-wide all-weather surfacing. Drainage structures, culverts, bridges and ancillary structures will be included. (See the USAID Bicol Secondary and Feeder Roads Project Paper, Nov. 1975, for further details.)

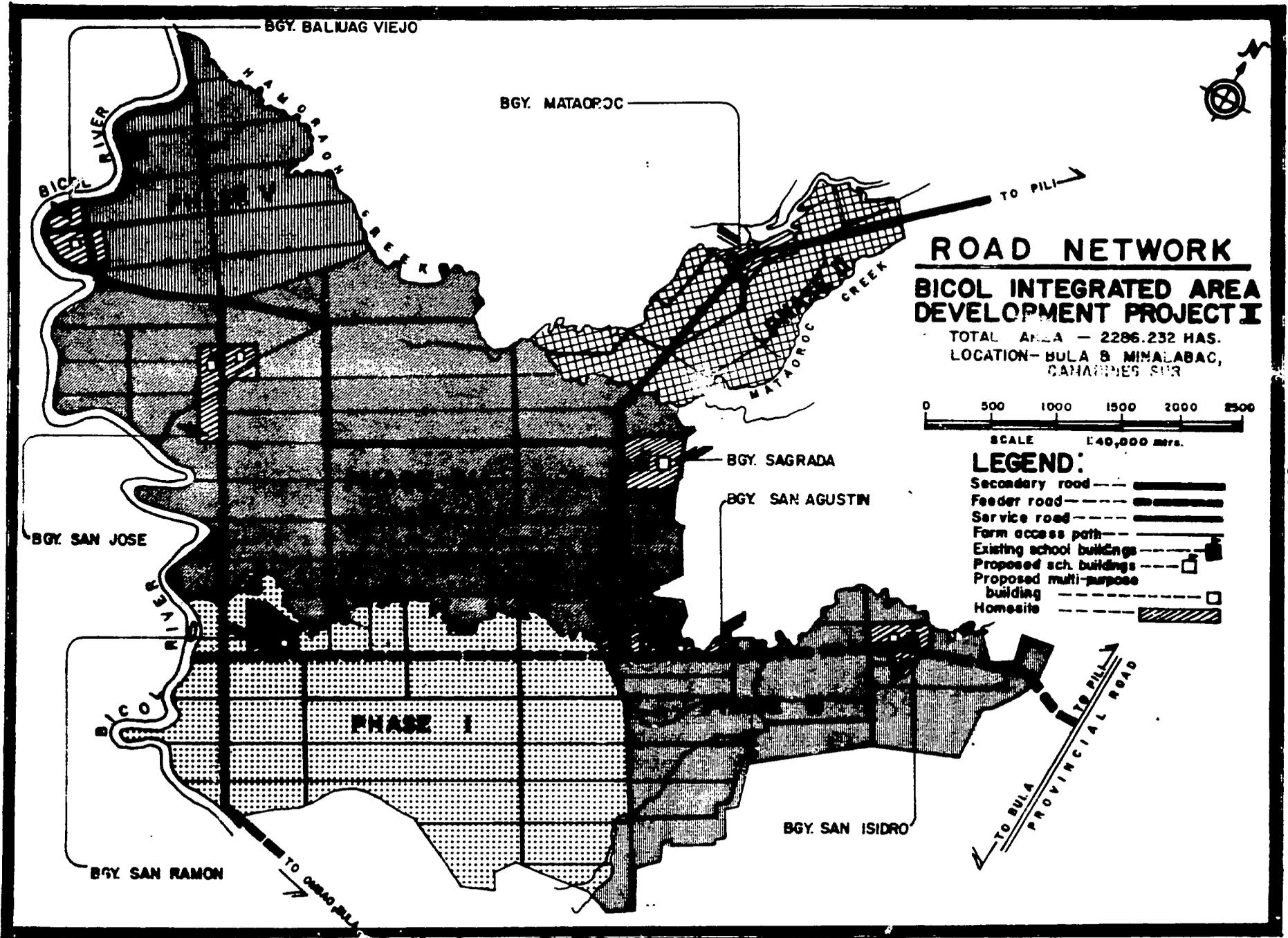
Approximately 20 kilometers of these secondary and feeder roads will be constructed (or improved) within the proposed Bicol IAD-IIA project area, including a secondary road (bituminous surface) from Pili through Mataoroc and Sagrada to Barrios San Jose and Baliwag Viejo on the Bicol, and gravel-surfaced feeder roads from the Pili-Bula secondary road at Barrio Santo Domingo through San Isidro and San Agustin to San Ramon, between Barrios San Ramon and San Jose, from Barrio San Ramon southeast to Ombao and the end of another secondary road from Bula, and between Barrios San Agustin and Sagrada (see Map #3). Bicol IAD-IIA will incorporate these roads as an integral part of its own design. They will be constructed simultaneously with parallel and perpendicular irrigation and drainage canals and structures and they will form an integral part of the planned farm access road grid. The BRBDP has already coordinated with DPH regarding priorities (the Bula-Minalabac Project Area roads will be constructed among the first in order to provide access for project-related activities) and DPH engineers will cooperate with DAR and NIA engineers regarding actual road alignments in the field.^{1/}

B. Detailed Project Description

The goal of this project is to improve the socio-economic situation and the quality of life of the rural poor residing in the Project Area. The physical geography, climate, soil and water resources, and the present state of road and housing infrastructure are described above and in Annex B and Annex C. The severe poverty, land tenure insecurity, low agricultural productivity, poor irrigation and drainage facilities, and the physical isolation of the area are described to some extent above.

Considering the potential of the human and physical resources in the area and the nature of apparent constraints inhibiting satisfactory goal

^{1/} Contract A&E firms began survey and design work in March 1977.



achievement, Government of the Philippines (GOP) planners identified the following sub-goals:

- 1) Increased agricultural production and productivity per hectare.
- 2) Increased productive employment opportunities.
- 3) Reduced crude population growth rate (before migration).
- 4) Improved health and nutritional status.
- 5) Elementary education made available to all project area children.
- 6) Increased farmer participation and leadership in social and economic development.

Among the various means to be employed to reach these sub-goals, the planners designed this comprehensive, multi-sectoral project to help achieve the following (as project purposes):

- 1) Farmers practicing appropriate modern crop production technology.
- 2) Farms utilizing and maintaining new irrigation and drainage systems and cultivating at least two crops annually.
- 3) Farmers utilizing and maintaining all-weather service road and farm path networks.
- 4) Reduced home-to-farm and lot-to-lot travel time.
- 5) Farm families adopting backyard projects to raise livestock and vegetables.
- 6) Improved land tenure security.
- 7) Significant increase in the prevalence rate of family planning acceptors.
- 8) Improved sanitary environment.
- 9) Improved meal planning and food preparation.
- 10) Improved access to elementary education facilities for Barangay San Jose residents.
- 11) Irrigation and other organizations functioning effectively.

The activities to be funded by the proposed project, the Project Outputs, include 1) the construction and installation of major physical facilities, 2) new homesite development and the relocation of farm houses and households to planned community homesites from scattered field locations, 3) land consolidation and tenure reform, 4) a series of inter-related organizational development and training activities, and 5) applied

agricultural research specific to the Project Area.

1) Major Physical Facilities to be Constructed or Installed

These consist of diversion works (pumps and pumphouses), irrigation canals, drainage canals, service road and farm access path networks, multipurpose community buildings and an elementary school.

Construction of Pumphouses and Installation of Pumps

The irrigation layout is designed as a rotational irrigation block system, with the blocks ranging from twenty to eighty hectares each, using pumps to irrigate the area drawing water from the Bicol River where possible. Phases II and III, more distantly located from the Bicol River, are designed to draw water from underground sources, pending the results of a professional groundwater survey and analysis to be completed in 1977. (The groundwater survey has been funded by BRBDP and a foreign consultant to assist with the analysis is to be funded in FY 1977 under the grant Bicol Project.)^{1/}

The proposed project is divided into five phases. (See Maps 3, above, and 4-6 in Annex B.) Each phase is a separate irrigation system and will have its own set of electrically-driven pumps to draw irrigation water from the Bicol River or from underground sources, depending upon the location of the irrigable area. Each pump station will be provided with a pump house complete with an overhead crane and other facilities for servicing the pumps.

The implementation plan calls for a 4-year construction period, with phase I construction scheduled to start in early 1978 and taking two years for completion. Phase II will be completed in 1979; Phase III in two years, 1979-80; Phase IV in two years, 1980-1981; and Phase V in 1980.^{2/}

Phase I, with an irrigable area of 567 hectares, will be irrigated by a set of two mixed-flow pumps operating, and one standby pump, to draw water from the Bicol River. The two operating pumps will be able to deliver a maximum of 0.85 cubic meters per second (cms) of irrigation water, enough to supply the water needs of each rotational block including expected losses.

Phase II, located farther away from the Bicol River, will utilize underground water sources. Two pumping plants will be constructed, each with one deep-well pump to deliver 0.300 cms of irrigation water for two rotational blocks, having an aggregate area of 184 hectares.

^{1/} Bicol River Basin Development Project, No. 492-55-199-260.

^{2/} See Table 1 for the projected annual unit completion rate of physical construction activities.

Similar to Phase II, the 286 hectares of Phase III will be irrigated by underground water sources. The topography of the area calls for the construction of five pumping plants, two of them using 3500 gallons per minute (g.p.m.) deep-well pumps and the other three to be provided with 1500 g.p.m. deep-well pumps. These pumping plants, each serving one rotational block will be able to deliver an aggregate volume of 0.430 cms of irrigation water.

Phase IV, close to the Bicol River, will use surface water from the Bicol to irrigate 810 hectares of irrigable land. Three large mixed-flow pumps, one of which is a standby, will divert a maximum of 1.215 cms for 16 rotational units. This phase has some areas at elevation higher than the proposed main canal. So, a set of three centrifugal booster pumps, one of which is a standby, will be installed to irrigate some 265 ha.

Phase V, almost 215 ha, will be irrigated by three mixed-flow pumps, one of which is standby, that will also draw water from the Bicol River. The set will supply up to 0.322 cms of irrigation water for the six rotational units in this phase. (See Map #4, Annex B, for pump locations and the Annex B narrative for more details.)

Canals and Canal Structures

The project area requires 154 kilometers of irrigation canals: 23 km of main canals, 26 km of laterals and 105 km of on-farm ditches or sub-laterals.

From each pumpsite stilling pool the water will run through the main canals, lined with concrete blocks to minimize percolation water losses. Lateral and sub-lateral canals will be constructed of compacted earth. Along the main canal are conveyance and regulating structures such as road crossings, headgates, diversion boxes, turnouts, in various combinations, following standard NIA designs. The water will then be diverted from the main canal to the laterals by means of gated structures. Parshall Flumes will measure the volume of water diverted to each lateral. The water from the laterals will be distributed to the rotational units through gated outlets with weirs. In no case will a rotational unit be irrigated from the main canal; the water will first pass through a lateral for better water management. Canal density in the project is 1 kilometer for each 13.4 hectares of irrigable land. (See Map #4, Annex B, for the irrigation canal network.)

Drainage Canal System

The Bicol is subject to tropical storms, and it has a high probability of being partially flooded during the annual typhoon season. Good drainage to mitigate the level and duration of flooding is necessary to increase rice production. The drainage system is designed to drain excess water from the fields and redirect it to areas where irrigation water is needed. It is also designed to take advantage of existing waterways and the natural slope of the land to

minimize construction costs.

Phase I will be drained by constructing a new drainage canal to convey water northerly to the Anayan River and thence to the Bicol and by constructing another canal along the southern boundary to convey water westerly to the Bicol. Both canals will help drain a large water-logged, frequently flooded area extending to the south beyond the Project Area, but protruding into the area between Phases I and III.

Phases II will be drained by Mataoroc Creek and Hamoraon Creek to the Bicol. Phase III will be drained by the existing Macatucas Creek to the Anayan River and thence to the Bicol. Phase IV will be drained by Hamoraon Creek to the Bicol on the north and by Anayan River to the Bicol in the south. Phase V will be drained by Hamoraon Creek to the Bicol on the south. There will be a total of about 92 kilometers of new drainage canal constructed, 1.6 km. main drainage, 38.1 km. secondary drainage and 52.5 km. on-farm drainage. The density will be one kilometer of drainage canal per 22.4 hectares of irrigable land. This does not include the lengths of existing creeks and rivers. (The proposed drainage system is outlined in Map #5, Annex B.)

Service Road and Farm Access Path Network

Coincident with the construction of irrigation and drainage canals the project will construct some 33 kilometers of service roads and 42 kilometers of farm access paths. Service roads will parallel the main irrigation canals and laterals and will connect with the 20 kilometers of larger secondary and feeder roads, to be constructed in the area by the Department of Public Highways under the Bicol Secondary and Feeder Roads Project, as described above. Service roads will be 4 meters wide with gravel surfacing 3 meters wide and will include wider parking, passing and turn-around zones (30 meters long and 6 meters wide with gravel surfacing 5 meters wide) spaced at every intersection with a farm access path, 300 meters apart. They will be built up to a surface level at least 0.6 meters above the surface of adjacent fields.

The farm access paths will link each farmland to service or feeder roads and will be 2 meters wide and surfaced with gravel to provide all-weather access. Most of these will parallel drainage ditches and can be widened easily at some future date if required. A two-meter gravel surface will permit access by jeeps, tractors, bullock carts and other small vehicles. They will be constructed longitudinally between each compact farm (24-hectare block) and will be provided with concrete crossings to permit passage from path to field over drainage and irrigation canals.

Together with the planned secondary and feeder roads, the project will enjoy a total road and access path density of one kilometer for every 24 hectares, or 4.2 km. of road and pathway for every square kilometer of land area. Counting only the secondary and feeder roads as good roads wide enough for regular traffic, the Project Area will

have a density of 0.9 km. of wide roads per square kilometer of land area, as opposed to the BRBDP basin-wide target of a 1:1 ratio for agricultural areas. (See Map #3 for the design of the road network.)

The Multipurpose Building and San Jose Elementary Schoolhouse

A three-room multipurpose building will be constructed in each of the seven Project Area barrios before the construction of each phase is begun. They will be first used as field administrative and work offices by the Project Management Office for final survey and engineering design activities, and for organizational and training activities during, and for one year following, the period of construction. One year after construction is completed in each phase the related building or buildings will be turned over to the Barangay Councils for their use as multipurpose Barangay Halls, one room will be designated as the Management Office of the local Irrigators' Association and the other rooms will be available as meeting and social halls and for use by visiting extension workers, health, nutrition and family planning clinics, or for other related social services.

The proposed buildings are to follow the standard Bagong Lipunan (New Society) schoolhouse model designed specifically for typhoon-prone areas. They will be reinforced concrete structures with concrete hollow-block walls, and will be available as a safe refuge to barangay residents during severe windstorms.

An eighth building of identical design will be constructed in Barangay San Jose to serve as an elementary school. This is the only one of the seven Project Area barangays without its own elementary school. Money is included in "Homesite Development" to relocate the schools in Barangays Sagrada and San Agustin.

(See Map #3, above, for the approximate location of these buildings.)

2) Homesite Development and Relocation

The project design includes the relocation of farm-beneficiaries to a developed community. Road networks and drainage facilities will be provided in the new homesite areas, and the homelots will provide about 500-650 square meters of land per household. The community site will provide areas for a school site, a chapel, a park and other facilities that may be desired. Homelots will be relocated strategically in such a way that the beneficiaries' farmlots will, on average, be only about one kilometer away. This will result in travel time savings which can be used for farm production or other activities. Results of project-related socio-economic surveys were considered in the planning and designing of the ideal homelot size. Ten percent of the homelot will normally be used for the house while the rest will be utilized for backyard projects. (See Map #3, above, for the locations of the 7 homesite areas.)

Most of the houses to be relocated (approximately 1010 of the 1230 total) are within one or two kilometers of the new homesite area and can simply be picked up and carried or put on skids and pulled by a tractor. A few may have to be partially dismantled first. Households residing in houses made of substantial materials difficult or impossible to move will not be required to relocate unless their house occupies necessary road or canal right-of-way. An allowance for right-of-way damages is included in the costing to cover this possibility. (Higher ROW damages are allowed for Phase V to cover the acquisition of canal and road right-of-way through a small area of privately-owned property.) Every household that relocates will be granted a flat ₱300 (\$40) to cover the minor expenses for repairs and replacement parts and materials such a house movement usually requires.

Relocation is voluntary, and if a farmer is reluctant to move no form of coercion will be used. His farmplot will in most cases simply be plotted to include his house, and his cultivable hectareage will be less by the size of his homelot. He will still be given title to another homelot in the new homesite area. There are reports from the Pilot Project area, where about 30% of the households have not yet moved to the new homesite area, that one of the reasons for the reluctance to relocate has been the inability of the poorest families to pay for the minor repairs and expenses required. The ₱300 allowance is believed sufficient to cover these costs in most cases and should help induce many others to make the move. Such an allowance was not budgeted in the Pilot Project.

In addition to the relocation allowance, ₱1000 (\$133) per household will be allocated to purchase small, hand-operated household water pumps (₱600 or \$80 each, including part of the labor requirements of driving a new shallow well) and the materials to construct a water-sealed pit privy (₱400 or \$53 each, all labor to be provided by the recipient)*. This cost is to be added to the irrigation construction loan and amortized by the recipients over a 40-year period. It is the minimum necessary to provide a sanitary community environment. The location of the shallow wells will be carefully plotted with respect to the location of the latrines to minimize possible contamination.

See Annex B for the criteria used in homesite design.

3) Land Consolidation and Tenure Reform

Agricultural land consolidation entails planned physical restructuring of all farm lots which are fragmented, narrow, small, and/or irregular in shape. The project will combine and re-shape the separate farmplot holdings of each farm-family beneficiary to form one contiguous holding within one or two kilometers from the operator's residence and thus facilitate farm operations and management. Unnecessary pathways, irrigation and drainage canals and/or right-of-ways shall be eliminated. Paddies, dikes, irrigation canals, and farm roads are designed to meet the requirement of intensive rice cultivation, in order to optimize the use of arable land, irrigation water, of available man-hours, and

* See also footnote on p. 4.

eventually of farm machinery and to facilitate joint operations.

In this project consolidated farmlots are also to be organized into compact farms, discussed below, averaging 17 hectares each, to facilitate cooperative farming operations.

The project area is covered by Presidential Decree No. 27 ordering land tenure reform on rice and corn lands. The Operation Land Transfer and Leasehold System has been accelerated and currently there are 765 farmer-tenants who are already recipients of Certificates of Awards (1959 program) or of Certificates of Land Transfer (CLT's--current program). They are now amortizing owners of the land they till.

The completion of the land transfer and leasehold system to cover all eligible tenants in the project area will be accelerated. Land values have already been assessed in the 5 phases of the project, so that the benefits of the project would flow to tenant-beneficiaries. Specialists will be organized by the Department of Agrarian Reform (DAR) and assigned to the Project Management Office to serve as the "Tenurial Development Team." The project plans to consolidate approximately 2668 farmlots into 1230^{1/} and to have them redistributed to 1230 farmers by the end of 1981. Some 1200 tenants and squatters will have been awarded CLT's for consolidated farms by that time. The eighteen project area tenants on landholdings below 7 hectares (the legal retention limit) have already negotiated and registered written leasehold contracts fixing rents at 25% of an average crop. The three-year average crop, and therefore the amount of rent, has already been determined and will not be subject to change as yields increase. The benefits of this Project are thus legally locked into the tenants' share of the crop and will not accrue to landlords.

The Land Consolidations Promotions Committee, already organized in Phase I and to be expanded to include local leaders of the other Phases, will assist the Tenurial Development Team in assessing land values, determining existing tillage rights and settling any controversies or disputes that might arise among farmer-beneficiaries, and in the equitable reallocation of land.

The following guidelines have been developed with the assistance of the Taiwanese land consolidation consultants:

a) Qualification of Beneficiaries

Since most of the project area is covered by the Land Reform Program, the re-allocation of land will utilize the masterlist of registered farmers of the Department of Agrarian Reform. Consid-

^{1/} Due to the additional hectareage (195 ha.) to be brought under cultivation under this project it is expected that about 23 farmlots will be demarcated in excess of the 1230 to be distributed to presently qualified Project Area farmers. These lots will be farmed out on government leases until qualified tillers can claim them.

eration will be given to the existing rules and regulations of that department wherein those beneficiaries or awardees who transferred their rights and interests over land already assigned to them (in Lirag Estate) without the consent of the department (exceptions are granted for widows, retirees, etc.) are disqualified to repurchase any lot under the administration of the DAR. In cases, however, where the project will create social problems, priority will be given to the actual tillers of the land, as decreed in P.D. 27.

b) Disqualified Persons

Beneficiaries or awardees who transferred their rights and/or interests over the land without official consent will be disqualified. Furthermore, those who are not personally tilling the land and those who are physically incapable of tilling the land are disqualified.

c) Use of Excess Area

The actual tillage rights existing before land consolidation shall be the basis of calculation and re-allocation of farm lots. After project completion any excess area will be allocated to qualified squatters in the project area.

d) Basis of Maximum and Minimum Area Allocation

To attain a more equitable wealth distribution, there will be a limit to the maximum area a family may own and cultivate. Presidential Decree No. 27 provides that no more than 3 hectares of irrigated riceland may be awarded to each farmer and his spouse, and no more shall be awarded than will bring their total owned and awarded land area up to the 3-hectare limit, including land previously owned or awarded elsewhere. In dividing up large estates, no less than one hectare will be awarded any one former tenant or squatter family in this Project Area, since that is considered a minimum viable farm size.

4) Organizational Development and Training

Under the Project, 74 existing compact farms will be reorganized and 49 new ones organized as the basic production units, each one composed of an average of 17 hectares of contiguous, irrigated land tilled by about 10 farmers. Compact farms will serve as:

- channels for the introduction and dissemination of recommended farm technology;
- units to systematize and consolidate farm operations through cooperative and reciprocal group action;
- an institutional mechanism to facilitate improvement of on-farm water management practices;
- basic production units to purchase and operate small scale farm.

machinery as and when needed; and

- liability and guarantee groups for the acquisition of production and marketing credit.

Compact farms are being organized under the government's cooperative program; i.e., under the Barrio Association (Samahang Nayan), which themselves are to be federated and organized into a larger Area Marketing Cooperative.

An Irrigators' Association (IA) would be organized in each phase of the project by the Project Management Office water management staff during the initial operational year of the irrigation system. IA members and staff at all levels will be trained and prepared to take over each system after the first full year of its operation in each Phase. The compact farms will be grouped by rotational irrigation blocks. Each rotational block will be organized as an irrigation district. There will be 45 rotational blocks, but since some of the smaller ones in Phase III will be grouped together, there will be 42 District Irrigators Associations (DIA's). All officers of the member compact farm units will become members of the DIA board. The compact farm coordinators will elect their district chairman and vice chairman.

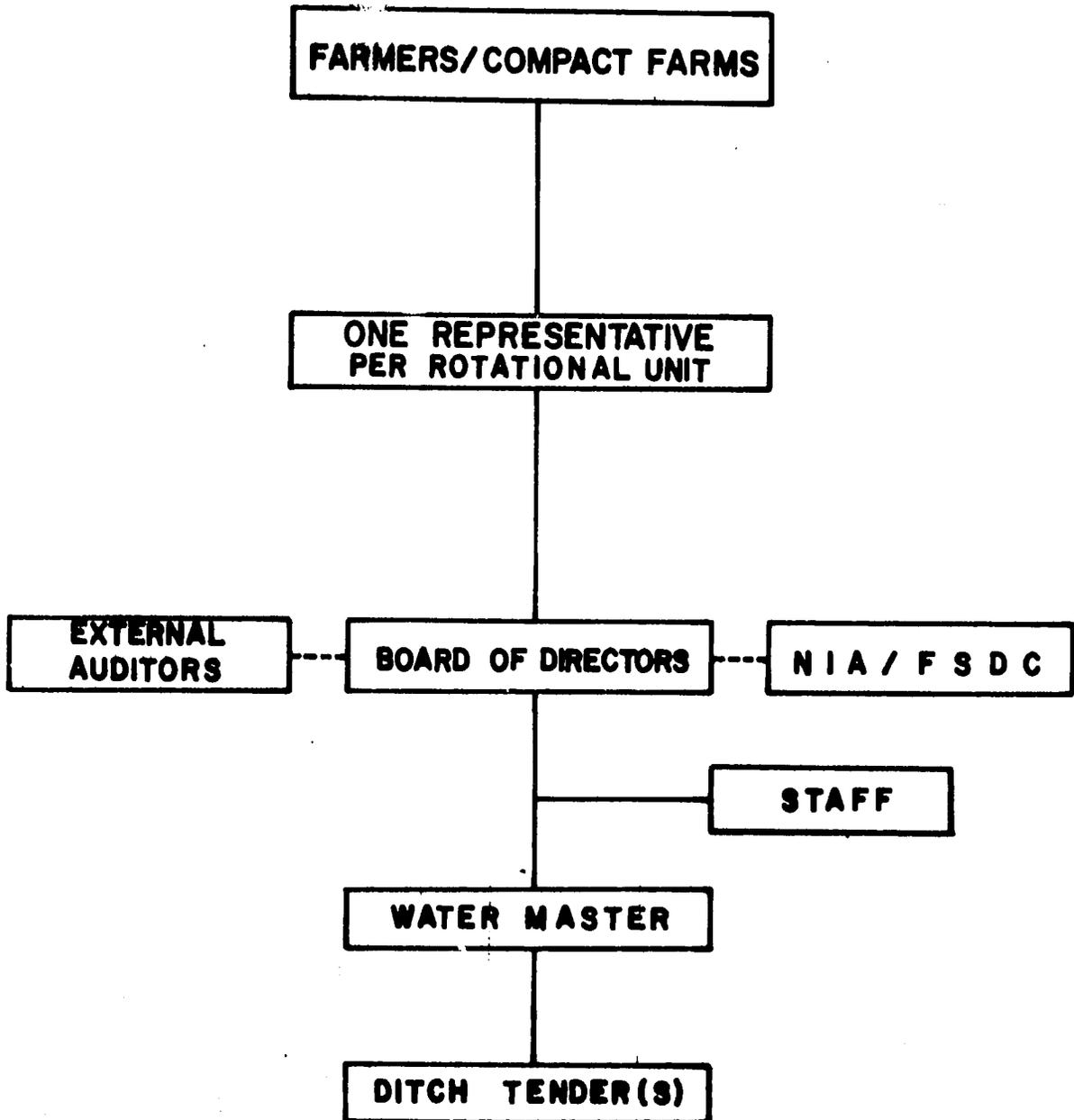
An Irrigators' Association will be formed for each Phase of the project to take over, operate and maintain each irrigation system. This central body will be composed of all the members of the District Executive Boards. All district chairmen will automatically become members of the Board of Directors of their respective Irrigation Associations, and they will elect their President and Vice President from among themselves. A trained watermaster will be selected and hired by the Board of Directors. A grievance officer will be chosen from among the members of the Board. Various committees for production, education and training, water management, finances and development will be organized. The association will also have a full-time, bonded secretary/treasurer to be assisted by a hired bookkeeper. The association charter will be duly registered with the Securities and Exchange Commission.

The Irrigators' Associations will collect water fees from their members, either in kind or in cash equivalent.

Once the five Irrigators' Associations are organized and activated, it is expected they would federate into a Project-wide organization for certain purposes. One such purpose would be the hiring and cost-sharing of a trained electrical mechanic to be on call to service the pumps throughout the entire project system (a resident could be trained for the job). The five IA's will be encouraged to consider this possibility.

In addition to Compact Farms and Irrigation Associations, the Project Management Office will organize Homemakers' Clubs and Rural Youth Clubs to facilitate project-related activities, to help develop leadership and the cooperative spirit, and also to serve as social

**PROPOSED
IRRIGATORS' ASSOCIATION
ORGANIZATIONAL CHART
(BIADP II)**



focal points.

The training components of the project are planned around the organizational efforts described above. Training in leadership, managerial skills, principles of organization and cooperative activities, in the operational and long-run plans and possibilities of the project, in modern agricultural and water management technology, the proper use of credit and other relevant subjects will be offered to all project area farmers, with special courses for barangay, compact farm, and irrigation association leaders, Land Consolidation Promotion Committee members, and government technicians responsible for implementing the project. Special training sessions will be conducted for watermasters and ditchtenders. Farmers, their wives and older children will also receive training in community leadership, health, sanitation, nutrition, family planning and backyard projects (the latter to raise vegetable and fruit gardens, poultry and livestock as part of the nutrition program). Training will normally take place in the barangay multipurpose buildings.

In addition to classroom training courses, agricultural extension agents will work with farmers in the field, will conduct demonstration plots using appropriate packages of technology, and will introduce the highly labor-intensive "Japanese Method" of rice culture. The latter is being successfully applied by a farmer in Bula Municipality, near the project area, who reports an annual yield of 700 cavans (35 metric tons) of rice palay per hectare--compared with the current average annual yield of around 46 or 57 cavans (2.3 or 2.85 M.T.).^{1/} Extension agents and project area farmers will also benefit from On-Farm Water Management activities already underway.

Seminars on nutrition and health will be conducted to create an awareness and transmit knowledge of proper food preparation and precautionary measures for better health. The family planning sessions shall be informational and motivational in nature. It will orient eligible married couples on the importance of family planning, its significance to their families and to the community as a whole. Classes, seminars and other training programs on health, nutrition and family planning will be conducted jointly for the compact farm members, their wives and rural youth.

For the development of youth, a training program will improve their skills and leadership capability. The youth will also be encouraged to put up model community projects such as backyard poultry and livestock raising and vegetable gardening.

None of the proposed training programs are so new they will require extensive prior preparation of training materials. They are all parts of on-going nationwide programs of the different line agencies

^{1/} Current average annual yield calculated from Lynch and Salazar, op. cit., Tables RS06.08-9, pp. 16-17, and Sagun, et. al, op. cit., respectively.

involved (see the implementation plan), but in which the project area, due to its relative inaccessibility, has been mostly neglected. The goal of this project is to provide an initial period of rather intensive introductory training in all of the areas described above and then to let the regular, on-going extension and rural development programs continue the effort in the future.

5) Applied Agricultural Research

The project will fund an applied research program within the project area conducted by the Bureau of Plant Industries designed to determine the optimum package of high-yield seed varieties, fertilizer, pesticides, and other inputs specifically for the soil, climate and water conditions of the area upon completion of planned irrigation and drainage facilities. The research project itself will serve as a demonstration farm for project beneficiaries and will provide valuable information for use by the extension agents in their project-related training and extension programs. The project calls for a five-year research effort, two crops a year, perhaps one year in each phase of the project upon completion of an operational portion of the irrigation system in each phase.

The magnitude of the expected project inputs and outputs discussed above and the targetted time frames for their completion are summarized in Table 2, Part I, and Table 4, Part III, Section B. The most important assumptions or conditions which will affect successful output achievement are:^{1/}

- 1) Farmers continue to show support for land consolidation and cooperative irrigation concepts and reforms.
- 2) Ground water survey and analysis indicates sufficient availability of ground water to irrigate Phases II and III.
- 3) GOP budgetary releases are made as planned to fund each year of project design, construction and training, including the redesign of Phase I before Sept. 30, 1977, and do not delay scheduled activities.
- 4) Bicol Secondary and Feeder Roads Project will provide improved main road access into Phases IV and V by the end of CY 1978.

As of this writing there is no reason to believe any of these conditions will become unfavorable. With a recent history of a delayed budgetary releases, however, condition (3) has been included as a conditions precedent (for the first year's budget) to focus attention on its importance for this project. (See discussion in Part IV, D, below.) Condition (4) has already been the subject of BRBDP, DAR, NIA and Department of Public Highways (DPH) coordination in Naga City and it has been agreed upon by the regional DPH office. The ground water survey currently underway

^{1/} See the Logical Framework Matrix at Annex D for other output-level assumptions of lesser importance.

and its analysis will tell us whether condition (2) holds or not, and construction will not begin in Phases II and III until it is completed and unless it is favorable.^{1/}

The projected outputs are expected to lead to the project purposes only in conjunction with other, complementary activities planned for the Project Area but not funded as a part of this project. The more important of these are (Purpose-level Important Assumptions):

- 1) Sufficient agricultural credit will be made available to finance required production inputs.
- 2) The National Grains Authority (NGA) and Area Marketing Cooperatives will help assure a satisfactory floor price for rice at farmgate by providing a ready, if residual, market for Project Area production.
- 3) The Department of Education and Culture (DEC) will staff the new San Jose elementary school with sufficient teachers as agreed.
- 4) The Camarines Sur Electric Cooperative II (CASURECO II) will extend sufficient electric power into the Project Area to drive all the pumps as they are installed.
- 5) The Bicol Secondary and Feeder Roads Project will provide improved all-weather main road access into the entire Project Area by the end of CY 1979.
- 6) The Proposed Bicol Integrated Health, Nutrition and Population Project will be approved and implemented.

As of this writing there are no reasons to believe these activities will not be pursued on a timely basis as planned. The principal officials involved in each instance at the regional or provincial level have agreed that the requirements of the Bula Project Area fit into their own line agency plans and budgets and have confirmed full support. They and BRBDP planners recommend that the first three assumptions be listed as covenants in the loan agreement. This will help assure that high-level attention is focused on their importance to the success of project plans, and will help assure timely budgetary releases from Manila for these activities. (See Part IV, D.)

In addition, there are four other important assumptions or conditions that will affect the successful achievement of Project Purposes:

- 7) Economic, financial and consumption incentives will be sufficient to encourage the use of irrigation systems and modern production technology to increase production.

1/ The Mission will not ask for authorization of that portion of the loan earmarked for those phases until and unless the ground water availability is assured, in accordance with restrictions contained in Section 611(a) of the FAA.

- 8) Training programs are or can be redesigned to make modern rice production technology and backyard garden and livestock projects acceptable and desirable to project area residents.
- 9) Family planning practices will be acceptable to area residents.
- 10) Nutritious diets recommended in training programs will be palatable to area residents.

Economic and financial incentives are analyzed in Part III below and are believed to be sufficient. In an effort to improve rural consumption incentives the BRBDP plans to conduct a study of rural housing prototypes and ways to facilitate rural household investment in better housing, as rural incomes rise. That such a study will be conducted is also recommended as a covenant of this project (see discussion in Part IV, D, below).

There appears no reason at present to believe the existing training programs, recommended diets, and family planning techniques will not be as successful in the Project Area as elsewhere, but these "assumptions" will be closely monitored.

Given these assumptions, favorable conditions and complementary activities the expected outputs of this project should lead to the successful achievement of the Project Purposes listed at the beginning of this section. The linkages are fairly direct and have been mentioned or alluded to in the discussion above. The magnitudes of expected purpose achievements will provide standards against which to measure the actual success of the Project. These are the "conditions that will indicate the purposes have been achieved," or the "End-of-Project Status (EOPS)":

- 1) 100% of Project Area farmers are using high-yield variety seeds, new technology and appropriate modern inputs by the end of CY 1982.
- 2) 2062 hectares effectively irrigated and producing at least two crops annually and all irrigation and drainage systems are in operation and satisfactorily maintained by 1982.
- 3) All-weather service roads and access paths reaching every farmplot (up from the 10% reached now by only dry-weather dirt roads) utilized by all farmers and maintained by Irrigators Associations (IA) by 1982.
- 4) Farm-to-Market transport costs per cavan of rice palay reduced from ₱4.50 to ₱1.20 (1974 prices) by 1982.
- 5) Home-to-Farm travel time reduced from ___ minutes each day^{1/} that the average farmer visits all of his plots to 25 minutes by 1982.
- 6) 50% of the households are implementing backyard poultry, livestock and/or garden projects by 1982.
- 7) 1200 former tenants and squatters are recipients of Certificates of Land Transfer (CLT's) of consolidated farms and are, by 1982, making their annual amortization payments toward eventual full ownership.

^{1/} Baseline data on this indicator is presently not available. It will be calculated from the results of the 1977 Bicol Multipurpose Survey.

- 8) 40% of women of reproductive age motivated to adopt a recommended family planning method by 1982.
- 9) 100% of households in the planned homesites equipped with and using sanitary toilet facilities; and no open drainage ditches will contain fecal matter or untreated sewage by 1982.
- 10) 100% of households in the planned homesites have access to and use safe water for household purposes by 1982.
- 11) 70% of households with children using recommended meal planning and food preparation procedures by 1982.
- 12) New 3-room schoolhouse in Barangay San Jose staffed and fully operational by June 1980.
- 13) Five Irrigators' Associations (IA's) are controlled and managed by the farmer-members themselves to operate and maintain irrigation and road facilities by the end of CY 1982.

The successful achievement of the project purposes discussed above is expected to lead to the substantial accomplishment of the 5 sub-goals listed earlier in this section. The following Objectively Verifiable Indicators are suggested as measures of Sub-Goal achievement:

- 1) Total rice production in 2286 ha. project area increased from 106,000 metric tons to 371,000 tons per year by 1986.
- 2) Project area rice farmers utilizing at least 35% more farm work-days per year by 1986 than the present annual average of an estimated 586,658.
- 3) Backyard projects producing supplementary vegetables and fruits or livestock for 50% of households by 1982, utilizing an average of 30 annual work-days of household labor per family involved.
- 4) Crude birth rate reduced from 39.7 per 1000 population^{1/} to 35.7 by 1982.
- 5) Infant mortality reduced from 73 per 1000 live births^{1/} to 50 by 1982.
- 6) Mortality due to communicable disease reduced from 3.5 to 2.5 per 1000 by 1982.
- 7) Morbidity rate due to water-borne diseases and intestinal parasitism reduced by 50% by 1982.

^{1/} Average for Camarines Sur Province in 1975, as reported by the Department of Health. Present data on birth, mortality and morbidity rates are not considered very reliable.

- 8) Third degree malnutrition among infants and pre-schoolers reduced to no more than 2%, 2nd degree malnutrition reduced to no more than 12%, and 1st degree to no more than 24% by 1982 (From 1975 Basin-wide ratios of 5.5%, 24% and 48%, respectively).
- 9) All 7 barangays in Project Area have functioning elementary schools by 1980.
- 10) By 1982, there is evidence that farmers are using IA, Samahang Nasyon, and/or other organizations to perform other than their original functions and that they are beginning to influence the timing, kind and manner of social and economic service delivery to the Project Area.

The linkages between purpose and sub-goal achievement are thought to be fairly direct, subject only to the following Important Assumptions or conditions that will affect sub-goal achievement:

- 1) Available high-yield technology is suited to project-area soil, water weather and environmental conditions without introducing intolerable risks of loss.
- 2) Plant diseases and pests in the project area can be controlled without undue expense or loss of crops.
- 3) Surface and underground water supplies are sufficient, as studies indicate, to meet projected irrigation requirements for double-crop intensity.
- 4) Effective capital/labor price ratios encourage labor-intensive agricultural production techniques rather than premature full-scale mechanization.

There is no reason to believe these conditions will become unfavorable to sub-goal achievement in this project.

In turn, the successful achievement of these sub-goals should result in substantial improvements in the socio-economic situation and the quality of life of the rural poor residing in the project area, the overall goal of this project. Goal achievement can be measured through the following objectively verifiable indicators:

- 1) Per capita income and/or consumption expenditure within project area raised from ₱863 in 1974 to ₱2000 by 1986 (in June 1974 prices).^{1/}

^{1/} Attempts to develop reliable estimates of per capita income in the project area have not yet been successful. An SSRU survey in February 1974 reported per capita household income of ₱270 annually, expenditure ₱206. A later (June 1974) survey by BRBDP did not attempt to calculate net income, but reported household expenditures averaging ₱5,470 annually, or ₱863 per capita (at 6.34 members per household). Both surveys included the imputed cash value of home-grown food and materials consumed. The 1986 income target assumes rice production presently provides about 60% of total real household income and that it will increase by 243% (see "Effects on Income in the Economic Analysis," Section D, Part III).

- 2) Productive labor employment rate increased significantly by 1983 (to be determined after next baseline survey).^{1/}
- 3) Raise perceived quality of life index from 3.9 in 1974 to at least 4.5 by 1987. (10.0 point scale, 10-high)^{2/}
- 4) Raise objective quality of life index by 1982 by a significant ratio (to be determined after next baseline survey and to include measures of infant mortality rate, morbidity rate, crude death rate, maternal death rate, nutritional status, education levels, school enrollment ratios, etc.).^{1/}

Successful goal achievement is subject to the following important assumptions or conditions, otherwise the linkages are fairly direct and obvious:

- 1) The farmgate price of rice relative to all other goods does not significantly decline.
- 2) Major weather patterns will continue as in the past and no major disasters will occur in the project area until 1983.
- 3) Stable economic and political conditions.
- 4) Social-cultural system of target area population can absorb multi-dimensional changes without undue dis-organization.
- 5) Bicol Basin social and economic milieu accommodates changed status of target area population in positive ways.

^{1/} Present plans are to conduct a new survey in 1977 in the project area to develop the specific baseline data required by the new and more stringent AID project evaluation requirements. This will include an attempt to develop an "objective quality of life index" to supplement the present SSRU efforts to develop a "perceived quality of life index." It will also include an attempt to measure total available labor. This will be a component of the Bicol Multipurpose Survey, discussed in Part II, Section A, above.

^{2/} The base figure cited here is the Milaor District average from SSRU studies. There is as yet no comparable figure for the project area itself.

PART III

PROJECT ANALYSES

A. Technical Analysis and Environmental Assessment

1. Condition of area without project

The total project area is predominantly suited for rice production. Out of the 2062 hectares of cultivable land of the project, only 653 hectares or 32%, are presently irrigated, although poorly, and the rest depends solely on rain water for cultivation. Due to the undependability of rain and the lack of adequate facilities, both for irrigation and drainage, dry season yields are extremely low. The average yield of palay is low, averaging only 57 cavans^{1/} (2.85 M.T.) per hectare annually, because the farmers can not apply the modern rice culture without sufficient water supply and drainage.

The project area is located in the typhoon belt and is annually affected by heavy rains and floods. About 25% of the project is subject to short term flooding from the Bicol River.

Transportation within the project area is negligible. Out of the present 2668 farm plots of the area, only 10% have access to transportation. The existing dirt roads are not passable during the rainy season and some portions are inundated during floods.

Farm plots are extremely small-sized and most farmers cultivate multiple plots which are usually widely scattered.

Many homelots are located in the low areas and are exposed to frequent flooding. Service facilities such as education, health centers, potable water supply, sanitation, electricity, parks and playgrounds are not available. There is no school building on the project side of the Bicol River in Barangay San Jose. Family planning has few acceptors and the average family in the area has 6.3 members. Extension services rarely reach the area due to lack of road access.

2. Benefits of the Project

The project will be an integration of irrigation, drainage and improved access with supportive social services designed to improve the quality of life of the beneficiaries. Extension of socio-economic services, the development of well-planned residential neighborhoods, facilities to hasten bringing in of farm inputs at the right time and bringing farm produce to the market, and establishment of health and family planning centers will be possible after completion of the physical components of the project.

^{1/} One cavan is 50 kgs.

The Project will maximize the production of rice, the basic food staple in the area, by providing adequate and reliable water supply and drainage, thereby increasing the average household income. Two crops per year are reasonable on project-irrigated land to attain an annual average of 180 cavans (9 M.T.) per hectare, an increase in annual yields of 216%.

The present rice yield per crop hectare is 24 (dry season) to 25 (wet season) cavans for non-irrigated and 35 (dry season) to 43 (wet season) cavans for irrigated land. With the project, with proper irrigation management and new rice culture, the yield per hectare is expected to rise to 84 cavans in the wet season and to 96 cavans in the dry season.^{1/}

3. Design Procedures

The DAR-BRBC in undertaking the land development program for the project decided to adopt the Taiwan land consolidation scheme. The Republic of China thru the USAID/Manila sent a 7-man team of land consolidation experts to design and prepare the detailed plans of the project and at the same time train GOP professionals for four months. A grid-iron layout was designed for the project wherein all farm lots shall be serviced by irrigation and drainage canals and shall abut a farm access road.

In accordance with the layout of the traverse farm roads having an interval of 800 meters and interfarm access roads at intervals of 300 meters, the farms were divided into 24 hectare blocks. Summarizing the cost estimates based on preliminary engineering plans, it was found that 67% of the total project cost went to the road and canal embankments. The average cost per hectare of improved irrigated land after completion reached ₱32,000 (\$4267) (in constant 1976-7 prices). This cost was too high for the project.

A team composed of engineers from the DAR, NIA and BRBDP was formed to redesign the project using the NIA standards, without sacrificing the production benefits derived from the Taiwan scheme.

Relocating the main canals on existing high ground and following the natural contours of the land, the borrow material requirement was greatly reduced. Relocation of the main canal did not reduce the areas to be irrigated. The laterals and access farm roads adhered as much as practicable to the grid-iron layout. The farm access roads were reduced from 4.0 meters wide to 2.0 meters wide which will permit the passage of small farm equipment and bullock carts.

The new design reduced the cost per hectare for the pump, canal and road improvements to less than ₱12,000 (\$1600) per irrigable hectare and most of the benefits as envisioned by the Taiwan scheme can still be obtained.

4. Irrigation

The possibility of constructing a gravity irrigation system, which has lower operating costs than a pump system, was investigated but found technically not feasible. Most of the project area has a dependable source of

^{1/} See Tables 3, 4 and 5, Annex B.

water supply from the Bicol River at an elevation lower than the project site. Studies had been made by the Republic of China consultants for the possible sources of water and only the Bicol River and underground water could supply the requirements of the project.

The waters of Anayan River have been adjudicated and appropriated to water users upstream of the project area and are not sufficient to irrigate the areas supposedly covered. Mataoroc Creek dries up during the dry season and whatever quantity of water that could be tapped by the project during rainy season comes from waste waters of the areas irrigated upstream.

In preliminary studies made by the NIA on the possibility of constructing impounding reservoirs on the upper portion of the Anayan River, this approach was found not feasible. The only alternative was to use the Bicol River and the underground water reservoir. Assurance of a sufficient underground water supply will depend on the completion of the ground water survey being undertaken by the BRBDP, which is expected to be completed by the end of 1977.

Electric motor driven pumps were selected over the internal combustion engines because of the assured availability of electric power in the area when the Bicol Region is connected to the Luzon grid in mid 1977. The advantages of the electric powered motors are the relatively long life of the motor, low maintenance costs, dependability, and ease of operation.

Three surface water pumping stations will be established along the bank of the Bicol River which will irrigate 1596 hectares. Due to the topography of the land, the remaining 466 hectares of cultivable land will be irrigated from ground water wells. Although these areas could be supplied from the Bicol River, it would involve construction of costly canal embankments, so the ground water supply was selected.

For economy in the operation of the pumps, the rotational irrigation scheme will be adopted in the area. The pumps required for each phase are described in Part II and Annex B of this PP. During land preparation, which will be the time for peak demand of the irrigation water (assuming no rainfall), the operational surface water pumps (not the standby units) will be operating at the same time for a maximum of 30 days. After transplanting the seedlings, the minimum water requirement for the crop maintenance can be supplied by operating only one pump. For phases II & III, the deep-well pumps will operate 24 hours a day only during the 30 day land preparation period, and will have a reduced rate of operation from six to zero hours daily for crop maintenance, depending on the amount of rainfall during the growing stages of the rice plants. The water will flow through the system by gravity after being raised to the proper level by the pumps. The canals and their structures are described in Part II, above, and in Annex B. (See Map #4, Annex B.)

5. Drainage

Adequate drainage is as important as irrigation in rice cultivation in the Bicol Region because of the heavy rainfall during the wet season. Good water control is important during seedling growth and for the first 45 days

after transplanting. After this period, the rice plants are more tolerant of higher water levels in the fields for short periods.

Farm drainage will be accomplished by gravity flow off the rice fields into field ditches which will flow into the main drains and then into the Bicol River. The project area has sufficient water-courses and slope of the land to accomplish this without excessive earthwork. Checkgates will be installed in the field ditches to control the water level during the dry season. Control structures will be installed where drainage ditches intersect main drains or natural watercourses.

The design of the drainage system considered rainfall, topography, drainage outlets, catchment areas, infiltration, land size and irrigation practices. (See Map #5, Annex B.)

6. Flood Protection

The land elevation of the project area varies from 5 meters above mean sea level (+5 msl.) along the Bicol and Anayan Rivers and Hamoraon Creek to a high of +20 msl. in the extreme northern end of Phase II, with the greatest land area lying between the elevations of +8 msl. and +10 msl.

The localized, short-term flooding within the project will be eliminated or greatly reduced by construction of the project drainage system. Recent studies and observations show that the land areas with an elevation of +6 msl. or higher will not be flooded in a major 20-year flood of the Bicol River and that the land areas along the Bicol and Anayan Rivers and Hamoraon Creek having an elevation of less than +6 msl. will probably not be flooded during 5- and 10-year Bicol River floods but will be flooded during a 20-year flood. The cost of flood protection works such as levees and pumping stations is greater than the benefits that would be received from the small areas protected. The project team recommended that flood protection works should not be included in the project. This decision was upheld during project technical reviews and the design proceeded without a flood protection component.

7. Road Network

Coincident with the construction of irrigation canals and drainage ditches, sufficient service roads and all-weather access paths will be constructed to provide direct access to each farm lot.

About 33.4 kilometers of farm service roads, with a gravel surface width of 3 meters and frequent 5-meter passing and parking zones, will connect each field block with the Secondary and Feeder Roads constructed under another project. About 41.9 kilometers of farm access paths, with a gravel surface width of 2 meters, will connect each farm lot with the farm service roads. (See Map #3, Part II.) (For more detail see Part II, above, and Annex B.)

8. Cost Estimates

Quantity estimates were prepared from preliminary designs of the various project components. Profiles and cross sections were taken in the field and

plotted and were then used to compute the earthwork quantities. National Irrigation Administration standard designs were utilized wherever possible.

Unit price estimates were prepared for each project component considering local labor, equipment rental, and material costs. The offices of the Department of Public Works, National Irrigation Administration and the Provincial Engineers Office of Camarines Sur were all consulted to obtain current prices.

9. Conclusions

The technology selected for the project is suitable for the Bicol Region and will provide the required improvements to the project area at a minimum cost. The designs are simple and can be constructed by local contractors using their normal labor-intensive methods of construction. Imported equipment and material were kept to a minimum. The completed project can be operated and maintained by the local irrigator's organization with a minimum of training.

The cost estimates are fairly accurate and show that the project is reasonably priced.

The project is technically sound; the cost estimates are reasonably firm and adequate planning has taken place. The project meets the requirements of FAA Section 611(a) and (b), except for the lack of a completed ground water survey and analysis for Phases II and III, as discussed in Part I, Section D. The initial loan authorization request includes sufficient funds for the surface water portions of the project alone, for which all Section 611 requirements have been met. Authorization for the second tranche will be requested only if and after the ground water availability has been satisfactorily assured and Section 611 requirements have thereby been satisfied for the relevant phases.

10. Environmental Assessment

Summary of Environmental Impacts and Adverse Environmental Effects

- a) Land leveling of some undulating or sloping portions of the project area is required to maintain an efficient distribution of irrigation water. Also, some hilly areas will be scraped and leveled for homesites. This process can have a negative impact on topsoils.
- b) Project related pumping would have a noticeable effect on the flow of the Bicol River through the Bula area. The drawdown would be approximately 40% of the current low-flow value for a five year return period and 30% of the low flow for a three-year return period.
- c) The concentration of pesticides and fertilizers will increase downstream from the project due to the improvement in farm management and second cropping.
- d) Irrigation water withdrawal could result in salinity intrusion at high tidal stages reaching 5.4 to 6.6 kms. further upstream than at present during average low-flow months recurring every 2 or 3 years.

- e) The project calls for underground water sources to be utilized to irrigate 23% of the cultivated lands.
- f) The increased concentration of pesticides due to irrigation activities may be detrimental to aquatic life.
- g) The increased residential concentration will increase the concentration of sewage and solid waste materials.
- h) The project area population is expected to double as a result of the project.
- i) The major long-term land use impact would be a shift from rainfed farming to irrigated agriculture in new areas to be served by the system.

Interests and considerations which offset adverse effects

Most of the adverse environmental effects discussed above will result from the construction of irrigation facilities and their use to intensify rice cultivation. Their combined environmental cost is small compared with the rice production and income benefits.

The other major adverse effect would result from resettling farm households from scattered locations into seven planned and organized rural communities of 150 to 200 families each. The additional problems of concentrated waste disposal are small compared with the expected gains from better health, education, transport and other social and economic services for each family.

See Annex C for further details.

B. Financial Analysis and Plan

1. Financial Plan and Budget Tables

Costs of Project Outputs

A tabular summary of project costs by input source is presented in Table 3, below. More detailed cost breakouts are included in the statistical tables attached to Annex B, and the unit cost analyses used in preparing the construction cost estimates have been forwarded to ASIA/PD, ASIA/RAA/P and SER/ENG in a separate volume of backup data and figures as a Supplement to Annex B.

A total of \$3.26 million (before contingencies and cost escalation) or 80% of all project costs, represents the cost of constructing irrigation, drainage and service road networks, including pumphouses, and importing the irrigation pumps required. Another \$443,000, or 11%, is slated for seven multipurpose community buildings (to be used temporarily as field offices and training centers by the Project Management Office), an elementary school, homesite levelling, construction and relocation, hand-operated household water pumps and water-sealed toilets. Institutional development, including land consolidation and tenure reform, organizational development and training, comprises another \$137,000, or 3% of the total. A small amount is also included for some applied agricultural research within the Project Area (\$12,800, or 0.2% of the total). Project Management and Operations involves a cost of \$197,000, or 5%.

All cost estimates are based on late 1976 prices, wage rates and salary scales. Construction costs are based on detailed unit price analyses, which in turn are based on current experience in the on-going construction of the Phase I pilot area of this project, and in nearby Libmanan (Bicol IAD-I loan project). Quantity estimates are based on a detailed preliminary engineering design completed over a period of one year by DAR, NIA and BREDP engineers.^{1/}

AID loan funds will be applied to 100% of the foreign exchange costs of imported pumps, vehicles, and typewriters (the latter for the FMO), and to about 60% of the costs of constructing the irrigation, drainage and service/access road facilities. All other project costs will be funded by the GOP. The total project cost, including a 15% contingency fund and the cost escalation factors discussed below, is estimated to be \$5,461,000. The \$2.9 million AID loan for this project will provide 53%, with GOP funding the remaining 47% of total project costs, fully satisfying the requirements of Section 110(A) of the Foreign Assistance Act that the host country contribution cover at least 25%.

Annual Cost Estimates and Financial Plan

The annual flow of funds required as project inputs has been estimated in Table 4, assuming construction of Phase I facilities in 1978-79, Phase II in

^{1/} The initial design, completed between January and September 1976 under the guidance of AID-funded Taiwanese engineering consultants, proved to be too expensive per hectare and, as discussed in Section A, Part III, above, it was redesigned between September 1976 and January 1977 to reduce costs, while providing the same benefits of water control.

Table 3. COSTING OF PROJECT OUTPUTS BY INPUT SOURCE
BICOL IAD II-A (BULA-MINALABAC) PROJECT
(\$1,000)

OUTPUT	TOTAL MAGNI- TUDE OF OUTPUT	INPUTS: AID APPROP. LOAN	GOP	TOTAL INPUT
I. Physical Facilities		<u>2,077.1</u>	<u>1,294.0</u>	<u>3371.1</u>
Pumphouses built	11	99.4	71.3	170.7
Pumps installed	19	355.7		355.7
Irrigation canals (km)	154)			
Drainage canals (km)	92) <u>1/</u>	1,622.0	1,116.1	2738.1
Service roads & paths (km)	76)			
Hectarage irrigated	2062	(2,077.1)	(1187.4)	(3264.5)
Multipurpose buildings	7		93.3	93.3
Elementary schoolhouse	1		13.3	13.3
II. Homesite Development			<u>336.5</u>	<u>336.5</u>
Homesites completed	7)			
Homesites developed and distributed	1010) <u>1/</u>		134.0	134.0
Households relocated	1010		47.0	47.0
Hand pumps installed or approved	1230		92.1	92.1
Water-sealed pit privies constructed or approved	1230		63.4	63.4
III. Land Consolidation & Tenure Reform			<u>22.4</u>	<u>22.4</u>
Farmlots consolidated	2668)			
Consolidated farms demarcated	1253) <u>1/</u>		22.4	22.4
New CLT's, leases, & titles issued (or old ones confirmed)	1230)			
IV. Organization Development & Training			<u>114.9</u>	<u>114.9</u>
a. <u>Organizations formed:</u>				
Compact farms	123)			
District Irrigators' Assoc.	42)	Cost included in training		
Irrigators' Assoc. (IA)	5)			
Homemakers' Clubs	32)			
Youth Clubs	65)			
b. <u>People trained:</u>				
Project implementors	34) <u>1/</u>		0.06	0.06
Promotion Committee members	18) <u>1/</u>			
Barangay leaders	70		0.1	0.1
Compact farm members*	1230		30.6	30.6
Compact farm leaders	369		0.3	0.3
District IA officers*	68) <u>1/</u>			
IA Board Members*	42)		4.5	4.5
IA watermasters*	5) <u>1/</u>		4.6	4.6
Ditchtenders*	123)			
Farmers (in health, etc.)	1230		10.7	10.7
Homemakers	1230		21.3	21.3
Youths	2460		42.7	42.7
V. Applied Agricultural Research			<u>12.8</u>	<u>12.8</u>
Applied Research crops	10		12.8	12.8
PROJECT OPS. & MGT.		<u>45.1</u>	<u>152.3</u>	<u>197.4</u>
SUB-TOTALS		2122.2	1932.9	4055.1
15% Contingency		318.3	289.9	608.2
Cost Escalation		459.5	337.9	797.4
TOTALS		<u>2,900.0</u>	<u>2560.7</u>	<u>5460.7</u>

1/ Constructed or accomplished together, not costed separately

* Includes both classroom instruction and seminars (usually 5 days each, 10 days for homemakers and youths), on-the-job training, and extension assistance, the latter consisting of close supervision for up to one year.

Table 4. ANNUAL COST ESTIMATES BY MAJOR PROJECT COMPONENT (INPUTS) AND FINANCIAL PLAN (\$1000)^{1/}
BICOL IAD-IIA (BULA-MINALABAC) PROJECT

Project Component	YEAR:						TOTAL	AID LOAN			GOP LC
	1976-7	1978	1979	1980	1981	1982		FX	LC	TOTAL	
I. Physical Facilities	371	740	797	940	494	28	3371	356	1721	2077	1294
a. Imported Equipment		(356) ^{4/}					(356)	(356)		(356)	
b. Construction Costs	(371) ^{2/}	(384)	(797)	(940)	(494)	(28)	(3015)		(1721)	(1721)	(1294)
II. Homestead Development	23	56	108	120	30		337				337
III. Land Consolidation & Tenure Reform	2	5	4	4	4	4	22				22
IV. Organizational Development & Training		24	22	21	23	24	115				115
V. Applied Agricultural Research		1	3	3	3	4	13				13
VI. Project Ops. & Mgt.	49	67	19	19	20	22	197	45		45	152
a. Imported Equipment		(45) ^{5/}					(45)	(45)		(45)	
b. Local Costs	(49) ^{3/}	(22)	(19)	(19)	(20)	(22)	(152)				(152)
SUB-TOTALS	445	894	953	1107	574	82	4055	401	1721	2122	1933
15% Contingency	67	134	143	166	86	12	608	60	258	318	290
SUB-TOTALS	512	1028	1096	1273	660	94	4663	461	1980	2441	2222
Cost Escalation Factor ^{6/}	0	109	159	287	205	38	798	69	390	459	339
GRAND TOTALS	512	1137	1255	1560	865	132	5461	530	2370	2900	2561
									53%	2900	47%

^{1/} Derived from peso estimates, Table 13, Annex B, using an exchange rate of ₱7.5/\$ for 1976-9, ₱8.0/\$ for 1980-2. For further details see Tables 14-27, Annex B.

^{2/} \$138 thousand = value of work completed in 1976, \$233 = amount budgeted CY 1977.

^{3/} \$ 36 thousand = Pilot Project Ops. & Mgt. through 1976, \$13 = est. for CY 1977.

^{4/} Pumps and spare parts.

^{5/} Vehicles, spare parts & typewriters.

^{6/} 1977 base year. Imported equipment escalated 15%/yr., all local costs 7%/yr. before conversion to dollars.

1979, Phase III in 1979-80, Phase IV in 1980-81, and Phase V in 1980, with appropriate phasing of Homesite Development and other project components. (See Magnitude of Outputs by year in Table 2, Part I.) The estimated project cost in 1976-77 prices without the contingency fund is \$4.06 million, and \$0.45 million, or 11% of that total, has already been spent or budgeted in the pilot project area of Phase I (CY 1976-77). Of the remaining \$3.60 million, 25% should be spent in 1978, 26% in 1979, 31% in 1980, 16% in 1981, and 2% in 1982, the latter only for operations and maintenance of half of Phase IV and for final training, field research and extension and other institutional activities. The AID supported part of the project is scheduled for completion within four years, 1978-81. (See discussion in Part IV, B, of the need for a four-year construction period.)

A contingency fund of 15% and cost escalation factors of 15% per year for imported equipment and 7% for all local currency costs have been applied and added to the annual totals, with 1977 as the base year for cost escalation calculations. All calculations were made in pesos and converted to dollars using an exchange rate of ₱7.5/\$1 through 1979 and assuming an average rate of ₱8.0/\$1 from 1980 through 1982. (It is assumed a peso devaluation against the dollar will eventually become necessary because of slightly differing rates of domestic inflation in the U.S. and the Philippines).

Fixed Amount Reimbursement Method (FAR)

The GOP, through the lead agency DAR and with the BRBDP monitoring the use of funds for NEDA, will make annual budget releases specifically for this project. These funds will initially finance construction costs. Upon completion of a Phase of irrigation, drainage and service road construction or a useable segment (including pumphouse construction and production well drilling), in conformity with previously agreed upon plans and specifications, AID will reimburse the fixed amount agreed upon. The GOP will be responsible for all cost overruns.

Except for disbursement for procurement of the pumps, vehicles, and other imported equipment, which will be financed by Letter of Commitment/Letter of Credit procedures, AID and the GOP will use the FAR method for all disbursements of AID loan proceeds. For the purposes of reimbursement, the five irrigation Phases will be divided into logical and useable segments, as agreed upon by the GOP and USAID. Upon completion of an approved segment of work by the contractor and after A & E certification that the construction is in conformity with agreed to plans and specifications, AID will, after acceptance, reimburse the GOP through the Direct Reimbursement Authority (DRA) mechanism under FAR procedures to be spelled out in detail in an implementation letter, following normal Mission practices.

The costs that are eligible for reimbursement will be reviewed and approved by AID prior to finalizing of each contract. Costs will be calculated in Philippine pesos and dollar reimbursement will be based on the selling rate for U.S. dollars set by the Central Bank of the Philippines on the date USAID/Manila

acknowledges receipt of an application for reimbursement from the GOP. AID reserves the right to inspect completed pumphouses, wells, canal and service road segments prior to approving reimbursement requests. AID will not reimburse for building construction (except for a portion of pumphouse costs), homestead development, or for right-of-way costs.

Equipment

Procurement of the proposed \$530,000 (including contingency and cost escalation) in U.S. pumps, vehicles and typewriters will follow normal AID Letter of Commitment procedures.

Loan Disbursement Schedule

The GOP Implementation Plan, required as a condition precedent of the proposed loan, will include an estimated quarterly AID loan disbursement schedule as a portion of project cash flow tables. The PMO, acting for the implementation agency, and the BREDP as the coordinating agency, will revise this schedule if required and provide updated copies to concerned GOP agencies and USAID. AID may withhold reimbursements whenever there is a failure to follow the approved implementation plan.

Interest Rate and Terms of Repayment

The borrower shall repay the loan to AID in United States Dollars within forty years from the date of first disbursement under the loan, including a grace period of not to exceed ten years. The borrower shall pay to AID, in United States Dollars, interest from the date of first disbursement at the rate of (a) two percent per annum during the grace period, and (b) three percent per annum thereafter on the outstanding disbursed balance of the loan and on any due and unpaid interest accrued thereon.

2. Budget Analysis of Implementing Agencies

The Project Management Office (PMO) to be established to implement the project will be composed of staff representatives of all participating agencies, with NIA performing a key role in supervising irrigation construction and, with FSDC, water management training activities. The PMO budget will be channeled through and supervised by DAR, as the lead implementing agency, and BREDP, acting for the National Economic and Development Authority (NEDA) in a coordinating and monitoring role, and will follow the financial plan presented above. The Government of the Philippines budgets development loan project funds separately and prohibits their use for any purpose other than that approved. These funds do not become a part of the normal operating budget of any of the implementing agencies.

The first year's (1978) budgetary requirement for counterpart funds of the project has already been incorporated in the DAR line budget for CY 1978. (See letter from DAR Assistant Secretary for Administrative Affairs dated March 17, 1977, at Annex H.)

3. Loan Amortization and the Financial Viability of Irrigators' Associations

The construction and other project-related costs plus irrigation operations and maintenance costs per hectare differ slightly from Phase to Phase. The financial requirements of each Irrigators' Association are therefore calculated separately and presented in Table 5, below. The annual financial requirement (minimum annual water fee) per hectare and per household for each Phase of the project can then be compared with the expected rice farm returns due to the project to determine its reasonableness, and the financial viability of the project as a loan to the farmer-participants can be determined.

For this analysis it was assumed that all construction and homesite development costs would be charged the Irrigators' Associations as a loan to be amortized over a 40-year period at an average annual interest rate of 1.33%, after deducting 10% of the principal as government overhead and taxes not to be charged. The 40-year amortization period is picked to parallel the duration of the AID loan; and the 1.33% concessional rate of interest is the current average rate of interest charged by NIA.^{1/} In their final implementation plan

^{1/} Present NIA regulations applied to all national systems require a 10% deduction for overhead and taxes, the remaining 90% to be amortized by water fees, while 70% is interest free and 20% is to earn 6% interest. The average annual interest rate on the 90% to be amortized is therefore 1.33%.

If, as anticipated, the annual amortization payment is calculated at this rate and set in cavans, it amounts to a real rate of interest over and above the current rate of inflation each year. If, for example, inflation averages 7% a year, as it has recently, then this is equivalent to slightly more than an 8% monetary rate of interest.

While the NIA interest rate formula amounts to a subsidy in favor of the project beneficiaries, the Mission believes it to be justified in a project such as this one for the following reasons:

1) Both the price of rice and the foreign exchange rate are politically-controlled prices. Depressed for political reasons that appear valid to the GOP, they operate to hold the farmgate price of rice palay below its true socio-economic value to the nation. (The economic analysis of this project uses a shadow price for palay 27% higher than its controlled price. See discussion in Part III, D.) Yet the Philippines has a strong national interest in fostering rural development in general and self-sufficiency in rice in particular. If the farmers being developed cannot amortize infrastructure loans for irrigation at market rates of interest, given the artificially depressed price for rice, it is in the national interest to subsidize those loans to better utilize the nation's natural resources of land, water and labor.

2) The Philippine rural sector is presently in such a state of general neglect and poverty, due to past development policies favoring the export-oriented and urban industrial sectors, for which the United States and its private sector business interests must share some of the responsibility, that a large amount of public social and physical infrastructure investment will have to be made

(cont. on next page)

Table 5. Financial Analysis of Irrigators' Association by Phase
Bicol IAD-IIA (Bula-Minalabac) Project

Item	Phase:					PROJECT TOTAL
	I	II	III	IV	V	
No. of Irrigable Hectares	567	184	286	810	215	2062
- Proportion of Total	.275	.089	.139	.393	.104	1.000
No. of Households	321	101	227	436	145	1230
- Proportion of Total	.261	.082	.185	.355	.118	1.001
Project Cost: (P1000)						
- Construction	9340	2567	4789	9956	3266	29,917
- Homesite Development	734	256	496	1111	391	2988
TOTAL	10,074	2823	5285	11,067	3657	32,905
Less 10% ^{1/}	-1,007	-282	-529	-1,107	-366	-3,291
Amortized Total	9,067	2541	4756	9,960	3291	29,614
Annual Amortization Payment ^{2/}	294.0	82.4	154.2	322.9	106.7	960.1
Annual O&M expenses ^{3/}	394.6	151.3	225.9	466.5	170.6	1,408.8
Vehicle & Pump Repair Sinking Fund ^{4/}	7.4	6.4	9.1	9.4	5.9	38.3
TOTAL ANNUAL REQUIREMENT (P1000)	696.0	240.1	389.2	798.8	283.2	2,407.2
Annual Requirement/ha. (P)	1227	1306	1359	986	1319	1167
Annual Requirement/family (P)	2168	2377	1715	1832	1953	1957
Minimum Annual Water Fee in cavans/ha. ^{5/}	22	24	25	18	24	21

1/ NIA normally deducts 10% of irrigation project costs as overhead, taxes and other transfer payments not to be amortized.

2/ Calculated for 40-year payback period at 1.33% rate of interest, the average interest presently charged by NIA for such projects. If the water fee is set in cavans, this represents a real rate of interest and is equivalent to a financial rate of 1.33% above the current rate of inflation each year.

3/ Annual operations and maintenance costs of irrigation, drainage and service road system by Phase.

4/ Savings to allow purchase of one new jeep plus spare parts (P50,000 or \$6,667) every 10 years for each Phase, plus enough to rebuild all pumps and motors after 20 years, assuming 5% annual interest earned on balance.

5/ Annual peso requirement per hectare converted to rice palay equivalent at P55 per cavan. One cavan equals 50 kg.

the lead implementing agency of this project, DAR, is not expected to deviate significantly from the NIA precedents in these matters.

Given these assumptions and using the current farmgate price of rice palay at ₱55/cavan, the analysis indicates the average annual water fee necessary to meet the amortization and other expenses of the Irrigators' Associations is equivalent to only 21 cavans per irrigated hectare, 14% of expected annual harvest the first year after construction and 12% of it after 1986, and only 17% of projected incremental production. These charges are deducted as costs of production in the discussions of the financial effects on project participants, just below, and of the income effects in the Economic Analysis (Section D, Part III).

The actual water fees charged by the Irrigators' Associations may be slightly higher than the minimum requirements calculated here to permit a collectively controlled fund to be used for the benefit of the membership or to cover possible shortfalls in collections, but this would be up to the member farmers themselves to decide. Based on this analysis, the required water fees appear reasonable and within the capability of the Project Area farmers to support.

4. Financial Effect on Project Participants

Farm production and budget data developed from the 1974 Socio-Economic Study in the Project Area and the current Bicol Farm Record-Keeping Project

1/ (Continued from preceding page)

in rural areas before the productive efficiency of the rural sector can approach that of the urban sector. To correct the lopsided development that has occurred will require large resource transfers to the rural sector, and a subsidized interest rate on large irrigation projects is but one small mechanism to this end.

3) In addition, it can be argued that, due to the long accumulation of productive human and physical capital that has occurred in urban areas, but not in the rural areas, the economic externalities that affect production costs are far more favorable in the urban sector than in the rural sector, that these favorable externalities are due to past government investment policies more than to inherent productive potential, and that until these differences are redressed rural productive activities will continue to be at a man-made economic disadvantage to urban productive activities unless various forms of urban to rural subsidation are applied to achieve balance.

4) It is also clear that real per capita incomes are considerably higher in the urban sector and in a few regions of the Philippines than in several rural regions, the Bicol Region being among the most impoverished. An interest rate subsidy on rural infrastructure loans such as this one can be viewed as a mechanism of real income transfer to the poor, in the same way that other rural infrastructure projects such as road-building, schools, health and nutrition projects, and rural electrification, represent real income transfers to the rural poor, to the extent they bear a smaller share of the cost than their share of the benefits received.

of the BREDP indicate that current returns from rice farming average a net of only ₱319 per hectare annually to the farmer plus ₱1825 to labor, or a total of ₱2144 (\$286). Since the hectareage tilled in the Project Area is presently only 1.52 per household, the annual household income from rice farming is only ₱3254 (\$434). This is equal to \$69 per capita, at the project area average of 6.34 members per family. (See Table 3, Annex B.)

Small net returns such as these make it difficult for Project Area farmers to support their families and at the same time make the annual amortization payments on land transferred to them under the various land reform programs. The latter payments will average ₱780 per family for the whole project, and will range from ₱103 per hectare for non-irrigated land, ₱257/ha. for irrigated land, in the Hernandez Estate (Phases I and III), expropriated in 1959,^{1/} to ₱515 or ₱669/ha. for non-irrigated land, ₱875/ha. for irrigated land, in the other Estates, expropriated in 1969 and 1972. (See Table 6a, Annex B.)

This project is expected to result in an increase in the net real income of Project Area residents from rice production of 243%, from its present ₱3254 (\$434) per household to around ₱11,200 (\$1500) annually by 1986. (See the "Effect on Income" analysis at the end of Section D, Part III, below.) Twenty-three per cent of the income increment will accrue to wage labor, and the other 77% to the farmers themselves. Net annual returns to farm management and land ownership will rise from its present average of ₱484 (\$65) per household to ₱6578 (\$877), or an increment of ₱6094 (\$813). The average land transfer amortization payment of ₱780 per family is only 13% of this income increment, 12% of the expected average net annual returns to farm management and land ownership (it is 245% of these returns now), and only 7% of total household income from rice production, including wages, expected by 1986 (as opposed to 24% now). (See Tables 3 to 6, Annex B.)

The project will thus better enable land transfer recipients to make their amortization payments and still have enough additional income left over to enjoy a substantially higher current standard of living. Land transfer amortization payments are not, after all, an operational cost to the farmer, such as are rents, but are rather an important form of savings increasing his wealth (increasing his equity in land ownership, like paying off a mortgage on a house). Such payments are not, therefore, netted out when calculating net income from farm operations.

With respect to the water fees to be imposed by the Irrigators' Association, which are netted out as costs in the discussions above and below, they also prove to be a small fraction of the anticipated net farm income, averaging 23% of net farm returns to management and ownership before deducting water charges and only 15% of total net returns to both labor and management. (See Table 5, above, and Tables 4 and 5, Annex B.) These are considered reasonable charges for the quality of water control this project will provide.

^{1/} Land values were set in pesos at the time of expropriation and are not increased as time goes on, even though peso price inflation and its resultant increase in peso land values and rice prices have greatly reduced their real value.

Project Area farmers will need access to short-term credit in order to finance some of the modern inputs expected of them, especially during the first few years while they are building up productivity and income from their currently low levels. Their organization into compact farms and Samahang Nasyon will make them eligible for government-sponsored agricultural credit programs and facilitate credit acquisition and control.

5. Summary Opinion

It is the opinion of the Mission that this project is financially sound. This judgement is based on (1) the formal GOP letter of loan application indicating GOP commitment to provide the required local currency for construction and other project-related activities (see Annex H), (2) the use of the fixed-amount reimbursement method for AID local currency inputs, after construction is completed to satisfactory design standards and accepted by AID, (3) the GOP agreement to fund approximately 50% of estimated project costs plus any cost overruns, (4) the capability of the GOP to budget and to release funds specifically for this project, (5) the apparent reasonableness of the estimated required water fees to be charged participating farmers by the Irrigators' Associations in order to fund loan amortization and annual irrigation operation and maintenance costs, and (6) the apparent capability of participating farmers to pay the assessed water fees out of incremental net farm returns and still have a sizeable income increment left for themselves.

C. Social Soundness Analysis

"As a group, the people of the study area (Bula) are at least as poor as the average rural Bicolanos... They are close to the bottom of the socio-economic scale, in fact, so that any change is likely to be for the better. They have nowhere to go but up!"^{1/}

1. Socio-Cultural Feasibility

The population residing in the Bula IAD project area are socially and culturally quite similar to the total rural farm population of the Bicol region. They speak "Bikol", are organized in nuclear family households and social alliance groups which function to integrate them into the local social organizations established to provide for sustenance and other human requirements. Like the rest of the Bicol, a two class stratification system, the wealthy (5-10%) and the poor (90-95%), related to the social alliance groupings, reinforces a symbiotic pattern whereby the more affluent control the majority of the resources and the poor, in turn, provide manual help and legitimize the existing patterns. Social acceptance and security are highly valued. Cross-cutting the social and cultural patterns supporting the status quo are two value orientations that relate to responsiveness to social change. First, the class system and the social alliance groupings are viewed as instrumentalities or means by which the individual's and households' human requirements are met.

"Big (affluent) and little (poor) Bicolanos stay together because they need one another's help, and because they have judged, consciously or unconsciously, that they can afford the going price. Let the need decline, or the price exceed the current limit set on either side, and they will drift, more likely fly apart."^{2/}

Second, the rural farmers of the Bicol aspire to have a secure, but better life than they have now. For example, a sample of household heads in Camarines Sur, responding to questions concerning changes that would improve their quality of life, reported that increased income, a sturdy home that was adequately furnished, sufficient food and drink, and favorable status and esteem were important.^{3/}

A market orientation further supports a perspective that it is not the cultural traditions that are responsible for the current low level of development in the Bicol region, but rather it is the prevailing opportunity structure. That is, given better physical infrastructure, access to expanded resources, markets and distribution centers for increased production, and means to convert

^{1/} SSRU Report Series, No. 6, p. 38.

^{2/} Frank Lynch, S.J., J. Illo, and J. Barrameda, Jr., "Let My People Lead! Rationale and Outline of a People-Centered Assistance Program for the Bicol River Basin," I.P.C. Report submitted to USAID/Naga, August 4, 1976, p. 17.

^{3/} Ibid., p. 26

the increased production into increased wealth and higher quality life, empirical evidence is available to support the hypothesis that rural development would occur to the region. A survey of the Bula Area^{1/} contains the following findings:

- nine out of ten farmers surveyed (90%) reported they currently use modern farming techniques such as flooding rice paddies to kill weeds;
- more than 75% report using fertilizers, insecticides and herbicides during the rice growing process;
- eight out of ten (81%) report securing a loan for needed rice production inputs and of that number, 54% have either fully (38%) or partially (16%) repaid the loan in a year's time;
- nine out of ten (89%) expressed willingness to pay higher fees for a better irrigation system and volunteered their reason for doing so would be to achieve a richer harvest and a better livelihood;
- more than 8 out of 10 (85%) report production-related problems such as inadequate irrigation, high cost of farm inputs, and frequent occurrence of floods and typhoons;
- more than 7 out of 10 (71%) said they would like to become owners or part owners of the land they farm.

A survey of the travel patterns in the Bicol region^{2/} shows that 40% of all travel in the region is for economic reasons, 12% for marketing, 20% for business, and 8% job related. Particularly relevant for the Bula project is the fact that this area's close proximity to Naga City, the dominant urban center in the province of Camarines Sur, encourages the development of marketing activities and other complementary rural-urban linkages necessary for development.

For the Bula IAD, perhaps the major feasibility issue to be addressed is the willingness of the people to accept the concept of compact farming and in doing so re-adjust their life styles by moving farm sites and, just as important, home sites. This is a complex issue and must be carefully examined. To assess the social acceptance of the compact farm concept, consider the following:

- 1) The granting of Certificates of Land Transfer to farmer-tillers will be tied to the land consolidation and formation of compact farms. The land transfer will be speeded up by making procedures simpler, and the formation of a Department of Agrarian Reform (DAR) Team to more efficiently process the necessary paper work.

1/ SSRU Research Report Series No. 6

2/ SSRU Research Report Series No. 9.

- 2) The design of the infrastructure improvements; flood control, irrigation, access roads, etc., is to be related to the compact farm organization of the land.
- 3) The rules and regulations governing the formation and operation of the compact farm organizations are to be promulgated such that they operate within and are consonant with the Samahang Nayong. These are the local community organization which are utilized throughout Philippine society to organize the population into small, viable, local communal groups. They are also used as pre-cooperatives to facilitate the formation, at a later time, of locally owned and operated, more formally organized, legal cooperatives.
- 4) The area selected for the project has a recent history of compact farm and joint loan group activities that have proven to be successful in terms of the farmers' positive response to the concepts.
- 5) The organizational functioning of the compact farms appears to be a blend of two long-standing traditional patterns of cooperation found among the population in the Bicol region; pakikiiba or formal community organization activities and pakikidamay or informal group activities carried out by kin, friends and/or neighbors in times of family need or crisis.^{1/} The small size of the compact farm (average membership of ten farmers), the contiguity of the farm parcels encouraging "neighborhood-like" joint activities, and the joint responsibility for production and facility loans, is intended to foster close, friendly relationships among the members thereby establishing affective feelings of mutual responsibility. The election of a compact farm coordinator, the organized and controlled marketing of farm goods to insure a fair price, and the regulation stipulating a joint savings program, all relate to the formal aspects of the organization and its instrumental character as a means for member farmers to achieve a higher socio-economic standing.
- 6) Other farmer-tillers near the project area who are recipients of DAR's Operation Land Transfer are clamoring, through formal resolutions sent to the Secretary of Agrarian Reform, to be included in the project.^{2/}
- 7) A study of farmer attitudes towards irrigation and farmer potential for cooperation in Nueva Ecija, Bulacan, and Laguna, reported that farmers acknowledged that close cooperation was needed in irrigation activities. Cooperation among farmers, however, seemed to be more at an informal than formal level.^{3/} For the Bula IAD, the compact farm organization, which incorporates both formal and informal patterns of cooperation, is viewed as the major instrumentality to guarantee maintenance, allocation and distribution of irrigation for rice farming.

1/ SSRU Research Report Series, No. 5.

2/ Interview with Assistant Project Manager, DAR-BREDP Pilot Land Consolidation Project, June 1976. See copies of these resolutions in Annex K.

3/ Wickham (1973).

To assess the social acceptability of moving homesites and establishing six new barrios, consider the following:

- 1) The implementation of a pilot land consolidation project in San Ramon, Bula, has provided first hand knowledge of the problems involved in the relocation of project participants to homesite. A study of the area in February 1974 reported that when 402 farmers were asked if they themselves were willing to be moved to a new homesite; 16% expressed willingness, 9% said it depended on the circumstances, and 75% replied in the negative.^{1/} Of those willing to move, the major reasons were a better harvest and a better life (90% so responded). Of those who weren't sure, 77% reported they would move if they were sure it would mean a better life for them. The majority who did not want to move gave the following reasons: satisfaction with life, security and familiarity with present surroundings, and the physical and financial difficulties involved in a move.

Five months later, in June 1974, a second survey was conducted, using the same questions and the same sample of households.^{2/} At that time, 39% were agreeable to moving their homesites while 61% preferred to remain where they were. In a relatively short period of time, the proportion who expressed willingness to move increased by 144% (from 16% in February 1974 to 39% on 1974). In the interim, an information campaign was organized and conducted by a Promotions Committee composed of local officials, farmer representatives, the parish priest of Bula and representatives of the major GOP line agencies involved in the pilot land consolidation (DAR, DLGCD, NIA, BOL). Expectations are that a continued information campaign will result in larger numbers of farmers accepting the idea of moving their homesites.

- 2) One of the high priority changes sought by farmers is accessible, safe water for drinking and food preparation. Plans to provide safe water in the new barrio homesites should be an additional inducement for the farmers to change their residence pattern.
- 3) Currently, approximately 41% of the farmers who till the land do not live in the project area but rather reside on the periphery of the area and have a considerable distance to travel every day to get to their land. Making the trip even more difficult is the fact that there are few roads in the area and those that are in place are of very poor quality. The planned new homesites are designed to have an adequate road pattern linking the farm lands to the homesite. This should also serve as an inducement for farmers to move.
- 4) Although the exact figures are not available, many of the farmers in the project area, as well as of those who farm within it and live outside, live on scattered site housing. These are primarily squatters who have settled on land that was not being used and lessees who have been directed to particular homesites by landlords. Approximately 98% of the farm population in the area are either former tenants (76%) or squatters (22%). (See Table 6b, Annex B.)

^{1/} SSRU Research Report Series, No. 6.

^{2/} Bicol River Basin Council, "Socio-Economic Study on the Pilot Land Consolidation Project," June 1974.

Traditionally, the Filipino farmer resides in barrios, small villages, with the farm land adjoining or surrounding the place of residence. The design of the new homesite-farm land configuration tends to be along the lines of the preferred cultural pattern. It is expected that as the work of the Promotions Committee continues and the farmers in scattered housing become more familiar with the land consolidation project, they will in fact move, because they will be re-establishing the residence-work patterns that have been traditionally used and preferred.

There is good reason to believe the farmers will accept and successfully adapt to the proposed compact farming pattern planned for the project area. While it is less sure that the move to homesites will occur in the same proportions among the farmers as compact farming, much of the evidence available suggests the likelihood that it will. The wealthier, better educated farmers, of which unfortunately there are only about 20%, are no problem. Analysis suggests that this group is most open to change and, while concerned about their security, are much less so than the poorest farmers.^{1/} The poorest farmers, who tend to be most conscious of security, have to be convinced that their lives will be better in the new homesites, or at least not worse than what they already have. As more information is forthcoming, and as they see more and more of their neighbors and peer members of the compact farms residing in the new homesites, expressing satisfaction with their new living arrangements, the best guess is that they too will be persuaded to make the move. In any case, relocation to new homesite areas is to be made on a voluntary basis, households are to be compensated for the minor structural damages such moves entail, and no farm of coercion is planned.

Beyond the social feasibility of the compact farm-homesite element of the project, there are numerous other planned changes which have already been addressed in related project documentation.^{2/} Further analysis and comment would only be redundant.

2. Spread Effects

A study of pump irrigation associations in Catanduanes,^{3/} one of the island provinces in the Bicol region, suggests the possibility of a spread effect among some of the constituent elements of the project itself. It was found that for a small group of farmers who work on contiguous rice fields, solving irrigation problems must be cooperative work. Moreover, it appears that as the farmers see that difficulties in water distribution can be satisfactorily resolved through their cooperative action they begin to grasp the advantages of collective action in other important but less obvious areas, such as the procurement of

1/ SSRU Research Report Series, No. 6, p. 34.

2/ Project Papers for: Libmanan/Cabusao IAD, May 1975; Bicol Secondary and Feeder Roads, November 1975, USAID Grant Project in Support of BREDP, September 1976. Project Review Paper for Rinconada IAD.

3/ Robinson, D.M. (1973).

farm inputs, marketing farm produce and settling disputes between themselves and others with whom they deal. This pattern of generalizing the use of cooperative action, by rice farmers, to solve problems is significant, for it provides partial confirmation of the appropriateness of the strategy being employed by the project to change the organization of rice farming activities and of the potential success of such a strategy.

Preliminary evidence of the diffusion of the compact farm pattern planned in the project area comes from the experience gained in the Pilot Land Consolidation Project initiated and operated jointly by the DAR and the BRRC. As was noted in the previous section (Socio-Cultural Feasibility) farmers outside the project area are making demands for their own inclusion in the program. Also, the experience gained from the pilot project has been invaluable in planning and designing the current project; past mistakes are avoided and past successes stressed.

Just as the design of the current project has grown out of the pilot project experience, so will follow-on projects and programs be designed, in a like manner, in the immediate area surrounding the project area. The total proposed Pili Integrated Area Development (IAD) district comprises 15,000 hectares. The present project involves only 2286 of these hectares. The same integrated, interagency planning approach used in designing the Bula sub-IAD will be used in planning for the development of the rest of the Pili-IAD, as, indeed, it is being used throughout the Basin. This task will be made easier by the accumulated experience of the Bula project effort, the anticipated greater awareness of the advantages of compact farming and cooperative endeavors on the part of the area's farm population, and the fact that some of the supporting infrastructure--"Secondary and Feeder Roads," "PDAP," "Integrated Health," "Rural Electrification," "Urban-Rural Linkages," etc.--are planned to have basin-wide influence by changing the socio-physical context to maximize the opportunities for spread. There is a systematic design strategy incorporated into the plan for Bula which involves selecting a site-specific high-potential sub-area, investing heavily in that sub-area, achieving development impact and then using the process as a model for planning the development of areas adjacent and beyond.

There is already in place an urban-rural linkage between Bula and Naga City. Preliminary analysis demonstrates that Bula can be characterized as a satellite area of Naga City wherein the residents of the area tend to travel to this municipality to secure the goods and services not available in their rural environment.^{1/} The Naga City-Bula linkage will undoubtedly expand and grow stronger as Bula develops and Naga City provides additional goods and services to keep pace. Thus the changes in the Bula area will have a direct influence on the development of Naga City. Previous research has demonstrated that the most frequent travel patterns of Bula residents involve Bula to Naga City, followed by Bula to Iriga. In both instances, if this population travels for

^{1/} Sulpicio S. Roco, Jr. and Frank Lynch, S.J., "N + N Institutions = Growth," Preliminary Draft of SSRU Research Report Series, No. 17.

the same reasons as the rest of the province of Camarines Sur, and there is no reason to believe they do not, economic motives primarily underlie the travel.^{1/} Not only Bula area residents but numerous other sub-areas have systematic travel patterns oriented toward Naga City or Iriga, or both. Not counting overlapping sub-areas, where travel is oriented to both municipal centers, Naga City and Iriga have between them the population of 18 different satellite sub-areas which use either one or the other as their primary urban linkage.

Using very conservative estimates, and only single-counting the population, the combined influence area population for Naga City is approximately 250,000 and for Iriga, 150,000. That means, potentially, the changes that result from this project and the related, changed orientations of the farmers can be communicated, discussed, and discovered by 1/4 (25%) of the total Bicol River Basin Program Area population as a result of the routine travel and interaction patterns.^{2/} Moreover, as the urban centers enlarge their capacities for providing goods and services to meet additional Bula IAD demand, it is anticipated there will be increased employment opportunities for the resident municipal population. In turn, this should provide an enlarged opportunity structure for the provision of urban goods and services for other sub-area populations and among other things act as a motivating force for additional number of farmers to adopt modern farming practices and organizational forms similar to those programmed for Bula.

There is the potential for the compact farm-homesite pattern to be diffused throughout much of the rural area of Philippine society. DAR is planning to use the experience gained in the pilot project and the second generation Bula project currently being proposed to develop the means to implement some variation of compact farming tied to "agrarian reform" across the country.

The proposed Bula effort is a crucial test not only of the development potential of compact farming and related "integrated area development" activities in Bula, but of its development potential for the whole society. In the course of managing and implementing all of the constituent pieces that are programmed for Bula, invaluable experience will be gained in the following areas: the nature and role of external donor assistance, host country management and implementation "loads," necessary development administration practices, proper phasing of inputs, the "critical mass" required for development take-off, the follow-on activities and assistance needed to sustain modernization momentum, and the soundness of a rural-based development strategy which emphasizes the active participation of the poor farmer. This will not only involve experiential knowledge but also will result from the rigorous continual evaluation of specific Bula project activities and their "mix" with region-wide and national programs, as a function of the larger BRBDP effort. The sheer learning that will occur, not only in terms of what is "socially sound" but also in terms of the various

1/ SSRU Research Report Series No. 9.

2/ Analysis of satellite populations drawn from 1970 Philippine Census figures contained in SSRU Research Report Series No. 15 and the preliminary draft of No. 17.

dimensions of development assistance, alone provides a powerful justification for the implementation of the project.

Seen in the context of the larger Bicol River Basin Development Program, Bula is a field experiment of integrated area development which includes planned changes specifically tailored to meet the particularistic needs of the local population coupled with more general planned changes that are thought appropriate for regional and societal development.

3. Benefit Incidence

The Bula Project represents bottom-up development. That is, the major effort is directed at changing the lives of small, poor, rural farmers by improving their socio-economic situation and quality of life.^{1/} More specifically it is planned that as a result of the Bula IAD project, the target population will receive the following benefits: increased income, reduced under-employment, improved nutrition, better health, more control over fertility, better housing, better sanitation, better education, and more control over the decision making processes that affect their lives. As the changes in the target population begin to occur, it is anticipated that the surrounding social environment, the existing institutional structure, will change. For example, private investment in rural industries will increase to provide for the increased demand for agricultural resource inputs and the processing, distribution and marketing of the increased agricultural production. In turn, additional services and goods will have to be provided, some by the private sector, some by government, to support the more complex and productive patterns of relationships that will develop. The point being that the catalyst for change will be the Bula target population and the subsequent changes that occur will in large measure support and sustain these changes. Thus the strategy for development built into the project is one that is purposely directed at improving the social life of the rural poor farmer.

Moreover, to further emphasize the commitment to the project target population, certain covenants have been written into the loan proposal:

- farmers will be given complete autonomy in operating communal irrigator associations that are to be fully operational.
- within 12 months from the start of infrastructure construction in each phase of the project, all eligible farmers will receive certificates of land transfer to newly consolidated plots.
- the National Grains Authority will construct and install a suitable "rice complex" to dry, mill and store the increased farmer rice production.
- the Department of Local Government and Community Development will establish marketing cooperatives to service the project area by 1981.
- sufficient agricultural credit shall be made available to project area farmers to purchase production inputs.

^{1/} See logical framework goal, sub-goal, and purpose level narrative and objectively verifiable indicator columns, Annex D.

- the Department of Education will equip and operate elementary grade schools in each of the project area barangays.
- BRBDP by the end of 1978, will conduct a study of the suitability of improved low-cost house prototypes for the project area and make recommendations to facilitate upgraded house construction and financing by rural families.

Not only are the poor farmers and their families the primary beneficiaries of project activity in Bula, but the development of the area and the consequent improvements have been framed in a systems context to insure that changes resulting from the specific project effort will endure and grow beyond the life of the project.

4. Role of Women

The comprehensive package of benefits and services include some that are specifically targetted for women. For example, the backyard projects, vegetable gardens and small-scale livestock will help make women more economically productive. The nutrition training and related homemaker services will give the women in farm households greater expertise in managing family activities and thereby give them a greater role in family decision making. The increased integration with and accessibility to urban centers will significantly reduce the isolation of the rural women. The resulting increase in opportunities to participate in a larger round of social life, beyond the immediate household, should provide them with a larger role in the development process than is currently the case.

There is some evidence that women in rural areas are already active participants in family decision making. For example, there are reports that the Filipino wife exercises a great deal of influence concerning farm business decisions acting in the capacity of family treasurer with a significant say in matters of expenditures. Beyond this mostly impressionistic data, though, there is little in the way of hard evidence on the various ways women currently participate in decision making. Therefore, very little can be said about how their role would be enhanced because of the planned activities associated with Bula. A study is now underway which specifically addresses the current roles of women in the Bicol population.^{1/} With this information, all of the Bicol project activities, including those associated with Bula, can be better shaped to have more desirable effects on women as well as on men.

5. Uncertainty and a Solution

It is clear that the Bula project, given available knowledge, addresses both the concerns of the BRBDP and USAID requirements. Further, all indications are that it is a socially sound project in that it will not unduly disrupt the current socio-cultural milieu of the population and, as well, focuses on the desires of the target population itself. Still, there is uncertainty as to whether the sought-after changes will actually occur once the project is

^{1/} Jeanne Ilio, "Role of Women in the Development of the Bicol River Basin," Institute of Philippine Culture, Manila, forthcoming.

implemented. To increase the chances of success, a significant monitoring, process-evaluation, and impact-evaluation effort will be undertaken concurrently with the implementation. To the extent possible, given the complexities of integrated area development and the numerous organizational entities involved, a feedback system will be employed to make necessary adjustments where problems and delays arise. The organizations implementing and coordinating the project actively will be periodically evaluated. The BRBDP is establishing a realistic management information system to monitor the activity. A socio-economic survey is currently being planned to establish baseline data for the total Bicol program area, including the Bula project area. The survey will be complemented by observational data such that impact can be more precisely and validly assessed. An urban functions study^{1/} will assess changes in the urban-rural linkages and provide a set of change indicators at a macro-level which will complement the other data sources. Thus while there is a realistic understanding of the uncertainties involved in a complex undertaking such as Bula, a great deal of assessment effort is planned to reduce the uncertainty and maximize the chances of success.

D. Economic Analysis

1. Costs and Benefits to the Economy

Costs

A standard economic cost-benefit analysis has been conducted for the portions of the project expected to result in an increase in rice production, comprising some 90% of total project costs. Included as project costs are all costs related to the construction of irrigation, drainage and access road facilities, architectural, engineering and survey costs, right-of-way acquisition, all costs of training and field extension activities related to agricultural production and irrigation system operation and management, of applied agricultural research, and of land consolidation and tenure reform, all project management costs, first-year operation and maintenance of each irrigation system, and 50% of Homesite Development levelling, construction and household and school relocation costs. Excluded as justified on other than rice-production grounds, are all Home and Youth Development costs (training in leadership, health, nutrition, population and backyard garden and livestock projects), multipurpose community buildings and the San Jose Elementary School, hand-operated household water pumps and toilets, and 50% of Homesite Development levelling, construction and household and school relocation costs.

All incremental farm costs of rice production are included, as estimated from the 1974 Socio-Economic Survey of the Project Area and the on-going Farm Record-Keeping Project, both BRBDP efforts, and the estimated annual cost of operating and maintaining the new irrigation, drainage and road facilities beyond the first year is included as a separate item. In the latter, the cost of purchasing a new vehicle by each of the five irrigators associations every 10 years is included (in years 11 and 21 of Tables 31, 33 and 34, Annex B Supplement--the cost of the initial 5-vehicle fleet is included in the original

^{1/} Bicol Urban Functions in Rural Development Project, funded by TA/UD, AID/W.

project costs as part of the project organization and management overhead), and the estimated cost of rebuilding the irrigation pumps and their motors (25% of purchase cost) is included in year 20.

A 50-year life span can be expected from the irrigation, drainage and access road facilities to be constructed under this project, given the maintenance and management system to be established and funded to protect them, and half of their cost is included as salvage value after 25 years.

Benefit Assumptions

The assumptions are that the project will result in an increase in project area rice palay production from the present annual average of 57 cavans (2.85 metric tons) per cultivated hectare to an ultimate annual average of 180 cavans (9.0 M.T.), while at the same time increasing the cultivated area from 1867 hectares to 2062. The targetted cropping intensity is only 2.0 crops per year, as opposed to the 2.5 thought possible (the latter was used in the Bicol IAD-I economic analysis), and as opposed to the continuous "Japanese" cultivation technique being successfully applied by a neighboring (Bula Municipality) farmer on a pilot basis and achieving a reported 700 cavans (35 M.T.) annually per hectare.

Yields are expected to rise gradually, reaching their peak in each phase five years after construction is completed. The wet season yield is projected to average 69 cavans (3.45 M.T.)/hectare the first year and rise gradually to an average of 84 cavans (4.2 M.T.)/hectare by the fifth year. The dry season crop is expected to average 79 cavans (3.95 M.T.)/hectare the first year after construction and rise to an average of 96 cavans (4.8 M.T.)/hectare by the fifth year. It should be noted that neither of these expected yields reaches the 99 cavans per crop-hectare target of the "Masagana 99" program. They are considered conservative projections for the quality of land existing in the project area and the degree of water control expected from this Project.

Since, for this analysis, the assumed cropping intensity is only 2.0 per year, leaving 3-4 months each year free of crops, it is expected that the cropping pattern adopted will leave the 2 or 3 months of maximum typhoon wind and flood damage risk relatively free of crops to damage. In addition, only about 25% of the project area is occasionally subject to sustained flooding (being below 6 meters above mean sea level elevation and in the Bicol River floodplain) serious enough to destroy a crop, and the most serious danger of typhoon wind damage is coincident with the worst part of the rainy and flood-prone season, so that the average damage to crops is not expected to be severe. Assuming, therefore, a 25% loss of one crop averaging every 10 years in the project area, with an equal likelihood of occurrence each year, incremental crop production has been reduced by 1.25% each year to simulate the economic losses that would occur. (Only losses of the increment are relevant to the Project economic analysis, since losses of the rest would be suffered anyway.)

Incremental rice production is the only quantifiable benefit considered in this analysis. A small savings in the travel time and costs can be attributed to service and access road construction and to land consolidation efforts. The attribution of these benefits must be shared, however, with the main roads to be constructed under the Bicol Secondary and Feeder Roads Project, and so they are

omitted here. Insufficient data exist at this time to estimate the travel time savings per farmer to be expected by the consolidation of separate parcels of land tilled, although these are believed to be significant.

Also omitted due to time constraints and the complexities involved are the benefits to the Philippine economy of pursuing this project, involving largely local currency costs, with a \$3 million foreign exchange loan, the value of which, as noted below, is thought to be some 20% higher than the current exchange rate and which is provided at concessional interest rates of 2-3% per year with a 10-year grace period and payback over a 40-year period, while continued dollar inflation averaging at least 5 or 6% a year can be expected to result in an effectively negative real interest rate of -3 or -4% charged to the Philippine economy.

Indirect benefits of the project not included in the cost/benefit analysis are the increased domestic employment and value-added that will accrue to the rice drying, milling, storage, transport and marketing sectors of the economy due to higher domestic production, rather than accruing to foreign exporters of milled rice. In an economy with high levels of underemployment and low productivity this should provide a significant net gain.

In addition, the higher real income of project area farmers and farm labor families will contribute to a higher level of demand primarily for low-cost, domestically produced goods and services, stimulating domestic investment and production.

The benefits of leadership, health, nutrition, family planning and backyard project training activities have been omitted as too difficult to quantify, and so have their costs. One half of the homestead development and relocation costs were omitted as attributable to the benefits of greater accessibility to social services, which are difficult to quantify. The benefits of individual household water pumps and toilets are well known, but are also difficult to quantify and, along with their costs, have been omitted.

Shadow Prices

Shadow prices have been used to adjust financial costs and benefits of the project to reflect more accurately their true value or marginal opportunity cost to the Philippine society. On the benefit side of the ledger, the current farmgate price of rice palay (P55/cavan) is considered lower than its true economic value for two reasons. First, government controls on the price of milled rice act to suppress the palay price below the free-market rate at current exchange rates (since the Philippines is still a net importer of rice, even though self-sufficient in good years, the free-market rate would generally equal the C.I.F. import value of imported rice). Secondly, since the current exchange rate of approximately P7.5/\$ has been maintained only by heavy government market intervention and foreign exchange borrowing from abroad, the peso is believed to be overvalued. The National Economic and Development Authority (NEDA) has suggested the shadow price of foreign exchange should be some 20% higher to reflect its scarcity and true economic value, or about P9/US\$. A failure to expand domestic rice production fast enough will lead to a higher import requirement in the future, and taking US\$314/metric ton (C.I.F. Manila)

as the probable long-run world market price trend for milled rice (it is slightly lower now due to good harvest), the appropriate shadow value of rice palay is calculated to be ₱70/cavan.^{1/}

On the cost side, the same shadow foreign exchange rate adjustment of 20% has been applied to the estimated foreign exchange (import) component of incremental fertilizer and pesticide chemicals used in rice production, of the equipment rental, fuel and oil costs of construction, and of the direct foreign exchange costs of imported pumps and spare parts, resulting in a shadow cost of these components higher than the estimated financial costs. Fifteen percent of total (rice-production-related) project costs has been deducted to eliminate taxes, fees and other transfer (non-economic) payments included in the financial cost estimates (this is a standard shadow adjustment used by National Irrigation Administration economists). The locally-hired, manual labor component of the construction and irrigation maintenance (ditchtenders) cost has been separated and reduced by half (from ₱11/man-day to ₱5.5/man-day) to reflect more accurately its local opportunity cost and marginal economic value (rural wages in the Bicol presently average about ₱5/day). (See Table 32, Annex B Supplement).

In addition to the foreign exchange component adjustments in fertilizer and chemical costs noted above, two shadow wage adjustments have been made on incremental farm costs to reflect the local opportunity value of farm labor without this project. First, the customary crop-share of harvest labor (1/7 in the wet season and 1/8 in the dry season) includes an institutional transfer payment from (relatively) better-off tillers to the poorer workers who team up in harvest labor brigades. To reflect the true economic value of this labor, its cost is reduced to ₱1/man-hour of work, or an average of ₱68 per metric ton of palay harvested. This shadow price is still higher (at ₱8 for an 8-hour day) than the normal rural daily wage rate of ₱5, as would be expected at times of peak demand. This adjustment is applied to the total cost of harvesting both with and without the project.

Secondly, the lower economic opportunity value of farm labor in the (without project) inaccessible project area is reflected in adjustments to reduce the incremental labor costs of rice production by 50% in periods of high demand (transplanting and harvest labor) and by 100% for the remainder. A higher level of productive employment in the project area for its residents is considered an important purpose and goal of this project, with its resulting higher levels of real household income and more equitable income distribution. It would be inconsistent to place the financial value of that incremental employment in the cost column; in this project it belongs on the benefit side. (See Table 35, Annex B Supplement.)

Finally, the annual discount rate applied to compare the present value of project and incremental farm costs with the expected value of incremental rice production is 15%, the rate commonly used to represent the shadow real opportunity value of capital investment funds in the Philippines, abstracting from subsidized official interest rates, inflationary factors and the higher risk element in

^{1/} See Derek M. Sherman, "Pricing the Factor Inputs and Outputs for the Comprehensive Water Resources Study," TAMS/TAE Report XX, Bicol River Basin Council, Baras, Canaman, Camarines Sur, May 1976, pp. 5-12.

some market interest rates.

Results

The basic 25-year economic cost-benefit analysis is summarized in Table 31, Annex B Supplement. The economic benefit/cost ratio of this project at a 15% annual rate of discount is found to be 2.0. The net present value at the same discount rate is ₱38 million (US\$5.0 million). The economic internal rate of return (IRR) on the investment is found to be 37%. The social-economic value of the anticipated increase in rice production resulting from this project, discounted to its present value, is 2.0 times its similarly discounted economic cost, and the difference between discounted costs and benefits calculated over a 25-year period equals US\$5 million. It takes a discount rate of 37% to reduce the expected stream of future benefits by enough to equal similarly discounted, but front-loaded, costs. Such a high rate of return is to be expected, given the currently high rate of underutilization of potentially productive land, water and labor resources existing in the project area. The formal calculations simply confirm the intuitively obvious fact that a well-designed irrigation project in such an area is an economically viable and worthwhile investment.

Sensitivity Analysis

To test the sensitivity of the basic analysis to possible errors in the cost and benefit estimates used, all incremental costs were increased by 20% and all incremental benefits decreased by 20%. The project still proved to be economically viable with a benefit/cost ratio of 1.33, a net present value of ₱15 million (\$2.0 million) and an internal rate of return of 23%. (See Table 33, Annex B Supplement.)

To test the sensitivity of the basic analysis to the shadow prices used, a re-calculation was performed using no shadow prices whatsoever, but rather the current (controlled) market prices for foreign exchange, rice palay, and the actual and costed wage rates for all labor components, including the institutional harvest-labor share of the crop. The estimated 15% of project costs attributable to taxes, fees and other transfer payments was left in, as was total project costs, including all homesite development, relocation, toilet and household water pump allowances, community buildings and the school, leadership, health, nutrition, family planning training and backyard project extension costs. In short, all financial costs of this project, of irrigation operations and maintenance, and of incremental farm operations were compared with the single benefit of projected incremental rice production valued at the current depressed price of ₱55/cavan. (See Table 34, Annex B Supplement.)

The Project still sported a monetary benefit/cost ratio (at 15% discount) of 1.15, a net present value of ₱7.6 million (US\$1.0 million), and a monetary internal rate of return (IRR) of 19%, still well above the 15% minimum economic IRR desired by A.I.D. for projects of this sort.

2. Effects on Employment

Of total current farm operating expenses in the Project Area, an estimated ₱3,407,275 annually is attributable to farm labor. Divided among the 1230 farm families residing and/or farming in the project area this would average ₱2770

(\$369) per household per year. It pays for an estimated 586,658 days of work, or an average of 477 workdays per household per year.^{1/}

With this project, productive farm labor requirements in the project area are expected to rise to a total of 792,839 workdays annually by 1986, or an average of 645 per family per year, a 35% increase. Farm labor would earn a total of ₱5,643,694 annually (in today's prices), or an average of ₱4,588 (\$615) per household, an increase of 66%.^{2/} (The value of the increased labor requirement rises more rapidly than the workday total due to the effects of the traditional sharing of the crop harvested with the harvest labor force, 1/7 of the wet season crop and 1/8 of the dry season crop, assuming this tradition remains unchanged, while yields are expected to rise rapidly. If the fractional share of harvest labor falls as yields increase, the difference would go to the farmer.)

Of course, it is possible the average daily wage will rise as labor demand increases, especially if developments in other Bicol Basin areas also increase the general demand for labor, in which case the income effect of this project on the workers would be even larger.

In addition, as a temporary effect, project-related construction activities will provide employment during the construction period for about 255,690 workdays of locally-hired manual labor at a value of ₱2,812,600 (₱11/workday). Following construction, about 123 ditchtenders will be recruited locally, trained and given permanent part-time jobs by the Irrigators' Associations to maintain and operate the irrigation and drainage system. The latter would involve approximately 8,250 workdays each year, at an estimated total cost/income of ₱66,000, not included in the farm labor totals above.

These are all direct employment benefits to the poorest rural families in the project area and its immediate neighborhood.

3. Effects on Income

As noted above, annual returns to farm labor in the Project Area will increase, due to this project, from an average of ₱2770 (\$369) per household to ₱4588 (\$612) by 1982. At the same time net annual returns to farm management and land ownership will rise from its present average of ₱484 (\$65) per household to ₱6578 (\$877). (See Tables 3-5, Annex B.) Part time ditchtenders' wages will add another ₱54 (\$7) per household (on average, actually only about 10% of Project Area families will have a member employed as a ditchtender, and each ditchtender will earn an average of ₱537 or \$72 annually).

Total household income from rice production in the Project Area is expected, therefore, to rise from its present annual average of ₱3254 (\$434) to ₱11,166 (\$1489) by 1986, or an increase of 243%. Since almost all the Project Area beneficiaries will be either former tenants made amortizing owners (76%) or

1/ Calculated from Table 3, Annex B.

2/ Calculated from Tables 4 and 5, Annex B.

squatters made amortizing owners (22%), this income increment is expected to go to an extremely poor group of rural residents. Even the 1% who are owner-cultivators are small, far from wealthy, farmers. The 1.5% who will remain tenants (on small holdings exempt from redistribution) will be protected by registered leases and their fixed rents will be based on pre-project yields, so that they, and not their landlords, will benefit from project-induced increases in rice production.

PART IV

IMPLEMENTATION PLANNING

A. Administrative Arrangements

1. Recipient

The National Economic and Development Authority (NEDA) will represent the GOP as the borrower. The Department of Agrarian Reform (DAR) will be the implementing agency working principally through their Region V office in the Bicol Region. The DAR and the Bicol River Basin Development Program Office (BRBDPO), the latter as the interagency coordinating office, will organize a composite Project Management Office (PMO). DAR will delegate authorities to the DAR Regional Director and the Project Manager to carry out the actual administration, contracting^{1/} and management of the Project. Local currency funds for the project will be budgeted by the GOP and transferred through the Budget Commission to the DAR Regional Office and PMO for project expenditures. This arrangement will allow policy and financial review and control to be exercised at the regional level.

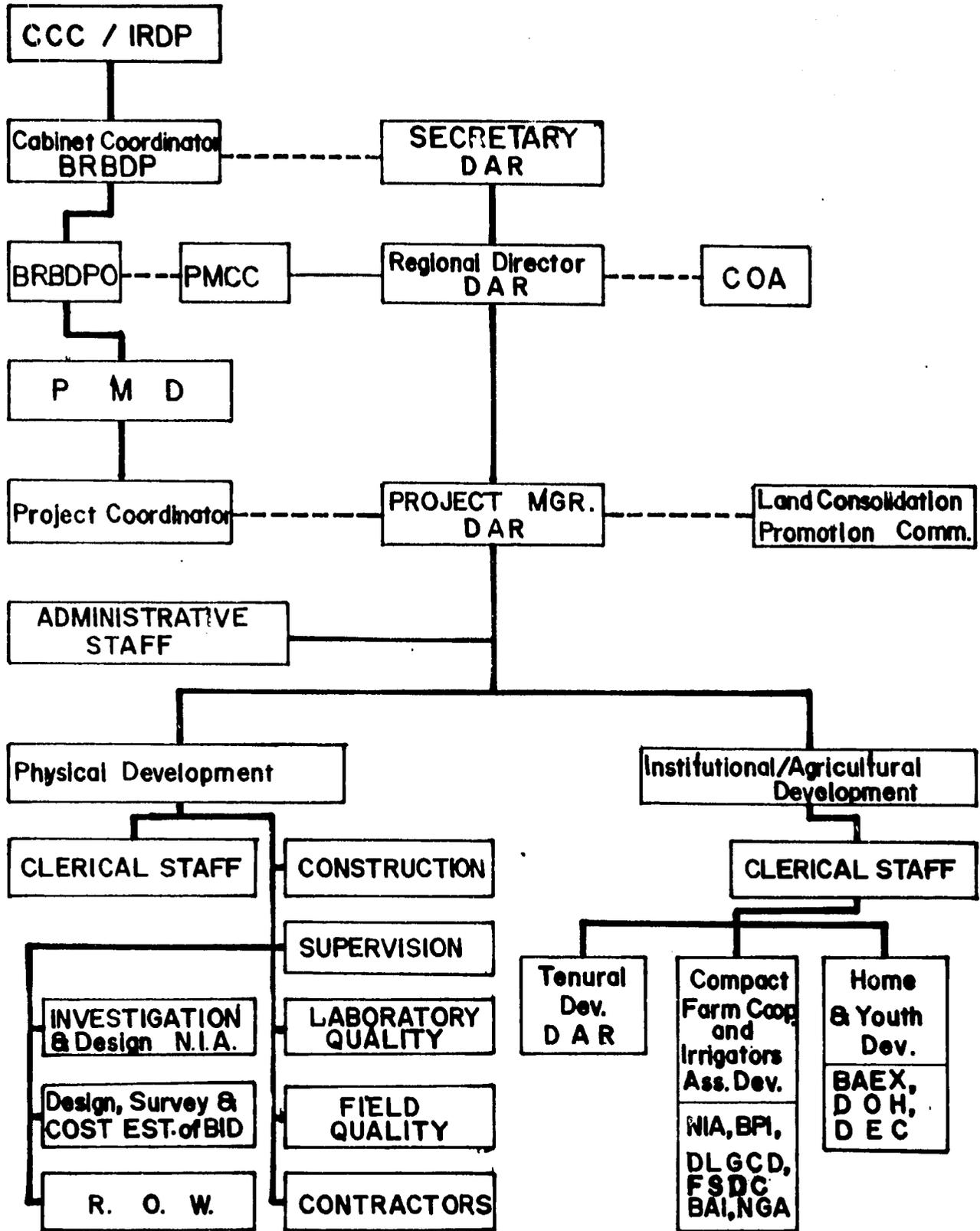
The PMO will include representatives of the Bicol Regional offices of DAR, BRBDPO, the National Irrigation Administration (NIA), the Department of Local Government and Community Development (DLGCD), the Department of Agriculture (DA), including its subordinate Bureaus of Plant Industry, Animal Industry and Agricultural Extension. A diagram of the proposed organizational structure is presented below.

The PMO will be established immediately after the signing of the AID/GOP loan agreement and will be granted the authority necessary to carry out its functions (see the Implementation Plan, Part IV, B, below). The DAR will appoint a qualified project manager as the PMO head. He shall be under the direct supervision of the DAR Regional Director. The PMO, with the coordination of BRBDPO, will prepare the implementation plan and will be responsible for staff work to satisfy the conditions precedent and other covenants of the proposed loan agreement. It will carry out the engineering and construction contract management functions and will be responsible for the daily monitoring and evaluation of contract work. The existing PMO of the on-going pilot project, similarly organized, will continue to carry out these functions in the interim and is already preparing the final implementation plan, the final engineering redesign of Phase I, the application for water rights and other documentation to satisfy the proposed conditions precedent of this loan.

The Deputy Manager for Physical Development will be a NIA engineer on detail and will be responsible for completing the final engineering survey,

^{1/} Contracts in excess of ₱200,000 (\$26,700) will require subsequent administrative approval of DAR/Manila; but they will be negotiated by the PMO and signed by the Regional Director, after which they are legally binding.

ORGANIZATIONAL CHART PROJECT MGT. OFFICE



design and construction drawings for Phase I and for supervising the contractor hired to complete the same for Phases II through V. He will be responsible for review of contract payment vouchers and will recommend or make payments. The Institutional and Agricultural Development Division chief of the PMO will supervise the "non-physical" components of the project, comprised of land consolidation, compact farm and irrigators association organization and training, applied agricultural research, technological training of farmers and extension activities, home and youth development, education, and cooperative marketing arrangements.

GOP administrative arrangements and authorities to administer funds and manage the project, as outlined above, will be detailed in the GOP Implementation Plan to be submitted as a condition precedent. In the opinion of the Mission, the agencies and organizations involved have the capability and commitment to implement their respective components of this project as proposed. The BRBDPO has developed its capability to coordinate effectively the several line agencies and provincial offices operating in the area, and the Presidential Decree 926 of April 1976 gives it clear authority to perform this function. The DAR is responsible for administering the nation's land reform program and is responsible for the successful transfer of most of the land in the Project Area to former tenants and squatters and for implementing programs to assist land reform beneficiaries maintain and improve their current level of production. The DAR has acquired experience in managing land consolidation/irrigation projects with the successful completion in 1975 of a 989-hectare project very similar to this one in Talavera, Nueva Ecija Province, utilizing a loan from the World Bank. The Talavera project, like this one, utilized Taiwanese engineers as consultants and required the coordinated efforts of a number of agencies in its implementation, primarily NIA, DLGCD, the Bureau of Agricultural Extension and the Agricultural Credit Administration, with DAR as the lead agency.

Regionally, DAR personnel have gained experience from the pilot 300 hectares of the Bula-Minalabac project and from the intensive training provided by the Republic of China consultants in 1976. NIA engineers are responsible for rehabilitating irrigation facilities servicing some 5,100 hectares of land, mostly upstream from the Bula project, under the Pilot On-Farm Water Management Project; and NIA itself is the lead agency of the 4,000-hectare Libmanan-Cabusao Integrated Area Development Project (Bicol IAD I), which is USAID funded. These and all the other agencies involved have qualified and experienced personnel available to implement their respective components of this project. The additional staff and budget required by these agencies to support this project have been identified, in coordination with the BRBDP, and are being requested in their FY 1978 budgets. **Budgeting and implementation concerns** are reinforced in the covenants.

The administrative environment in the Bicol is presently one of intense activity and enthusiasm, coupled with a new awareness of how much more can be accomplished with well-planned and coordinated effort. Nationally, GOP leadership continues to give high priority to intensified, integrated, and decentralized development projects in the Bicol Region. It is a very favorable climate in which to implement this project.

The project area farmers have already been involved in plenary meetings and discussions about the proposed project. Most of Barangay San Ramon residents have already transferred to their new homesite and have agreed to the land consolidation and other elements of the project. All farmers will become increasingly involved in the project as it is implemented, first as wage labor and trainees and finally as the controlling membership of the Irrigators Associations that will assume responsibility for the operations and maintenance of the irrigation and road systems constructed under the project.

2. AID

AID monitoring of Government of the Philippines implementation and management will be provided by the Mission utilizing on-board direct-hire personnel assigned to on-going Bicol grant and loan projects. Other special technical consultancy required for monitoring and evaluation will be provided under the Bicol grant project.

The Office of the Assistant Director for Regional Development will coordinate various USAID supporting inputs at the field level and will be the principal liaison with the BRBDPO, the GOP coordinating agency. An AID direct-hire engineer (presently on-board under AD/CD) is budgeted under the grant Bicol Integrated Rural Development Project to monitor A.I.D. Bicol loan projects. His primary function, however, is that of engineer/planner consultant to the BRBDPO and other appropriate regional agencies as a member of the USAID Bicol core team.

The Office of the Assistant Director for Capital Development (AD/CD) will represent the Mission in loan negotiations and loan administration, and in all engineering matters. The Office of the Assistant Director for Agricultural Development (AD/AD) will provide assistance in the fields of agricultural technology, credit, cooperatives, extension and marketing from on-board staff as requirements are identified and time permits. The Mission, with various office inputs, will take appropriate action to meet all AID legal requirements for loan administration.

USAID will have access to all pertinent project reports and other documents issued by the implementing agency, the Project Management Office, and the contractors that relate to project progress and problems. USAID will monitor all activities, including quality control measures, that relate to reimbursement of local currency costs, including field inspections as required.

B. Implementation Plan

As outlined in the description of GOP administrative arrangements above, the Project Management Office (PMO) is the management organization that will integrate, into a functional office with adequate authority vested in the project manager, all agencies concerned with the implementation of this project. Each agency or organization represented on the PMO staff will assign qualified representatives from current staffing patterns or will hire additional staff as necessary. The project provides funds for honorariums and per diem, but the basic salaries of the PMO staff members will be funded as part of their parent agencies' normal operating budgets. The BRBDP is coordinating these plans and will assure that each line agency involved requests any additional staff and funds required for support of this project in their FY 1978 budget submissions. Written Memoranda of Agreement will be negotiated to this end among BRBDP, DAR and the other agencies involved.

DAR headquarters in Manila will appoint a qualified, full-time Project Manager (and his deputy for Institutional/Agricultural Development) and will delegate sufficient authority to him and to the DAR Regional Director in Legaspi to administer, contract and fully manage the project without requiring prior approvals on their actions by the DAR/Manila central office.^{1/} The DAR Regional Office will be responsible for overall project implementation and the BRBDPO will be responsible for coordination at the regional and national level. The BRBDP Director or his representative shall be present during all negotiations with the funding agency.

1. Proposed Schedule and Responsible Parties

Preliminary Activities

The responsibilities of each participating agency for PMO staffing and logistic support will be specified in an initial memorandum of agreement among DAR, BRBDP and the other agencies involved. This will be accomplished within the first month after the loan agreement is signed and personnel assignments to the enlarged PMO will occur by not later than the third month.

The existing PMO and its successor, monitored and assisted by the BRBDPO, will be responsible for completing or securing and submitting all documentation to satisfy the conditions precedent to disbursement in accordance with the loan agreement.

The underground water survey for the Project Area is to be conducted during CY 1977, completed no later than January 1978, by the Department of Public Works, Transportation and Communication (DPWTC) funded by the BRBDP

^{1/} Contracts in excess of ₱200,000 (\$26,700) will require the subsequent administrative approval of DAR/Manila, but will become legally binding upon negotiation and signing at the regional level. A special Bula Project liaison office will be established under Regional DAR to expedite approvals and actions at that level. A senior project liaison officer will also be designated at DAR Manila.

(it did in fact begin in Phase II on February 23, 1977). A foreign consultant qualified to analyze the results of the survey is now being sought and will be funded for four months by the USAID grant Bicol River Basin Development Project.

Final Design

Final engineering redesign and the preparation of construction specifications will begin in March 1977, under the supervision of the existing, pilot project PMO, and be completed for the 610 hectares of Phase I by an "in-house" team of DAR and NIA engineers and technicians by October 1977, with a private A&E firm contracted to review the designs upon completion. A redesign is necessary before construction work can continue on the pilot 300 hectares and will be funded out of the P2 million (\$266,667) already released by DAR to the Pilot Land Consolidation Project Management Office for CY 77 construction. The latter office will supervise this work and on-going construction activities until the loan agreement is signed and the new PMO established. The new PMO will issue invitations for bid by October 1977 and make construction contract awards for the portion of Phase I remaining to be constructed no later than January 1978, before the beginning of the 1978 Bicol dry season.

The new PMO will identify, select and, with the concurrence of the DAR Regional Office and BRBDPO, contract with an A&E firm to undertake the final engineering survey, design and specification preparation for Phases II, III, IV and V. Invitations for bid will be sent to pre-qualified A&E firms in October 1977 and a contract will be awarded by December 1977. All survey and final design work will be completed by the A&E firm for Phase II by June 78, Phase III by Nov. 78, Phase IV by April 79, and Phase V by July 79, with the preparation of construction contract documents (IFB) to be completed within the following month for each Phase. The PMO shall make awards for each Phase construction within three months following completion of IFB's.

Services to be provided by the A&E firm will include (1) preparation of detailed engineering design, plans, specifications, engineering cost estimates and complete bid packages, (2) advice and assistance to the PMO in prequalifying construction contractors, in advertising for, opening and evaluating bids, and in awarding contracts for actual construction, and (3) performance of day-to-day construction supervision, inspection and materials quality control.

The method of selection and the form and content of contracts for A&E services will be determined by the PMO, subject to the review and approval of the DAR Regional Office, BRBDPO and AID. The A&E contracts will be administered and monitored by the PMO. Plans, specifications, cost estimates, and bid packages will be subject to the review and approval of the PMO, Regional DAR, BRBDPO and AID.

Construction and Homesite Development

Construction services for all pumphouses, irrigation, drainage and road facilities, homesite development, multipurpose buildings and the

schoolhouse will be performed by contract. The PMO will prequalify contractors, supervise the public bidding process, evaluate bids, and with the concurrence of the DAR Regional Office, BRBDP and AID, award construction contracts.

Once contracted, the A&E's will advise and assist the PMO in all phases of reviewing contractors' statements for prequalification, advertising for, opening and reviewing bids, and awarding of construction contracts. The prequalification procedures, the form and content of construction contracts, and the contract awards will be subject to the review and approval of Regional DAR, BRBDP and AID. The A&E firms will perform day-to-day construction supervision, inspection, and quality control, under the general supervision of the PMO. The PMO, in their administration of contracts, will monitor the work of A&E firms and construction contractors to the extent necessary to assure compliance with approved plans, specifications and work schedules. Approval of completed construction will be subject to final inspection by DAR Regional Office, BRBDP and AID.

Actual construction will be staggered and concentrated in the Bicol dry season months of February to May or June of each year. Work can be started when the rains slack off in January and can continue at a reduced pace from June through September, but minimal construction can occur during the peak rainy season months of October through December. Construction contracts will specify that Project Area residents be given priority in the recruitment and hiring of unskilled manual labor required.

Phase I construction is expected to take 20 months beginning in February 1978, Phase II 13 months beginning (with contractor mobilization) in November 1978, Phase III 14 months beginning March 79, Phase IV 26 months beginning November 79, and Phase V 14 months beginning December 79. The drilling of production irrigation wells in Phases II and III will be undertaken by DPWTC immediately upon a favorable determination from the ground water survey and analysis, as will be agreed upon in a Memo-Agreement between the PMO and that agency. If a negative determination is made on the feasibility of using ground water, no further expenditures will be made in Phases II and III and AID/W authorization for the second tranche of the loan (\$750,000) will not be sought.

The project schedule proposes a four-year construction period, January 1978 to December 1981, rather than a shorter, three-year period, in recognition of 1) the lead time that must be allowed for A&E final survey and design in all Phases but Phase I, 2) the difficulties and delays that will be encountered by the contractors working in initially inaccessible areas subject to heavy seasonal rainfall and annual typhoons, 3) the likelihood that the number and capacities of experienced contractors interested in undertaking such contracts in the Bicol might be limited, considering the number of larger irrigation projects being planned elsewhere in the country, 4) the fact that the labor-intensive construction methods planned are slower than more heavily mechanized methods, and 5) the fact that the institutional and training components of the project (GOP-funded) are scheduled over a period of five years and cannot be hastened without an inordinate increase in the Project Management Office staff (government personnel required for short-term duty).

Homesite construction in Barangay San Ramon (Phase I) will be completed in 1977 by the DAR pilot project office, utilizing funds already released. Levelling and construction of the other six new homesite areas will comprise one of the earliest elements of construction in each Phase and may or may not be performed by the same contractor hired to do the canal and service road construction in each Phase. Present plans call for all seven homesite areas to be completed and ready for occupancy by the end of 1980. Four multipurpose buildings will be constructed in the new Homesite Areas of Phases I, II and III (two in the latter) in 1978 and three in Phases IV and V in 1979, so that they can be used as training centers and field offices by the PMO. In addition, the elementary school building will be constructed in the new San Jose homesite in 1979. The building construction may be contracted separately by the PMO as soon as their desired locations can be identified.

The PMO will make homelot assignments and directly supervise the relocation of houses to assigned homelots, providing the ₱300 relocation allowance to the household head of every household that moves its old house or builds a new one. The PMO will also supervise the relocation of the elementary schools in San Agustin and Sagrada to their new homesite locations. DPWTC sanitation engineers assigned to the PMO staff will supervise the provision of materials for the construction of water-sealed toilets and hand-operated household water pumps and their installation.

It is expected that the actual relocation of households and the installation of household pumps and toilets will be completed within one year after the completion of each homesite, and that these activities will proceed concurrently with canal and road construction and be completed by the end of 1981.

The multipurpose buildings are to be turned over to the respective barangays and Irrigators' Associations (one room for an office of the latter) by the PMO after the work of the PMO is completed in each Phase. The schoolhouse will be turned over immediately after its construction and the Camarines Sur Provincial Superintendent of Schools will assign three qualified elementary school teachers to staff it.

Equipment Purchase and Installation

The PMO, assisted by the A&E contractor and AID advisors, will finalize irrigation pump specifications and will advertise for international competitive bidding, receive and evaluate bids and will award a contract to a supplier, subject to Regional DAR, BRBDP and AID approval. All activities in the purchasing and delivery of equipment will be handled in accordance with AID Handbook 1.1 and subject to final review by AID for compliance.

Pump specifications are to be prepared for surface water pumps by February 1978, purchase contracts awarded by June 1978, and delivery is expected by July 79. Pump specifications are to be prepared for ground water pumps by May 78, purchase contracts awarded by Sept. 78 and delivery expected by Sept. 79. Installation by the supplier is scheduled to coincide with the final two months of construction in each Phase. The Camarines Sur Electric Cooperative (CASURECO - II) will install sufficient

electric transmission lines into the Project Area to power the pumps by the time they are installed.

The purchase of imported vehicles and typewriters required by the PMO will also be handled according to AID Handbook 11. Four vehicles will be rehabs in order to obtain them quickly. Five jeeps will be purchased new and turned over (one each) to the Irrigators' Associations within two years after completion of construction and upon completion of field training in each Phase.

Land Consolidation and Tenure Reform

PMO staff members detailed from DAR will perform the land consolidation and redistribution component of the project. Current tillage rights have already been recorded. Contemporaneously with irrigation construction in each Phase the DAR personnel will make new farmlot assignments first to those with current legal tillage rights and secondly to Project Area residents without legal tillage rights (squatters), granting the latter families a minimum of one hectare each. The targetted date for the issuance of new or revised Certificates of Land Transfer is within 4 months after the completion of construction in each Phase.

The Bureau of Lands representative on the PMO staff will assist land transfer beneficiaries in registering their certificates properly.

Organization, Training and Extension

As members of the PMO staff, field personnel of BAEx, BPI and DLGCD will reorganize the existing 74 compact farms and organize 49 new ones concurrently with irrigation construction in each Phase, following the consolidated farmlot assignments by the Tenurial Development team. DLGCD personnel will complete the necessary reorganization of the Samahang Nayon cooperative associations, based on the new Compact Farm organizations, and will organize an Area Marketing Cooperative of which Project Area Samahang Nayon will be a part.

NIA and Farm Systems Development Corporation (FSDC) specialists assigned to the PMO will organize and train District Irrigators' Associations around each rotary irrigation block, again using the Compact Farms as basic organizational units. They will then organize one Irrigators' Association in each Phase, building up from the District IA's. This activity will also proceed concurrently with construction in each Phase, beginning as soon as the Compact Farms are organized and completed by 1981. FSDC is a government-sponsored corporation specializing in organizing and training small farmers to run their own cooperative irrigation systems, and a current agreement with NIA specifies that NIA will rely on and fund FSDC operatives to perform these tasks, as soon as construction is completed, on small irrigation systems such as those to be constructed by this project.

BAEx specialists on the PMO staff will organize an expected total of 32 Homemakers Clubs and 65 Youth Clubs over the five-year period 1978-82.

The DAR project management will be responsible for organizing a 5-day (40-classroom-hour) orientation session for the entire PMO staff and the 18

Land Consolidation Promotion Committee members before the end of CY 1977. The project plans, schedule and detailed implementation guidelines will be discussed, and competent resource speakers will be invited to discuss particular aspects of the project. Each trainee will be given a copy of this Project Paper for background and future reference.

DLGCD specialists in leadership training will conduct a 5-day training program for 10 leaders in each barangay, with the course in each barangay scheduled to coincide with the first month of construction in each respective Phase, or possibly sooner.

BAEx specialists (assisted by NIA, DAR, DLGCD, BPI, BAI, NGA personnel) will conduct a 5-day (40-hour) training program for 309 Compact Farm Leaders (3 for each Compact Farm) during the first three years of the Project, soon after their initial organization or reorganization. The BAEx personnel will also be responsible for the 2-week (96-hour) training program to be offered all Compact Farm members (every farmer in the Project Area) over a 4-year period. Both of these programs will contain training elements on leadership, organizational principles and skills, modern farm management and technology, cooperative activities, water management, irrigation system operations, and canal and road maintenance requirements, as well as a discussion of this project, the farmers' role and responsibilities in it, the financial requirements of loan amortization, land amortization, irrigation and road system operations and maintenance, the net financial gain to the farmers due to the project and what the latter means in terms of consumption choices and opportunities to the farmer's family.

Following this initial training session, a supportive field extension effort, intensified for the first two years after completion of construction in each phase, will be sustained by all relevant Department of Agriculture bureaus (BAEx, BPI and BAI) as parts of their on-going programs.

NIA and FSDC personnel assigned to the PMO will be responsible for the appropriate training of 82 District IA officers and 42 Irrigators Association Board members. This training will also be conducted concurrently with construction in each Phase, beginning as soon as the Associations have been organized and have selected their leadership. This training module will last for 5 days (40 hours) and will emphasize irrigation and service road management, operations and maintenance and the necessary financial, bookkeeping and auditing arrangements. It will be followed by two years of on-the-job training under the close supervision of the FSDC members of the PMO and sustained field monitoring and counselling (by FSDC) after that, to assure smooth technical operation and adequate maintenance of the facilities installed.

FSDC personnel will also conduct an intensive 5-day (4-hour) classroom training course for the 5 watermasters and 123 ditchtenders in the skills and knowledge required for their respective jobs, to be followed again by two years of on-the-job training under close PMO (FSDC) supervision. The classroom training will be completed before construction is completed in each Phase.

BAEx and DOH members of the PMO will conduct (with assistance from outside resource speakers) a 5-day (40-hour) training course for all adult and teenage Project Area residents on nutrition, health, family planning and backyard projects, and an additional 5-day (40-hour) program for homemakers and youths on leadership and organizational skills. This training will be phased mostly during the slack farming seasons and will take five years for completion, with classes of between 30 and 50 participants each. Phase I training can be started immediately, utilizing excess classrooms in an existing (newly constructed) schoolhouse in Barangay San Ramon. Training in the other barangays will be scheduled upon completion of the Multipurpose Buildings to be constructed by the PMO.

Continuous extension services after the initial training period will be provided by BAEx, DOH, DAR, and POPCOM (Population Commission) personnel.

Applied Research

The Bicol Rice and Corn Experiment Station of the Bureau of Plant Industries, Pili, Camarines Sur Province, will organize and conduct the applied research plots within the Project Area, beginning with the first cropping season after a useable segment of irrigation and drainage facilities are put into operation. The Project will fund a total of ten cropping seasons, two in each Phase (GOP-funded), but these will be reduced if they are later deemed more than necessary to determine optimum packages of rice technology for each Phase.

Critical Performance Indicator Network

Key elements of the above schedule are identified in the Project Performance Tracking (PPT) Network Chart at Annex E as milestones against which the progress of the project can be measured. In the selection of these "critical performance indicators" those dealing with the portion of the project against which the AID funds are to be allotted have been emphasized for AID tracking simplicity. The BRBDPO and DAR will wish to enlarge their own PPT Chart to include all the other important elements of the project to be funded by the GOP. This will be part of the PMO's task when it prepares the final implementation plan after the loan agreement is signed.

Evaluation Plan

An Annual Evaluation of the Project will be undertaken each June, beginning in 1978, jointly by the BRBDPO, the DAR Regional Office and AID (the latter considering the June 1982 evaluation as final), until all components of the project are completed. The details of the Evaluation Plan are discussed in next section (IV. B) below.

2. Funding and Payment

U. S. dollar funds required for the purchase and shipment of pumps, vehicles and other equipment will be funded from the AID loan and payments made in accordance with AID Handbook 11 and appropriate regulations.

can be expected to represent the interests of their respective members.

The Compact Farms, District IA's and their membership will undergo organizational and leadership training as soon as irrigation construction begins in each phase. The Project Management will thus be obtaining feedback through the training and organizational sessions from the beginning of project implementation in each phase and will continue to work closely with all three farmers' organizational levels throughout the construction period and during the first year of each system's operation before the turn-over of responsibility occurs.

In addition, the Land Consolidation Promotions Committee (LCPC), whose composition and activities are described in Part II.A., above, is to be expanded, given some additional orientation training, and relied upon to provide another formal link between the PMO and the Project Area residents. Since its membership includes the seven Barangay Captains and Samahang Nayan presidents, as well as other local leaders, it is expected to represent the interests of project beneficiaries as expressed through these organizations and to discuss and seek solutions to any problems, suggestions or issues that may arise during project implementation.

Since both the Land Consolidation Promotions Committee and the newly formed Irrigators' Associations will in effect be monitoring the progress of project implementation from the viewpoint of the local leadership and the farmers themselves, respectively, they will be invited by the DAR, BRBDP and USAID monitors to submit quarterly reports on the progress and problems of the project independently of the reports submitted by the PMO itself. They will be encouraged and expected to hold public hearings or membership meetings in each Project Area Barangay to discuss any issues, problems and suggestions prior to and in preparation of their quarterly reports, as well as at any other times and at whatever frequency they so desire. The reports will be expected to reflect not only the majority views within the organizations but also to include viewpoints held by minority.

C. Evaluation Plan

1. Basin-wide Socio-economic Research and Impact Evaluation

Periodic surveys will be carried out within the Bicol River Basin Development Program Area (Camarines Sur and Albay Provinces) by contract and in-house (operational surveys by the BRBDP) (a) to provide feedback to planning, and (b) measure the progress and impact of BRBDP projects, other key GOP programs, and major private sector investment. Intensive analysis of data will be carried out on a continuous basis but will be concentrated during the year following the major multi-purpose surveys. Indicators of social and economic change include:

- per capita income and income distribution
- agricultural productivity per person and per hectare

- level of employment, underemployment and migration
- fertility and mortality rates
- nutritional and health status of the population and environmental conditions
- status of women in the development process
- land use and tenure status
- perceived and objective quality of life, etc.

Various kinds of baseline data, progress indicators and impact measures need to be established and analyzed if BRBDP development projects are to be properly designed, their implementation effectively monitored, and their impact evaluated. In addition to providing a basis for good management, this information is useful in establishing measurable linkages between purposes of component projects and overall BRBDP program goals. It is particularly important to have adequate baseline data to be able to understand the combined and synergistic effects of the various GOP projects and programs along with the other positive or negative processes of growth outside the control of regional development efforts (e.g. the oil crisis).

Background

From 1973 to 1976, the Institute of Philippine Culture (IPC) through its Social Survey Research Unit (SSRU) established in Naga City, carried out various surveys and research activities.^{1/} The April 1974 SSRU panel survey, a random sample of 3,240 households in Camarines Sur Province (only), is the primary data source for the BRBDP. Several other special studies were carried out and data analyzed to support BRBDP feasibility studies and the social soundness of development projects. A series of sixteen research reports have been published by the SSRU and other basic data is in tabular form. The SSRU is finalizing a socio-economic profile of the Bicol River Basin based on 1974 surveys.

A follow-on IPC study on the role of women in development in the Bicol is being undertaken and the preliminary results will be available by March 1977. The study will pretest questions for the more extensive multi-purpose survey. The output of the IPC study will also contribute a national level study proposed by the Mission to establish a current data base on women in development. The latter will analyze impediments to women's participation in the economy and recommend development policy alternatives and program responses which will enhance the role of women.

^{1/} See operational description in BRBDP Framework Plan (1973), USAID Bicol Project PROP (1974), and scope of work in Bicol ProAgs and sub-agreements (1974-1975). Also see listing of published reports in BRBDP Bibliography, Annex C(4) of the Bicol Integrated Rural Development Project Paper, Oct. 1976. Reports are on file in AID/W.

Bicol Multi-purpose Survey (FY 1977-1981)

To adequately design, monitor (progress indicators) and evaluate, over time, the impact of BRBDP projects on the population, particularly the poor majority, a comprehensive, well-designed household survey will be carried out in Camarines Sur and Albay provinces (est. 3,000 households). It will build on and be comparable with the existing 1974 baseline survey. The survey will be tailored to measure the contributions of integrated area projects, new agro-industries, and sectoral projects (Integrated Health, Bicol Roads, Rural Electrification, etc.) both individually and in combinations.

For purposes of planning, the BRBDP has divided its Program Area into ten IAD's (Integrated Area Development Districts), following TAMS/TAE guidelines, and they have specified that the survey should provide reliable profile and indicator information on an IAD level. For the survey, the IAD's have been further subdivided such that each of the three major cities (Naga, Iriga, Legaspi) and the Bula-Minalabac Land Consolidation Project (IAD-IIa) will be sampled separately as sub-IAD's. (See Map #1 Part II.)

In addition, for purposes of developmental impact and causal analysis, it is desirable to have a return panel survey representative after 10 years on at least the province level. To accomplish this, the first survey in 1977 will double as the first year of a biennial panel survey and will include 1100 households in Camarines Sur and 800 in Albay. A random sample of 100 households will be drawn from the Bula IAD-IIa sub-IAD itself. Since an attrition rate of 50% can be expected from such a panel over a period of ten years, an expected 550 households in Camarines Sur (including 50 in the Bula Project Area) and 400 in Albay will remain in the 1987 survey. This is considered sufficient to do panel survey analysis by province. In order to obtain the representativeness required for indicator analysis by IAD, additional random surveys (using the same instrument) will have to be taken in later years (a panel ceases to be representative after a few years of attrition), and this will include the Buia Project Area. (In addition to the overall survey, and additional 1400 households will be selected--100 from each of the 14 subproject areas of the Bicol Secondary and Feeder Roads Project. Any overlap will be eliminated, and some barangays--the sampling procedure calls first for a random selection of barangays within each area--will be counted as part of both surveys.)

The first survey, scheduled for 1977, will serve a dual role as the first year of the biennial panel survey and together with the 1974 SSRU survey, it will provide baseline data for comparison with later random surveys.

To accomplish this purpose, key components of the SSRU panel survey questionnaire are being combined with a modified Laguna multi-purpose survey questionnaire^{1/} to carry out periodic multi-purpose surveys to meet the evaluation requirements of agencies concerned. It has been designated the Bicol Multipurpose Survey (instrument). Complete surveys and analysis will

^{1/} Evenson, F. R. and B. Popkin, The Laguna Household Survey, Agricultural Development Council, 1975.

be carried out by a qualified research institution (contracted by BRBDP) based on detailed scopes of work developed jointly by the BRBDP and USAID and approved by NEDA at intervals of two years: 1977, 1979, and 1981. Consultancy was funded by AID/W to assist in the design and pre-testing of the multi-purpose instrument. Additional U.S. consultancy is programmed for the analysis stages. AID/W (PPC/PDA) has proposed that a University of Michigan Survey Research Center (standard package) multi-purpose instrument be pre-tested in the Bicol to provide additional information and provide a means for external validation of the proposed Bicol Survey instrument and data collection. This is proposed for early 1978.

The Bicol Multipurpose Survey was initiated in October 1976 beginning with instrument modification. The initial design phase is involving Filipino researchers from several organizations who will conduct most of the analysis. After pretesting of the instrument and training of staff, field work is scheduled to begin in mid 1977 and analyses started in early 1978. A special workshop is proposed to evaluate the experience of the Bicol Survey and similar regional surveys using a modified Bicol instrument. Bicol planners and USAID consider it particularly advantageous to link into a multipurpose survey network with comparative analytical possibilities.^{1/}

The Bicol Multipurpose Survey and analysis will also link into the Economic and Social Impact Analysis Project proposed by the Mission (PP under preparation) for FY 1978-80. The project, under NEDA, would coordinate the collection and analysis of development data by government and private institutions nationwide.

2. Project-Specific Evaluation Plan

Surveys, related studies and reports will generate information necessary for evaluating: 1) Operational efficiency and relevance of the organization and management adopted for the project, and the accomplishment of physical targets, 2) socio-economic impact, and 3) effects on the general quality of life, attitudes and social awareness of the beneficiaries. These surveys and studies may further be broadly grouped into two types: a) Operational progress reports, and b) Socio-economic household surveys.

a. Operational Progress Reports - The lead implementing agency (DAR) shall submit monthly, semi-annual and annual progress reports, including a terminal report at the end of the first year of the project. These reports will include the rate of progress and accomplishment of the objectively verifiable inputs and outputs of the project, including comments on problems encountered and actions taken in the course of project implementation.

The above reports shall be supplemented by regular monthly reports being prepared for the BRBDPO Project Management Information System (PMIS).

^{1/} This will also assist the NEDA regionalization effort. A NEDA/IBRD group is encouraging the development of high quality and comparable household data in each region in the Philippines.

The quarterly and semi-annual reports will indicate the status of construction, problems encountered, management efficiency and corresponding recommendations designed to improve project organization and management.

b. Socio-Economic Household Surveys - A randomly sampled, socio-economic household survey shall be conducted every two years, beginning in 1977, as a component sub-IAD of the Bicol Multipurpose Survey, described above, by a competent research group to be contracted by BRBDP. These surveys are to be planned by competent specialists in relevant fields and contracted for specific pieces of analysis. The analytical reports will include measures of the socio-economic impact of the IAD-IIA project and will enable evaluators to determine whether the project components and the overall project are achieving their desired objectives. The analysts will be able to compare socio-economic indicators and their trends within the project area with similar data from other Bicol project areas. The key indicators of social and economic change to be evaluated are listed in subsection C.1. of Part IV, above. The Bula Project area portion of the survey will be expanded sufficiently in 1983 to include all project-specific objectively verifiable indicators (end-of-project status). The Bicol Multipurpose Survey and follow-on analysis is to be jointly financed under the grant Bicol Integrated Rural Development Project and with regular BRBDP budget.

Some baseline data for the Bula Project area have already been generated by two socio-economic surveys conducted in 1974. The Social Soundness analysis of this PP is primarily based on these studies.^{1/} The 1977 Bicol Multipurpose Survey will update this information and provide more detailed baseline data in several areas of concern.

^{1/} See Robert C. Salazar and Frank Lynch, S.J., "Farmers of the River Basin's Land Consolidation Project Area: Nowhere to Go but Up -- and in No Hurry to Get There," SSRU Report Series No. 6, Social Survey Research Unit, Ateneo de Naga, Naga City, May 1974, and "Socio-Economic Study on the Pilot Land Consolidation Project," Bicol River Basin Council, Baras, Canaman, Camarines Sur Province, 1974.

D. Conditions, Covenants and Negotiating Status

1. Conditions Precedent

In addition to the standard terms and conditions precedent (CP's) to the release of loan funds, the loan agreement should provide that: "prior to the first disbursement of loan proceeds, the Borrower shall submit, or cause to be submitted, the following in form and substance satisfactory to A.I.D.:

"(1) A copy of the Philippine Government order establishing the Department of Agrarian Reform (DAR) as the lead implementing agency, responsible to the Bicol River Basin Development Program (BRBDP) for the effective and timely implementation of this project."

"(2) A copy of the Philippine Government order establishing a composite Project Management Office (PMO) under the supervision of the DAR regional office, with authorities and responsibilities to enable the PMO to effectively carry out assigned functions, including necessary delegations of authority from the Department of Agrarian Reform (DAR), the lead implementing agency, to the DAR Regional Director and the Project Manager, to (a) enter into contracts, (b) make financial payments for work accomplished, and (c) hire any additional personnel required by the PMO, with the concurrence of the Bicol River Basin Development Program Office (BRBDPO), the coordinator."

"(3) A plan for the implementation of the project prepared by the PMO on behalf of the DAR and BRBDPO, including a projection of funds available to finance the various elements of the project."

"(4) A plan for socio-economic and construction evaluation of the project, the former by BRBDPO contract, the latter involving periodic review of the project by an evaluation team consisting of, inter alia, one representative each of BRBDPO, NEDA, and A.I.D., and an undertaking by the Borrower that it will cause periodic recommendations of the project evaluation team to be implemented in a timely and effective manner."

"(5) Written assurance from the BRBDPO that a farmer-controlled Irrigators' Association will be formed for each separate irrigation system constructed, properly chartered, and that they will be given complete responsibility for managing, operating and maintaining the systems prior to the third full cropping season after construction is completed and operational in each Phase, including provisions for the collection of water fees and the repayment of construction costs, in accordance with government policy, and a plan for systematic operations and maintenance."

Discussion: The Mission believes that the dynamics of the institutional and human relationships involved would militate against successful long-run collection of water fees, maintenance and operations of the small irrigation systems to be constructed under this project if operational control were maintained by NIA or DAR or any other government agency. DAR and NIA or the Farm Systems Development Corporation (FSDC) should continue to provide technical advise and support to the Irrigators' Associations, but the farmers themselves should be in charge and responsible for their respective facilities.

"(6) Notification by January 1978 that all money has been released to DAR or the BRNDPO necessary to fund the first year of construction, contracting, and all other project activities as agreed to in the implementation plan, including sufficient money to contract final architectural and engineering design and construction drawings as required for the whole project."

Discussion: A past history of project delays due to the central government's failure to release first-year funding on a timely basis makes this CP necessary, especially given the tight timetable of this project and the limited dry-season time available each year during which construction is preferable (January or February to May of each year).

"(7) The PMD and DAR, as the lead agency, shall provide A.I.D. with a copy of the appropriate water permit duly procured from the National Water Resources Council covering all diversions and uses of public water resources proposed in this project, except that, if river and ground water permits must be separately procured, the river water permit shall satisfy this condition precedent and the ground water permit shall be provided as part of a subsequent condition for Phases II and III."

Discussion: Both GOP and AID planners agree that the newly established legal procedure requiring these permits must be followed.

2. Covenants

The loan agreement shall contain the following special covenants by the Borrower:

"(1) The Borrower, through the DAR, will, within twelve months from the beginning of construction in each of the five phases of the project area, issue all Certificates of Land Transfer (CLT's) and secure written, registered leasehold contracts for all farmers eligible in that phase area under R.A. 3844, P.D. 27, and subsequent implementing instructions, it being understood that in most cases the CLT's will be for the consolidated plots of land and will often differ in location and size from the farmers' original parcels, according to plan."

"(2) The Borrower, through the DAR, will determine and fix within six months from the signing of the loan agreement, if it has not already done so, land values for all land in the project area subject to transfer under the provisions of P.D. 27 and subsequent implementing instructions."

"(3) BRNDP will assure that Project Evaluation Procedures are implemented in accordance with the agreed upon plan."

"(4) The PMD and DAR will submit, in form and substance satisfactory to A.I.D., a copy of a signed contract with a reputable architectural and engineering firm(s) to complete final design, construction drawings, specifications and contract documents for Phases II, III, IV and V of the project and to review the same for Phase I, the latter to be completed by an "in house" National Irrigation Administration (NIA)/DAR/BRNDP team."

Discussion: The Mission believes DAR and NIA engineers have the capability to accomplish final design and construction drawings themselves, but there

is some doubt about their timely and sufficient availability to do so, given the priorities of other, larger projects that will be demanding their attention. The small team of capable engineers currently assigned to the pilot Bula Land Consolidation Project will be able to revise and finalize design works for Phase I between now and September 1977, given DAR agreement to rebudget their project funds to that end, but once that is completed this team will be heavily occupied with the job supervising actual construction activities. It will be able to negotiate and supervise an A & E contract with a domestic firm to do the other phases.

"(5) The PMO and DAR will submit for A.I.D. approval final engineering designs, drawings, specifications and the proposed construction contract for each phase of the project as they are completed, with those for Phase I to be completed in sufficient time for IFB procedures and contract negotiations to be accomplished before the beginning of the 1978 Bicol dry season in January 1978."

Discussion: Given the expected date of the final AID/GOP loan agreement (4th quarter FY 1977), this covenant is required if Phase I construction is to begin as desired by the beginning of the 1978 dry season. A delay of 2 or 3 months would essentially foreclose any significant construction activity until January 1979, one year later. The satisfactory completion of this covenant by the date specified is possible because of the unique circumstances surrounding this project and the ability of the DAR to build on and to utilize funds already budgeted for the pilot 300-hectare project. Given the head start of the pilot project, the design for which has merely to be revised, it will be possible for the team of DAR, NIA and BRBDP engineers currently assigned to the project to complete the revised engineering design and construction drawings for all 610 hectares of Phase I within 5 months. By rebudgeting some of the funds already allotted for construction of the pilot project and utilizing BRBDP funds to finance the engineering redesign of the whole Phase I beginning April 1, 1977, DAR will be able to honor this covenant and permit construction to begin in January 1978. (See letter from DAR to this effect at Annex H.)

"(6) The Borrower shall assure that the National Grains Authority (NGA) will implement current plans to construct and install a rice drying, milling and storage complex in the Municipality of Pili, Camarines Sur Province, so that it becomes operational with sufficient capacity to service the needs of the central portion of Camarines Sur Province, which includes the project area, by 1978, and that sufficient funds are released on a timely basis to NGA of Camarines Sur Province for this purpose."

Discussion: These current plans of NGA are considered important to the future marketing potential of project area rice production. NGA activities will establish a farmgate price floor below which the price of rice paddy will not drop, and this will provide an important income guarantee and a production incentive to project area farmers.

"(7) The Borrower shall assure that the Department of Local Government and Community Development (DLGCD) proceeds with current plans to establish branches of the Camarines Sur Area Marketing Cooperatives to service the entire project area by no later than 1981."

Discussion: Planned Area Marketing Cooperatives are also seen as important institutions to help assure farmers a market for their produce and a source of timely inputs during the growing season.

"(8) The Borrower shall assure that sufficient agricultural credit funds are made available to Project Area farmers through existing, revised, or successor programs to enable them to purchase modern agricultural inputs, such as new seed varieties, fertilizer and insecticides, as are required to cultivate two crops of high-yield rice annually."

Discussion: Sufficient agricultural credit will be especially vital in the early years after project construction as poor farmers, with no capital accumulation, struggle to finance the high cost of modern agricultural inputs.

"(9) The Borrower shall assure that the Department of Education and Culture (DEC) will equip and staff the additional elementary grade classrooms to be constructed in Barangay San Jose and will continue to staff elementary classrooms in each of the other six barangays in the Project Area, as required by the school age population, and that sufficient funds will be released to the DEC provincial office in Camarines Sur on a timely basis for that purpose."

Discussion: As of now, the Camarines Sur Provincial Superintendent of Schools sees no problem in staffing any of the schools, including the needs such as desks, chairs and blackboards for the new San Jose school.

"(10) BRBDP will, by the end of 1978, conduct a study, or contract to have one conducted, to determine the suitability of low-cost single-family rural house prototypes for the Project Area and for similar rural areas of the Bicol River Basin and to recommend any administrative or institutional changes in existing housing or mortgage loan programs that could facilitate home improvements or reconstruction by rural residents, when their average annual household income rises to a level sufficient to finance it."

Discussion: Household survey analysis has indicated a close correlation between the overall satisfaction with life of the average household head in Camarines Sur Province and his job, his income, and the sturdiness of his house.^{1/} In addition, better housing may be a key first step to providing the important consumption incentives poor farmers need to justify to themselves the significantly higher levels of family labor, investment and risks required by modern double-cropped agricultural technology. (They cannot put many electric appliances or much new furniture in a nipa hut.) The BRBDP intends to study the rural housing situation and its possibilities and to look for ways to facilitate and to stimulate private investment in (not to subsidize) the construction of better rural housing in the future. It is considered an important incentive component of the present project, since over 80% of project area residents live in inadequate housing made mostly of nipa.

3. Negotiating Status

This project paper is based on a feasibility study and preliminary engineering design and redesign for costing purposes conducted by an interagency team of Bicol Region planners organized and chaired by the BRBDP. USAID input was minimal until the final review and editing process began. There is substantive agreement among the regional agencies involved, BRBDP and USAID on the design, analyses, implementation and evaluation plans, and on the desirability of the conditions precedent and the covenants listed above.

^{1/} See Robert C. Salazar and Frank Lynch, S.J., "Happiness Starts with a Good Job and a Good Home--So Say the People of the Bicol River Basin," SSRU Research Report Series #12, Social Survey Research Unit, Ateneo de Naga, Dec. 1974. The analysis was based on a 1974 survey of 3240 households.

Addendum: Additional Covenant

The following covenant was added in the loan authorization by AID/W:

"(11) The Borrower, in consultation with A.I.D., agrees to review the findings of the environmental assessment in post-authorization design and implementation stages of the Project for appropriate application therein."

(See paragraph 1.A.(3) of State 227606 cable dated 21 Sep 77 at Annex H.)

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SUBJECT: BICOL INTEGRATED AREA DEVELOPMENT II PRP

1. SUBJECT PRP WAS REVIEWED BY APAC MEETING 1/15/76 WITH USAID DIRECTOR ZIMMERLY PARTICIPATING. PROJECT WAS APPROVED FOR INCLUSION IN FY 77 CP AND FOR DEVELOPMENT OF PP.

2. SUGGESTIONS/QUESTIONS/ISSUES FOR PP DEVELOPMENT ARE AS FOLLOWS:

(A) SHOULD TESTS OF INTEGRATED AREA DEVELOPMENT IN BICOL YIELD ANTICIPATED ECONOMIC AND SOCIAL BENEFITS; IS IT LIKELY GOP WOULD BE WILLING AND ABLE TO UNDERWRITE REPLICATION BOTH WITHIN BICOL AND IN OTHER BASINS?

Ans: Yes. See Part II, Section A, of PP for a discussion of the on-going replication of IAD planning and implementation in the Bicol and its applicability elsewhere.

(B) IS PROJECT CONSISTENT WITH TAMS RECOMMENDED PLAN FOR BASIN DEVELOPMENT?

Ans: Yes. See Part II, Section A. In reference to the Pili-Bula IAD-II area TAMS/TAE concluded "It is believed that the irrigated areas can be substantially increased if groundwater development, whose exploration appears promising is confirmed, or by pumping from the Bicol River." -- TAMS/TAE/BRBDP, Comprehensive Water Resources Development Study, Vol. I -- Summary, Aug. 1976, p. 29.

(C) HOW DOES PROJECT MANAGEMENT PLAN TO DEAL WITH RELUCTANCE OF FARMERS TO ACCEPT LAND CONSOLIDATION PLAN IF PROOF OF VIABILITY IS NOT IMMEDIATELY FORTHCOMING?

Ans: The only reluctance farmers have expressed is toward the household relocation part of the plan, not toward land consolidation itself, and the major reason seems to be an inability to cover the minor damages to nipa thatch houses expected from such a move. The relocation is to be voluntary (no legal action would be employed unless important road or canal right-of-way is involved) and sweetened with a relocation allowance to pay for damages plus sufficient money to provide a new hand-operated water pump and water-sealed toilet for each household. See Social Soundness Analysis, Part III, Section C, of PP.

(D) ASSUMING PILOT PROJECT EFFORT IS MEANS EMPLOYED TO GAIN FARMER ACCEPTANCE; IS COMPLETION WITHIN FOUR YEARS REALISTIC?

Ans: Pilot Project is only part of means. Vast majority of farmers in project area were tenants or squatters, without legal title to the land they till. This project ties acceptance of whole scheme to the issuance of Certificates of Land Transfer and eventual ownership of land by former tenants and squatters, as well as to the benefits of irrigation and road access. Most farmers are presently expressing impatience with delay, not reluctance to accept. See Part II, Section A, and Part III, Section C, and petitions from neighboring barangays asking to be included at Annex K. Completion within four years is realistic.

(E) SINCE NO RECONNAISSANCE LEVEL ENGINEERING DESIGNS ARE INCLUDED IT IS DIFFICULT TO JUDGE TECHNICAL ASPECTS AND COST ELEMENTS. PP WILL NEED TO INCLUDE FEASIBILITY-STUDY-LEVEL COVERAGE FOR BOTH THESE ELEMENTS INCLUDING AMONG MANY ITEMS: AMOUNT OF LIFT FOR IRRIGATION PUMPS, ANALYSIS OF WHETHER DRAINAGE PUMPING ALSO REQUIRED, AND WHETHER ANY FLOOD CONTROL MEASURES ARE NECESSARY TO PROTECT PROJECT.

Ans: Mission and GOP have concluded project is technically feasible. See Part III, Section A, and Annex B.

(F) HOW DO PROJECT ROAD DESIGN STANDARDS COMPARE WITH THOSE OF BICOL SECONDARY AND FEEDER ROAD PROJECT? ARE APPARENT PER KM COST DIFFERENCES EXPLAINABLE BY DESIGN DIFFERENCES? WHAT ENTITY WILL MAINTAIN PROJECT ROADS AND WHAT ASSURANCES ARE THERE THAT ROADS WILL BE MAINTAINED?

Ans: See Part II, Section B, Part III, Section A, and Annex B. Main roads of project area are funded under Bicol Secondary and Feeder Roads Project. They will be maintained by the province. Farm access roads and paths funded under this project have less expensive design and less right-of-way and will be maintained, along with irrigation and drainage canals, by local Irrigators Associations.

(G) HAS PROJECT LAND BEEN CLASSIFIED AS SUITABLE ONLY FOR RICE? RICE HAS HIGH WATER REQUIREMENT AND IS RELATIVELY EXPENSIVE TO PUMP IRRIGATE. ARE THERE ANY PRACTICAL POSSIBILITIES FOR CROP DIVERSIFICATION?

Ans: See Annex C, Environmental Assessment, for a description of project area soils and a discussion of their greater suitability for irrigated rice than for diversified crops or even for the irrigation of other crops.

(H) PRP DOES NOT ADDRESS REQUIREMENTS FOR PROJECT OPERATING INPUTS, I.E., CREDIT AND PHYSICAL INPUTS, AND ONLY BRIEFLY COVERS EXTENSION SERVICES. THESE WILL NEED TO BE DETAILED IN PP.

Ans: See Part II, Section B.

(I) SINCE PRELIMINARY IRR IS RELATIVELY LOW, EVEN USING A 40 YEAR PROJECT LIFE IT WILL BE ESSENTIAL TO DEMONSTRATE THAT ALL REALISTIC FACTOR COSTS SUCH AS THOSE IN (H) ABOVE AND RETURNS ARE INCLUDED IN THE FINAL ECONOMIC ANALYSIS.

SINCE THIS PROJECT IS IDENTIFIED AS AN INTEGRATED AREA DEVELOPMENT PROJECT THE ECONOMIC ANALYSIS ALSO DEAL WITH QUALITATIVE RETURNS TO THE SOCIAL INFRASTRUCTURE OF THE PROJECT.

Ans: IRR discounted over 25 years is 37%. All factor costs have been included. See Part III, Section D. Social infrastructure inputs are limited to introductory training programs and rely on other existing and proposed programs for follow-up and maximum impact.

(J) RE FINANCIAL FEASIBILITY, PP SHOULD INCLUDE TYPICAL FARM BUDGET DEMONSTRATING ABILITY FARMERS TO COVER PROJECT O AND M COSTS AND AMORTIZATION OF AT LEAST PORTION OF CAPITAL COSTS.

Ans: See Part III, Section B, and Tables 3-6, Annex B.

(K) MARKETING ASPECTS OF PROJECT ARE FUNDAMENTAL AND WILL NEED CAREFUL ANALYSIS. MOVING FARMERS TOWARD ADDITIONAL PRODUCTION WILL NOT NECESSARILY INCREASE FARMER INCOME UNLESS THE MARKETING ASPECTS ARE TAKEN CARE OF.

Ans: More efficient marketing activities are important components of overall BRBDP and GOP development strategy. See Part II, Section B.

(L) PP WILL NEED TO PROVIDE GREAT DEAL MORE INFORMATION ON SOCIAL DEVELOPMENT ELEMENTS INCLUDING SCOPE OF ACTIVITY, SOURCES AND ASSURANCES OF FINANCING. IF CONCURRENT DEVELOPMENT SOCIAL ELEMENTS UNDULY JEOPARDIZES PROJECT'S ECONOMIC VIABILITY, USAID MAY WISH TO CONSIDER PHASING SOCIAL ELEMENTS (OTHER THAN LAND CONSOLIDATION WHICH IS UNIQUE FEATURE THIS PROJECT) UNTIL PROJECT PROGRESS IS SUFFICIENTLY ADVANCED FOR ECONOMIC DEVELOPMENT GAINS FROM PRODUCTION INPUTS TO SUPPORT SOCIAL INFRASTRUCTURE DEVELOPMENT.

Ans: See Part II, Section B, and Part IV, Section D.

(M) EMPHASIS ON HEAVY CONSTRUCTION EQUIPMENT AND REFERENCE TO FARM MECHANIZATION RAISE QUESTIONS OF WHETHER LABOR INTENSITY ASPECTS AND POTENTIAL HAVE BEEN DULY CONSIDERED.

Ans: Construction is designed to use labor-intensive methods utilizing labor recruited from project area residents wherever feasible. Dept. of Public Works study in phase I area concluded men could not handle heavy project soils when wet and most earth movement requires mechanical compaction. There will be intensive labor components in irrigation system ditches and structures. Compact farms are designed to permit cultivation by machinery when the stage of Philippine economic development reduces the rural underemployment problem, but premature and unnecessary mechanization will not be encouraged or subsidized by this project. Each farmer will be working his own identified parcel of land within the compact farm area defined by a rotary irrigation block.

(N) WHILE HIGH-LEVEL MANAGEMENT TRAINING WILL BE PROVIDED, WHAT PROVISIONS WILL BE MADE FOR MIDDLE AND LOWER LEVEL MANAGEMENT TRAINING?

Ans: Emphasis of this project is on cooperative irrigation system and compact farm management training. See Part II, Section B.

(O) PROJECT POTENTIAL FOR AFFIRMATIVE ACTION TO ENHANCE ROLE FOR WOMEN NEEDS TO BE ADDRESSED; ADDITIONALLY, CONSISTENT WITH CONGRESSIONAL CONCERN ABOUT HUMAN RIGHTS PP SHOULD DISCUSS POSSIBLE IMPACT OF PROJECT ON DIGNITY, SECURITY, AND BASIC RIGHTS OF BENEFICIARIES AND OTHER PERSONS POTENTIALLY AFFECTED BY PROJECT.

Ans: Women to be organized and to receive training in community leadership, health, nutrition, family planning and backyard garden and livestock projects. Improved access to social services and urban areas will also benefit women. See Part III, Section C.

(P) WE ASSUME ENVIRONMENTAL IMPACT ASSESSMENT WILL BE INCLUDED IN FORTHCOMING BROADER ENVIRONMENTAL STUDY EFFORT.

Ans: See Part III, Section A, and Annex C.

(Q) WHAT ARE USAID'S PLANS FOR MONITORING PROJECT IMPLEMENTATION INCLUDING FAR ELEMENTS?

Ans: See Part IV, Section B and Section C, and Part III, Section B.

(R) LOGFRAME DOES NOT REFLECT WHAT APPEARS TO BE STATEMENTS IN THE BODY OF THE PRP OF EXPECTATIONS REGARDING THE PROJECT PURPOSE. FOR EXAMPLE:

(1) P.5. FARM MECHANIZATION OR EFFECTIVE FARM MANAGEMENT TO REDUCE THE 11.3 PERCENT UNPRODUCTIVE FARM LAND ON EACH PLOT.

(2) P.6. MAXIMIZE FARM PRODUCTION AND MINIMIZE PRODUCTION COSTS - TO INCREASE NUMBER OF CROPS/YEAR FROM 1-1/2 TO 2-1/2.

(3) P.6. ESTABLISH DISTRICT LAND USE AND LAND DISTRIBUTION PATTERNS.

(4) P.14. TO ESTABLISH LAND ADMINISTRATION AND MANAGEMENT PRACTICES.

(5) P.15. ESTABLISH EFFECTIVE COMPACT FARM AND EXTENSION SERVICES.

(6) P.16. ESTABLISH CROP DEVELOPMENT PROGRAM UTILIZATION OF EFFECTIVE FARM TECHNOLOGY PRACTICES.

(7) P.17. ESTABLISH EFFECTIVE HOME AND YOUTH PROGRAMS IN HEALTH AND NUTRITION AND HOMEMAKERS PROGRAMS WITH FAMILY PLANNING SERVICES.

(8) P.18. ESTABLISH EFFECTIVE USE OF GRAIN FACILITIES, RICE DRYING, MILLING AND STORAGE.

Ans: In the preparation of the Project Paper, both the project itself and the Logframe have been revised. They should now be consistent.

(S) BLOCK 9C OF PP FACESHEET SHOULD SHOW AMOUNT PROPOSED AID L/C FINANCING (SLC IS A DEVICE FOR REIMBURSING L/C COST ELEMENTS AND THUS NOT FINANCING OF FX COSTS).

Ans: See PP facesheet.

(T) PPT NETWORK SHOULD BE INCLUDED IN THE PP. IN THIS REGARD, DETAILED TIMING AND PHASING OF ALL PROJECT ASPECTS MUST BE INCLUDED IN THE PP.

Ans: See Annex E and Part IV, Section B.

(U) MULTIPLICITY OF GOP AGENCIES INVOLVED WITH THIS PROJECT AND HISTORY OF ATTEMPT TO COORDINATE AGENCIES IN BICOL HIGHLIGHT NEED TO GIVE CAREFUL ATTENTION TO PROVINCIAL COORDINATION ASPECTS WITH PARTICULAR CONSIDERATION OF WORKING RELATIONS BETWEEN BRBD AND PDAP.

Ans: Bicol agency coordination is now very positive. See Part IV, Sections A and B. Neither PDAP nor the Provincial Development Staff is directly involved in this project. Provincial coordination is required for road constructing under the Bicol Secondary and Feeder Roads Project and for their maintenance, and that is already being effectively coordinated by the BRBDP, its Coordinating Committee and the Project Management Office of the Roads Project.

(V) RE HOME AND YOUTH DEVELOPMENT PROGRAM, MORE DETAILS ARE NEEDED ON THIS ASPECT OF THE PROGRAM; THE MAIN QUESTIONS WE WANT ADDRESSED ON EACH COMPONENT ARE: WHAT, WHERE, WHEN, WHO AND ESPECIALLY HOW. KISSINGER

Ans: See Part II, Section B, and Part IV, Section B.

PROJECT TECHNICAL DETAILS
NARRATIVE

A. GENERAL

1. Rationale

The project covers a contiguous land reform area of 2,286 hectares situated in the municipalities of Bula and Minalabac, both in the province of Camarines Sur. The topography of most of the area is fairly level with slopes ranging from 0 to 3 percent and land elevations varying from 4 to 12 meters above mean sea level. The lower elevations are located in the flood plain of the Bicol River Basin. Higher elevations, up to 20 meters above mean sea level, are reached in Phases II and III, and these areas have slopes that range from 3 to 8 percent.

The land classification survey conducted in the area determined that the project site is suitable for rice production. Climatic conditions are favorable. The Bicol River has great potential as an irrigation water source and the Anayan River is a main drainage way through the project area. However, in spite of all these favorable conditions, the average yield of palay is relatively low because of the lack of irrigation facilities and inundation problems caused by the absence of drainage. Inadequate roads cause transportation constraints, especially for bringing farm produce to the market, further aggravating the situation by creating disincentives for higher production.

While attention has been focused on the development of irrigation and drainage facilities, a transport and road network, and the extension of other socio-economic services, the development of well-planned residential neighborhoods in the area is also included to insure full project success. A satisfactory physical plan is obtained by giving sufficient consideration both to the physical characteristics of the site and to local customs and preferences. For example, not only does the efficient provision of social and community services require some grouping of houses together, but rural Philippine customs and traditional social preferences tend to favor small residential communities over individual, isolated houses scattered in the fields.

2. Objectives

The project is designed to improve the quality of life of beneficiaries by providing dependable irrigation and drainage facilities supported by adequate transport and road networks and a developed homestead.

3. Current Situation

Climate

Dependable records on rainfall, evaporation and temperature in the Bicol River Basin Area are available at the Weather and Evaporation

Rainfall Stations in Naga City and Pili, Camarines Sur. These stations are very near the project area.

At the Pili station, the average annual rainfall is about 2,196 mm. and varies widely from a low of 1,639 to a high of 2,949 mm. within a record of two years (1956-1957). In general, there is no pronounced dry season but there is less rain from February through May with heavy precipitation coming during the months of July to December.

In terms of temperature, at the Naga City station the temperature distribution is generally uniform with an average of about 27°C for the record period, 1957-1962. Extreme high temperature of 37.2°C was recorded on May 12, 1912, and the extreme low of 13.7°C on February 9, 1916, and on March 20, 1918, was also recorded. The average annual evaporation within the same period is 1,647 mm. using an open rim pan having a pan co-efficient of 0.60 in measuring the evaporation rate.

The prevailing wind direction conforms with the three Philippine main airstreams or the seasonal winds. An average of about two tropical cyclones passes annually through the area, as observed at the Naga City Weather station.

Records at the Naga City station also show that the average relative humidity is 85 percent.

Hydrology

In evaluating the available water supply of the Bicol Region for the Project Area, data of the stream gaging station at Ombao, Bula, Camarines Sur, from 1963 to 1972 was used. The drainage area of the gaging station is about 1,630 sq. kms.

Actual data recorded at the station by the Bureau of Public Works are from January 1963 to December 1972. However, there are missing data, particularly August, November and December in 1966; July to September in 1970; and March in 1971. These missing data were estimated using data from the Stream Gaging Station at Sto. Domingo, Nabua, Camarines Sur.

During the record period (1963-1972), the discharge of the Bicol River as recorded at Ombao, Bula, Camarines Sur, station ranged from an annual low of 287.80 cms. in 1969 to an annual high of 1345.59 cms. in 1967, with an annual average of 852.19 cms. Monthly flow ranged from a minimum of 3.53 cms. in April 1969 to a maximum of 354.25 cms. in November 1970. The average monthly flow is estimated at 70.93 cms. About 81 percent of the average annual flow occurs during the period from July to January.

The monthly flows of the Bicol River at the pumpsites of Phases I and IV were estimated from the recorded data at Ombao, Bula, gaging station. Monthly values are indicated in Table 28.

Water Quality of Bicol River

Water samples for this project from the Bicol River were taken monthly, simultaneously with the Libmanan/Cabusao IAD Project.

The laboratory analysis conducted by the Bureau of Public Works determined that water from the Bicol River is suitable for irrigation (Tables 29 and 30).

Ground Water Resources

The project area has the most extensively developed water wells in the Bicol River Basin area. This degree of development evidently stems from the need for water in the higher elevations of the project site, plus the availability of ground water at a shallow depth.

No drill logs of the wells have been kept. However, it was determined in personal interviews conducted with the well owners^{1/} that the aquifer consists of thirty to forty meters of sand and gravel underneath a layer of about five meters of clay or sandy clay. Since some of the wells are in pyroclastics and others in alluvium, there are undoubtedly lithologic differences between wells. In either case, however, it appears that the aquifers are open aquifers recharging directly from the surface.

During the drilling of a test well at Bgy. San Ramon the general picture of the shallow aquifer was confirmed. The drilling log showed 3 meters of clay and sandy clay over 30 meters of sand and gravel which is underlain by a layer of impervious clay and shale of unknown thickness. The well was stopped in the impervious material and was cased with 6-inch mild steel slotted pipe to a depth of 33 meters and gravel packed. The well was developed and test pumped for 24 hours at a rate of 144 gpm. A maximum drawdown of 1.7 feet was measured. From the recovery curve a transmissivity of 43,000 gpm per day per foot was calculated using the Jacob method.

Further ground water exploration is necessary to confirm the capacity of the shallow aquifer and to determine if a second aquifer exists under the aquaclude encountered in the Bgy. San Ramon test well.

Soils

The project area soils have been classified as sandy clay loam to clay loam soil types. These soils are considered to be very good for paddy rice and highly responsive to management including adequate irrigation, drainage and good cultural practices.

Land Use and Classification

The land use and classification survey for the project provided physical data necessary for the physical developmental planning of the area. The survey was conducted by the Bureau of Soils, Region V, using the U.S. Bureau of Reclamation methods and standards with some modifications to suit the local conditions.

^{1/} See Table 4 attached to the "R.O.C. Consultants Terminal Report for Land Consolidation Feasibility Grade Study with Training Components," transmitted to DAR on 29 Feb. 1976 by K. C. Wang.

Table 1, Annex B, shows the land use pattern and segregation of land classes. Land classification work was mainly based on soil and flooding hazards. Of the total project area, about 82% is cultivated, 14% uncultivated, and the rest are occupied by roads, canals, community area and other right-of-ways.

Physiography and Drainage

The project area, as a whole, is on a slightly dissected broad alluvial plain. It is generally level with some rolling portions and sloping areas near creeks and rivers. There are some depressions which serve as drainage for run-off water. The area is dissected by creeks and canals with the Bicol River running along the western part of Phases I, IV and V and serving as the main drainage course for the entire area.

The internal drainage is poor because of the heavy texture of the soil as well as the fluctuating water table below the soil profile. External drainage is also poor to fair due to the nearly level topographic characteristics of most of the land.

Road Network Accessibility

Farm production in the project area is adversely affected by roads and transport problems. Much difficulty is encountered in transporting farm produce to the market and bringing farm supplies and equipment to the field. Even if a barrio is reached by a road, transportation operators are charging high rates due to the very poor road condition. Some farmers survive by carrying products on their shoulders or on primitive carabao carts or sleds to the nearest good highway or road where the fare is lower. Others make use of water transport such as small unmotorized "bancas." Within the project site, only ten percent of the farm lots are accessible to transportation.

A dirt road that is usually impassable during the wet season presently connects Phases II and IV to the town proper of Pili. Another dirt road leads from Phases I and III to the provincial road connecting Bula to the national highway. These main access roads to the project area are scheduled for improvement under the Bicol Secondary and Feeder Road Project (See Map #2, Part II of this FP.)

Homesite

Most residential houses are (or were, in the case of Barrio San Ramon) located in the lower elevations of the project area, exposed to frequent flooding during heavy downpours. Some of these barrios can be reached by dirt roads, while others are not reached by any road.

Services and facilities such as health centers, potable water supply systems, electricity, parks, etc., are not available. Most (82%) of the houses are made of light materials such as bamboo, nipa, anahaw, cogon, buri, etc. The average estimated floor area of each house is about twenty-five square meters, giving about four square meters per person in the average family of 6.3 members.

4. Design and Consideration

The physical plan and design of the project takes into consideration the current physical conditions existing in the project area. The potentials of physical resources that can be tapped for development were assessed. The direction of developmental efforts for the region and the nation as a whole was also considered.

The methodology used and the details of the factors considered in the design are discussed in the succeeding section.

Irrigation and Drainage System

Since the project area is highly suitable for irrigated crop production, attention was focused on the development of irrigation and drainage systems. Irrigation water resources were given careful study.

The irrigation portion of the project adopts the rotational irrigation unit scheme using pump irrigation systems to divert water from the Bicol River for Phases I, IV and V and pumped ground water irrigation systems for Phases II and III. The area of the rotational irrigation block varies from twenty to eighty hectares based on actual topographical and geomorphological conditions. There will be a total of forty-five rotational irrigation units.

Irrigation Water Supply

The Bicol River has been identified as the major source of irrigation water. Records show that the river is a good source of irrigation water even during the dry season, having a 5-year return one-month average low flow of 6 cms. Due to the geographical and topographical limitations of the area, river water can economically be used to irrigate only an area of about 1,592 hectares. For the rest of the cultivable area, ground water resources will be used.

Phase I of the project, with a cultivable area of 567 hectares, will utilize Bicol River as the source of irrigation water. Two 9800 gallons per minute (g.p.m.), mixed-flow, 185 Hp pumps with 50-foot head capacity are required, plus one standby pump. Hamoraon Creek does not have sufficient dry-season water flow for the needs of Phase II, consisting of 184 hectares, and therefore ground water irrigation system will be used. The water needs of this area can be supplied by two 3500 g.p.m., 185 Hp, deep-well pumps. Phase III, consisting of 286 hectares, will also utilize ground water furnished by two 3500 g.p.m., 185 Hp, deep-well pumps and three 1500 g.p.m., deep-well pumps. Phase IV will depend on the Bicol River and will require two 14,100 g.p.m., 340 Hp, mixed-flow pumps with 40-foot head capacity plus one standby pump, to supply the irrigation water requirements for its 810-hectare cultivable area. To irrigate the higher elevations in Phase IV, consisting of an area roughly 265 hectares, three 4800 g.p.m., 40 Hp, centrifugal booster pumps with 20-foot head capacity (one for standby) will be required to raise the water required.

The last phase, Phase V, containing an area of 215 hectares, will be irrigated by two 3500 g.p.m., 75 Hp, mixed-flow pumps with 55-foot head capacity drawing water from the Bicol River, plus one standby pump. A comparison of pump delivery and head capacity and the requirements of their respective service areas is presented in Table 11.

All pumps will be driven by electric motors. A dependable source of electric power will become available when the 230 KV transmission line connecting the Bicol Region to the Luzon grid is completed in mid 1977. The Camarines Sur Electric Cooperative II will provide electric services within the project area. Pump locations are noted in Map #4.

The portions of the project that depend upon ground water for irrigation will not be constructed until the ground water resources are confirmed by the on-going ground water exploration program. If sufficient ground water is not available these areas will be deleted from the project.

Irrigation Canal System

The irrigation canals were designed to supply the proper quantity of irrigation water to the rotational units by gravity flow from the pumps through the system. Basic factors considered in the design to minimize conveyance losses were the proper maintenance of the canal and its embankment; strong management of every diversion gate and turn-out; checking and prevention of illegal turn-outs, proper design of irrigation structures, control of weed growth, increase of irrigation efficiency, establishment of correct water management devices, training of workers in water management for water conveyance to farm lands, establishment of concrete lining of canals to reduce percolation, and compliance of water management with the irrigation water calendar scheme.

Three types of irrigation canal systems were designed for the project:

- Main irrigational canal will extend from the pumpsite through the length of the project following the contours at higher elevations;
- Lateral canals will be connected from the main irrigation canals and laid along each rotational irrigation block; and
- Sub-lateral or farm ditches will be located between two farm roads and connected from the lateral.

A total of about 154 kilometers of irrigation canals will be constructed, 15 percent of which are main canals; 17 percent lateral and 68 percent sub-lateral (Table 7). In terms of density, there will be 1 kilometer per 13.4 hectares of irrigable land. See Map #4 for a sketch of the proposed irrigation network.

Drainage Canal System

The project area is located within the typhoon belt, and it has a high probability of being partially flooded during the annual typhoon

season. Good drainage to mitigate flooding is necessary to improve rice production. The drainage system is designed to perform the dual functions of draining excess water out from the fields and redirecting excess water to areas where irrigation water is needed. All drainage is by gravity.

The Bicol River forms the western boundary of the project and it is the main drainage course in the Bicol River Basin. The Anayan River, a tributary of the Bicol, flows in a westerly direction between Phase I and Phase IV and also forms the northern boundary of Phase III. Hamoraon Creek, also a tributary of the Bicol, flows northwesterly along the northern boundary of Phase IV and Phase V and also forms the boundary between Phase II and Phase IV. Mataoroc Creek, a tributary of Hamoraon Creek, forms the easterly boundary of Phase II. These rivers and creeks form the basis of the drainage system designed for the Project.

The land generally slopes from east to west toward the Bicol River with transverse north-south slopes towards Anayan River and Hamoraon Creek. Isolated low pockets having no drainage outlet exist at scattered locations.

The drainage system for the project is designed to take the utmost advantage of the existing waterways and the natural slope of the land to minimize construction costs. Phase I will be drained by constructing a new drainage canal to convey water northerly to the Anayan River and thence to the Bicol, and by constructing a new drainage canal along the southern boundary to convey water westerly to the Bicol. Phase II will be drained by Mataoroc Creek and Hamoraon Creek to the Bicol. Phase III will be drained by the existing Macatucas Creek to the Anayan River to the Bicol. Phase IV will be drained by Hamoraon Creek to the Bicol on the north, and by Anayan River to the Bicol on the south. Phase V will be drained by Hamoraon Creek to the Bicol on the north.

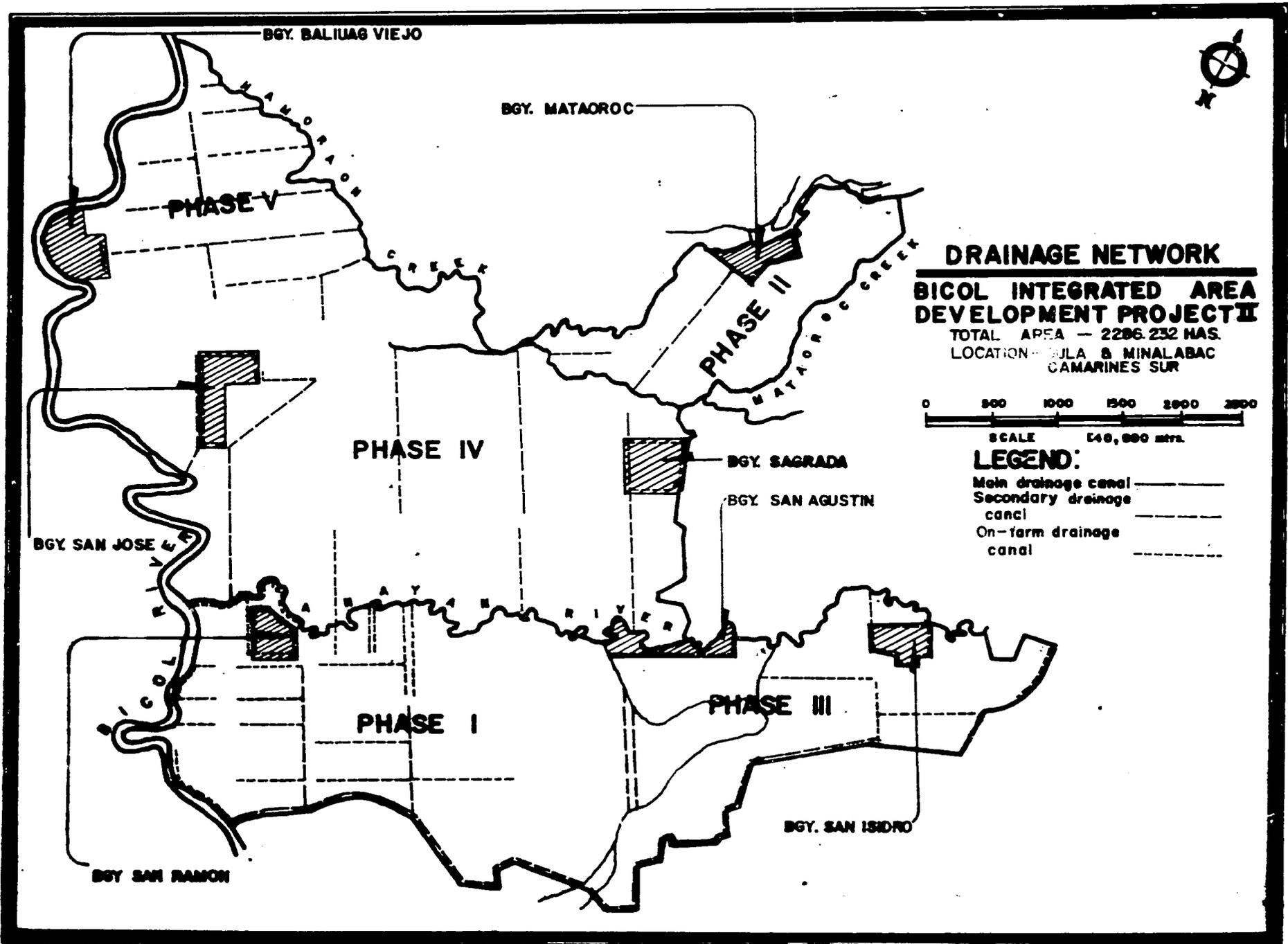
There will be a total of about 92 kilometers of drainage canal, 2% main drainage, 41% secondary drainage and 57% on-farm drainage. The density is 1 kilometer per 22.4 hectares of irrigable land (Table 8), not counting the lengths of existing creeks and rivers. The proposed drainage system is outlined in Map.#5.

Rotational Irrigation Block

The plots designed to form rotational irrigation blocks are primarily based on the natural environment of farm structures, increased irrigation system efficiency and introduction of improved agricultural techniques. With these considerations, every rotational irrigation block will have an area from twenty to eighty hectares. There will be a total of forty-five rotational units.

Road Network

Farm roads are not only required for the transport of farm inputs and production, but they are also the backbone of communication in the rural areas as well. One of the main features of the project is the construction of road networks surrounding field blocks composed of several



farm lots each. In addition to having direct irrigation and drainage facilities, each farm lot is connected to all-weather farm roads or all-weather farm access paths.

The Project Area roads have been classified as follows:

- 1) A 10.2-kilometer secondary road, with an asphalt-paved width of 5 meters and with a 1.5-meter gravel shoulder on each side, and with a 15-meter right-of-way, will connect Bgy. Baliwag Viejo and San Jose with Pili.
- 2) Some 10.1 km. of feeder roads, with a gravel-surface width of 5 meters on a 15-meter right-of-way, will connect all barangays within the project to each other, to the Pili-Bula Provincial Road, and to a secondary road ending in Ombao. The construction of secondary and feeder roads will be financed by the Bicol Secondary and Feeder Roads Project.
- 3) About 33.4 km. of farm service roads, with a gravel-surface width of 3 meters and frequent 5-meter passing and parking zones, will connect each field block with the Secondary and Feeder Roads.
- 4) About 41.9 km. of farm access paths, with a gravel-surface width of 2 meters, will connect each farmlot with the farm service roads.

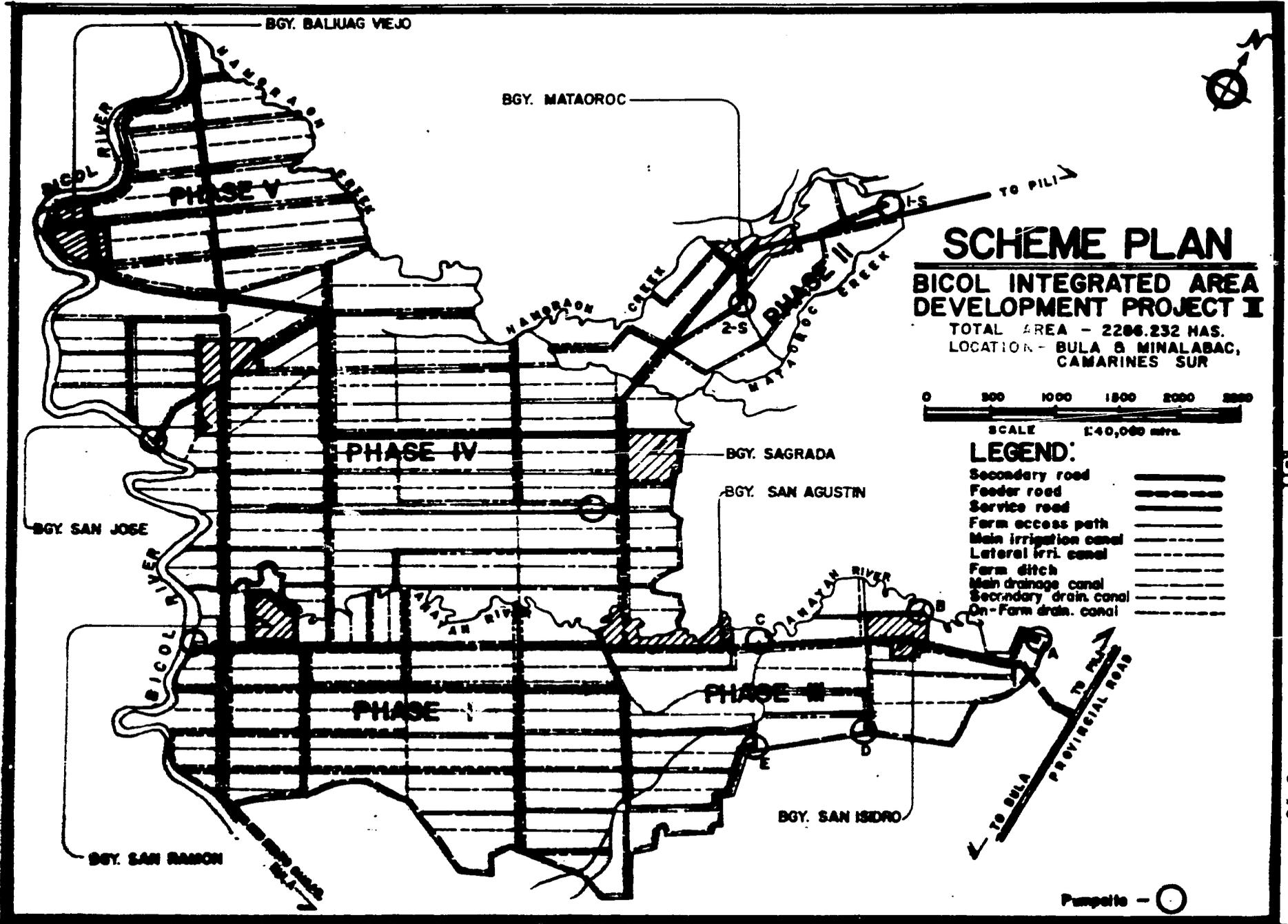
The road network was planned to provide good all-weather access to each farmlot at a minimum cost. This will greatly improve farming operations by providing easy access to markets and lowering transportation costs. Including secondary and feeder roads, a total of about 95.6 kilometers of roads and paths will be constructed, or a density of one kilometer per 24 hectares of land. (See Map #3, Part II, for a map of the road network alone and Map #6 for a schematic presentation of all roads, paths, canals and drains.)

Homesites

In the plan of the community size, the following criteria were considered:

- Playground to allow 12 sq. m. per child within a radius of 1 km.
- Roads with ten meters width for circumferential roads and 6 meters for service roads.
- Lot corners at street intersections should be rounded with a radius not less than four meters.

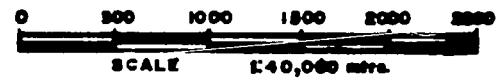
In the entire project area, a total of 1230 homelots was designed divided among seven separate homesite (Barangay) areas. (See subdivision schemes in Figures 23-29.) These will be served by a total of about 24 kilometers of service and circumferential roads. Twenty-nine hectares will be allocated for school sites, commercial sites, and open spaces.



SCHEME PLAN

BICOL INTEGRATED AREA DEVELOPMENT PROJECT II

TOTAL AREA - 2286.232 HAS.
LOCATION - BULA & MINALABAC, CAMARINES SUR



- LEGEND:**
- Secondary road
 - Feeder road
 - Service road
 - Farm access path
 - Main irrigation canal
 - Lateral irri. canal
 - Farm ditch
 - Main drainage canal
 - Secondary drain canal
 - On-Farm drain. canal

B-11

Map #6

Pumpets -

The following criteria were used in the design of lots and blocks:

- Every homelot shall abut a street at least ten meters wide.
- Corner lots may be larger to allow houses to conform to building lines on the front and side street.
- Boundaries of lots located at street intersections shall be at right angles.
- Minimum size and frontage wherein the shape will be rectangular with at least 500 or 600 sq. m. in area with a minimum street frontage of twelve meters.
- A block shall not exceed four hundred meters in length. A pedestrian way of not less than four meters will be provided near the center of any block that is more than 250 meters long.
- Only one house shall be allowed to be constructed within the residential lot.
- No rice or other grain mill machines exceeding an aggregate of 10 Hp nor any factory of equal capacity shall be allowed to be installed within these community sites.
- Each community should have an independent drainage system but be inter-linked with the farmland drainage system to allow rainwater to be drained within 24 hours.

B. Methodology

1. Rotational Irrigation System

There are three methods of irrigation used in the cultivation of rice fields, namely: continuous flooding, intermittent, and rotational. Of these three systems, the rotational irrigation method is the most modern and efficient system satisfying the crop water requirement by delivering the right amount of water at the right time utilizing the available irrigation water most efficiently. The rotational method was chosen for this project because all of the irrigation water will be pumped either from the Bicol River or from wells. Since it is costly to pump water, the most efficient system utilizing the smallest volume of water will minimize construction and operating costs.

The irrigation water requirement in a rotational system is defined as the delivery of the right volume of water at the right time to meet the crop water requirement of a rotational area in order to produce optimum yields. The rotational irrigation system supplies the supplemental water required to satisfy the crop water requirement when the rainfall is deficient.

The rotational irrigation system is based upon irrigating the rice on a scheduled 24 hours-a-day rotational basis. This keeps the size of the pumps and the canals to a minimum, thus minimizing the cost of the irrigation system.

Following is a tabulation of the average monthly rainfall in Camarines Sur Province based upon 37 years of records at the Naga City Station.

Table B-1. Average Monthly Rainfall in Camarines Sur Province

Month	Rainfall (mm)	# of Rainy days
January	114.8	12
February	81.28	9
March	68.82	7
April	86.36	8
May	155.70	12
June	202.18	16
July	274.32	19
August	186.94	16
September	291.34	18
October	292.10	19
November	308.61	18
December	290.08	17

From Republic of China Consultants Terminal Report

Effective rainfall is the net amount of rainfall available during the cropping period to meet the consumptive water requirements of the crops. Distribution and intensity of rainfall, depth of standing water in the paddy field, size and maintenance of farm dikes, irrigation method and water delivery interval, topography of land, and drainage facilities, are the main factors that greatly influence the effectiveness of rainfall.

In order to determine the effective rainfall the following principles were followed:

- a. All rainfall is effective in an amount not to exceed the total of consumptive use (CU) or evapotranspiration of the crop plus percolation (P).
- b. An initial 5-day study was used for the rotational system.
- c. Effective rainfall can be maximized and excessive drainage of water prevented if the following schedule for irrigation suspension is adopted.

<u>Previous Days Rainfall Range (mm)</u>	<u>Number of Days Irrigation is Suspended</u>
0-4	0
5-10	1
11-18	2
19-27	3
28-36	4
37-45	5
above 45	6

d. In accordance with the National Irrigation Administration's (NIA) method of computing effective rainfall, all precipitation in excess of 80 mm in a 10 day period is ineffective.

Table B-2. Monthly Average Effective Rainfall in Project Area

<u>Month</u>	<u>Rainfall (mm)</u>	<u>Rainy Days</u>	<u>Ave. CU on Rainy days (mm)</u>	<u>Perco- lation (mm)</u>	<u>Drainage from Runoff (mm)</u>	<u>Effective Rainfall (mm)</u>	<u>Rate of Use %</u>
January	114.81	12	29.52	121.32	18.81	96	83.6
February	82.28	9	21.53	90.99	9.28	72	88.6
March	68.83	7	17.22	70.77	12.83	56	81.4
April	86.36	8	19.68	80.88	22.36	64	74.1
May	155.70	12	29.52	121.32	59.70	96	61.7
June	202.18	16	39.36	161.76	74.18	128	63.3
July	274.32	19	46.74	192.09	122.43	153	55.4
August	186.94	16	39.36	161.76	58.94	128	68.5
September	291.34	18	44.28	181.98	117.34	174	59.7
October	292.10	19	46.78	192.09	140.10	142	52.0
November	308.61	18	44.28	181.98	134.61	174	56.4
December	290.08	17	41.82	171.87	154.08	136	46.9

From Republic of China Consultants Terminal Report

This table shows that from January through April is the dry season and from May through December is the wet season. The average rate of effective rainfall is 82% for the dry season and 58% for the wet season.

The quantity of water supplied by the water source should satisfy the water requirements in the irrigation system. The forms of water requirement and their corresponding formulas are as follows:

a. Consumptive Use of Water (CU)

CU = evaporation and transpiration (evapotranspiration) = 7mm/day

Studies in India, Thailand, the Philippines and other Southeast Asian countries show that the average rate of evapotranspiration ranges from six to eight mm/day depending upon the prevailing climatic conditions. Since

the data for making the analysis in the project is available, 7.0 mm/day was computed as the consumptive use.

b. Field crop Water Requirement (FC)

$$FC = CU + P = 10 \text{ mm/day}$$

Where: FC = Field Crop Requirement

P = Percolation losses, including seepage = 3 mm.

The lowland rice growing duration in the field is from the period of transplanting to harvesting. There are some basic factors considered in determining water requirement for the rice field, such as:

Average maturity of the rice varieties to be used.

A 105-days rice-maturity variety is used in this project.

Percolation losses

The project land under irrigation has been farmed for hundreds of years by the chinese method of water leveling the land and puddling the soil. This method of cultivation builds up an impervious layer at plow depth which inhibits excessive percolation. Experience in this area shows that percolation does not exceed 3 mm per day.

c. Crop Water Requirement (CWR)

$$CWR = N + LP + FC$$

Where: CWR = Crop Water Requirement

N = Nursery requirement

LP= Land preparation requirement = 130 mm/day

FC= Field crops requirement = 10 mm/day

Nursery Requirement

By utilizing the "Dapog" method of raising seedlings to be included in the agricultural training and extension components of this project, the seedbed area can be reduced from 400 square meters for every hectare to be planted to only 40 square meters per hectare to be planted. This method also requires less water because the depth of irrigation is reduced from 5 cm to 2 cm. With the reduction in seedbed area and water used the nursery requirement becomes almost negligible in the calculation of the crop water requirement.

Land Preparation Requirement

The water requirement for land soaking and land preparation constitutes the greatest demand upon the irrigation system and was computed after considering the basic factor that prior to and during the period of land

preparation is a period usually without effective rainfall. It was further assumed that the depth of tilling the land is 150 mm.

The formula used is as follows:

$$LP = Dt (P - Wp) + Cd + 2 (T + In)$$

Where: LP = Water Requirement for land preparation = 130 mm/day

Dt = Depth of land tillage = 150 mm

P = Porosity (or pore space) = 45%

Wp = pore water = 5.23%

Cd = Cover depth of water = 30 mm

T = Transpiration = 4.64 mm/day

In = Infiltration Rate = 15 mm/day

The maximum crop water requirement for a typical 50-hectare rotational unit was calculated to be 140 mm per day.

d. Crop Irrigation Requirement on Farm (CIR)

$$CIR = CWR - (RE + CE + CM) \frac{t}{tm}$$

Where: CIR = Crop irrigation requirement

RE = effective rainfall

CWR = Crop Water Requirement

CE = Effective groundwater

CM = Carry-over moisture or water

t = days in which moisture could be utilized

tm = days in month

The crop irrigation requirement on farm for a 50-hectare rotational unit was calculated to be 137 liters per second or 0.137 cms.

Crop irrigation requirement is the crop's water requirement less the volume of water from effective rainfall ground water and carry-over moisture effective in the production of crops and must be supplied by the irrigation system.

e. Turn-out Water Requirement (TWR)

$TWR = CIR + \text{losses from farm ditches (Assumed to be 20\% of CIR)}$

Where: TWR = turnout water requirement

CIR = crop irrigation requirement

The turn-out water requirement for a typical 50-hectare rotational unit was calculated to be 164 liters per second or 0.164 cms.

f. Diversion Water Requirement (DWR)

$DWR = TWR + \text{conveyance losses in the main canal and laterals}$

Where: DWR = diversion water requirement

TWR = turn-out water requirement

Considering administrative losses and other factors a design conveyance loss of 25% was used.

Engineering factors to minimize conveyance losses include:

- i. Concrete lining of main and lateral canals.
- ii. Compacted soil construction of sub-lateral canals and farm ditches.
- iii. Adequate velocity in canals
- iv. Adequate plans, specifications and inspection to insure good quality construction by the contractors.
- v. Proper design of on-farm irrigation system
- vi. Keep farm ditches less than 1,000 m in length

Operational factors to minimize conveyance losses include:

- i. Proper maintenance of canals and embankment
- ii. Strong management of diversion gates and turnouts
- iii. Prevention of illegal turnouts
- iv. Control of weed growth
- v. Increase efficiency of irrigation
- vi. Use correct water management devices

vii. Training workers for water management

viii. Water distribution should be in accordance with an established water calendar schedule.

g. Water Distribution by Rotational Unit

The background of farm plot-planning in the project area is based on the natural environment of farm structures, increased efficiency of irrigation system, and introduction of improved agricultural techniques. The interval of farm service roads is 800 meters, and 300 meters for the farm access paths, forming about a twenty-five hectare operational unit. In each operational unit, an average of 800 meters farm ditch is established for irrigating the plots. The model irrigation systems adopted for each Phase are illustrated in Figures 9 to 13.

The irrigation water distribution system consists of main canals, lateral canals, sub-lateral canals, farm ditches and sub-farm ditches. The water flows by gravity through the system from the pumps to the rice fields.

The irrigation system designed for this project considered the following basic elements for design and construction of the irrigation system:

- i. 800 meters of canal for every 24 or 12 hectares of service area;
- ii. Delivery of water by rotation within an average rotational area of about 50 hectares. The crop irrigation requirement is supplied from the farm ditch;
- iii. The 50-hectare rotational area is further subdivided into rotational units of 12 hectares more or less each. Water distribution to the 12 hectare rotational units is from the sub-farm ditch;
- iv. One gated turn-out and a measuring device will be provided for every 50-hectare rotational unit;
- v. One division box shall be provided for each 12 hectare rotational unit;
- vi. One off-take or outlet for every 2.5 or 3.0 hectare of farm plots;
- vii. One end-check at the end of every farm ditch; and
- viii. 800 meters of drainage ditch for every 12 or 24 hectares.

The theoretical study for water distribution used the following fundamental formula:

$$QT = A. D.$$

Where: Q = delivered quantity of water ($m^3/sec.$ or l/sec)

T = time irrigated (sec)

A = service area (has. or m^2)

D = depth irrigated (m or mm)

The water distribution practice in operation shall be from canal turn-out to crop rotational unit in the field. The fundamental formula of water distribution was reformed into four elective formulas, as follows:

$$(1) \quad Q = \frac{A \cdot D}{T}$$

$$(3) \quad D = \frac{Q \cdot T}{A}$$

$$(2) \quad T = \frac{A \cdot D}{Q}$$

$$(4) \quad A = \frac{Q \cdot T}{D}$$

Two irrigation patterns from the turn-out to the farmland were also considered, either irrigate from downstream to upstream; or from upstream to downstream. The adopted scheme was to irrigate from downstream to upstream in a rotational method of water distribution.

The relation between irrigation time and irrigation water on the farm plot depth derived from the fundamental formula of water distribution is shown by the following equation:

$$T = \frac{A \cdot D}{EQ}$$

Where: T = time irrigated

E = Irrigation Efficiency

A = Plot's area

Q = delivered quantity of water

An irrigation schedule must be prepared for the entire system based upon the crop irrigation requirements, the past average effective rainfall and the rainfall during the preceding week. Basic data such as: irrigation land registration, cadastral maps for irrigation, section maps for rotational irrigation, and system maps for irrigation, must be established. Ditch-tenders will operate the turn-outs on a 24-hour rotational basis according to the irrigation schedule. On-farm water rotational distribution will be controlled by the farmer members of each compact farm.

The design criteria used in the pump design for this project are:

drive - electric motors

Q = quantity of water

$Q = 1.5$ liters/second/hectare = 23.8 gallons/min./ha

$$WHP = \frac{QH}{3,960}$$

$$BHP = \frac{WHP}{E_p E_m}$$

$E_p = 75\%$

$E_m = 90\%$

Where WHP = water horsepower, H = total dynamic head, BHP = brake horsepower, E_p = pump efficiency, and E_m = motor efficiency.

The design criteria used in the design of the main canals, lateral canals, sub-lateral canals, farm ditches and sub-farm ditches are:

For concrete lined canals:

$V = 0.3$ to 1.0 meters/sec

$n = 0.015$

$S = 0.0025$ to 0.01

Side Slopes = $1:1$

Where V = velocity, n = roughness coefficient, and S = slope.

For compacted earth canals and ditches:

$V = 0.2$ to 0.7 meters/sec

$n = 0.025$

$S = 0.005$ to 0.008

Side Slopes = $1.5:1$

The National Irrigation Administration standard designs will be used for headgates, culverts, turn-outs, terminal structures, division boxes, etc.

2. Drainage

The project is located within the typhoon belt and is subject to heavy rainfall during the wet season. The drainage system has a dual purpose of draining excess water off the farm lands and redirecting excess water to areas where it is needed for irrigation.

Adequate drainage is as important as irrigation in rice cultivation. Good water control is important during seedling growth and for the first 45 days after transplanting. Excess water depth will deter the growth of the meristematic tissues and reduce the stooling of the rice plants. Good stooling of the individual plants is necessary for increased production. After this period, the rice plants are more tolerant of excess water depth in the fields.

Drainage of the project will be accomplished by gravity flow off the rice fields into open ditches on each compact farm where it will be collected by sub-lateral or lateral drains for conveyance to the main drain. In the main drain the water will be conveyed to one of the natural

water courses through the project and thence to the Bicol River. The project has sufficient watercourses and slope to the land to accomplish this without excessive excavation.

The minimum size of the farm drainage ditches is two feet deep with 4:1 side slopes. The purpose of these ditches is to control the ground water table and to provide surface drainage. Check gates with removable sections will be installed at various locations in the ditches to control the water at the desired level during the dry season. However, during the wet season the gates will be opened to provide faster drainage for storm flows. Control structures or drops will be installed where the drainage ditches intersect collector ditches or natural watercourses.

The proposed drainage system will include farm drains, lateral drains, main drains and improvements to existing watercourses plus the necessary control structures.

The design of the surface drainage system for the project considered rainfall, topography, drainage outlets, catchment areas, flooding, infiltration, land size and irrigation practices.

Peak hourly rainfall data for the project area was not available so an approximation was necessary and a factor of 35% was adopted from the Magat River Feasibility Study. This was used to convert the 5, 10 and 25-year one-day rainfall into peak hour rainfall.

Topographic maps with a scale of 1:4,000 having a contour interval of 0.5 meters were used to layout the drainage system. The farm, lateral and main drains were located to provide gravity drainage to the entire area. Farm ownership boundaries were also considered in the drainage system layout. The routes of the main drains were surveyed and profiles and cross sections were taken and plotted to verify the accuracy of the topographic maps.

The topographic map, parcellary maps and service area maps were used to determine the drainage areas for storm discharge computations.

The design criteria used for the design of the storm drainage system are:

- a. Nine-year rainfall record
- b. Use Hazens formula to determine the frequency of rainfall graph
- c. Runoff coefficient of 80% for farmland
- d. Runoff coefficient of 10% for barrio site
- e. Farm drainage system shall drain rain water of three consecutive rainy days using a frequency of once in 20 years.

- f. Barrio site drainage shall drain rain water of one day using a frequency of once in 20 years.
- g. The Barrio site drainage system shall be independent of the farmland drainage system but may use the same outlets.

The farmland drainage system is based upon the following formula:

$$Dqf = \frac{r c a}{NT}$$

Where: Dqf = per hectare discharge of rain water in CMS

r = rainfall (m) = 0.4968

c = coefficient of runoff = 0.80

a = unit area (10,000 sq. m)

T = 1 day's time (86,400) seconds

N = duration of drainage = 3 days

The barrio site drainage is based upon the following formula:

$$Dqb = \frac{r c a}{NT}$$

Where: Dqb = per hectare discharge of barrio site drainage water

r = rainfall (m) = 0.3914

c = coefficient of runoff = 0.1

a = unit area (10,000 sq. m)

T = 1 day's time (86,400) seconds

N = duration of drainage = 1 day

3. Flood Protection

The land elevation of the project area varies from +5 msl. along the Bicol and Anayan Rivers and Hamoraon Creek to a high of +20 msl. in the extreme northern end of Phase II with the greatest land area lying between elevations of +8 msl. and +10 msl.

River gauging stations are maintained by the GOP at Ombao which is about 5 kms. upstream from the project and at Baliwag Nuevo which is located at the downstream boundary of the project. The TAMS/TAE Comprehensive Water Resource Study Volume III contains charts for determining the water surface elevations at these two gauging stations for 1 to 50 year floods. From these charts, Figure A-100 for Baliwag Nuevo and Figure A-101 for Ombao, the expected Bicol River water elevations for

1, 5, 10 and 20 year floods were obtained and tabulated as follows:

Station - Baliwag Nuevo - Figure A-100

Year	Water Elevation
1	2.6
5	4.1
10	4.5
20	4.6

Station - Ombao - Figure A-101

1	4.5
5	7.1
10	7.7
20	8.5

On 12/29/76, a high mean water elevation of 8.82 was recorded at the Ombao station and a high mean water elevation of 4.31 was recorded at the Baliwag Nuevo station. A water elevation of 5.5 was observed in the vicinity of Barrio San Ramon, located in Phase I, during this same period. This flood occurred after about one month of heavy rainfall including one minor typhoon. The rainfall data is not available yet.

The localized flooding within the project will be eliminated or greatly reduced by the construction of the project drainage system. The land having an elevation of +6 msl. and higher will not be flooded during a 20-year flood of the Bicol River and will be adequately drained by the new drainage system.

Areas along the Bicol and Anayan Rivers and Hamoraon Creek having an elevation of less than +6 msl. will be flooded during the 20-year floods but will probably not be flooded during the 5-10 year floods. The cost of flood protection works such as levees and pumping stations is greater than the benefits received from the small area protected. The project team recommended that flood protection works should not be included in the project. This decision was upheld during project reviews and the design proceeded without a flood protection component.

**ENVIRONMENTAL ASSESSMENT
BICOL INTEGRATED AREA DEVELOPMENT II-A
(BULA-MINALABAC)**

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(c) The concentration of pesticides and fertilizers will increase downstream from the project due to the improvement in farm management and second cropping.

(d) Irrigation water withdrawal could result in salinity intrusion reaching 5.4 to 6.6 kms. further upstream than at present during average low-flow months recurring every 2 or 3 years.

(e) The project calls for underground water sources to be utilized to irrigate 23% of the cultivated lands.

(f) The increased concentration of pesticides due to irrigation activities may be detrimental to aquatic life.

(g) The increased residential concentration will increase the concentration of sewage and solid waste materials.

(h) The project area population is expected to double as a result of the project.

(i) The major long-term land use impact would be a shift from rainfed farming to irrigated agriculture in new areas to be served by the system.

4. Alternatives considered:

- (a) No project
- (b) Postpone project
- (c) Irrigation of other crops
- (d) Alternative water sources
- (e) No pesticide use
- (f) Alternative homesite locations
- (g) Centralized water supply
- (h) Energy conservation

I. DESCRIPTION OF THE PROJECT

GENERAL DESCRIPTION OF THE PROJECT

The Bula-Minalabac Project is proposed as an Integrated Area Development (IAD) involving primarily enhancement of irrigation activities. The project will finance five major components:

1. the construction and installation of major physical facilities, namely, irrigation and drainage canals, electric turbine pumps, and pumphouses sufficient to irrigate 2,062 hectares all year, all-weather service roads and farm paths, multipurpose community building for each of seven barangays that will serve as the Project Management Office and training center during project implementation, and one elementary school;
2. new community homesite development and the relocation of farm houses and households from scattered field locations to planned community homesites;
3. land consolidation and tenure reform;
4. a series of inter-related organization development and training activities to transmit modern agricultural and irrigation technology and some basic principles of cooperative organization, leadership, preventive health, nutrition, family planning and backyard garden and livestock project possibilities; and
5. applied agricultural research to determine optimum rice production technological packages for the project area.

Over 90% of the total cost of the project will be used for the final design and construction of irrigation and drainage facilities, roads and paths and for training farmers in irrigation technology.

The project lies in the center of the Bicol River Basin which is located in the province of Camarines Sur, Luzon island. The Basin is an area of some 300,000 hectares with about a million people. The approximately 2,300 hectare project is located along the Bicol River midway between the towns of Bula and Minalabac (Figure 1).

PROJECT PURPOSE

The overall goal of this project is to improve the socio-economic situation and the quality of life of the rural poor residing in the project area.

This will be accomplished by (the purposes of this project):

- 1) farmers practicing modern, double-crop technology, utilizing and maintaining new irrigation and road systems and adopting backyard vegetable and livestock projects, 2) reduced home-to-farm and lot-to-lot travel time, 3) improved land tenure security, 4) increased family planning, 5) improved sanitation, meal and food preparation, 6) improved access to primary education in one barangay, and 7) Irrigation Associations and other organizations functioning effectively.

KEY FEATURES OF THE PROJECT

Irrigation Facilities

The irrigation facilities are a five-block rotational irrigation system. The land area within each block ranges from twenty to eighty hectares. The cultivated land will be leveled within each rotational block. It will be terraced where the slopes are too great.

Each block will comprise a separate irrigation system with appropriate size electric pump stations. Three pump stations will draw from the Bicol River and seven pump stations from underground sources, if the latter are shown to be adequate. The groundwater stations are intended to irrigate 23% of the project area. Total annual water withdrawal from the Bicol River is estimated to be 35,600,000 cubic meters and from the underground sources, it is estimated to be 10,600,000 cubic meters.

The whole project area requires 154 kilometers of irrigation canals. About 23 kilometers will be main canals, 26 kilometers will be laterals and 105 kilometers will be on-farm ditches or sub-laterals. The canal density in the whole project area is 1 kilometer for each 13.4 hectares of irrigable land.

The drainage component will consist of a total of 92 kilometers of new drainage canals and existing creeks and rivers. The new construction will include 1.6 kilometers of main drainage, 38.1 kilometers of secondary drainage and 52.5 kilometers of on-farm drainage. The main drain will be constructed to accelerate floodwater runoff from an adjacent (non-project) area through part of the project area in order to reduce flooding and persistent problems of water-logging. The drainage canal density will be one kilometer of drainage canal per 22.4 hectares of irrigable land.

Service Facilities

The project includes 33 kilometers of gravel-surfaced service roads and 42 kilometers of unsurfaced farm access paths. The service roads will be parallel with the main irrigation canals and laterals. They will connect with the 20 kilometers of larger secondary and feeder roads being constructed under the Bicol Secondary and Feeder Roads Project. The farm access paths will link each farmlot to service or feeder roads.

Seven 3-room multipurpose buildings will be constructed in each project area barangay. They will be used first as project field offices and then turned over to barangay councils as community and training centers.

An eighth building of identical design will be constructed in Barangay San Jose to serve as an elementary school. This is the only one of the seven project area barangays without its own elementary school.

Homesite Development and Relocation

The project design includes the potential relocation of approximately 7,000 farm beneficiaries to one of seven development communities. Road networks and drainage facilities will be provided in the new homesite areas. Each homelot will be between 500-650 square meters. Each community will contain areas for a school, chapel, health center, park and other facilities. Homelots will be relocated strategically in such a way that most beneficiaries' farmlots will be, on the average, less than two kilometers away. The homelots will be above the high water mark of most periodic floods.

In addition to a relocation allowance, each household will receive a \$133 allowance for sanitation improvements. Of this sum, \$80 will be available to purchase small, hand-operated household water pumps and some of the labor requirements of driving a new well. The remainder of this sum, \$35, will be available for materials needed to construct a simple, but satisfactory water-sealed pit privy. All labor in the latter case will be provided by the recipient.

Land Consolidation and Tenure Reform

Agricultural land consolidation entails planned physical restructuring of all farm lots which are fragmented, narrow, small or irregular in shape. The reshaping aims to form one continuous holding. In addition, the project will assist in implementing Presidential Decree No. 27 ordering land tenure on rice.

Organizational Development and Training

The training component of the project includes instruction of farmers in the principles of irrigation, modern farm technology and cooperative activity. It also includes training of homemakers, youths and farmers alike in basic principles and importance of preventive health, nutrition, family planning, backyard projects and community leadership.

Applied Agricultural Research

The project will fund an applied research program within the project area. The project is designed to determine the optimum package of high-yield seed varieties, fertilizer, pesticides and other inputs specifically for the soil, climate and water conditions of the area.

RELATED ACTIVITIES OF SAME NATURE IN BICOL RIVER BASIN

Libmanan/Cabusao Integrated Area Development

This project is currently underway on the west side of the mouth of the Bicol River. It involves several interrelated subprojects in irrigation, drainage, road construction, land reform, compact farm organization, extension service development and applied research. It will irrigate and drain some 3,870 hectares utilizing water from the Sipocot River, a tributary of the Bicol River downstream from the Bula-Minalabac project site.

Pilot On-Farm Water Management

This project is designed to rehabilitate and improve several national, communal and pump irrigation systems in order to permit modern water management practices, to provide the professional and technical training needed to operate and maintain them, to stimulate the formation of farmers' associations, and to conduct applied research in on-farm water management. The project includes 4,800 hectares in four separate locations upstream from the project area and 300 hectares in the Lirag Estate pilot portion of the project.

Bicol River Basin Secondary and Feeder Roads

This project consists of 14 subprojects each of which includes a secondary road as a trunk line with feeder roads branching out into rural farm areas. The 14 secondary roads comprise 200 kilometers and the attendant feeder roads another 254 kilometers for a total project of 454 kilometers of farm-to-market roads.

All project secondary roads currently exist but will require improvement and reconstruction. Work on these roads will include all-weather surfacing. Feeder roads, in most cases, will be constructed to replace trails and cart tracks and can properly be called penetration roads. Construction of feeder roads will utilize gravel for all-weather surfacing. Drainage structures, culverts, bridges and ancillary structures will be included.

Approximately 20 kilometers of these secondary and feeder roads will be constructed (or improved) within the Bula-Minalabac project area. They will be constructed simultaneously with irrigation and drainage canals and structures and they will form an integral part of the planned farm access road grid.

Bicol Integrated Health, Nutrition and Population

This project will provide start-up funds for organizing, staffing, training, supporting and selling (to rural residents and their leaders) a new, integrated, decentralized approach to rural health care delivery. It will create a locally-hired and funded Barangay Health Aide in each barangay.

This project will also provide funds to upgrade laboratory facilities for water supply analysis, to construct or rehabilitate a few rural health

centers and stations, to conduct an environmental sanitation survey of rural barangays, and to establish a revolving loan fund to help rural barangay councils and households finance improved water supply, drainage and toilet facilities, with emphasis on upgrading water supplies.

The health project, when implemented, will reinforce and expand on the training elements of the Bula-Minalabac project dealing with preventive health, environmental sanitation and family planning matters.

Rinconada Integrated Area Development

This proposed project in the upper reaches of the Bicol River Basin involves flood control, water storage, irrigation and drainage, roads, agricultural support services and watershed protection. The main physical features of this project are reservoirs and drainage facilities and a combination of vegetation and mechanical controls on areas subject to heavy erosion.

The primary benefits from the project are increased rice yields and mitigation of floods. Total rice production in the IAD will be increased by one-third as a result of this project. The flood control and water storage for downstream irrigation benefits will be significant in the project area as well as in other IAD's, including the Bula project area.

II. RELATIONSHIP TO NATIONAL DEVELOPMENT PLANS, LAND AND RESOURCE USE POLICIES

The proposed project, which is part of Bicol River Basin Development Program, is in line with the basic goals of national development plans announced by the Republic of the Philippines. It is described in the National Economic and Development Authority (NEDA) Regional Development Projects, Supplement to the Four-Year Development Plan, FY 1974-77 and in the USAID Development Assistance Program (DAP) for the Philippines (revised June 1975).

It is also in line with the major recommendations of economic advisors from the World Bank and the United Nations.¹ The principal recommendations of the "Ranis Report" were directed toward the mobilization of the rural sector.² Their second major thrust was toward labor-intensive, decentralized, and export-oriented industry. Much of their report is concerned with unemployment and the maldistribution of wealth and income:

"... income inequality in the Philippines is closely related to regional differences in the use of modern technology and inputs, in investments in feeder roads and irrigation works, and so on. The mission's strategy includes reducing those differences through rapid improvements in the low income regions... The Government should encourage irrigation vigorously in Bicol..."³

. . .

"... Although the (Bicol) region has substantial water resources (seven major rivers pass through it), irrigation is, paradoxically, one of the main deficiencies; moreover, inadequate transport and communications have virtually isolated Bicol from the rest of Luzon. Irrigation and infrastructure could clearly provide a main impetus to development; land reform measures could further enhance its prospects. Much is expected from a multi-purpose project for the Bicol River Basin which is supported by the United States Agency for International Development and focused on a concentrated rural development effort for the region."⁴

The proposed project will follow some of the main policy thrusts of the central government. It will increase agricultural production.

¹For a detailed discussion of these overall goals and recommendations see Bicol Integrated Rural Development (BIRD) Project Paper, Oct. 1976, Annex C(1). See also International Labor Office, Sharing in Development, A Programme of Employment, Equity and Growth for the Philippines, ILO, United Nations, and NEDA, Manila, 1974, pp. 35, 104-5, 463-4, and 30.

²International Labor Office, op. cit., p. 35.

³Ibid., pp. 104-5

⁴Ibid., pp. 463-4

It will provide more productive employment opportunities (by double-cropping cultivated land) in areas away from Manila, thus helping to reduce immigration into that congested urban area. It will result in higher incomes for rural poor people, thus raising the national per capita income while at the same time achieving a more equitable income distribution. It will improve the quality of life in other, non-monetary ways by providing access to social services of various kinds and by moving people out of frequently flooded areas.

The project will intensify rice production on land areas most suitable for rice cultivation and generally too wet for most other crops, thus releasing other areas more suitable for other crops from rice cultivation. In this manner, the project and others like it contribute significantly to the national policy of crop diversification, even while intensifying the cultivation of rice on discreet areas of land.

Institutionally, the project builds on Operation Land Transfer not only by distributing formerly large landed estates to former tenants and squatters, but also by consolidating and rationalizing their holdings in the process, which contributes to increasing the productivity, income and tenure security of the rural poor.

The project is part of the national thrust to rationalize the use of water resources and to irrigate more arable land so as to intensify the use of limited land areas. The project management is seeking approval for the proposed use of surface and underground water from the National Water Resources Council and cannot proceed without it.

III. DESCRIPTION OF THE ENVIRONMENT

CLIMATE

Dependable records on rainfall, evaporation and temperature in the Bicol River Basin area are available at the Weather and Evaporation Rainfall Stations in Naga City and Pili, Camarines Sur. These stations are very near the project area.

At the Pili station, the average annual rainfall is about 2,196 mm. and varied widely from a low of 1,639 to a high of 2,949 mm. within a record period of two years (1956-1957). In general, there is no pronounced dry season but there is less rain from February through May with heavy precipitation coming during the months of July to December.

In terms of temperature, at the Naga City station the temperature distribution is generally uniform with an average of about 27°C for the record period, 1957-1962. The extreme high temperature of 37.2°C was recorded on May 12, 1912, and the extreme low of 13.7°C on February 9, 1916 and on March 20, 1918. The average annual evaporation within the same period is 1,647 mm. using an open rim pan having a pan co-efficient of 0.60 in measuring the evaporation rate.

The prevailing wind direction conforms with the three Philippine main airstreams or the seasonal winds. An average of about two tropical cyclones passes annually through the area, as observed at the Naga City Weather station.

Records at the Naga City station also show that the average relative humidity is 85 percent.

TOPOGRAPHY AND SOIL TYPE

The project area, as a whole, is on a slightly dissected broad alluvial plain. It is generally level with some rolling portions and sloping areas near creeks and rivers. There are some depressions which serve as drainage for run-off water. The area is dissected by creeks and canals with the Bicol River running along the western part of the project area and serving as the main drainage course for the entire area.

The topography of most of the area is fairly level with slopes ranging from 0 to 3 percent and land elevations varying from 4 to 12 meters above mean sea level (Figure 2). The lower elevations are located in the flood plain of the Bicol River Basin. Higher elevations, up to 20 meters above mean sea level, are away from the river and these areas have slopes that range from 3 to 8 percent.

The project area soils have been classified as sandy clay loam to clay loam soil types (Figure 3). These soils are considered to be very good for paddy rice and highly responsive to good management practices including adequate irrigation and drainage. Their consistency is generally plastic and sticky when wet, firm when moist and hard to very hard when dry. They are highly to moderately fertile.

The tillage of most of these soils for diversified crops would be difficult. The range of moisture content at which the soil can be plowed without destroying the soil structure is narrow. The high clay content and firm consistency indicate that draft requirements are high and favor the use of heavy equipment for tillage operations.

Tillage of the soils for irrigated rice is less difficult. They are easy to puddle. Losses of irrigation water due to deep percolation and losses of soil nutrients or fertilizers by leaching should be small.

Internal drainage is generally poor with permeabilities ranging from very slow to moderately slow (less than 0.48 m/day). Available hydraulic and infiltration measurements indicate that most of these soils may be better suited for the irrigation of rice than for the irrigation of other crops.^{1/}

HYDROLOGY

In evaluating the available water supply of the Bicol Region for the project area, data of the stream gaging station at Ombao, Bula, Camarines Sur, from 1963 to 1972 was used. The drainage area of the gaging station is about 1,630 sq. kms.

During the record period (1963-1972), the discharge of the Bicol River as recorded at Ombao, Bula, Camarines Sur, station ranged from an annual low of 288 cms. in 1969 to an annual high of 1346 cms. in 1967 with an annual average of 852 cms. Monthly flow ranged from a minimum of 3.5 cms. in April 1969 to a maximum of 354 cms. in November 1970. The average monthly flow is estimated at 71 cms. About 81 percent of the average annual flow occurs during the period from July to January.

The monthly flows of the Bicol River at the project pumpsites were estimated from the recorded data at Ombao, Bula gaging station. Monthly values are indicated in Table 1.

WATER QUALITY

Extensive conversion of the terrestrial environment from the indigenous forest and swamp land to agricultural and urban development use over a long period of time has resulted in corresponding changes in the aquatic environment. The nature of the substances which enter lakes and rivers from the surrounding lands is now primarily derived from man-made activities. The large inflow of pesticides, nutrients and domestic and other wastes has contributed to prominent changes in the water quality of the basin.

^{1/} Report, Comprehensive Water Resources Development Study, Bicol River Basin, TAMS-TAE Joint Venture and BRDP, Baras, Canaman, Camarines Sur Province, Philippines, August 1976, Vol. II, pp. II-42-45.

TABLE C-1

MEAN DAILY DISCHARGE IN LITERS/SECOND
BICOL RIVER, OMBAO, BULA, CAM. SUR

Y E A R	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1963	22,730	20,300	15,990	14,210	13,690	26,270	84,620	183,760	148,520	78,390	38,520	35,260
1964	29,540	17,990	15,340	14,380	15,000	24,510	66,860	57,830	93,240	222,920	131,660	256,160
1965	129,160	58,580	28,600	23,490	31,490	95,820	263,360	142,450	124,290	70,140	54,840	57,910
1966	207,415	79,045	44,295	24,595	27,025	56,520	151,520	no record	146,805	102,070	no record	
1967	285,670	99,510	59,990	25,700	22,560	21,220	39,820	129,690	169,320	134,000	298,700	59,410
1968	38,410	45,630	22,140	15,570	15,250	12,510	11,780	56,060	59,230	89,530	37,580	20,840
1969	15,240	13,370	7,870	3,530	6,360	11,410	26,340	27,430	26,850	26,200	33,120	90,080
1970	62,251	19,711	16,475	13,647	13,895	14,054	no record	no record		344,043	354,257	261,277
1971	71,523	38,689	no record	26,549	49,378	112,242	118,018	42,122	37,007	132,277	49,368	196,504
1972	251,588	12,064	44,619	28,415	19,736	49,485	131,508	61,991	88,695	28,028	16,511	35,258
AVERAGE	111,353	40,489	28,424	19,009	21,438	42,404	99,314	87,667	99,329	122,760	112,734	112,522

Source: TAMS-TAE, Comprehensive Water Resources Development Study Report, August 1976.

A preliminary investigation of organochlorine pesticide concentrations in the Bicol River Basin was conducted in April 1976.^{1/} Interpretation of the results is difficult since criteria for acceptable pesticide levels have not been established for Philippine waters. Comparison of the data with pesticide criteria for freshwater aquatic life in United States indicates that throughout the basin, existing levels of aldrin, dieldrin, endrin, DDE, DDT, heptachlor and lindane already exceed recommended maximum concentrations. (Tables 2 and 3). However, the data must be treated with considerable caution because they are based on only one grab sample at each station.

From 6 sampling stations in the Bicol River, 10 pesticides were analyzed. Three (Alpha BHC, Lindane, and o-p DDT) were persistent; the rest (Heptachlor, Aldrin, Heptachlor Epoxide, Dieldrin, o-p DDE, p-p DDE, and Endrin) were moderately persistent.

In many cases pesticide concentrations were way above the safe maximum limits. The o-p DDT concentrations in Baliwag Nuevo (0.65 parts per billion) and Milaor (0.56 parts per billion), both near the project area, exceeded the maximum limit of 0.002 part per billion by 0.653 and 0.562 parts per billion respectively.

Other data about chemical concentrations are displayed in Table 4. Even though the data are limited, the use of this water appears to be suitable for irrigation purposes.

Additional water quality problems arise from the inflow of untreated domestic sewage, which places a heavy organic load upon the aquatic ecosystem. Organic materials undergo bacterial decomposition with a subsequent reduction of the available dissolved oxygen in the receiving waters. When organic matter is present in sufficiently high quantities, the oxygen concentrations may be severely depressed, and harmful effects to aquatic life can result. Fish kills, reported in the vicinity of Baliwag Nuevo, Milaor, Malbong and other areas, may have been caused by the depletion of dissolved oxygen following organic decomposition activities. Also, it is possible that the kills may be attributed to the presence of high pesticides levels at a particular time of the year.

The presence of large amounts of human fecal wastes (from sewage runoff) in surface waters can lead to the spread of communicable water-borne diseases such as typhoid fever, cholera and hepatitis. Coliform bacterial counts of more than 30,000 per 100 ml. have been reported from the Bicol River by the National Pollution Control Commission.

^{1/} "An Ecological Inventory of the Bicol River Basin--with Particular Reference to Water Resources Development", Planning and Project Development Office, Department of Public Works, April 1976.

TABLE C-2

PESTICIDE CONCENTRATIONS AT SELECTED STATIONS
(ppb)

<u>Location of Sampling Station</u>		<u>Aldrin</u>	<u>Heptachlor</u>	<u>Heptachlor Epoxide</u>	<u>Dieldrin</u>	<u>O-P DDE</u>	<u>O-P DDT</u>	<u>P-P DDE</u>	<u>P-P DDT</u>	<u>Endrin</u>
Bicol River	Baliwag Nuevo	.019	.031	-	-	.125	.655	-	-	-
	Milaor	.025	.005	-	-	.383	.564	.196	-	-
Bicol Estuary	Balongay	.042	.036	-	.256	-	.128	.073	1.49	-

Source: "An Ecological Inventory of the Bicol River Basin--with Particular Reference to Water Resources Development," Planning & Project Development Office, Dept. of Public Works, April 1976.

TABLE C-3

Recommended Maximum Concentrations of Organochlorine Pesticides in Whole (Unfiltered) Water, Sampled at Any Time and Any Place.

<u>Organochlorine Pesticides</u>	<u>Recommended maximum concentration (ppb)</u>
Aldrin	0.01
DDT	0.002
TDE	0.006
Dieldrin	0.005
Chlordane	0.04
Endosulfan	0.003
Endrin	0.002
Heptachlor	0.01
Lindane	0.02
Methoxychlor	0.005
Toxaphene	0.01

Source: "Water Quality Criteria 1972, EPA.R3.73.033.March 1973, p.186

TABLE C-4

WATER QUALITY ANALYSIS

(PARTS PER MILLION)

Station: Bicol River

Location: Ombao, Bula, Cam. Sur

Date Collected: 11-25-74

Sample No.	pH	Chloride	Calcium	Hardness as CaCO ₃	CO ₃	HCO ₃	Total Alkalinity as CaCO ₃	TDS	Specific Conductance	Magnesium
1/4	8.1	24	44	170	5	107	95	150	230	14
1/2	8.0	25	46	145	5	102	91	176	270	7
3/4	8.25	30	42	160	5	116	103	185	285	13

WATER QUALITY ANALYSIS

(PARTS PER MILLION)

Station: Bicol River

Location: Ombao, Bula, Cam. Sur

Date Collected: 10-29-75

Sample No.	pH	Chloride	Calcium	Hardness as CaCO ₃	CO ₃	HCO ₃	Total Alkalinity as CaCO ₃	TDS	Specific Conductance	Magnesium
1/4	8.00	34	28	120	0	99	89	158	225	12
1/2	7.4	9	20	50	0	69	57	95	135	0
3/4	8.1	41	36	90	0	108	89	161	230	7

Remarks: The use of this water is suitable for irrigation purposes as per result of analysis.

Source: Bureau of Public Works
Water Resources Laboratory
Manila

GROUNDWATER

The project area has the most extensively developed water wells in the Bicol River Basin. This degree of development evidently stems from the need for water in the higher elevations of the project site, plus the availability of ground water at a shallow depth.

No drill logs of the wells have been kept. However, it was determined in personal interviews conducted with the well owners that the aquifer consists of thirty to forty meters of sand and gravel underneath a layer of about five meters of clay or sandy clay. Since some of the wells are in pyroclastics and others in alluvium, there are undoubtedly lithologic differences between wells. In either case, however, it appears that the aquifers are open aquifers recharging directly from the surface.

During the drilling of a test well at Barangay San Ramon the general picture of the shallow aquifer was confirmed. The drilling log showed 3 meters of clay and sandy clay over 30 meters of sand and gravel which is underlain by a layer of impervious clay and shale of unknown thickness. The well was stopped in the impervious material and was cased with 6-inch steel slotted pipe to a depth of 33 meters and gravel packed. The well was developed and test pumped for 24 hours at a rate of 144 gpm. A maximum drawdown of 1.7 feet was measured. From the recovery curve a transmissivity of 43,000 gpm per day per foot was calculated using the Jacob method.

Further ground water exploration is necessary to confirm the capacity of the shallow aquifer and to determine if a second aquifer exists under the aquifer encountered in the Barangay San Ramon test well.

AQUATIC ECOLOGY

The rivers and lakes of the Bicol River Basin are naturally rich in fish species. In addition they are enriched by migrants from the sea. Table 5 lists the species caught by local fishermen in the vicinity of the project area.

Few species can be considered true freshwater fishes. Only tabios, mullet, eel, and freshwater goby are known to be exclusively restricted to lakes and rivers.

Other species, though basically considered freshwater, migrate to the estuarine and the bay waters. Examples of these are milkfish and gourami which are also commonly caught in estuarine waters. Except for these 2 species, the rest of the species listed in Table 5 are found as far as the San Miguel Bay.

TABLE C-5

FISH AND SHELLFISH: BICOL RIVER BASIN

<u>Common Name</u>	<u>Scientific Name</u>
1. <u>FISH</u>	
Climbing Perch	Anabas testudineus
Freshwater Eel	Anguilla sp.
Milkfish	Chanos chanos
Silverbar Fish	Chironcentrus dorab
Freshwater Catfish	Clarias batrachus
Freshwater Catfish	Clarias sp.
Carp	Cyprinus carpio
Mojarra	Gerres filamentosus
Freshwater Goby	Glossogubius giurus
Slipmouth	Leiognathus sp.
Gray Snapper	Lutianus argentimaculatus
Silver Spotted Gray Snapper	Lutianus argentimaculatus
Tarpon	Megalops cyprinoides
Sinarapan or Tabios	Mistychthys luzonensis
Mullet	Mugil dussumierri
Mullet	Mugil sp.
Pike Eel	Muraenesox cinereus
Striated Murrel or Mudfish	Ophicephalus striatus
Gourami	Osphronemus gourami
Large Mouth Croaker	Otolithus argenteus
Four-lined Grunt	Pelates quadrileneatus
Spade Fish	Scatophagus argus*
Swamp Eel	Symbranchus bengalensis
Tilapia	Tilapia mossambica
Plasalid	Trichogaster pectoralis
Goby	Glossogubius sp.
Anchovy	Steolephorus commersoni lacepede
Halfbeak	Hemiramphus balinensis
Snake Eel	
Common Slipmouth	Leiognathus equulus
2. <u>SHELLFISH</u>	
Freshwater Snail	
Oyster	
Freshwater Clam	Neptunus Pelagicus
Mussels	Mystilus smarodinus
Blue Crab	Neptunus pelagicus
Crab	Scylla serrata
Shrimp	Peneaus sp.
Shrimp	Peneaus monodon
Very Fine Shrimp	
Freshwater Prawns	Macrobranchum rosenbergi

*Endangered species

Source: "An Ecological Inventory of the Bicol River Basin--with Particular Reference to Water Resources Development, "Planning and Project Office, Department of Public Works, April 1976.

Although introduced, carp, tilapia, and gourami currently predominate the lakes and rivers of the Basin, heavily offsetting the natural stocks. According to local fishermen, these species comprise about 80 percent of their usual catch.

Chief invertebrates in the Bicol River are saltwater shrimp, freshwater prawns, clams, mussels and snails.

VEGETATION

The project area is basically a monoculture agricultural ecosystem. Approximately 80% of the total land area is cultivated to rice. Lands not used for agricultural purposes, other than those used for settlement and roads, are generally covered with cogon (Imperata cylindrica) and talahib (Saccharum spontaneum) grasses. Along the margins of the Bicol and Anayan Rivers and the Hamoraon creek, thin vegetation strips are composed chiefly of guinea grass (Panicum maximum), Kawayan (Bambusa sp.), cogon (Imperata cylindrica), and some annual herbs and shrubs. The banks of the Bicol River at this point are about 8 meters high, indicating the upriver characteristic. Soft banks have eroded where only grass serves as protection.

WILDLIFE

Wildlife species fairly represented throughout the Basin include lizards, snakes, birds and mammals. Those species observed or reported in the vicinity of the project area are listed in Table 6.

Uncultivated areas within the project comprise 14% of the total land area and support many of the lizards and birds reported in the relevant tables.

TABLE C-6

REPTILES, BIRDS AND MAMMALS: BICOL RIVER BASIN

<u>Common Name</u>	<u>Scientific Name</u>
1. <u>Reptiles</u>	
Land Turtle	Cyclemys sp.
Flying Lizard	Draco sp.
Gecko	Gekko gekko
House Lizard	Hemidactylus sp.
Monitor Lizard	Varanus sp.
Boiga	Boiga dendrophilis
Dryophis	Dryophis prasinus
Cobra	Naja naja
Python	Python reticulatus
Pit Viper	Trimeresurus sp.
Typhlos	Typhlos jagorii

2. Birds

Kingfisher	Alcedinidae
Kingfisher	Halcyon sp.
Wandering Tree Duck	Dendrocygna arcuata
Cattle Egret	Bubuleus ibis
Heron	Egretta sp.
Large-billed Crow	Corvus macrorhyncus
Philippine Falconet	Microhierax erythogony
Watercock	Gallicrex cinerea
Red Jungle Fowl	Gallus gallus
Mannikin	Lonchura sp.
Rail	Rallus sp.
Snipe	Gallinaga megala
Philippine Horned Owl	Bubo philippinensis
Spotted Button Quail	Turnix ocellata
Grass Owl	Tyto longimembris

3. Mammals

Short-nosed Fruit Bats	Cynopterus sp.
Fruit Bats	Pteropus sp.
Housebats	Scotophilus sp.
Deer	Rusa sp.*
Wild Pig	Sus celebensis philippinensis
Palm Civet	Paradoxusus philippinensis
Monkey	Macaca philippinensis

*Endangered species

Source: "An Ecological Inventory of the Bicol River Basin--with Particular References to Water Resources Development," Planning and Project Development Office, Department of Public Works, April 1976.

HISTORICAL AND ARCHAEOLOGICAL SITES

Within the project area, there are no archaeological, historical or paleontological sites.

VECTORS AND PUBLIC HEALTH

Communicable, deficiency, enteric, metabolic and respiratory diseases are prevalent human diseases in the area. Spread of these diseases can be traced to improper sewage and solid waste disposal, inadequate treatment of domestic water supply, lack of health education and sanitary practices of the inhabitants, and inadequate health facilities and services. Disease outbreaks, especially of typhoid fever, often accompany flood conditions when the contaminated river water enters drinking water supplies.

Regarding communicable vector-transmitted disease, the evidence indicates that schistosomiasis (or bilharzias) is virtually absent from Bicol River Basin at the present time, but it is well known in the outlying areas of Sorsogon (200 kms. to the East).^{1/} Oncomelaria quadrasi, the snail vector of schistosomiasis, is not known to occur in the Bicol River Basin, but surveillance will be maintained in order to prevent its introduction and subsequent spreading.

Cases of malaria have been reported in the Bicol River Basin, but none reaching epidemic proportions. High incidence areas, however, are found in Tinambac and Siruma, northeast of the river basin. Generally, most malarial infections reported in the basin proper, such as Naga City and Buhi, were actually incurred elsewhere. Normally exposure to this disease is confined to local, upland areas where clean, flowing streams exist and provide the necessary habitat for the anopheline vector (chiefly Anopheles minimus).

POPULATION

The total population residing in the project area is around 4,680, or about 740 families.

No reliable figures exist on the crude birth and death rates within the project area itself. The average rate of crude population growth for Camarines Sur Province between 1960 and 1970 was 3.3% annually. However, with an average out-migration rate of 1.8% the average annual rate of net population growth was only 1.5%.

LAND USE PATTERN

Within the Bicol Basin proper, of which the project area is a part, agricultural activities (including the kaingin or slash-and-burn farming), logging operations, grazing and general urban development have already supplanted more than 80% of the indigenous vegetation. Existing and proposed land use estimates indicate that only around 13 to 14% of the more than 300,000 hectares of land in the basin remains (and will remain) in its native state. Presently, these areas are principally confined to the margins of lakes and water sources and to upland portions of the basin outside the proposed project area.

The project area itself is 2,300 hectares, of which agricultural activities are the dominant use. Out of the 1,870 hectares of cultivable land, only 653 hectares are presently irrigated, although

^{1/} Hairston, Nelson G., and Dr. Alfredo T. Santos, Jr., Report on Schistosomiasis and the Development of the Bicol River Basin, Comprehensive Water Resources Development Study, Vol. XXIV, TAMS/TAE and BRBC, Camarines Sur, August 1976.

poorly, and the rest depends solely on rain water for irrigation. Of the remaining area, 68 hectares are used for human settlement, 36 hectares for roads and canals and the remainder, 315 hectares, are uncultivated.

Most residential houses are (or were, in the case of Barrio San Ramon) located in the lower elevations of the project area, exposed to frequent flooding during heavy downpours. Some of the residential areas can be reached by dirt roads, while others are not reached by any road.

Service facilities such as health centers, potable water supply systems, electricity and parks are not available. There is no school building in one of the seven barangays.

ECONOMIC DEVELOPMENT

The project is located in the center of an economically depressed region characterized by:

1. a declining level of production and real income per capita, already the lowest of all eleven Philippine regions;
2. high rates of unemployment and underemployment;
3. serious maldistribution of income;
4. a high (3.3%) rate of natural population growth;
5. a high rate of outmigration (mostly to metropolitan Manila);
6. low rates of savings and investment;
7. a low ratio of manufacturing activity; and
8. physical and economic isolation.

IV. ENVIRONMENTAL IMPACTS OF PROPOSED ACTION

INTRODUCTION

Since the Bulabul-Minalabac project is confined to a small area and will essentially only intensify existing land use activities, its overall impacts on the environment will be limited. Some of the impacts will be beneficial and others adverse. Still other impacts are problematical, that is the effects are unknown or are not completely understood. In order to more fully and thoroughly estimate environmental impacts, AID/Manila is sponsoring a basinwide Environmental Assessment during 1977. This basinwide environmental assessment will examine the environmental impacts of all AID and proposed other donor projects. These projects include extensive irrigation facilities, water storage compounds and diking to prevent salinity intrusion. The major issues to be addressed in this basinwide assessment are the effects of changes in water quantity and quality on aquatic life and the effects of concentrated human settlement on water supply and waste disposal.

CLIMATE AND AIR QUALITY

.. No measurable effect in climate resulting from the project development is foreseen.

Nor is there any anticipated long-term effect on air quality. Dust created by construction activities could temporarily affect air quality. However, no heavy traffic, which could adversely affect air quality, will be generated by the project-funded farm and service access roads because these roads will be lightly travelled.

SOILS

Land leveling of some undulating or sloping portions of the project area is required to maintain an efficient distribution of irrigation water. Also some higher elevation areas will be scraped and levelled for homesites.

This process can have a negative impact. Disturbed top soils, unless properly replaced, can decrease the fertility of the soil.

The earthworks and fresh borrow pits created during the construction will temporarily result in greater soil erosion and turbid water conditions when it rains. Since most of the construction activity is scheduled during the dry season, this unfavorable effect should not be too serious.

HYDROLOGY

Project related pumping would have a noticeable effect on the flow of the Bicol River through the Bula area. The average one month low-flow value for a five-year return period is 6.7 cubic meters per second (cms.) and 9.0 cms. for a three-year return period. The maximum gross drawdown would be 3.6 cms., if all six pumps were operating at the same time. The maximum net drawdown would amount to only 2.8 cms. because under normal conditions 20% of the withdrawal would ultimately drain back into the Bicol River. Thus the drawdown would be approximately 40% of the low-flow value for a five-year return period and 30% of the low-flow for a three-year return period.

This could, if unmitigated or unanticipated, have a limiting effect on riverine transportation from Bula to Naga City during low-flow periods. It could also affect water quality and aquatic life, which effects will be discussed later in this chapter.

The provision of new or improvement of old roads will have a significant impact in the form of drainage problems caused by rapid water run-off. The extent of this impact will vary with the size of roads, soil type, provisions for disposal of run-off water and hydrology. Drainage, culverts, bridges and other supportive structures are included in the plan to facilitate and in fact to improve the drainage network of the area.

WATER QUALITY (EXCEPT SALINITY)

Turbidity levels in the Bicol River could increase during the construction period due to spillage. Also, when it rains during this time, there will be an increase in soil erosion and thus an increase in stream turbidity. Minimal adverse impact on aquatic ecology is anticipated because the construction period will be very short.

The concentration of pesticides and fertilizers will increase downstream from the project due to the improvement in farm management and second cropping. At present there is no quantitative information about how this increased use of pesticides and fertilizers will actually affect water quality parameters.

WATER QUALITY (SALINITY INTRUSION)

The Bicol River Estuary during low fresh-water periods is at times brackish and unsuitable as an irrigation water supply. Field surveys of the salinity intrusion problem indicate that, during high tides, low concentrations of salt water reach as far as 20 kilometers upstream in the Bicol River when river discharge falls as low as 17 cubic meters per second (cms.). Apparently, when the Bicol River discharge falls below 17 cms., high tides can bring low concentrations of salt water above river kilometer 20.

These periods of deeper salt intrusion are of short duration, however, since the saline water is eliminated in the next phase of the tidal cycle. Under these conditions, the intrusion of saltwater will not be a serious deterrent to agricultural development.

An analysis of the fresh water flow and salinity intrusion data and correlations derived by the TAMS-TAE consultants indicate the current extent of high tide salinity intrusion may reach as far as 29 to 33 kms. upstream from the mouth of the Bicol Estuary (as measured along the natural bed of the Bicol River) during one-month average low-flow periods recurring every two and three years, or to a point just 1 to 5 kms. downstream from Naga City. Assuming the six project pumps were operating simultaneously at full capacity, with 20% of the water returned, the freshwater flow of the Bicol would be reduced by 2.77 cms. This could result in salinity intrusion reaching 5.4 to 6.6 kms. farther upstream than at present during average low-flow months recurring every 2 or 3 years, to a section of the river just above Naga City. For the extreme low-flow periods recurring every 5 or 10 years the present extent of salt intrusion reaches 38 to 47 kms. upstream, respectively, and it could be increased by project pumping to points 7.1 to 8.8 kms. farther upstream. (See Table 7)

GROUNDWATER

The project calls for underground water sources to be utilized to irrigate 23% of the cultivated lands. Little is yet known for certain about the flow and permeability characteristics of the shallow aquifer or whether a deep, artesian aquifer exists and can be tapped for irrigation purposes. A test well at Barangay San Agustin was just completed, in March 1977, and it has penetrated a deep aquifer at 180 meters extending down to 240 meters. Though the prospect is unlikely, withdrawal for irrigation may have an adverse impact on the availability of water supply for residential purposes. The suction hand pumps would be inadequate if irrigation requirements deplete the shallow wells.

Human waste generated by residential activities may adversely affect the quality of groundwater, which is the source of domestic water supply. Each family will be provided materials for an inexpensive waste disposal system, most likely a water sealed pit-privy. Domestic water supplies will be obtained from shallow wells driven 20 to 30 feet deep. Contamination of water supplies is possible in at least three of the barrios near the river. During periods of heavy rainfall, the water table is found 10 feet or less below the surface in low elevations. In this situation the wastes from the pit privies might contaminate the groundwater.

TABLE C-7

**Maximum Effect of Bula-Minalabac Project
Drawdown of Bicol River Flow on Extent of Salinity Intrusion
During High Tides in Dry Season**

A. Neap Tides (.74-.84 meter stages)

<u>(1)</u> Average Bicol Low Flow at Ombao, Bula (cms)	<u>(2)</u> Est. Extent of Current Salini- ty Intrusion (km)	<u>(3)</u> Est. Extent of Salinity Intru- sion with 2.77 cms Drawdown (km)	<u>(4)</u> Est. Increase in Extent of Salinity Intrusion Due to Maximum Project Drawdown (km)
<u>2-yr. low ave.</u>			
1 mo. 11.0	26.1	31.8	5.7
2 mo. 12.0	24.3	29.6	5.3
3 mo. 13.0	22.6	27.6	5.0
<u>3-yr. low ave.</u>			
1 mo. 9.0	30.1	36.7	6.6
2 mo. 10.0	28.0	34.2	6.2
3 mo. 11.0	26.1	31.8	5.7
<u>5-yr. low ave.</u>			
1 mo. 6.7	35.5	43.3	7.8
2 mo. 7.5	33.5	40.9	7.4
3 mo. 8.6	31.0	37.8	6.8
<u>10-yr. low ave.</u>			
1 mo. 3.3	45.3	55.3	10.0
2 mo. 3.8	43.7	53.3	9.6
3 mo. 4.4	41.9	51.1	9.2

TABLE C-7 (cont.)

B. Spring Tides (1.47 meter stage)

<u>(1)</u> Average Bicol Low Flow at Ombao, Bula (cms)	<u>(2)</u> Est. Extent of Current Salini- ty Intrusion (km)	<u>(3)</u> Est. Extent of Salinity Intru- sion with 2.77 cms Drawdown (km)	<u>(4)</u> Est. Increase in Extent of Salinity Intrusion due to Maximum Project Drawdown (km)
<u>2-yr. low ave.</u>			
1 mo. 11.0	28.8	34.2	5.4
2 mo. 12.0	27.0	32.2	5.2
3 mo. 13.0	25.4	30.2	4.8
<u>3-yr. low ave.</u>			
1 mo. 9.0	32.6	38.8	6.2
2 mo. 10.0	30.6	36.5	5.9
3 mo. 11.0	28.8	34.2	5.4
<u>5-yr. low ave.</u>			
1 mo. 6.7	37.7	44.8	7.1
2 mo. 7.5	35.8	42.7	6.9
3 mo. 8.6	33.5	39.8	6.3
<u>10-yr. low ave.</u>			
1 mo. 3.3	46.7	55.5	8.8
2 mo. 3.8	45.2	53.8	8.6
3 mo. 4.4	43.5	51.8	8.3

Source: Calculated from Bicol River Basin Comprehensive Water Resources Development Study Report, TAMS-TAE Joint Venture and BRBDP, Baras, Canaman, Camarines Sur Province, Philippines, August 1976, Vol. III, Table A-5, Figure A-142, and Appendix D. Estimated maximum drawdown of 2.77 cms at project site is based on assumption of two 24-inch, two 20-inch and two 12-inch pumps operating at full capacity simultaneously with 20% of the water from project irrigation returned. Extent of salinity intrusion is maximum distance above mouth of Bicol Estuary, as measured along the natural river bed, penetrated by saline water. Calculations here are based on measurements taken at high water slack periods at 7 stations along the Bicol River and their resulting correlations.

AQUATIC ECOLOGY

The increased concentration of pesticides due to irrigation activities may be detrimental to aquatic life. Detrimental effects of pesticides upon aquatic life are exhibited in two ways. Sudden exposure to high levels of pesticides often results in acute mortality, while a prolonged contact of non-lethal amounts may reduce efficient reproductive and development activities. Data are not available at this time to estimate the quantitative effects on aquatic life found in the Bicol River.

The change in the salinity gradient due to water withdrawal for irrigation may limit the habitat available to the freshwater fishery. If the reduction in river flow permitted a deeper intrusion of saline water during high tides, fresh water varieties might be forced somewhat farther upstream.

VEGETATION

Implementation of the project will result in the cultivation of an additional 200 hectares. This area is now primarily covered with cogon and talahib grasses.

WILDLIFE

The utilization of more project area land for roads and cultivation will eliminate a small amount of habitat. This modification will have a non-perceivable effect on the lizards and birds inhabiting the project area.

HISTORICAL AND ARCHAEOLOGICAL SITES

There are no effects because there are no sites.

VECTORS AND PUBLIC HEALTH

The roadway and related construction activities may open up new pathways for disease vectors affecting humans, plants or animals -- for example hoof and mouth disease. Surveillance for the introduction of new diseases will therefore be necessary.

The increased residential concentration may result in increased incidence in communicable, deficiency, enteric, metabolic and respiratory diseases. Spread of these diseases can be traced to improper sewage and solid waste disposal, inadequate treatment of water supply, and lack of health education and sanitary practices. These diseases may be increased by the concentration of project area residents into the seven barrios.

Since schistosomiasis is unknown in the area, there is no anticipation that it will now occur in the project area as a result of the increased irrigation of cultivable land.

As the proposed drainage system reduces periodic flooding, the population of rats and other pests will probably increase. This change will require greater pest control in order to prevent intensified crop damage and the potential for human disease. In addition, the intensification of the present monoculture of rice will increase the area's susceptibility to rice diseases and pest infestation since the checks and balances among organisms of a more diversified ecosystem will be virtually absent.

POPULATION

The project area population is anticipated to double as a result of the project. Many of the farmers who till land in the project area presently reside outside of it; and, as a part of the project, they will be invited to move into one of the 1,230 homelots being planned in the seven project area homesites. When all 1,230 homelots are occupied, the total population in the project area will increase from around 4,700 to approximately 7,800, assuming the average family size at present (6.33).

LAND USE PATTERN

The major long term land use impact of the project would be a shift from rainfed farming to irrigated agriculture in new areas to be served by the system. Likewise, in the presently irrigated areas, year-round irrigated farming will also be practiced compared to the existing practice of partial dry season service. Lastly some new land, 200 hectares, would be brought under cultivation.

The other significant land use change would be the concentration of residences and development of sites for parks, chapels, etc. The total area used for human settlement activity would increase from 68 to 116 hectares. Concentration of activities will have a positive effect in that community facilities and services will be more accessible. In addition, the homesites will be located in elevated areas not subject to flooding. One potentially negative effect is that the homesites might become concentrations of slum dwelling.

V. AVOIDABLE ENVIRONMENTAL IMPACTS

INTRODUCTION

Some of the adverse environmental impacts listed in the previous chapter can be minimized by control measures. Others can only be partially controlled, or if they could be controlled, the cost of control is prohibitive. Others cannot be avoided. This chapter will describe avoidable adverse impacts and the next chapter will describe unavoidable adverse impacts. Since some adverse impacts are only partially avoidable, they will be described in both chapters.

SOILS

The earthworks and fresh borrow pits created during the construction will temporarily result in greater soil erosion. Since most of the construction activity is scheduled during the dry seasons, this unfavorable effect should not be too serious. Upon project completion, the borrow pits will be leveled (except those to be converted to permanent fishponds) and their topsoil returned. Borrow pits, banks of roads, canals and drains built by the project will be reseeded in hardy grasses. Wild vegetation strips along natural drainageways will be preserved to help filter overland runoff and to provide habitat for the characteristic wildlife of the area.

Land leveling of some undulating or sloping portions of the project area will disturb topsoils, which will decrease the fertility of the soil. However, the adverse effect will be minimal because the topsoil will be pushed to one side before leveling and returned to the field afterwards.

Homesites will be located in elevated areas not subject to flooding. As a result, some hilly areas will be scraped and leveled. This could result in the loss of vegetation and topsoils. However, such losses can be minimized by proper supervision during the construction stage. Topsoil will be saved and returned to its original site and revegetation will be initiated as soon as the populace is resettled. Trees, shrubs and grasses can be planted, especially fruit trees, and backyard gardening will be encouraged.

HYDROLOGY

While water withdrawal for irrigation will result in a noticeable drawdown of Bicol River flow, this effect will be mitigated by water storage reservoirs upstream from the project area. Three lakes are planned as water storage reservoirs to maintain a higher continuous flow in the Bicol River during the dry season. The project will be completed in 1982, the first year of operation for all six river pumps for the Bula project.

The use of a rotational system of irrigation rather than continuous flow promotes the efficient use of dry season water resources. Although this system is more expensive to install, it is an acceptable incremental cost because it conserves on water and power requirements of the pump sites by delivering the right amount of water at the right time.

WATER QUALITY (EXCEPT SALINITY)

Some increased siltation and turbidity will be unavoidable, but their extent will be reduced as much as possible by concentrating construction work during the dry season, by providing adequate drainage facilities where structures disrupt or cross natural drainage patterns, by providing for the revegetation of affected areas, road and canal embankments and by cover cropping, terracing, contouring, and soil stabilization. The banks of canals and exposed slopes can be vegetated by quick, fast-growing annual grasses. These could be disseminated above ripraps, especially along slopes and embankments which could be substantially affected by erosion caused by moving water. When these grasses have already grown to maturity, they could be sprayed with a safe contact herbicide. The dead plant bodies could then provide a mulch that could be over-seeded with perennial grasses.

While the increase in runoff of pesticides and their resultant concentrations in the Bicol River cannot be controlled at this time, the government is acting to minimize potential adverse effects. Through the Masagana 99 Rice Production Program, the government sells the farmer a package of technology. This package includes only the necessary amount of pesticides and directions for appropriate doses. The more persistent pesticides are not included in this package. In addition, two future developments may either reduce their impact or reduce the need for pesticides. One development is the previously mentioned water storage reservoirs. Releases from the reservoirs will increase the average monthly dry season flow, which will reduce the concentration of chemicals in the Bicol River. However, the increased flow cannot negate the accumulation of persistent pesticides in aquatic organisms. The other development is the current national effort to upgrade agricultural research capabilities. The research emphasis on biological methods of pest control should result in measures which reduce the need for the use of pesticides.

WATER QUALITY (SALINITY)

A small increase in the extent to which saline water intrudes up the Bicol River during high tides in the dry season is an unavoidable effect of using surface water for irrigation purposes. However, the potentially adverse effect on irrigation can be avoided by properly timing water withdrawal for irrigation in the lower reaches of the river. Salinity intrusion is and will continue to be limited to periods of high tides during the dry season flow of the river. The salt completely disappears during low tides with no "shadow" effect. Water withdrawal for irrigation can occur during this period. This practice avoids soil and crop damage.

In addition, the previously mentioned water storage reservoirs will maintain a higher continuous flow in the Bicol River during the dry season. The increased flow will more than reduce the extent of salinity intrusion due to the Bula project.

GROUNDWATER

Withdrawal of groundwater for irrigation may limit the availability of groundwater as a source for domestic water supply. However, this situation is unlikely to occur, since additional groundwater withdrawal

for irrigation will not be permitted in the project area unless the groundwater survey and analysis shows that sufficient water will remain available for domestic water supply.

There is also some possibility of contaminating groundwater with wastes from the pit privies. However, this danger is minimized by requiring each homestead to install a water-sealed pit privy and by relocating most houses to areas of higher elevation, where there is a larger band of filtration between pit latrines and the groundwater table.

VECTORS AND PUBLIC HEALTH

An intensification of rice monoculture within the project area will also occur because one crop of rainfed rice will become two or more crops of irrigated and rainfed rice annually. This will exacerbate the problems of pest control generally associated with monoculture cropping patterns, which will increase the importance of enhancing the national and regional agricultural research capabilities to develop biological methods of pest control. Also, the problem will support the need for different rice strains, which are not so easily subject to pest infestations.

The greater concentration of people in selected homestead areas will increase the concentration (but not the total volume) of sewage and solid waste materials. If not properly handled and disposed, this could result in a higher level of contamination of the drinking water and living environment for some households. However, each family will be provided materials for and will be expected to construct an inexpensive waste disposal system, most likely a water-sealed pit privy. Domestic water supplies are obtained from shallow wells with a suction hand pump, driven 20 to 30 feet deep. To prevent gross contamination of groundwater, the bottom of pit privies must be at least 10 feet above the water table, and shallow pump wells must be at least 50 feet lateral distance from pit privies and other source of contamination.

Another mitigating measure is moving a large number of households out of the low-lying, frequently flooded locations to higher ground. One advantage of the move is that on the higher ground the water table is deeper. This will permit a larger band of filtration between pit latrines and the household water source. The other advantage is that all of the homesteads will be above the normal flood level. They will no longer suffer from the widespread fecal contamination that occurs when floodwaters simultaneously inundate pit latrines, shallow pump wells and living and playing areas.

In addition, through its health education and organizational components, this project and the proposed Bicol Integrated Health, Nutrition and Population Project will increase project area residents' awareness of the importance of sanitation and preventive health measures and will enhance their individual and organizational capacity to deal with such problems. These project components would be more difficult if the area residents were to remain in scattered locations. Area residents will also have more convenient access to health, education and other social services in an organized barangay than they have at present in their scattered locations.

VI. UNAVOIDABLE ENVIRONMENTAL IMPACTS

The adverse environmental effects which cannot be avoided would be as follows:

SOIL

Despite precautions some degree of erosion would occur during land levelling and construction of pumpsites, canals and ditches.

WATER QUALITY (EXCEPT SALINITY)

Some increased siltation and turbidity will be unavoidable, particularly during the construction period.

An increase in the runoff of fertilizers and pesticides and their resultant higher concentration in the Bicol River are adverse effects of encouraging farmers to plant two or more crops annually instead of just one and to utilize modern cultivation practices with high yield rice varieties, as planned in this and similar projects. In part these are unavoidable effects of modernizing agriculture and of attempting to provide for the food and fiber requirements of a growing population. They are problems not merely of this project but of the development needs and strategy of the Bicol Basin and, indeed, of the nation as a whole.

WATER QUALITY (SALINITY)

A small increase in the extent to which saline water intrudes up the Bicol River during high tides in the dry season is an unavoidable effect of using surface water for irrigation purposes.

AQUATIC ECOLOGY

Degradation of aquatic habitat through silting destroys stream bed organisms, renders spawning gravels less permeable, destroys food organisms and results in residues in fish flesh that can be harmful or objectionable to consumers. This type of degradation, while unavoidable, will be minimal in this case because of the limited amount of erosion that will result from construction and the short period of actual construction of this project.

There will probably be some initial adjustment of the habitat of fresh water fish because of the change in the salinity intrusion. This change will be corrected by water releases from the storage compounds planned for 1982.

The most potentially serious adverse effect is the exposure of aquatic life to higher levels of pesticides. Sudden exposure to high levels of pesticides often results in acute mortality, while a prolonged contact of non-lethal amounts may reduce efficient reproductive and development activities. Data are not available at this time to estimate the quantitative effects on aquatic life found in the Bicol River.

LAND USE PATTERN

The use of land for agricultural activities would increase by 200 hectares. The major effect of the project is to intensify the present irrigation activities.

The other major change in land use would be the concentration of residences and sites for parks, chapels, etc.

VII. SHORT AND LONG TERM ENVIRONMENTAL USE

The only significant short versus long term trade off is the increase in rice production gained by potentially disrupting aquatic life and surface water supply for domestic activities. The irrigation improvements would increase annual rice production from 2.9 tons/hectare to 9.0 tons/hectare. Increase application of pesticides is one factor contributing to the increase in rice production.

The increased application of pesticides will result in increased pesticide concentrations in the Bicol River. If these pesticide concentrations come to exceed water quality standards, they could have the previously described detrimental effects on aquatic life. A decrease in aquatic life would have serious nutritional consequences for the inhabitants of the region because fish and shellfish are their principal source of protein. In addition, the increase in pesticide concentration may render surface waters unsuitable sources of domestic water supply.

Although very unlikely, the clustering of residential activities may result in a short term gain achieved at a long run environmental cost. The resettlement program is expected to result in each family receiving better health service, education, transport and other social and economic services. However, the program will result in a concentrated waste disposal problem, which, if handled incorrectly, could result in serious public health problems. This adverse long-run consequence is highly unlikely because of the funds available to install adequate waste disposal and water supply systems and training programs in preventive health and sanitation methods for project area residents.

VIII. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF NATURAL OR CULTURAL RESOURCES

The irreversible commitments of resources will be the common and select borrow material used for access road and canal construction.

IX. ALTERNATIVES TO EXISTING PROJECT

NO PROJECT

While having no project would avoid some of the adverse effects, its deletion would abandon the project area to a far less desirable future of ignorance, poverty, overpopulation, malnourishment, disease, under- and unemployment and social unrest. Without positive action to the contrary, current trends will continue and the adverse effects of those trends will intensify. This alternative is clearly not acceptable.

POSTPONE PROJECT

Postponing the project pending further study would gain little and allow further deterioration of the current situation. The loss of bureaucratic momentum alone could be devastating to the successful completion of the project. Any further delay would cause more disappointment among area farmers, whose interest and participation in the project have already been aroused, and thus result in more difficult social problems for the government. The area has been noted for social and political unrest in the past and the farmers are already skeptical about the desire and ability of local government leaders to serve their interests.

Enough is known to plan a suitable development strategy and to implement it with confidence. Steps are presently underway to fill in the crucial gap in knowledge about the availability and characteristics of an underground water aquifer. The portion of the project dependent on that source of water will be undertaken only if the ground-water survey presently underway proves it to be available.

OTHER ECONOMIC ALTERNATIVES

Since the land area involved is more suitable for the cultivation of wet rice than of any other crop of comparable economic value, there are no more economically attractive alternatives to the development of dry season irrigation facilities. No other alternative could produce a similar magnitude of benefits in terms of the value of incremental production or of the incremental income and employment potential for individual farmers.

WATER USE

The rotational block irrigation design conserves both on the use of water and therefore on the use of energy to pump the water. Continuous flow designs would require more of both and would result in an even greater drawdown of dry season water flow in the Bicol River, thus increasing the extent of salinity intrusion.

An increased use of groundwater to conserve on Bicol River water would raise costs, since the groundwater must be pumped from lower elevations. As of this writing, the adequacy of the groundwater aquifer to serve the area for which it is planned is not yet certain.

Alternatively, to increase the use of Bicol River water for land presently designed for groundwater would increase costs due to the distance from the river and the elevation of those two areas. If the groundwater source proves inadequate for these two areas, the planned irrigation facilities will probably be dropped.

PESTICIDE USE

A complete ban on pesticide use would decrease the anticipated increase in yield by approximately 25 percent. A decrease of this magnitude is unacceptable to project area farmers and to a nation attempting to insure self sufficiency in rice production.

HOUSEHOLD LOCATIONS

Leaving farm households in their currently scattered locations rather than resettlement would reduce the concentration of human waste materials. However, it would also reduce the benefits to be derived from the land consolidation and irrigation aspects of the project. Many of the fields and canal designs would be disrupted by scattered homelots. It would also reduce the benefits to be gained by those households of residing in barangay clusters closer to various health, education, transportation and other social and economic services.

CENTRALIZED WATER SUPPLY

An alternative to the shallow pump wells for each household is a centralized system for each barangay. A centralized supply would consist of a deep well and a distribution system, either to each household or several key points within the barangay. The advantage of a centralized supply is that it could not be contaminated by wastes from pit privies. However, centralized systems are not being planned for the project area because of the prohibitive cost (three times the costs of shallow wells) and the difficulty of collective maintenance.

ENERGY USE

The project will use electric pumps which will be supplied by the Camarines Sur Electric Cooperative. The main source of its power will be the Tiwi geothermal generators, which do not require energy imports. Gravity-fed irrigation, eliminating the need for pumps entirely, is not feasible in this area. Both sources of dry season water--the Bicol River and the groundwater aquifer--are at lower elevations than the ricefields.

Labor intensive methods of construction, utilizing manual labor recruited mostly from project area residents themselves, will conserve on the use of imported petroleum energy during the construction phase.

X. INTERESTS AND CONSIDERATIONS WHICH OFFSET ADVERSE EFFECTS

Most of the adverse environmental effects discussed above will result from the construction of irrigation facilities and their use to intensify rice cultivation. Their combined environmental cost is small compared with the rice production and income benefits. (See Appendix A). The project will enable the nearly 8,000 residents of the area to work their way out of conditions of abject rural poverty due to low productivity on small, scattered parcels of land. The new level of income will permit a considerable increase in their quality of life and human dignity. It will also contribute to national goals of rural development, per capita income growth and domestic self-sufficiency in food production.

The other major adverse effect would result from resettling farm households from scattered locations into seven planned and organized rural communities of 150 to 200 families each. The additional problems of concentrated waste disposal are small compared with the expected gains from better health, education, transport and other social and economic services each family will enjoy. In addition, since many households will be moving from low-lying, frequently flooded areas onto higher ground, it is probable that the net sanitary environment will be better than before. It will certainly be better for a large number of poor families. Project-sponsored and subsequent efforts to educate and train residents in preventive health and sanitation methods should better prepare them to deal with whatever sewage problems remain.

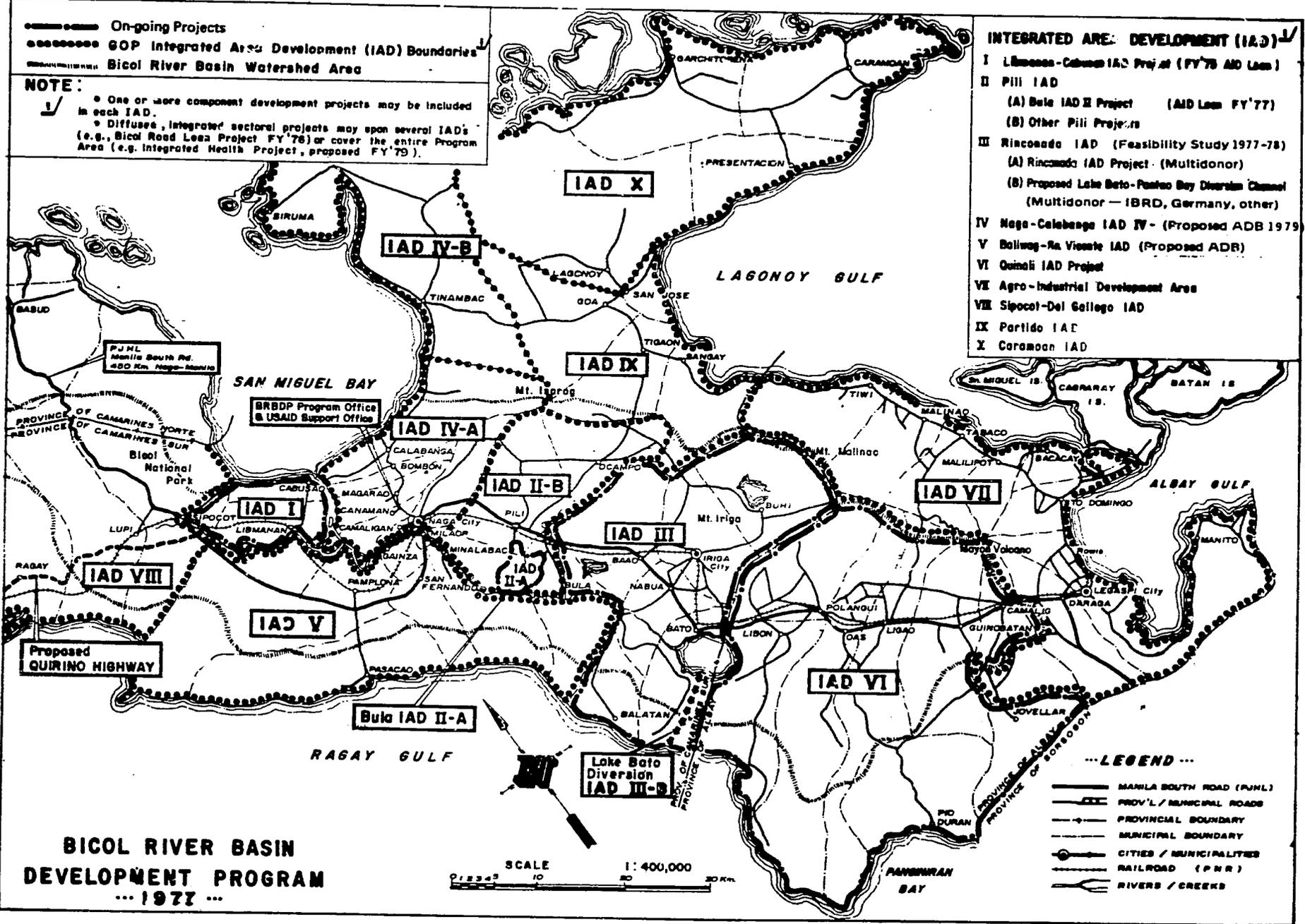
 On-going Projects
 GOP Integrated Area Development (IAD) Boundaries
 Bicol River Basin Watershed Area

NOTE:

- ✓ One or more component development projects may be included in each IAD.
- Diffuse, integrated sectoral projects may span several IAD's (e.g., Bicol Road Lessa Project FY'78) or cover the entire Program Area (e.g. Integrated Health Project, proposed FY'79).

INTEGRATED AREA DEVELOPMENT (IAD)

- I Linaoan-Cabanga IAD Project (FY'78 AID Loan)
- II Pili IAD
 - (A) Bula IAD II Project (AID Loan FY'77)
 - (B) Other Pili Projects
- III Rinconada IAD (Feasibility Study 1977-78)
 - (A) Rinconada IAD Project (Multidonor)
 - (B) Proposed Lake Bato-Panabo Bay Diversion Channel (Multidonor - IBRD, Germany, other)
- IV Naga-Calahanga IAD IV - (Proposed ADB 1979)
- V Boliwag-Ra Vieuste IAD (Proposed ADR)
- VI Omalil IAD Project
- VE Agro-Industrial Development Area
- VII Sipocot-Del Gallego IAD
- IX Partido IAD
- X Caromoon IAD



**BICOL RIVER BASIN
 DEVELOPMENT PROGRAM**
 ... 1977 ...

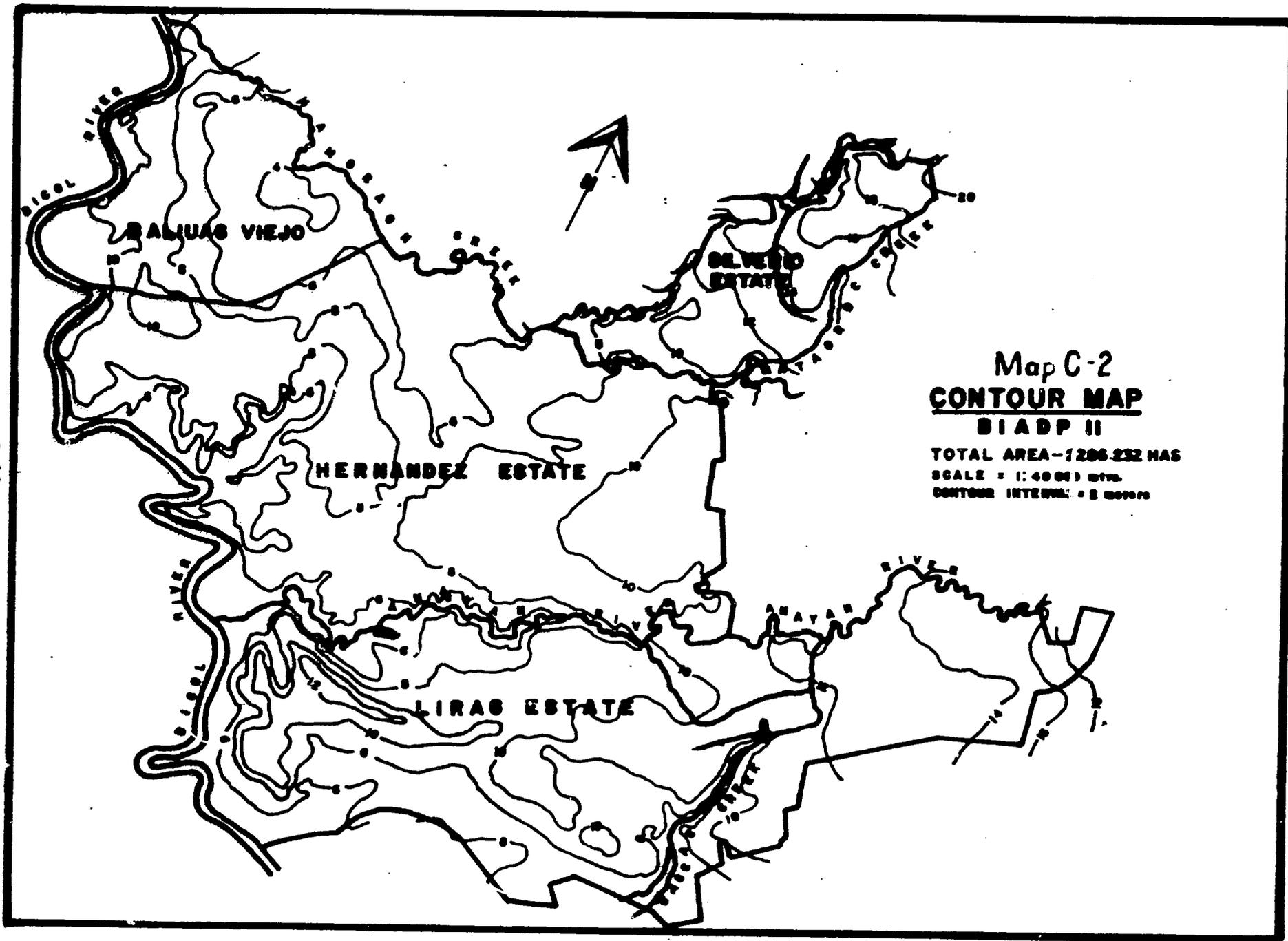
SCALE 1:400,000
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...LEGEND...
 MANILA SOUTH ROAD (P.N.H.)
 PROV'L / MUNICIPAL ROADS
 PROVINCIAL BOUNDARY
 MUNICIPAL BOUNDARY
 CITIES / MUNICIPALITIES
 RAILROAD (P.N.R.)
 RIVERS / CREEKS

C-37

Map C-1

C-38

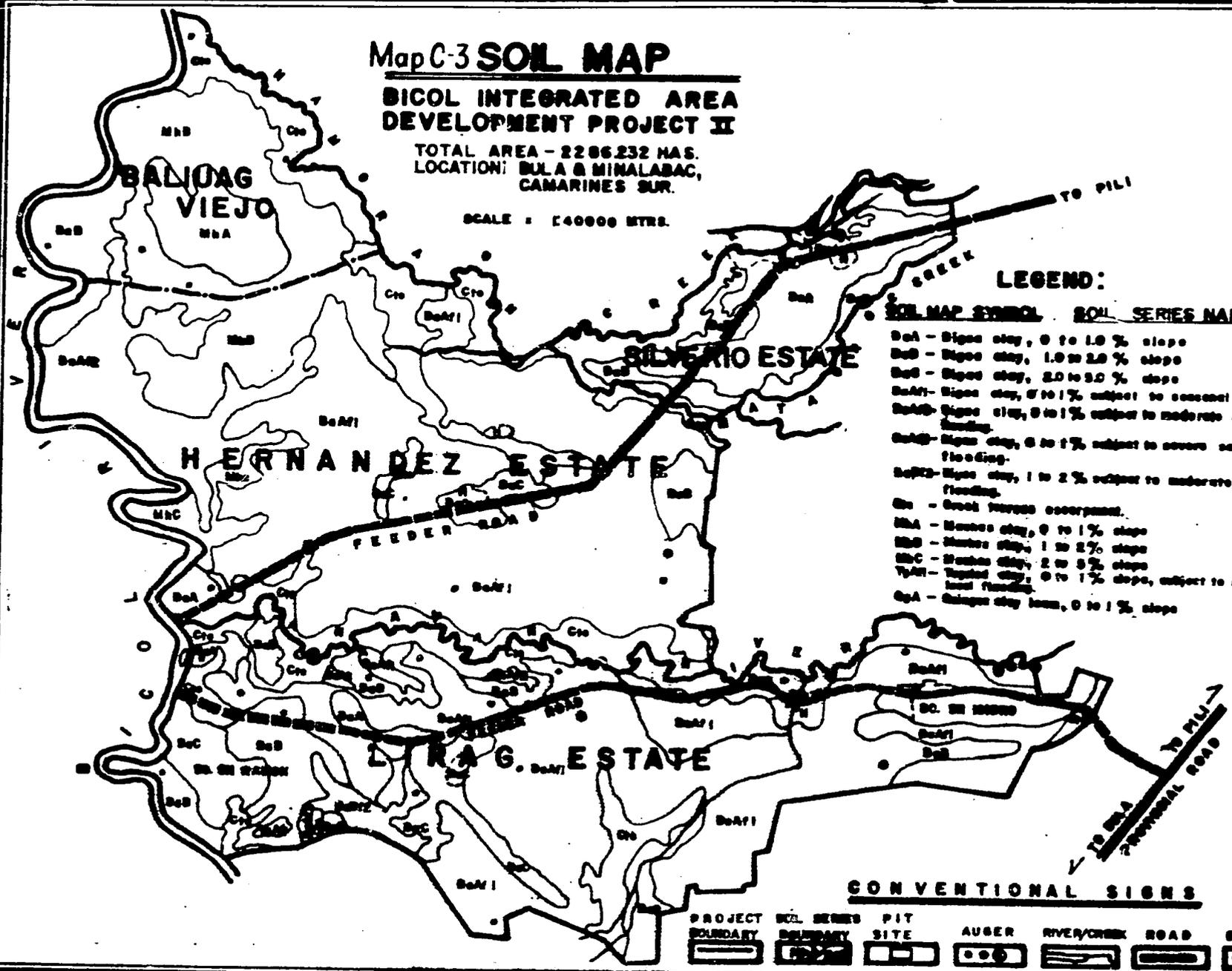


Map C-3 SOIL MAP

BICOL INTEGRATED AREA DEVELOPMENT PROJECT II

TOTAL AREA - 2286232 HAS.
LOCATION: BULA & MINALABAC,
CAMARINES SUR.

SCALE : 1:40000 MTRS.



LEGEND:

- | SOIL MAP SYMBOL | SOIL SERIES NAME |
|-----------------|--|
| BaA | Silt loam clay, 0 to 1.0 % slope |
| BaB | Silt loam clay, 1.0 to 2.0 % slope |
| BaC | Silt loam clay, 2.0 to 5.0 % slope |
| BaA1 | Silt loam clay, 0 to 1%, subject to occasional local flooding |
| BaA2 | Silt loam clay, 0 to 1% subject to moderate occasional local flooding |
| BaA3 | Silt loam clay, 0 to 1%, subject to severe occasional local flooding |
| BaA4 | Silt loam clay, 1 to 2% subject to moderate occasional local flooding |
| Cn | Good terrace occurrence |
| MbA | Medium clay, 0 to 1% slope |
| MbB | Medium clay, 1 to 2% slope |
| MbC | Medium clay, 2 to 5% slope |
| TpA1 | Topsoil clay, 0 to 1% slope, subject to slight occasional local flooding |
| GpA | Clayey clay loam, 0 to 1% slope |

CONVENTIONAL SIGNS

PROJECT BOUNDARY	SOIL SERIES BOUNDARY	PIT SITE	AUGER	RIVER/CREEK	ROAD	BRIDGE

Appendix A

SUMMARY OF PROJECT ECONOMIC ANALYSIS INCLUDING ENVIRONMENTAL COSTS

Economic Analysis

The economic cost-benefit analysis conducted on this project indicates a high degree of viability with an internal rate of return (IRR) of 37%, an economic benefit/cost ratio at a 15% annual discount rate of 2.0 and a net present value at the same discount rate of US \$5.0 million, calculated over a 25-year period on rice-production-related costs and benefits.

In the sensitivity analyses, calculations based on assumed cost increases of 20% and benefit decreases of 20% produce an IRR of 23%. Calculations including all project costs and no shadow prices, but still counting only rice production benefits, indicate a monetary IRR of 19%.

Employment effects are significant, with rice farm demand for productive labor increasing in the project area by 35% in terms of workdays and 66% in terms of wages. This means an increase from an average of 477 workdays per household per year to 645.

Income effects of the project are even more striking, with household income in the project area from rice production activities arising from its current annual average of ₱3,254 (\$434) to ₱12,193 (\$1,626) by 1986, or an increase of 275%. The entire income benefit will accrue to former tenants (76% of total farmers), squatters, (22%), leaseholders (1.5% and small owner-cultivators (1%) now living in isolated rural conditions of abject poverty.

For additional information about Economic Analysis, see Part III, Section D in the Project Paper.

Environmental Costs

Environmental costs include both damages to the environment and expenditures for abatement technology. The project economic analysis does not include any estimates of damages. The primary damage in this case would be to aquatic life. Data are not available to estimate the effect of pesticide runoff or ambient concentration on the abundance of commercial species. The project economic analysis does include the expenditures for pit privies.

Appendix B

CONSULTATION AND REVIEW

Consultation

The following individuals contributed to the preparation of this EA:

<u>NAME</u>	<u>ORGANIZATION</u>	<u>PROFESSION</u>
Yolanda Mingoa	Planning and Program Development Office Department of Public Works	Biologist
Peter Olaño	Bicol River Basin Development Program Office	Sanitation Engineer
Emmanuel Astillero	Planning and Program Development Office Development of Public Works	Environmental Planner
C. Stuart Callison	Regional Development AID/Manila	Economist
Ralph Bird	Regional Development AID/Manila	Engineer

The following individuals/organization reviewed this EA:

<u>NAME</u>	<u>ORGANIZATION</u>	<u>PROFESSION</u>
Chris Dixon	Inter-governmental Committee on Ecological Studies	Biologist

Appendix C

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138
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Table 1LAND USE PATTERN WITHOUT PROJECT
(Hectares)

<u>LAND USE</u>	Phases: <u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>V</u>	<u>TOTAL</u>
Total Area	610.3	207.4	327.0	893.6	248.0	2,286.2
Cultivable Area	460.3	169.0	285.7	734.1	218.0	1,867.1
Irrigated	152.3	54.0	48.7	330.5	67.7	653.3
IR	141.3	54.0	48.7	330.5	67.7	642.3
2R	11.0	-	-	-	-	11.0
Non-Irrigated	308.0	115.0	237	403.5	150.3	1,214.2
1R	308.0	115.0	237	390.5	150.3	1,201.2
3R	-	-	-	13.0	-	13.0
Roads, Canal & Other ROW	9.0	4.0	14	7.0	2.0	36
Community Area	33.0	6.0	8	13.0	8.0	68
Uncultivated Other Area	108.0	28.4	19.3	139.1	20.0	314.8

Table 2

**LAND USE PATTERN WITH PROJECT
(Hectares)**

LAND USE	Phases: <u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>V</u>	TOTAL
Total Area	610.3	207.4	327.0	893.6	248.0	2,286.2
Cultivable Area (All IR Irrigated)	567.3	183.8	286.3	810.4	214.7	2,062.5
Roads, Canals and other Right-of-Way	29.0	9.6	14.7	42.7	11.3	107.3
Community Area	14	14	26	40.5	22	116.5
					Total	2,286.2

TABLE 3. CURRENT FARM PRODUCTION AND BUDGET PER HECTARE, WITHOUT PROJECT, BICOL IAD-IIA (BULA-MINALABAC) PROJECT

I T E M	Irrigated 2R Land Class		Non-Irrigated 1R Land Class		Annual Average for Project Area
	Wet Season	Dry Season	Wet Season	Dry Season	
I. Yield (cavans) ^{a/}	43	35	25	24	57
<u>Production Value (P55/cavan)</u>	<u>2365</u>	<u>1925</u>	<u>1375</u>	<u>1320</u>	<u>3122</u>
II. <u>Farm Production Cost (P)</u>	<u>1667</u>	<u>1685</u>	<u>1355</u>	<u>1338</u>	<u>2803</u>
A. Fixed Cost	(1011)	(1011)	(854)	(854)	(1744)
1) Labor	(725)	(725)	(725)	(725)	(1393)
a. Clearing, repair of dikes & ditches	40	40	40	40	77
b. Seedbed preparation, sowing & seedling care	45	45	45	45	86
c. Land preparation ^{b/}	340	340	340	340	653
d. Transplanting	135	135	135	135	259
e. Care of plants	165	165	165	165	317
2) Seeds	(136)	(136)	(129)	(129)	(252)
3) Pump operation & maintenance	(150)	(150)	-	-	(98)
B. Variable Cost	(656)	(674)	(501)	(484)	(1059)
1) Labor	(329)	(269)	(189)	(181)	(432)
a. Harvesting & threshing	269	220	155	149	354
b. Winnowing & bagging	17	14	9	8	21
c. Hauling & handling	43	35	25	24	57
2) Fertilizers & chemicals	(146)	(233)	(166)	(160)	(329)
3) Interest ^{c/}	(47)	(35)	(30)	(29)	(65)
4) Contingency/miscellaneous ^{d/}	(133)	(137)	(116)	(114)	(234)
III. Net Return to Farmer before Rent or Amortization payments	<u>698</u>	<u>240</u>	<u>20</u>	<u>-18</u>	<u>319</u>
Applicable Area in Project Area (ha.)	653	568	1214	1153	1867

a/ 20 cavans equal one metric ton

b/ Non-mechanized cost

c/ Interest at 17%^{mo.} for land preparation, transplanting, seeds, fertilizers and chemicals.

d/ 10% of labor, seeds, fertilizers, chemicals, operation & maintenance

Source: Draft feasibility study 1976: Pilot Land Consolidation Project; Socio-Economic Study on the Pilot Land Consolidation Project, BRBDP, 1974; and Farm Record-Keeping Project data, BRBDP, 1976.

CSCallison:lep:AD/RD 2/22/77

TABLE 4. PROJECTED FARM PRODUCTION AND BUDGET PER HECTARE, IRRIGATED IR LAND CLASS WITH PROJECT, WET SEASON, BICOL IAD-IIA (EULA-MINALABAC) PROJECT

I T E M	Year after Construction: 1	2	3	4	5
I Yield (cavans) ^{a/}	69	73	76	80	84
Production Value (P55/cavan)	3795	4015	4180	4400	4620
II Farm Production Cost (P)	2109	2215	2301	2407	2513
A. Fixed Cost	861	861	861	861	861
1) Labor	725	725	725	725	725
a. Clearing, repair of dikes & ditches	40	40	40	40	40
b. Seedbed preparation, sowing and seedling care	45	45	45	45	45
c. Land preparation ^{b/}	340	340	340	340	340
d. Transplanting	135	135	135	135	135
e. Care of the plant	165	165	165	165	165
2) Seeds (Certified)	136	136	136	136	136
B. Variable Cost	1248	1356	1440	1546	1652
1) Labor	492	521	543	572	601
a. Harvesting and threshing	431	456	475	500	525
b. Winnowing and bagging	27	29	30	32	34
c. Hauling and handling	34	36	38	40	42
2) Fertilizers and chemicals	503	567	631	695	760
3) Interest Charged ^{c/}	67	71	62	66	69
4) Contingency ^{d/}	186	195	204	213	222
III Net Return to Farmer before Water Fees & Amortization	1686	1800	1879	1993	2107

^{a/} 20 cavans equal one metric ton.

^{b/} Non-mechanized cost.

^{c/} Interest charged for land preparation, transplanting, seeds, fertilizers and chemicals at 1%/month.

^{d/} 10% charged for labor, seeds, fertilizers and chemicals.

Source: Farm Record Keeping Project, BRBDP, 1976

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TABLE 5. PROJECTED FARM PRODUCTION AND BUDGET PER HECTARE, IRRIGATED IR LAND CLASS WITH PROJECT, DRY SEASON, BICOL IAD-IIA (BULA-MINALABAC) PROJECT

I T E M	Year after Construction: 1	2	3	4	5
I Yield (cavans) ^{a/}	79	83	91	91	96
Production Value (P55/cavan)	4345	4565	4785	5005	5280
II Farm Production Cost (P)	2143	2184	2208	2248	2296
A. Fixed Cost	861	861	861	861	861
1) Labor	725	725	725	725	725
a. Clearing, repair of dikes & ditches	40	40	40	40	40
b. Seedbed preparation, sowing & seedling care	45	45	45	45	45
c. Land preparation ^{b/}	340	340	340	340	340
d. Transplanting	135	135	135	135	135
e. Care of plant	165	165	165	165	165
2) Seeds (Certified)	136	136	136	136	136
B. Variable Cost	1282	1323	1347	1387	1435
1) Labor	564	593	622	650	686
a. Harvesting and threshing	494	519	544	569	600
b. Winnowing and bagging	31	33	35	36	38
c. Hauling and handling	39	41	43	45	48
2) Fertilizers and chemicals	465	472	479	486	494
3) Interest charged ^{c/}	64	65	50	51	51
4) Contingency ^{d/}	189	193	196	200	204
III Net Return to Farmer before Water Fees & Amortization	2202	2381	2577	2757	2984

a/ 20 cavans equal one metric ton.

b/ Non-mechanized cost.

c/ Interest charged for land preparation, transplanting, seeds, fertilizers and chemicals at 12%/month.

d/ 10% charged for labor, seeds, fertilizers and chemicals.

Source: Farm Record Keeping Project, BRBDP, 1976

Table 6 a. Annual Land Amortization Payments Required of Land Transfer Beneficiaries by Phase, Bicol IAD-IIA (Bula-Minalabac) Project

Phase	I	II	III	IV	V	TOTAL
Irrigated Hectarage before Project	152	54	49	331	68	653
Non-Irrigated Hectarage before Project	<u>308</u>	<u>115</u>	<u>237</u>	<u>404</u>	<u>150</u>	<u>1214</u>
Total Hectarage Before Project	460	169	286	734	218	1867
Total Irrigated Ha. After Project	567	184	286	810	215	2062
No. of Households	321	101	227	436	145	1230
Ha. per Household After Project	1.77	1.82	1.26	1.86	1.48	1.68
Value of Land per Ha. when Expropriated (P): ^{1/}						
a) Irrigated	2500	8500	2500	8500	8500	6666
b) Non-irrigated	<u>1000</u>	<u>6500</u>	<u>1000</u>	<u>5000</u>	<u>5000</u>	<u>3346</u>
A V E R A G E	<u>1496</u>	<u>7139</u>	<u>1257</u>	<u>6585</u>	<u>6092</u>	<u>4507</u>
Yearly Land Amortization Payment per Ha. (P) ^{2/}						
a) Irrigated	257	875	257	875	875	686
b) Non-irrigated	<u>103</u>	<u>669</u>	<u>103</u>	<u>515</u>	<u>515</u>	<u>345</u>
A V E R A G E	<u>154</u>	<u>735</u>	<u>129</u>	<u>678</u>	<u>627</u>	<u>464</u>
Average Amortization Payment per Household After Project:	273	1338	163	1261	928	780

^{1/} Value fixed by Dept. of Agrarian Reform and local Land Committees at the time of expropriation. It remains fixed in monetary terms and does not rise with price inflation. Land in Phases I and III were expropriated in 1959, Phase II in 1969 and Phases IV and V in 1972.

^{2/} Amortized over 15 years at 6% interest.

Table 6b. Number of Project Area Farmers by Tenure Status and Place of Residence, Bicol IAD-II
(Bula-Minalabac) Project, 1976

I T E M S	P H A S E					TOTAL
	I	II	III	IV	V	
<u>Total Area (hectares)</u>	<u>610.2</u>	<u>207.4</u>	<u>327.0</u>	<u>893.5</u>	<u>248</u>	<u>2286.2</u>
Number of Amortizing Owners (Land Reform Beneficiaries)	176	87	128	412	131	934
Number of Legal Leaseholders	-	-	-	9	9	18
Number of Owner-Cultivators	-	-	-	6	5	11
Number of Squatters	<u>145</u>	<u>14</u>	<u>99</u>	<u>9</u>	<u>-</u>	<u>267</u>
Total No. of Farmers Tilling Project Area	321	101	227	436	145	1230
Number of Households Residing in Project Area	188	59	133	287	53	720
Estimated Present Project Area Population ^{1/}	1192	374	843	1820	336	4565
Estimated Project Area Population after Relocation ^{1/}	2035	640	1439	2764	919	7798

^{1/} Estimated as 6.34 members per family

Table 13. ANNUAL COST ESTIMATES BY MAJOR PROJECT COMPONENT (INPUTS) AND FINANCIAL PLAN (P1000)
BICOL IAD-IIA (BULA-MINALABAC) PROJECT

Project Component	YEAR:						TOTAL	AID LOAN			GOP LC
	1976-7	1978	1979	1980	1981	1982		FX	LC	TOTAL	
I. Physical Facilities	2784	5550	5979	7520	3954	227	26,014	2668	13,390	16,058	9,956
a. Imported Equipment		(2668) ^{3/}					(2,668)	(2668)		(2,668)	
b. Construction Costs	(2784) ^{1/}	(2882)	(5979)	(7520)	(3954)	(227)	(23,346)		(13,390)	(13,390)	(9,956)
II. Homesite Development	170	420	810	960	238		2,598				2,598
III. Land Consolidation & Tenure Reform	14	35	31	31	31	31	173				173
IV. Organizational Development & Training		183	163	171	184	195	896				896
V. Applied Agricultural Research		10	20	20	20	30	100				100
VI. Project Ops. & Mgt.	369	506	146	155	162	172	1,510	338		338	1,172
a. Imported Equipment		(338) ^{4/}					(338)	(338)		(338)	
b. Local Costs	(369) ^{2/}	(168)	(146)	(155)	(162)	(172)	(1,172)				
SUB-TOTALS	3337	6704	7149	8857	4589	655	31,291	3006	13,390	16,396	14,895
15% Contingency	501	1006	1072	1329	688	98	4,694	451	2,008	2,459	2,235
SUB-TOTALS	3838	7710	8221	10186	5277	753	35,985	3457	15,398	18,855	17,130
Cost Escalation Factor ^{5/}	0	817	1191	2292	1640	305	6,245	519	3,036	3,555	2,690
GRAND TOTALS	3838	8527	9412	12478	6917	1058	42,230	3976	18,434	22,410	19,820
										53%	77%

^{1/} P1034 thousand = value of work completed in 1976, P1750 = amount budgeted in CY 1977.

^{2/} P 269 thousand = Pilot Project Ops. & Mgt. through 1976, P100 = est. for 1977

^{3/} Pumps and spare parts.

^{4/} Vehicles, spare parts & typewriters

^{5/} 1977 base year. Imported equipment escalated 15%/yr., all local costs 7%/yr.

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AD/RD 4/15/77

Table 14. Total Cost of Construction-Related Activities and First-Year Maintenance, by Phase
Bula-Minalabac IAD-IIA Project, Camarines Sur, Bicol
(1000 Pesos)

	Phases: I	II	III	IV	V	Sub-Total	15% Con-tingency	TOTAL
Irrigation Construc- tion Total	6,575 (1,016) ^{1/}	1,713	3,282	6,721	2,002	20,291 (1,016)	3,044 (152)	23,335 (1,168)
Architectural & Engineering	1,023 (18)	259	448	1,122	309	3,161 (18)	474 (3)	3,635 (21)
Right-of Way Damages	40	20	20	60	270	410	62	472
First-Year Ops. & Maintenance ^{2/}	383	140	215	455	159	1,352	203	1,555
Multipurpose Bldgs. & School	<u>100</u>	<u>100</u>	<u>200</u>	<u>300</u>	<u>100</u>	<u>800</u>	<u>120</u>	<u>920</u>
Sub-total	8,121 (1,034)	2,232	4,164	8,658	2,840	26,014 (1,034)	3,903 (155)	29,917 (1,189)
15% Contingency	<u>1,218</u>	<u>335</u>	<u>625</u>	<u>1,299</u>	<u>426</u>	<u>3,903</u>		
TOTAL	9,340 (1,189)	2,567	4,789	9,956	3,266	29,917 (1,189)		

^{1/} Sums in parenthesis represent present value of construction already completed (in 1976) in the Phase I pilot project area.

^{2/} Excludes cost of vehicle operation and maintenance, which is included in PMO budget.

AD/RD, CSCallison, fcs
4/13/77

Table 15.

Summary of the Cost of Irrigation Construction Per Phase (Pesos)
Bula-Minalabac IAD Project II-A, Camarines Sur, Bicol
(1000 Pesos)

	Phases	I	II	III	IV	V	Sub- Total	Contractor's Overhead and Taxes	TOTAL
Total Area (Has)		610	207	327	894	248	2,286		
Irrigable Area (Has)		567	184	286	810	215	2,062		
Road & Canal Embankment		2,795 (734) ^{1/}	500	749	1,604	746	6,395	1,019	7,414
Canal Structure		548 (101)	148	170	711	192	1,769	300	2,069
Canalization		1,007 (58)	244	594	1,719	114	3,678	652	4,330
Terminal Facilities		457 (43)	48	105	431	92	1,133	196	1,329
Drainage Facilities		265 (15)	39	137	279	104	823	146	969
Pumping Plant		730 (65)	528	1,140	1,072	491	3,960	221	4,181
Sub-Total		<u>5,802</u> (1,016)	<u>1,505</u>	<u>2,895</u>	<u>5,816</u>	<u>1,739</u>	<u>17,758</u>	<u>2,534</u>	<u>20,292</u>
Contractor's Overhead & Taxes (18%, Pumps exc.)		<u>772</u>	<u>208</u>	<u>386</u>	<u>904</u>	<u>263</u>	<u>2,534</u>		
Irrigation Construction		<u>6,575</u> (1,016)	<u>1,713</u>	<u>3,281</u>	<u>6,721</u>	<u>2,002</u>	<u>20,292</u>		

^{1/} Sums in parenthesis represent present value of construction already completed (in 1976) in the Phase I pilot project area. Contractor's overhead is not included for this amount, since construction was managed by government personnel.

COUNTRY	PROJECT NO.	PROJECT TITLE	DATE	<input checked="" type="checkbox"/> ORIGINAL REVISION # _____	APPROVED
Philippines	492-0275	Bicol Integrated Area Development II (Bula)	2/77		

PROJECT PURPOSE (FROM PRP FACESHEET)

Increase agricultural production, productivity per hectare and employment opportunities. Improve health and nutritional status and reduce crude population growth rate. Make elementary education available to all project area children. Increase farmer participation and leadership in social and economic development.

CPI DESCRIPTION

Prior Jun 77 Loan Agreement signed between AID and GOP.
Action

- 1.Oct 77 Detailed engineering design and plans preparation for Phase I completed by PMO team. PMO begins issuance of IFBs for Phase I construction.
- 2.Oct 77 Conditions precedent reviewed and approved by USAID.
- 3.Jan 78 Phase I contract for construction awarded by PMO.
- 4.Jan 78 Underground water exploration completed by BRBDP.
- 5.Feb 78 PMO completes surface water pumps (SWP) specifications and begins issuance of IFB's for manufacture of SWP's.
- 6.May 78 PMO completes ground water pumps (GWP) speci- and begins issuance of IFB's for manufacture of GWP's.
- 7.May 78 PMO, with personnel detached from DLGCD and NIA, begins organizing and training of project implementation teams, compact farms, district associations, and irrigation associations (IA).
- 8.Jun 78 PMO awards contract for SWP's to manufacturer.
- 9.Jun 78 First Annual Evaluation by AID, BRBDP and DAR.
- 10.Jul 78 Phase II engineering design, surveys, and specifications preparation completed by A&E firm. PMO begins issuance of IFB's for Phase II construction.
- 11.Sep 78 PMO awards contract for GWP's to manufacturer.
- 12.Oct 78 PMO awards Phase II contract for construction. Contractor begins mobilizing for construction of Phase II.

- 13.Dec 78 Phase III survey, engineering design, and specifications preparation completed by A&E firm. PMO begins issuance of IFB's for Phase III construction.
- 14.Mar 79 PMO awards Phase III contract for construction. Contractor begins mobilizing for construction.
- 15.Jun 79 Phase IV survey, engineering design, and specification preparations completed by A&E firm. PMO begins issuance of IFB's for Phase IV construction.
- 16.Jun 79 Second Annual Evaluation by BRBDP, AID and DAR.
- 17.Jul 79 Importer delivers SWP's.
- 18.Aug 79 Phase V survey, engineering design and specifications preparation completed by A&E firm. PMO begins issuance of IFB's for Phase V construction.
- 19.Sep 79 Contractor completes Phase I construction. SWP's installed by importer. PMO begins trial run and on-the-job training.
- 20.Sep 79 PMO awards Phase IV contract for construction. Contractor begins mobilizing for construction.
- 21.Sep 79 Importer delivers GWP's.
- 22.Nov 79 PMO awards Phase V contract for construction. Contractor begins mobilizing for construction of Phase V.
- 23.Nov 79 Phase II construction completed by contractor. GWP's installed by importer. PMO begins trial run and on-the-job training.
- 24.May 80 Contractor completes Phase III construction. GWP's installed by importer. PMO begins trial run and on-the-job training.
- 25.Jun 80 Third Annual Evaluation by BRBDP, AID and DAR.
- 26.Jan 81 Contractor completes Phase V construction. SWP's installed by importer. PMO begins trial run and on-the-job training.
- 27.Jun 81 Fourth Annual Evaluation by BRBDP, AID and DAR.
- 28.Dec 81 Contractor completes Phase IV construction. SWP's installed by importer. PMO begins trial run and on-the-job training.
- 29.Jun 82 Final Evaluation by AID, Fifth Annual Evaluation by BRBDP and DAR.

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6C(2) - PROJECT CHECKLIST

Listed below are, first, statutory criteria applicable generally to projects with FAA funds, and then project criteria applicable to individual fund sources: Development Assistance (with a sub-category for criteria applicable only to loans); and Security Supporting Assistance funds.

CROSS REFERENCES: IS COUNTRY CHECKLIST UP TO DATE? IDENTIFY. HAS STANDARD ITEM CHECKLIST BEEN REVIEWED FOR THIS PROJECT? -- Yes. Yes. See Project Paper for Pest Control, 492-0288.

A. GENERAL CRITERIA FOR PROJECT.

1. App. Unnumbered; FAA Sec. 653(b)
 - (a) Describe how Committees on Appropriations of Senate and House have been or will be notified concerning the project;
 - (b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than \$1 million over that figure plus 10%)?
 2. FAA Sec. 611(a)(1). Prior to obligation in excess of \$100,000, will there be (a) engineering, financial, and other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?
 3. FAA Sec. 611(a)(2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?
 4. FAA Sec. 611(b); App. Sec. 101. If for water or water-related land resource construction, has project met the standards and criteria as per Memorandum of the President dated Sept. 5, 1973 (replaces Memorandum of May 15, 1962; see Fed. Register, Vol 38, No. 174, Part III, Sept. 10, 1973)?
 5. FAA Sec. 611(e). If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed \$1 million, has Mission Director certified the country's capability effectively to maintain and utilize the project?
- A.1.(a) A description of the project was included in the A.I.D. Congressional Presentation for FY 1977.
 - (b) Yes.
 - 2.(a) Yes. Preliminary designs are complete, final A&E design of the irrigation systems will be contracted under the project.
(b) Loan authority is being requested initially for only the 3/4 of the project for which feasibility is certain. Additional authority for the final 1/4 of the proposed loan will be requested, and the loan agreement so amended, only after the current groundwater exploration has been completed and analysis proves sufficient groundwater is available for all planned uses, including household uses, in Phases II and III. Construction cost estimates are reasonably firm for all phases.
 3. N.A. All legislative authority needed exists.
 4. Yes.
 5. Yes.

A.

6. FAA Sec. 209, 619. Is project susceptible of execution as part of regional or multi-lateral project? If so why is project not so executed? Information and conclusion whether assistance will encourage regional development programs. If assistance is for newly independent country, is it furnished through multi-lateral organizations or plans to the maximum extent appropriate?
7. FAA Sec. 601(a); (and Sec. 201(f) for development loans). Information and conclusions whether project will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.
8. FAA Sec. 601(b). Information and conclusion on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).
9. FAA Sec. 612(b); Sec. 636(h). Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized to meet the cost of contractual and other services.
10. FAA Sec. 612(d). Does the U.S. own excess foreign currency and, if so, what arrangements have been made for its release?

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

- a. FAA Sec. 102(c); Sec. 111; Sec. 281a. Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production, spreading investment out from cities to small towns and rural areas; and (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage democratic private and local governmental institutions?

6. No. N.A.

7. (a) Yes. It will help the Philippines become self-sufficient in rice production, thus saving foreign exchange which can be used to import other items, and it will hasten the day when it could export rice or more of other agricultural products, thus earning more foreign exchange for trade.
 - (b) Yes. The consolidated farms and irrigation facilities organized and constructed under this project are to be privately owned and operated. Private contractors will perform construction.
 - (c) Yes. The project will teach farmers to organize and manage their own cooperatives and encourage them to utilize agricultural credit provided through the Rural Bank of Bula.
 - (d) Yes. The farmers cooperatives will be doing their own buying and selling in a very competitive market.
 - (e) Yes, of agriculture.
 - (f) No.

8. Project will utilize 18% of loan funds for procurement of irrigation pumps, vehicles, and other equipment.

10. The Philippines is not an excess currency country.

B.1.a.(a) This project directly involves poor farmers in the construction and management of medium-sized pump irrigation systems and trains them in modern farm technology. It increases market access with roads and cooperatives. It utilizes labor-intensive construction methods as much as possible and promotes labor-intensive use of land for production. All of its investment will be made in a very poor rural area.

(b) The project will organize farmers into cooperative compact farms and will provide training in cooperative activities and management. The irrigation, drainage and access road facilities will be turned over to farmer-run irrigation associations. The whole integrated project is specifically designed to assist the rural poor of the project area increase their real production, income and quality of life, including their health and nutritional status.

B1

b. FAA Sec. 103, 103A, 104, 105, 106, 107. Is assistance being made available: [Include only applicable paragraph -- e.g., a, b, etc. -- which corresponds to source of funds used. If more than one fund source is used for project, include relevant paragraph for each fund source.]

- (1) [103] for agriculture, rural development or nutrition; if so, extent to which activity is specifically designed to increase productivity and income of rural poor; [103A] if for agricultural research, is full account taken of needs of small farmers;
- (2) [104] for population planning or health; if so, extent to which activity extends low-cost, integrated delivery systems to provide health and family planning services, especially to rural areas and poor;
- (3) [105] for education, public administration, or human resources development; if so, extent to which activity strengthens nonformal education, makes formal education more relevant, especially for rural families and urban poor, or strengthens management capability of institutions enabling the poor to participate in development;
- (4) [106] for technical assistance, energy, research, reconstruction, and selected development problems; if so, extent activity is:
- (a) technical cooperation and development, especially with U.S. private and voluntary, or regional and international development, organizations;
 - (b) to help alleviate energy problem;
 - (c) research into, and evaluation of, economic development processes and techniques;
 - (d) reconstruction after natural or manmade disaster;
 - (e) for special development problem, and to enable proper utilization of earlier U.S. infrastructure, etc., assistance;
 - (f) for programs of urban development, especially small labor-intensive enterprises, marketing systems, and financial or other institutions to help urban poor participate in economic and social development.
- b. (1) Yes, for agriculture, rural development and nutrition. It is 100% designed to increase productivity and real income of rural poor, including the productivity of the housewife in the home in nutrition and health matters (and backyard projects). It aims at increasing the gross output of small rice farmers from roughly 2.9 metric tons of palay per hectare per year to at least 9.0 M.T. per hectare per year, and at converting most of them from tenants or squatters on scattered, small un-irrigated plots to amortizing owners of consolidated, irrigated parcels of land.

81

(5) [107] by grants for coordinated private effort to develop and disseminate intermediate technologies appropriate for developing countries.

c. FAA Sec. 110(a); Sec. 208(e). Is the recipient country willing to contribute funds to the project, and in what manner has or will it provide assurances that it will provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or has the latter cost-sharing requirement been waived for a "relatively least-developed" country)?

d. FAA Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing?

e. FAA Sec. 207; Sec. 113. Extent to which assistance reflects appropriate emphasis on; (1) encouraging development of democratic, economic, political, and social institutions; (2) self-help in meeting the country's food needs; (3) improving availability of trained worker-power in the country; (4) programs designed to meet the country's health needs; (5) other important areas of economic, political, and social development, including industry; free labor unions, cooperatives, and Voluntary Agencies; transportation and communication; planning and public administration; urban development, and modernization of existing laws; or (6) integrating women into the recipient country's national economy.

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

c. Yes. The loan agreement will so provide and the planned administrative arrangements will assure it.

d. No. All A.I.D. funding is to be in a loan.

e. (1) Project will organize and train leadership for irrigators associations, cooperative compact farms, rural youth and homemakers clubs. Project is result of successful interagency planning and farmers plenary meetings conducted by BREDP on a regional and sub-regional basis.

(2) Project will increase rice and backyard project production, the former by three-fold annually in project area.

(3) Project will train farmers in irrigation system management and modern farm technology.

(4) Training in health and nutrition and backyard projects is designed to improve health and nutrition status.

(5) Project will organize farmers into cooperative compact farms. It will construct farm access roads and paths to improve transportation. It is a direct result of an important experiment in decentralized, integrated planning and its implementation will likewise be decentralized and integrated, thus strengthening regional development organizations.

(6) By permitting labor-intensive development of irrigated farms, the project will result in more wage-labor for both men and women. It also attempts to upgrade the efficiency of women's activities in the home.

f. Project is a component of regional Bicol River Basin development strategy devised by indigenous regional planners specifically to meet local needs, desires and potential. Local farmers in project area have held several meetings to provide inputs into planning process. All project-related training will be conducted by locally or regionally assigned personnel. No foreign technical assistance is envisioned. Organizational management and civic leadership are important elements of planned training program.

81

g. FAA Sec. 201(b)(2)-(4) and -(8); Sec. 201(e); Sec. 211(a)(1)-(3) and -(8). Does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities and self-sustaining economic growth; or of educational or other institutions directed toward social progress? Is it related to and consistent with other development activities, and will it contribute to realizable long-range objectives? And does project paper provide information and conclusion on an activity's economic and technical soundness?

h. FAA Sec. 201(b)(6); Sec. 211(a)(5), (6). Information and conclusion on possible effects of the assistance on U.S. economy, with special reference to areas of substantial labor surplus, and extent to which U.S. commodities and assistance are furnished in a manner consistent with improving or safeguarding the U.S. balance-of-payments position.

g. The project directly increases the productive capacities of land and labor by providing water for controlled irrigation. Agricultural production in the project area will be lifted to a permanently higher level; and increased farmer income will provide a higher level of effective demand for both food and non-agricultural products, thus helping to stimulate economic growth elsewhere, as well. Project is an integral part of overall regional and national development strategy to invest in decentralized, rural, agricultural, food-producing, irrigation activities and to improve the income and quality of life of rural poor. It will contribute to the long-range goal of national self-sufficiency in food production. The economic and technical soundness of the project are discussed in Part III, Sections A and D.

h. AID financial inputs will provide for procurement of some commodities (equipment) from the U.S. Long-term effect will increase U.S. exports of spare parts, decrease need for concessional PL480 exports of rice.

AID HANDBOOK 3, App 6C	Trans. Memo No. 3:11	Effective Date November 10, 1976	Page No. 6C(2)-5
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2. Development Assistance Project Criteria (Loans Only)

a. FAA Sec. 201(b)(1). Information and conclusion on availability of financing from other free-world sources, including private sources within U.S.

b. FAA Sec. 201(b)(2); 201(d). Information and conclusion on (1) capacity of the country to repay the loan, including reasonableness of repayment prospects, and (2) reasonableness and legality (under laws of country and U.S.) of lending and relending terms of the loan.

c. FAA Sec. 201(3). If loan is not made pursuant to a multilateral plan, and the amount of the loan exceeds \$100,000, has country submitted to AID an application for such funds together with assurances to indicate that funds will be used in an economically and technically sound manner?

d. FAA Sec. 201(f). Does project paper describe how project will promote the country's economic development taking into account the country's human and material resources requirements and relationship between ultimate objectives of the project and overall economic development?

2.a. Financing is not available for this project from other sources on terms comparable to this proposed plan. Irrigation and institutional development are exceedingly lumpy, long-term investments.

b.(1) A.I.D. and other international institutions, especially IBRD, closely watch GOP foreign exchange earnings and debt service requirements. It appears that currently and for the foreseeable future, the GOP will be able to repay this loan. (2) The rate of interest is considered reasonable and repayment of the loan with interest is within the financial capability of the borrower. Interest will accrue at 2% per annum through the grace period, 3% thereafter. These rates are well within the legal limits of both countries.

c. An application has been received. Expected economic and technical soundness was analyzed by GOP and Taiwanese (consultant) technicians and is discussed in Part III of this PP.

d. Yes, See Part II of PP.

82

e. FAA Sec. 202(a). Total amount of money under loan which is going directly to private enterprise, is going to intermediate credit institutions or other borrowers for use by private enterprise, is being used to finance imports from private sources, or is otherwise being used to finance procurements from private sources?

e. Total of loan funds will go to private enterprise, either to finance direct purchase of equipment from U.S. private enterprise or to share the costs of construction contracts with private local contractors.

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

f. No. It is not likely that Philippine rice could ever be exported to the U.S. on a competitive basis with U.S.-produced rice in a free trade situation.

3. Project Criteria Solely for Security Supporting Assistance

3. N.A.

FAA Sec. 531. How will this assistance support promote economic or political stability?

4. Additional Criteria for Alliance for Progress

4. N.A.

[Note: Alliance for Progress projects should add the following two items to a project checklist.]

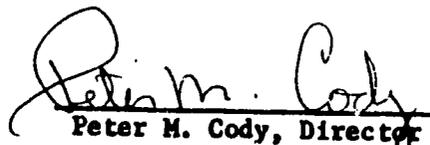
a. FAA Sec. 251(b)(1), -(8). Does assistance take into account principles of the Act of Bogota and the Charter of Punta del Este; and to what extent will the activity contribute to the economic or political integration of Latin America?

b. FAA Sec. 251(b)(8); 251(h). For loans, has there been taken into account the effort made by recipient nation to repatriate capital invested in other countries by their own citizens? Is loan consistent with the findings and recommendations of the Inter-American Committee for the Alliance for Progress (now "CEPCIES," the Permanent Executive Committee of the OAS) in its annual review of national development activities?

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

I, PETER M. CODY, the principal officer of the Agency for International Development in the Philippines, having taken into account, among other things, the maintenance and utilization of projects in the Philippines previously financed or assisted by the United States, do hereby certify that, in my judgement, the Philippines has both the financial capability and the human resources capability to effectively implement, utilize and maintain the proposed Bicol Integrated Area Development II (Bula-Minalabac Land Consolidation) Project.

This judgement is based upon the project analysis as detailed in the Bicol Integrated Development Area II Project Paper and is subject to the conditions imposed therein.


Peter M. Cody, Director
USAID/Philippines

May 11, 1977
Date



REPUBLIC OF THE PHILIPPINES
 NATIONAL ECONOMIC AND DEVELOPMENT AUTHORITY
 P.O. Box 1116, Manila

ANNEX H

Tel. 50-39-71
 Cable Address: NEDAPHIL

August 12, 1977

Mr. Peter M. Cody
 Director, USAID Mission
 Manila

Dear Mr. Cody,

I wish to refer to USAID letter of May 18, 1977 presenting the Project Paper for the Bicol Integrated Area Development II (Bula-Minalabac Land Consolidation).

I endorse this project and its component and hereby request a development loan in the amount of \$2.9 million divided into two tranches. The first tranche in the amount of \$2.15 million to be authorized in the 4th quarter of FY 1977 for disbursement over a period of five (5) years and the second tranche of \$0.75 million to be authorized in FY 1978 subject to a favorable determination of groundwater availability for irrigation in relevant portion of the project area.

The Department of Agrarian Reform (DAR) will be the lead implementing agency for the project to be assisted by other participating agencies, e.g. NIA for irrigation, BPH for roads, DLGCD for institutional development and thru the coordinating mechanism established by the BRBDP.

It is my understanding that cost figures indicated in the Project Paper are planning figures and that they will be subject to refinements when a more detailed calculation of requirements for each activity shall have been determined.

Sincerely yours,


 GERARDO P. SICAT
 Secretary of Economic Planning
 (Director-General)

DIV.	ACT.	INF.
ODM		✓
PE		
LA		
PO		
TD		✓
OEO		
CMD		
CSD		
GSO H		
GSO S		
LOG		
PER		
OC		
AD		
CD		✓
HRD		
PD		
RD	✓	
IIS		
AAE EA		
TRV		



Republic of the Philippines
NATIONAL ECONOMIC AND DEVELOPMENT AUTHORITY
P.O. Box 1116, Manila

Tel. 50 30 71 60 65
Cable Address: NEDAPHIL

September 22, 1977

Mr. Peter M. Cody
Director, USAID Mission
M a n i l a

Dear Mr. Cody,

Please refer to my letter of August 12, 1977, endorsing the Project Paper for the Bicol Integrated Area Development II (Bula-Minalabac Land Consolidation) Project and requesting for a development loan of \$2.9 Million.

I would like to revise the development loan request to make it a full \$3.0 Million divided into two tranches. The first tranche in the amount of \$2.25 Million to be authorized in the 4th quarter of FY 1977 for disbursement over a period of five (5) years and the second tranche of \$0.75 Million to be authorized in FY 1978 subject to a favorable determination of groundwater availability for irrigation in relevant portion of the project area.

The additional \$100,000 will be used for the construction of water supply facilities in the project area.

Sincerely yours,

GERARDO P. SICAT
Secretary of Economic Planning
(Director-General)



Republika ng Pilipinas
KAGAWARAN NG REFORMANG PANSAKANAN
(DEPARTMENT OF AGRARIAN REFORM)
Tanggapan ng Kalihim
Diliman, Lungsod ng Quezon

In reply, please address:

THE SECRETARY
Department of Agrarian Reform
P.O. Box No. 1006
Manila

March 17, 1977

Dr. Laurence Marenilli
Assistant Director/Regional Development
U S A I D
Naga City

Dear Dr. Marenilli:

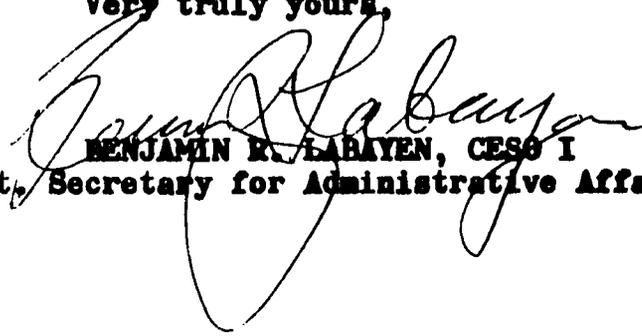
I am pleased to know that the Project Paper (PP) for the Bicol IAD II (Land Consolidation Project) is now being finalized for USAID Project Review Committee in Manila.

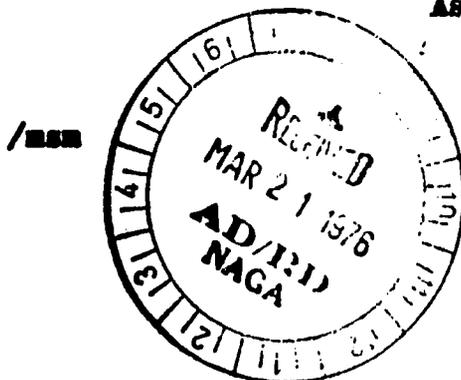
The Department of Agrarian Reform (DAR) as the lead implementing agency of the project agreed to the re-design of Phase I by the "in-house" team (DAR, NIA & BRBDP) and the cost for redesigning will be charged against the BRBDP as agreed upon in our dialogue with the Acting Program Director of the BRBDP on March 12, 1977.

Please be informed further that the first year's budgetary requirement for counterpart funds of the project has been incorporated under DAR line budget for CY 1978. The subsequent annual budgetary requirement until project completion shall likewise be programmed.

Regards.

Very truly yours,


BENJAMIN R. LABAYEN, CESO I
Asst. Secretary for Administrative Affairs



H-3

"Hindi na matatalikuran pa ang pagbabagong-ayos ng pansakanan. Higit kong pangarap na makita ang ating mga magsasaka na pag-aari ang lupang kanilang binubungkal." - Pangulong MARCOS

B. AS THE APAC WAS CONCERNED ABOUT POSSIBLE CONTAMINATION OF THE SHALLOW WELL SYSTEM IN THE NEW HOMESITES, THE BUREAU AGREES TO INCREASE THE AMOUNT OF THE LOAN BY DOLS. 100,000 FOR FURTHER STUDY AND, IF THE GOP SO DECIDES, FOR DESIGN AND CONSTRUCTION OF CENTRALIZED WATER SYSTEMS IN AT LEAST THE THREE LOWEST LYING VILLAGES. PER WADLEY/MORROW TELECON, UNDERSTAND GOP ALSO FAVORS FURTHER REVIEW AND POSSIBLE CONSTRUCTION OF IMPROVED WATER SYSTEMS. AS AUTHORIZATION WILL BE HELD IN ABEYANCE UNTIL RECEIVE OFFICIAL REQUEST, PLEASE ASK GOP TO REVISE THEIR LETTER OF APPLICATION TO INCREASE FIRST TRANCHE REQUEST TO DOLS. 2.25 MILLION AND TOTAL TO DOLS. 3.0 MILLION AND CABLE IMMEDIATELY UPON RECEIPT.

C. REALIZING THAT CONSTRUCTION PROJECTS SUCH AS IAD II CAN HAVE NEGATIVE TEMPORARY, OR SOMETIMES EVEN PERMANENT, EFFECTS ON THE INCOMES OF SOME LOCAL RESIDENTS, THE APAC WAS CONCERNED THAT ADEQUATE CONSIDERATION BE GIVEN TO COMPENSATING THOSE DISPLACED OR OTHERWISE SERIOUSLY ECONOMICALLY INCONVENIENCED. DOES THE GOP HAVE PROCEDURES FOR SUCH COMPENSATION? IF SO, PERHAPS WOULD BE USEFUL IF REFERRED TO EXPLICITLY IN LATER DOCUMENTS. IF NOT, THE APAC WOULD LIKE TO URGE THE MISSION TO DISCUSS SUCH ISSUES WITH GOP OFFICIALS TO TRY TO ENCOURAGE PRACTICES MINIMIZING ECONOMIC LOSSES TO RESIDENTS.

D. THE PP INDICATES THAT ROADS CONSTRUCTED UNDER THE PROJECT WILL BE MAINTAINED COLLECTIVELY BY LOCAL RESIDENTS. IS THIS REALISTIC? WILL IT ENSURE ADEQUATE MAINTENANCE? ARE THERE MORE VIABLE ALTERNATIVES?

2. DLC ACTION ANTICIPATED BY 9/23. PLEASE ADVISE PRIORITY RE ACCEPTABILITY OF PROPOSED COVENANT IN PARA 1A (3) ABOVE AND WILLINGNESS OF GOP TO INCREASE LOAN REQUEST BY DOLS. 100,000 PER PARA 1B ABOVE. OTHER ISSUES CAN BE RESPONDED TO LATER. VANCE
BT

fk

H-5

DEPARTMENT OF STATE TELEGRAM

SEP 22 PM 4 43

INDICATE
 COLLECT
 CHARGE TO USAID

FROM AMEMBASSY MANILA	CLASSIFICATION UNCLASSIFIED
---------------------------------	---------------------------------------

E.O. 11652:
TAGS:
SUBJECT:

NA
BICOL INTEGRATED AREA DEV. II PROJECT, 492-0275

P 220843z Sep 77

14996

7

ACTION:

SECSTATE WASHDC PRIORITY 5470

UNCLASSIFIED MANILA 14996

AIDAC

REFS:

A) MANILA 12972 B) MANILA 14905 C) STATE 227606

ADM
EC/COM
CRU

1. Mission concurs para 1A (3) reftel (C).

2. The letter from Secretary Sicat to Mr. Cody indicating willingness of GOP to increase loan request by Dols. 100,000 has been received by Mission. This cable should be made part of Annex H of Project Paper following Sicat to Cody letter of August 12, 1977. Full text of letter follows:

DIST:

AD/RD
PO
ODM
C&R

Quote. Please refer to my letter of August 12, 1977, endorsing the Project Paper for the Bicol Integrated Area Development II (Bula-Minalabac Land Consolidation) Project and requesting for a development loan of \$2.9 million.

"I would like to revise the development loan request to make it a full \$3.0 million divided into two tranches. The first

DRAFTED BY: FYoung/prb <i>[Signature]</i>	DRAFTING DATE 9/22/77	TEL. EXT. 456	CONTENTS AND CLASSIFICATION APPROVED BY: <i>[Signature]</i> William F. Mulcahy, Program Officer
--	--------------------------	------------------	---

CLEARANCES:

AD/RD:S. Callison *[Signature]*

AD/CD:R. Dangler *[Signature]*

UNCLASSIFIED

CLASSIFICATION

H-6

OPTIONAL FORM 152(H)
(Formerly FS-413(H))
January 1975
Dept. of State

tranch in the amount of \$2.25 million to be authorized in the 4th quarter of FY 1977 for disbursement over a period of five (5) years and the second tranch of \$0.75 million to be authorized in FY 1978 subject to a favorable determination of groundwater availability for irrigation in relevant portion of the project area."

"The additional \$100,000 will be used for the construction of water supply facilities in the project area. Signed Gerardo P. Sicat (dated September 22, 1977). End Quote.

3. Mission endorses increase in loan request.

STULL 

DEPARTMENT OF STATE TELEGRAM

NOV. 310
03061
CN:

INCOMING
Amembassy, MANILA

80 SEP 1977
8:32 A.M.

- ACTION:**
- AID 12
 - INFO:
 - AMB
 - DCM
 - POL
 - POLR
 - CONS
 - DAO
 - ECOM ✓
 - LGAT
 - LO
 - ADM ✓
 - USIS
 - CPRP
 - JMAG
 - CEBU
 - ATD
 - ADB
 - AGR
 - R&F
 - DISP
 - GSO
 - HU
 - TU
 - PER
 - RSO
 - RSC

UNCLASSIFIED
Classification

ACTION COPY

Action Taken: _____
No action necessary

IMMEDIATE DATE 9/30/77

DM

10-3-77

O 292318Z SEP 77
FM SESTATE WASH DC
TO AMEMBASSY MANILA
BT
UNCLAS STATE 234828

AIDAC
E.O. 11652: N/A

TAGS:
SUBJECT: BICQ IAD II

REF: STATE 227606, MANILA 15474

1. SUBJECT PROJECT WAS AUTHORIZED SEPTEMBER 29, 1977 FOR DOLS. 2.25 MILLION IN FY 77 AID APPROVED FOR TOTAL LOP FUNDING OF DOLS. 3.0 MILLION.
2. PER SECRETARY SIGAT'S LETTER, DOLS. 100,000 INCREASE OVER ORIGINAL AMOUNT REQUESTED IS INTENDED FOR CONSTRUCTION OF IMPROVED WATER SYSTEMS IN VILLAGES. PROAG SHOULD INDICATE THAT THIS INCREASE IS FOR DESCRIBED PURPOSE AND THAT, IF IT IS LATER DETERMINED THAT THE DOLS. 100,000 IS NOT NECESSARY FOR THAT PURPOSE, THE FUNDS WILL BE DEOBLIGATED RATHER THAN USED FOR GENERAL PROJECT FUNDING.
3. AUTHORIZATION READS IDENTICAL TO THAT INCLUDED IN PP EXCEPT (1) FOR FUNDING INCREASE AND (2) COVENANT RE ENVIRONMENTAL ANALYSIS PARA I.A.(3.) REFTEL.

4. SINCE THESE ARE NO YEAR FUNDS, OBLIGATION DURING FY 77 NOT REQUIRED CHRISTOPHER

BT
#4 828

ATO	DW	ACT	INT
RCO	0 M		
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	TRV		

RECEIVED
SEP 30 10 00 AM '77
USAID/C&R

DEPARTMENT OF STATE TELEGRAM

INDICATE
 COLLECT
 CHARGE TO USAID

	FROM AMEMBASSY MANILA	CLASSIFICATION UNCLASSIFIED	1585
E.O. 11652:	N/A		R 030323Z OCT 77 7
TAGS:	SUBJECT: BICOL INTEGRATED AREA DEVELOPMENT II PROJECT, 492-0275		
ACTION:	SECSTATE WASHDC 6002		
	UNCLASSIFIED MANILA 15652		
	AIDAC		
REF.:	A. STATE 227606 B. MANILA 14996		
	1. Mission agrees to suggestion in reftel A, para 1A and will		
DIST.:	incorporate appropriate language in Project Agreement and		
	letters of implementation.		
ODM	2. Mission and GOP appreciate APAC concern about possible		
FO	contamination of groundwater used for household purposes		
AD/CD	expressed in para. 1B and readily agree to increased loan		
OC	amount for improved barangay water systems where necessary.		
AD/RD-10	Informally, GOP planners had already expressed their		
C&R	intention of constructing more substantial household water		
ADM	supply systems where necessary depending on outcome of		
ECON	environmental sanitation studies in Project Area. GOP		
CRU	officials have indicated they welcome AID interest and		

DRAFTED BY: AD/RD:CSCallison:DFWadley:fcs	DRAFTING DATE 9/29/77	TEL. EXT. 408	CONTENTS AND CLASSIFICATION APPROVED BY: Peter M. Cody, Director
--	--------------------------	------------------	---

CLEARANCES:

FO:FYoung (in draft)
 AD/CD:RDangler (in draft)

ODM:CCChristian

support in this project component which is also complementary to other Mission efforts to improve rural barangay water supplies.

3. Ref para. 1C, project has been carefully designed to minimize temporary economic losses to area residents. Useable irrigation facility segments will be constructed during dry seasons to avoid disrupting main cropping season. Use of locally hired labor will provide many families with additional employment during construction. All small scale farmers, tenants and landless squatters registered in project area villages will be awarded at least as much land as they presently till. The minimum allocation is 1.0 hectare for those with smaller holdings or no land. The project rotational irrigation system will encourage labor-intensive production which will in turn provide more employment for farm workers. PP describes plan to compensate families for minor damages expected from relocating thatch houses (nipa huts) and to provide funds for new toilets and wells. Routine procedures exist to compensate those few families expected to suffer unavoidable right-of-way damages, and it is believed that adequate funds have been allocated for such compensation. (See page 36 and Tables 14 and 18, Annex B(3), of subject PP.) Mission believes adequate consideration has been given to compensating those

economically inconvenienced by project, and we do not believe anyone will be displaced. We will, of course, expect to see these project design features, including equitable land allocation, in the official implementation plan. This also will be closely monitored by USAID during implementation.

4. Ref. para. 1D, maintenance of project area roads was an issue of major concern to Mission and GOP planners. As PP indicates, all main roads of project area are included in Bicol Secondary and Feeder Roads Project and will be maintained by provincial engineer's office. To qualify for provincial maintenance, road must have 15-meter right-of-way (owned by province) and a 5-meter surface. It was considered too expensive in terms of land area and construction costs to meet ROW and surface width requirements for other project area roads (service and farm access). Maintenance of these tertiary gravel roads will be required only for farm access, and irrigation and drainage canal maintenance. The Mission believes the Irrigators Associations, composed of all farmers benefitting from each irrigation system, will be sufficiently capable of and interested in maintaining the required roads, as well as the canals, pumps and irrigation structures themselves, as outlined in the PP.

Department of Public Highways willing to maintain barangay roads on a reimbursible basis and is an alternative. Barangay settlement streets constructed by the project, of course, will be maintained by the barangay organization.

- 5. Para 2, reftel A answered in reftel B.

EXCEL WENZEL
EW

- Hand pumps installed	188	380	479	183	-	1230
- Water-sealed pit privies constructed or approved	188	380	479	183	-	1230
Land Consolidation and Tenure Reform						
- Farmslots consolidated	908	403	349	1003	-	2663
- Consolidated farms demarcated	425	237	145	446	-	1253
- New CLT's, leases & titles issued (or old ones confirmed)	321	328	145	436	-	1230
Organizational Development and Training						
a. Organizations formed						
- Compact farms	32	33	34	24	-	123
- District Irrigators' Associations	12	11	11	8	-	42
- Irrigators' Associations (IA)		3	1	1	-	5
- Homemakers' Clubs	5	9	6	7	5	32
- Youth Clubs	9	11	15	23	9	65
b. People trained						
- Project Implementors	34					34
- Promotion Committee Members	18					18
- Barangay Leaders	18	19	33	-	-	70
- Compact farm members ^{2/}		161	375	476	218	1230
- Compact farm leaders	96	99	102	72	-	369
- District IA officers ^{2/}	-	24	22	22	16	84
- IA Board Members ^{2/}	-	12	11	11	8	42
- IA watermasters ^{2/}	-	-	2	2	1	5
- Ditchtenders ^{2/}	-	-	2	2	1	5
- Farmers (in health, etc.)	205	305	259	265	196	1230
- Homemakers	205	305	259	265	196	1230
- Youth	306	414	540	840	366	2460
Applied Agricultural Research						
- Applied Agricultural Crops	1	2	2	2	3	10

1/ 82% of 1230 total families expected to relocate.

2/ Completion of both classroom and on-the-job training to include intensive extension assistance for up to one year.

- concepts and studies.
- Groundwater survey and analysis indicates sufficient availability of groundwater to irrigate Phases II and III.
 - COP budgetary releases are made as planned to fund each year of project design, construction and training, including the redesign of Phase I before Sept. 30, 1977, and do not delay scheduled activities.
 - Bicol Secondary and Feeder Roads Project will provide improved main road access into Phases IV and V by the end of CY 1978.

Project Inputs: (\$1000)^{1/} (D-1) **Implementation Target: (Type and Quantity) (D-2)**

Project Component	AID LOAN			GOP LC	TOTAL	YEAR:					
	FX	LC	TOTAL			1976-7	1978	1979	1980	1981	1982
I Physical Facilities	356	1721	2077	1294	3371	371	740	797	940	494	28
a. Imported Equipment	(356) ^{2/}		(356)		(356)		(356) ^{4/}				
b. Construction Costs		(1721)	(1721)	(1294)	(3015)	(371) ^{2/}	(384)	(797)	(940)	(494)	(28)
II Homesite Development				337	337	23	56	108	120	30	
III Land Consolidation & Tenure Reform				22	22	2	5	4	4	4	4
IV Organizational Development & Training				115	115		24	22	21	23	24
V Applied Agricultural Research				13	13		1	3	3	3	4
VI Project Ops. & mgt.	45		45	152	197	49	67	19	19	20	22
a. Imported Equipment	(45) ^{5/}		(45)		(45)		(45) ^{5/}				
b. Local Costs				(152)	(152)	(49) ^{3/}	(22)	(19)	(19)	(20)	(22)
SUB-TOTALS	401	1721	2122	1933	4055	445	894	953	1107	574	82
15% Contingency	60	258	318	290	608	67	134	143	166	86	12
SUB-TOTALS	461	1980	2441	2222	4663	512	1028	1096	1273	660	94
Cost Escalation Factor ^{6/}	69	390	459	339	798	0	109	159	287	205	38
GRAND TOTALS	530	2370	2900	2561	5461	512	1137	1255	1560	865	132
			53%	47%							

(D-3)

Assumptions for providing inputs: (D-4)

1/ Derived from peso estimates, Table 13, Annex B, using an exchange rate of P7.5/\$ for 1976-9, P8.0/\$ for 1980-2.

2/ \$138 thousand = value of work completed in 1976, \$233 = amount budgeted CY 1977.

3/ \$36 thousand = Pilot Project Ops. & Mgt. through 1976, \$13 = est. for CY 1977.

4/ Pumps and spare parts.

5/ Vehicles, spare parts & typewriters.

6/ 1977 base year. Imported equipment escalated 15%/yr., all local costs 7%/yr before conversion to dollars.

OBJECTIVE	OBJECTIVELY MEASURABLE INDICATOR (A-2)	MEANS OF VERIFICATION (A-3)	IMPORTANT ASSUMPTIONS (A-4)
<p>Objective 1: Increase rice yield</p> <p>1.1. Increase rice yield from 1977 to 1982 to 100% of the 1977 level.</p> <p>1.2. Increase rice yield from 1977 to 1982 to 120% of the 1977 level.</p> <p>1.3. Increase rice yield from 1977 to 1982 to 150% of the 1977 level.</p>	<p>(A-2)</p> <p>1.1. Rice yield per hectare (1977-1982)</p> <p>1.2. Rice yield per hectare (1977-1982)</p> <p>1.3. Rice yield per hectare (1977-1982)</p>	<p>(A-3)</p> <p>1. Rice yield per hectare (1977-1982)</p> <p>2. Rice yield per hectare (1977-1982)</p> <p>3. Rice yield per hectare (1977-1982)</p>	<p>(A-4)</p> <p>1. Sufficient agricultural credit will be available to finance required production inputs.</p> <p>2. The National Grains Authority (NGA) and Area Marketing Cooperatives will help assure a satisfactory floor price for rice at farmgate by providing a ready, if residual, market for project area production.</p> <p>3. The Department of Education and Culture (DEC) will staff the new San Jose elementary school with sufficient teachers as agreed.</p> <p>4. The Camarines Sur Electric Cooperative II (CASURECO II) will extend sufficient electric power into the project area to drive all the pumps as they are installed.</p> <p>5. The Bicol Secondary and Feeder Roads Project will provide improved all-weather main road access into the entire project area by the end of CY 1979.</p> <p>6. The proposed Bicol Integrated Health, Nutrition and Population Project will be approved and implemented.</p> <p>7. Economic, financial and consumption incentives will be sufficient to encourage the use of irrigation systems and modern production technology to increase production.</p> <p>8. Training programs for rice and backyard garden and livestock projects acceptable and desirable to project area residents.</p> <p>9. Family planning practices will be acceptable to area residents.</p> <p>10. Nutritious diets recommended in training programs will be palatable to area residents.</p>

Project Purpose: (B-1)	Conditions that will indicate purpose has been achieved. End-of-Project Status. (B-2)	(B-3)	Assumptions for achieving Purpose: (B-4)
<p>1. Farmers practicing appropriate modern crop production technology.</p> <p>2. Farms utilizing and maintaining new irrigation and drainage systems and cultivating at least two crops annually.</p> <p>3. Farmers utilizing and maintaining all-weather service road and farm path networks.</p> <p>4. Reduced home-to-farm and lot-to-lot travel time.</p> <p>5. Farm families adopting backyard projects to raise livestock and vegetables.</p> <p>6. Improved land tenure security.</p> <p>7. Significant increase in the prevalence rate of family planning acceptors.</p> <p>8. Improved sanitary environment.</p> <p>9. Improved meal planning and food preservation.</p> <p>10. Improved access to elementary education facilities for Barangay San Jose residents.</p> <p>11. Irrigation Associations and other new organizations functioning effectively.</p>	<p>(B-2)</p> <p>1) 100% of project area farmers are using high-yield varieties seeds, new technology and appropriate modern inputs by the end of CY 1982.</p> <p>2) 2062 hectares effectively irrigated and producing at least two crops annually and all irrigation and drainage systems are in operation and satisfactorily maintained by 1982.</p> <p>3) All-weather service roads and access paths reaching every farm lot (up from the 10% reached now by only dry-weather dirt roads) utilized by all farmers and maintained by Irrigators Associations (IA) by 1982.</p> <p>4) Farm-to-market transport costs per cavan of rice paddy reduced from P4.50 to P1.20 (1974 prices) by 1982.</p> <p>5) Round-trip home-to-farm travel time reduced from 30 minutes each day (as determined in 1977 DHS) that the average farmer visits all of his plots to 25 minutes by 1982.</p> <p>6) 50% of the households are implementing backyard poultry, livestock and/or garden projects by 1982.</p> <p>7) 1200 former tenants and squatters are recipients of Certificates of Land Transfer (CLT's) or consolidated farms and are making their annual amortization payments toward full ownership by 1982.</p> <p>8) 40% of women of reproductive age motivated to adopt a recommended family planning method by 1982.</p> <p>9) 100% of households in the planned homesteads equipped with and using sanitary toilet facilities; no open drainage ditches will contain fecal matter or untreated sewage by 1982.</p> <p>10) 100% of households in the planned homesteads have access to and use safe water for household purposes by 1982.</p> <p>11) 70% of households with children using recommended meal planning and food preparation procedures by 1982.</p> <p>12) New 3-room schoolhouse in Barangay San Jose staffed and fully operational by June 1980.</p> <p>13) Five Irrigators Associations (IA's) are controlled and managed by the farmer-members themselves to operate and maintain irrigation and road facilities by the end of CY 1982.</p>	<p>(B-3)</p> <p>1) Farm technicians reports</p> <p>2) Rural bank credit records</p> <p>3) On-site inspection</p> <p>4) Bicol multipurpose socio-economic surveys (BMS)</p> <p>5) Dept. of Agrarian Reform and tax records</p> <p>6) Irrigation Association records</p> <p>7) Line agency extension workers' reports.</p>	<p>(B-4)</p> <p>1) Sufficient agricultural credit will be made available to finance required production inputs.</p> <p>2) The National Grains Authority (NGA) and Area Marketing Cooperatives will help assure a satisfactory floor price for rice at farmgate by providing a ready, if residual, market for project area production.</p> <p>3) The Department of Education and Culture (DEC) will staff the new San Jose elementary school with sufficient teachers as agreed.</p> <p>4) The Camarines Sur Electric Cooperative II (CASURECO II) will extend sufficient electric power into the project area to drive all the pumps as they are installed.</p> <p>5) The Bicol Secondary and Feeder Roads Project will provide improved all-weather main road access into the entire project area by the end of CY 1979.</p> <p>6) The proposed Bicol Integrated Health, Nutrition and Population Project will be approved and implemented.</p> <p>7) Economic, financial and consumption incentives will be sufficient to encourage the use of irrigation systems and modern production technology to increase production.</p> <p>8) Training programs for rice and backyard garden and livestock projects acceptable and desirable to project area residents.</p> <p>9) Family planning practices will be acceptable to area residents.</p> <p>10) Nutritious diets recommended in training programs will be palatable to area residents.</p>

Project Outputs: Stage II	Magnitude of Outputs: Stage I (C-2a)	Stage II (C-3a)	Assumptions for achieving Outputs: Stage II (C-4a)																																																																																																																																																			
<p>Physical Facilities</p> <ul style="list-style-type: none"> - Pumphouse built - Pumps installed - Irrigation canals (km) - Drainage canals (km) - Service roads and paths (km) - (Motorcar (irrigat.) - Multipurpose buildings - Elementary schoolhouse <p>Humanite Development</p> <ul style="list-style-type: none"> - Homesteads completed - Homesteads developed and distributed 	<p>(C-2a)</p> <table border="1"> <thead> <tr> <th>Year</th> <th>1978</th> <th>1979</th> <th>1980</th> <th>1981</th> <th>1982</th> <th>TOTAL</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>5</td> </tr> <tr> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>10</td> </tr> <tr> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>15</td> </tr> <tr> <td>4</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> <td>20</td> </tr> <tr> <td>5</td> <td>5</td> <td>5</td> <td>5</td> <td>5</td> <td>5</td> <td>25</td> </tr> <tr> <td>6</td> <td>6</td> <td>6</td> <td>6</td> <td>6</td> <td>6</td> <td>30</td> </tr> <tr> <td>7</td> <td>7</td> <td>7</td> <td>7</td> <td>7</td> <td>7</td> <td>35</td> </tr> <tr> <td>8</td> <td>8</td> <td>8</td> <td>8</td> <td>8</td> <td>8</td> <td>40</td> </tr> <tr> <td>9</td> <td>9</td> <td>9</td> <td>9</td> <td>9</td> <td>9</td> <td>45</td> </tr> <tr> <td>10</td> <td>10</td> <td>10</td> <td>10</td> <td>10</td> <td>10</td> <td>50</td> </tr> <tr> <td>11</td> <td>11</td> <td>11</td> <td>11</td> <td>11</td> <td>11</td> <td>55</td> </tr> <tr> <td>12</td> <td>12</td> <td>12</td> <td>12</td> <td>12</td> <td>12</td> <td>60</td> </tr> <tr> <td>13</td> <td>13</td> <td>13</td> <td>13</td> <td>13</td> <td>13</td> <td>65</td> </tr> <tr> <td>14</td> <td>14</td> <td>14</td> <td>14</td> <td>14</td> <td>14</td> <td>70</td> </tr> <tr> <td>15</td> <td>15</td> <td>15</td> <td>15</td> <td>15</td> <td>15</td> <td>75</td> </tr> <tr> <td>16</td> <td>16</td> <td>16</td> <td>16</td> <td>16</td> <td>16</td> <td>80</td> </tr> <tr> <td>17</td> <td>17</td> <td>17</td> <td>17</td> <td>17</td> <td>17</td> <td>85</td> </tr> <tr> <td>18</td> <td>18</td> <td>18</td> <td>18</td> <td>18</td> <td>18</td> <td>90</td> </tr> <tr> <td>19</td> <td>19</td> <td>19</td> <td>19</td> <td>19</td> <td>19</td> <td>95</td> </tr> <tr> <td>20</td> <td>20</td> <td>20</td> <td>20</td> <td>20</td> <td>20</td> <td>100</td> </tr> </tbody> </table>	Year	1978	1979	1980	1981	1982	TOTAL	1	1	1	1	1	1	5	2	2	2	2	2	2	10	3	3	3	3	3	3	15	4	4	4	4	4	4	20	5	5	5	5	5	5	25	6	6	6	6	6	6	30	7	7	7	7	7	7	35	8	8	8	8	8	8	40	9	9	9	9	9	9	45	10	10	10	10	10	10	50	11	11	11	11	11	11	55	12	12	12	12	12	12	60	13	13	13	13	13	13	65	14	14	14	14	14	14	70	15	15	15	15	15	15	75	16	16	16	16	16	16	80	17	17	17	17	17	17	85	18	18	18	18	18	18	90	19	19	19	19	19	19	95	20	20	20	20	20	20	100	<p>(C-3a)</p> <p>1) Physical verification (at end of project) and BMS Management Information System (MIS) reports</p> <p>2) BMS MIS records and special survey</p> <p>3) Training reports</p> <p>4) Records of Dept. of Agrarian Reform (DAR), National Irrigation Administration (NIA), Dept. of Health (DOH), DENR, and other United Agencies.</p>	<p>(C-4a)</p> <p>1) The farmer will not depart from normal pattern and do drastically unproductive operations will see to distinct physical construction activities.</p> <p>2) Critical construction are available to do the physical construction work required.</p> <p>3) Extension personnel and participant institutions are available to be responsible for project area residents.</p> <p>4) Farmers continue to have support for land reclamation and sewerage construction.</p>
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*** Printed separately in the Annex B Supplement to this PP, available in ASIA/PD, ASIA/EAA/P, and SER/ENG, as well as in USAID/Manila.**

ANNEX I

DRAFT OF PROJECT DESCRIPTION TO BE USED IN THE
LOAN AGREEMENT

The Bicol Integrated Area Development II Project (Bula-Minalabac Land Consolidation) is designed to improve the socio-economic situation and the quality of life of the rural poor residing in the project area by 1) increasing agricultural production and productivity per hectare, 2) increasing productive employment opportunities, 3) reducing the crude population growth rate, 4) improving health and nutritional status, 5) making elementary education available to all project area children, and 6) increasing farmer participation and leadership in social and economic development.

Specifically, the proceeds of this loan are to be used to finance the United States Dollar costs and a portion of local currency costs incurred in the construction of pump irrigation, drainage and road access facilities within the project area. As an integral part of the project, the borrower will also fund 1) the construction of seven multipurpose barangay buildings, one elementary schoolhouse, and seven planned homesite areas with water-sealed toilets and improved water supply facilities for each family, 2) the organization of compact farms, district and irrigators association, rural homemaker and youth improvement clubs, 3) land consolidation and redistribution, and 4) the training of project area residents in cooperative activities, water management, modern farm technology, leadership, health, sanitation, nutrition, family planning and backyard projects. Together with other activities listed as covenants below, these project components are expected to result in 1) farmers practicing appropriate modern crop production technology, 2) farms utilizing and maintaining new, efficient irrigation and drainage systems and cultivating at least two crops annually, 3) farmers utilizing and maintaining all-weather service road and farm path networks, 4) reduced home-to-farm and lot-to-lot travel time, 5) farm families adopting backyard projects to raise livestock and vegetables, 6) improved land tenure security, 7) significant increase in the prevalence rate of family planning acceptors, 8) improved sanitary environment, 9) improved meal planning and food preparation, 10) improved access to elementary education facilities for Barangay San Jose residents, 11) irrigation and other rural organizations functioning effectively.

DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D.C. 20523

ANNEX J.

SEP 28 1977

ACTION MEMORANDUM FOR THE AA/ASIA

FROM: ASIA/PD, Alexander R. Love

SUBJECT: Project Authorization Form and Request for Allotment
Bicol Integrated Area Development II
PHILIPPINES

Problem: Your signature is requested on the attached Project Authorization Form authorizing \$2.250 million for FY 77 and approving another \$.75 million for FY 78, subject to availability of funds and a favorable ground water survey.

Discussion: The APAC approved the Bicol Integrated Area Development II Project on September 14 for \$3.0 million, \$100,000 over the amount requested but still within the OYB level. The additional funds are to allow for study and design and construction, if the GOP judges it feasible, of centralized water systems in at least three of the lowest-lying villages. The Committee felt this desirable to ensure that, if further study indicated a high possibility of contamination of shallow wells, the GOP would have adequate resources for construction of the more costly centralized systems. The GOP agrees with this approach, and we have received a cabled copy of the letter from Secretary Sicat requesting the additional funds (TAB B). No Advice of Program Change is required.

The Committee also decided to add a special covenant, which has been agreed to by USAID/Manila, indicating that the GOP will review and respond to the environmental assessment in the Project Paper. The assessment identifies several possible negative effects of the project and outlines how careful project implementation might minimize those effects.

Recommendation: That you sign the attached Project Authorization Form, Part II.

Approved John R. Love

Disapproved _____

Date 9/27/77

Attachments:

TAB A - PAF, Parts I and II
TAB B - Manila 14996

PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS PART I

PAF

A ADD
 C CHANGE
 D DELETE

2. DOCUMENT CODE
5

3. COUNTRY ENTITY Philippines		4. DOCUMENT REVISION NUMBER <input type="checkbox"/>	
5. PROJECT NUMBER (7 digits) [492-0310]	6. BUREAU/OFFICE A SYMBOL ASIA B CODE [04]	7. PROJECT TITLE (Maximum 60 characters) [Bicol Integrated Area Developmt II]	
8. PROJECT APPROVAL DECISION <input type="checkbox"/> A APPROVED <input type="checkbox"/> D DISAPPROVED <input type="checkbox"/> DE DEAUTHORIZED		9. EST. PERIOD OF IMPLEMENTATION YRS. [05] QTRS. [20]	

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE		E. 1ST FY 77		H. 2ND FY 78		K. 3RD FY	
		C GRANT	D LOAN	F GRANT	G LOAN	I GRANT	J. LOAN	L. GRANT	M. LOAN
(1) FN	B213		210		2250		750*		
(2)									
(3)									
(4)									
TOTALS					2250		750*		

A. APPROPRIATION	N. 4TH FY		Q. 5TH FY		LIFE OF PROJECT		11. PROJECT FUNDING AUTHORIZED	
	O. GRANT	P. LOAN	R. GRANT	S. LOAN	T. GRANT	U. LOAN	1. LIFE OF PROJECT	2. INCREMENTAL LIFE OF PROJECT
(1) FN						3000		2
(2)								
(3)								
(4)								
TOTALS								8 2

12. INITIAL PROJECT FUNDING ALLOTMENT REQUESTED (\$000)			13. FUNDS RESERVED FOR ALLOTMENT <i>Unallocated</i>	
A. APPROPRIATION	B. ALLOTMENT REQUEST NO. 1		TYPED NAME (Chief, SER/EM/PSD)	
	C. GRANT	D. LOAN	SIGNATURE <i>[Signature]</i>	
(1) FN		2250	DATE <i>[Date]</i>	
(2)				
(3)				
(4)				
TOTALS		2250		

14. SOURCE/ORIGIN OF GOODS AND SERVICES
 000 541 LOCAL OTHER _____

15. FOR AMENDMENTS, NATURE OF CHANGE PROPOSED

FOR PPC/PIAS USE ONLY	16. AUTHORIZING OFFICE SYMBOL	17. ACTION DATE MM DD YY	18. ACTION REFERENCE (Optional)	ACTION REFERENCE DATE MM DD YY

AID 1989-8 (7-78) *Authorization and obligation of this tranche depends on favorable ground water survey.

DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D.C. 20523

PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS

PART II

PHILIPPINES

**Bicol Integrated Area Develop-
ment II (Bula-Minalabac
Land Consolidation) Project
A.I.D. Loan No. 497-T-046**

Pursuant to Part I, Chapter 1, Section 103, and Chapter 2, Title I, of the Foreign Assistance Act (FAA) of 1961, as amended, I hereby authorize a Loan to the Government of the Philippines, (the "Cooperating Country") of not to exceed Two Million Two Hundred and Fifty Thousand United States Dollars (\$2,250,000) (the "Authorized Amount"), to help in financing certain foreign exchange and local currency costs of goods and services required for the project as described in the following paragraph. The project consists of 1) the construction and provision of pump irrigation, drainage and road access facilities and equipment within the 2300-hectare project area, and 2) related land consolidation and tenure reform, organizational development, training and applied agricultural research (hereinafter referred to as the "Project").

I approve the total level of A.I.D. appropriated funding planned for this Project of not to exceed Three Million United States Dollars (\$3,000,000) Loan, including the funding authorized above, during the period FY 1977 through FY 1978. I approve a second increment during that period of Loan funding up to \$750,000, subject to the availability of funds in accordance with A.I.D. allotment procedures and subject to a favorable determination of ground water availability for the proposed irrigation purposes in relevant portions of the project area (Phases II and III), as required by Section 611(a) of the FAA.

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

a. Interest Date and Terms of Repayment

The Cooperating Country shall repay the Loan to A.I.D. in United States Dollars within forty (40) years from the date of first disbursement of the Loan, including a grace period of not to exceed ten (10) years. The Cooperating Country shall pay to A.I.D. in United States Dollars interest from the date of first disbursement of the Loan at the rate of (a) two percent (2%) per annum during the first ten (10) years, and (b) three percent (3%) per annum thereafter, on the outstanding disbursed balance of the Loan and on any due and unpaid interest accrued thereon.

b. Source and Origin of Goods and Services

Except for ocean shipping, goods and services financed by A.I.D. under the Project shall have their source and origin in the Cooperating Country or in the United States or in countries included in A.I.D. Geographic Code 941 except as A.I.D. may otherwise agree in writing. Ocean shipping financed under the Loan shall be procured in any eligible source country except the Cooperating Country.

c. Other Terms and Conditions

1. Unless A.I.D. otherwise agrees in writing:

A. The Loan Agreement shall provide that prior to any disbursement or the issuance of any commitment documents under the Loan Agreement, the Cooperating Country shall furnish, or cause to be furnished, the following in form and substance satisfactory to A.I.D.:

(1) A copy of the Philippine Government order establishing the Department of Agrarian Reform (DAR) as the lead implementing agency, responsible to the Bicol River Basin Development Program (BRBDP) for the effective and timely implementation of this Project.

(2) A copy of the Philippine Government order establishing a composite Project Management Office (PMO) under the supervision of the DAR regional office, with authorities and responsibilities to enable the PMO to effectively carry out assigned functions, including necessary delegations of authority from the DAR, the lead implementing agency, to the DAR Regional Director and the Project Manager to (a) enter into contracts (b) make financial payments for work accomplished and (c) hire any additional personnel required by the PMO, with the concurrence of the Bicol River Basin Development Program Office (BRBDPO), the "coordinator."

(3) A plan for the implementation of the Project prepared by the PMO on behalf of the BRBDPO, including a projection of funds available to finance the various elements of the Project.

(4) A plan for socio-economic and construction evaluation of the Project, the former by BRBDPO contract, the latter involving periodic review of the Project by an evaluation team consisting of inter alia one representative of BRBDPO, The National Economic Development Authority (NEDA), and A.I.D., and an undertaking by the Cooperating Country that it will cause periodic recommendations of the Project evaluation team to be implemented in a timely and effective manner.

(5) Written assurance from the BRBDPO that a farmer-controlled Irrigators Association will be formed for each separate irrigation system constructed, properly chartered, and that they will be given complete responsibility for managing, operating and maintaining the systems prior to the third full cropping season after their construction is completed and operational in each Phase, including provisions for the collection of water fees and the repayment of construction costs, in accordance with government policy, and a plan for systematic operations and maintenance.

(6) Notification by January 1978 that all money has been released to the PMO necessary to fund the first year of construction, contracting and all other first-year project activities as agreed in the implementation plan, including sufficient money to contract final architectural and engineering design and construction drawings as required for the whole Project.

(7) The PMO and DAR, as the lead agency, shall provide A.I.D. with a copy of the appropriate water permit duly procured from the National Water Resources Council covering all diversions and uses of public water resources proposed in this Project, except that, if river and ground water permits must be separately procured, the river water permit shall satisfy this condition precedent and the ground water permit shall be provided as part of a subsequent condition for Phases II and III.

B. The Loan Agreement shall contain the following special covenants by the Cooperating Country:

(1) The Cooperating Country, through the DAR, will, within twelve months from the beginning of construction in each of the five phases of the project area, issue all Certificates of Land Transfer (CLT's) and secure written, registered leasehold contracts for all farmers eligible in that phase area under R.A. 3844, P.D. 27

and subsequent implementing instructions, it being understood that in most cases the CLT's will be for consolidated plots of land and will often differ in location and size from the farmers' original parcels, according to plan.

(2) The Cooperating Country, through the DAR, will determine and fix within six months from the signing of the Loan Agreement, if it has not already done so, land values for all land in the project area subject to transfer under the provisions of P.D. 27 and subsequent implementing instructions.

(3) BRBDP will assure that Project Evaluation Procedures are implemented in accordance with the agreed upon plan.

(4) The PMO and DAR will submit, in form and substance satisfactory to A.I.D., a copy of a signed contract with a reputable architectural and engineering firm(s) to complete final design, construction drawings, specifications and contract documents for Phases II, III, IV and V of the Project and to review the same for Phase I, the latter to be completed by an "in house" National Irrigation Administration (NIA)/DAR/BRBDP team.

(5) The PMO and DAR will submit for A.I.D. approval final engineering designs, drawings, specifications and the proposed construction contract for each phase of the Project as they are completed, with those for Phase I to be completed in sufficient time for IFB procedures and contract negotiations to be accomplished before the beginning of the 1978 Bicol dry season (Jan. 1978).

(6) The Cooperating Country shall assure that the National Grains Authority (NGA) will implement current plans to construct and install a rice drying, milling and storage complex in the Municipality of Pili, Camarines Sur Province, so that it becomes operational with sufficient capacity to service the needs of the central portion of Camarines Sur Province, which includes the Bula-Minalabac Land Consolidation Project Area, by 1978, and that sufficient funds are released on a timely basis to NGA of Camarines Sur Province for this purpose.

(7) The Cooperating Country shall assure that the Department of Local Government and Community Development (DLGCD) proceeds with current plans to establish branches of the Camarines Sur Area Marketing Cooperatives to service the entire IAD-II Land Consolidation Project Area by no later than 1981.

(8) The Cooperating Country shall assure that sufficient agricultural credit funds are made available to Project Area farmers through existing, revised, or successor programs to

enable them to purchase such modern agricultural inputs, such as new seed varieties, fertilizer and insecticides, as are required to cultivate two crops of high-yield rice annually.

(9) The Cooperating Country shall assure that the Department of Education & Culture (DEC) will equip and staff the additional elementary grade classrooms to be constructed in Barangay San Jose and will continue to staff elementary classrooms in each of the six barangays of the Project Area, as required by the school age population, and that sufficient funds will be released to the DEC provincial office in Camarines Sur on a timely basis for that purpose.

(10) BRBDP will, by the end of 1978, conduct a study, or contract to have one conducted, to determine the suitability of low-cost single-family rural house prototypes for the Project Area and for similar rural areas of the Bicol River Basin and to recommend any administrative or institutional changes in existing or mortgage loan programs that could facilitate home improvements or reconstruction by rural residents, when their average annual household income rises to a level sufficient to finance it.

(11) The Cooperating Country, in consultation with A.I.D., agrees to review the findings of the environmental assessment in the post-authorization design and implementation stages of the Project for appropriate application therein.

Clearances:	Date	Initial
Herbert E. Morris, GC/Asia	9/16/77	HEM
Alexander R. Love, Asia/PD/As	9/20/77	Ar Love
T. C. Clark, Jr., Asia/TR	9-20-77	TC
James L. Sloan, SER/ENGR	9-22-77	JLS
Donald D. Cohen, Asia/DP	9-23-77	DDC
Vance L. Elliott, Asia/PT/P	9/23/77	VLE
Michael H. B. Adler, DAA/Asia	9/24/77	MBA

Signature [Handwritten Signature]
 Assistant Administrator
 Bureau for Asia
 9/23/77
 Date

GC/Asia:HEMorris:hp:9/16/77

**EXCERPT FROM THE MINUTES OF THE MEETING OF THE
SAMAHANG NAYON OF BALIWAG VIEJO, MINALABAC
CAMARINES SUR, April 4, 1976**

**"RESOLUTION REQUESTING FOR THE LAND DEVELOPMENT OF
BALIWAG VIEJO"**

WHEREAS, it has been the obsession of the farmer-tillers at Baliwag, Viejo, Minalabac, Camarines Sur to keep abreast with the desire of the President, President Ferdinand E. Marcos to elevate all poor tillers of the land to a more dignified existence;

WHEREAS, majority of the DAR program beneficiaries find it hard for them to climb to the level of a strong middle class society, the President desires to build without a packaged support from the government;

WHEREAS, irrigation, drainage and service roads have been felt the need of the residents of this Barangay: the presence of which would greatly improve the deplorable condition of the tillers;

WHEREAS, on the motion of Roman Berina, duly seconded by Alejandro Tigie and concurred by all present, be it:

RESOLVED, as it is hereby resolved that this farmers' organization, membership of which comes from the different sectors of society, to request the powers-that-be, as the request is hereby made, that Baliwag Viejo be programmed for land development and made part of the present DAR-BRBC Pilot Land Consolidation Project considering its proximity to the project site; and inclusion of which promises the fulfillment of the felt needs of the farmer-beneficiaries.

RESOLVED FURTHER, that copies of this resolution be furnished all those concerned and proper representations by this organization should be made to add weight and credence to the above-quoted resolution: that it may readily be adopted and implemented by the implementing agency.

UNANIMOUSLY APPROVED:

I HEREBY CERTIFY to the correctness of the above-cited resolution.

(SGD.) SN Secretary

**(SGD.) ANTONIO TIGUE
SN President**

**EXCERPTS FROM THE MINUTES OF THE BARANGAY COUNCIL
MEETING AT FABRICA, CAUSIP ESTATE, BULA,
CAMARINES SUR HELD MARCH 30, 1976.**

RESOLUTION NO. _____

**"RESOLUTION REQUESTING DAR TO INCLUDE CAUSIP ESTATE
IN THE LAND CONSOLIDATION DEVELOPMENT PROGRAM"**

WHEREAS, majority of the farmer-leaders and Barangay Council members at the Causip estate chanced to visit the DAR-BRBC Pilot Land Consolidation Project at Lirag Estate, Bula Camarines Sur;

WHEREAS, said Barangay Council members and farmer-leaders are fully aware of the benefits that will accrue to farmer-beneficiaries at Lirag Estate after the completion of the project;

WHEREAS, if only Lirag Estate would be developed, farmer-beneficiaries at Causip Estate will never reach the goal that Lirag Estate farmer-beneficiaries aim to attain;

WHEREFORE, on motion presented and duly seconded, be it:

RESOLVED, as it is hereby resolved that this Barangay Council must request the Honorable Secretary, Secretary Conrado F. Estrella through Director Salvador Pejo of the Department of Agrarian Reform that Causip Estate must be seriously considered as the next land Consolidation Site, it being a landed estate and expropriated by the government.

RESOLVED FURTHER, that copies of the resolution be furnished the Honorable Secretary of the Department of Agrarian Reform Secretary Conrado F. Estrella and Director Salvador Pejo for their information and ready reference.

UNANIMOUSLY APPROVED:

I HEREBY CERTIFY to the correctness of the above-cited resolution.

(SGD.) BARRIO SECRETARY

ATTESTED:

(SGD.) ARSENIO ESPIRITU
Barangay Captain

**EXCERPTS FROM THE MINUTES OF THE MEETING OF THE
BARANGAY COUNCIL OF STO. DOMINGO, BULA,
CAMARINES SUR HELD FEBRUARY 2, 1976**

**"RESOLUTION REQUESTING THE DAR SECRETARY TO
CONSOLIDATE OLT AREAS IN BULA, CAMS. SUR."**

- WHEREAS,** almost 80 percent of the Barangay Sto. Domingo falls within the purview of P.D. No. 27;
- WHEREAS,** farmlots transferred to the OLT beneficiaries and farmlots under owner-cultivatorship are irregular in shape, fragmented and not serviceable by roads and irrigation canals;
- WHEREAS,** because of the foregoing problems, OLT recipients could hardly cope up with their amortization payments of the land transferred to them;
- WHEREAS,** lending institutions, both private and government-controlled, suffered poor loan repayments from both OLT recipients and owner-operators due to high production inputs coupled by very low yields;
- WHEREAS,** if roads and irrigation network will be made available and fragmented farmholdings would be consolidated, production inputs will be minimized, precious time and effort will be saved;
- WHEREAS,** on motion presented by Luciano Pili, duly seconded by Inocencio Balleon, be it:
- RESOLVED:** as it is hereby resolved that all OLT recipients and small owner-operators stand as one and request the DAR Regional Director, Director Salvador Pejo, to count on Sto. Domingo as one of the areas to be consolidated as soon as the present Land Consolidation Project at this municipality has been completed.
- RESOLVED FURTHER:** that copies of this resolution be furnished Director Salvador Pejo for his consideration and inclusion in the succeeding development plans of the DAR-BRBDP.

UNANIMOUSLY APPROVED:

I HEREBY CERTIFY to the correctness of the above-cited resolution.

(SGD.) BIENVENIDO VELASCO
Bo. Secretary

ATTESTED:

(SGD.) ANTONIO ORCENE
Barangay Captain