ADB

Completion Report

Project Number: 27245
Loan Number: 1668-PHI
October 2011

Philippines: Southern Philippines Irrigation Sector Project

Asian Development Bank

CURRENCY EQUIVALENTS

Currency Unit - peso (P)

		At Appraisal	At Project Completion
		28 October 1998	17 March 2011
P1.00	=	$0.02440	$0.02191
$1.00	=	P40.750	P45.639

ABBREVIATIONS

ADB	–	Asian Development Bank
ARMM	–	Autonomous Region of Muslim Mindanao
CIS	–	communal irrigation system
CPMO	–	central project management office
DENR	–	Department of Environment and Natural Resources
DOH	–	Department of Health
EA	–	executing agency
EIRR	–	economic internal rate of return
FIA	–	federation of irrigator associations
ha	–	hectare
IA	–	Irrigators' Association
M	–	meter
NIA	–	National Irrigation Administration
NIS	–	national irrigation system
O&M	–	operation and maintenance
PGAN	–	provincial government of Agusan del Norte
SPMO	–	subproject management office
SRIS	–	small reservoir irrigation system

GLOSSARY

service area	–	The intended (or designed) area to benefit from an irrigation scheme.
firmed-up service area	–	The area that is being irrigated for crop production and is net of areas that cannot be irrigated, including those converted to other uses—areas planted to trees and/or coconuts which owners decided not to convert to irrigated rice and/or vegetable production.
irrigated area	–	The area receiving irrigation water within an irrigation scheme's service area.

NOTE

In this report, "$" refers to US dollars unless otherwise stated.

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BASIC DATA

A. Loan Identification

1.	Country	PHI
2.	Loan Number	1668
3.	Project Title	Southern Philippines Irrigation Sector Project
4.	Borrower	Republic of the Philippines
5.	Executing Agency	National Irrigation Administration Provincial Government of Agusan del Norte
6.	Amount of Loan	$60,000,000
7.	Project Completion Report Number	1273

B. Loan Data

1.	Appraisal	
	– Date Started	6 July 1998
	– Date Completed	28 July 1998
2.	Loan Negotiations	
	– Date Started	21 November 1998
	– Date Completed	23 November 1998
3.	Date of Board Approval	18 December 1998
4.	Date of Loan Agreement	1 March 1999
5.	Date of Loan Effectiveness	
	– In Loan Agreement	30 May 1999
	– Actual	29 October 1999
	– Number of Extensions	3
6.	Closing Date	
	– In Loan Agreement	30 June 2006
	– Actual	30 June 2011
	– Number of Extensions	2
7.	Terms of Loan	
	– Interest Rate	LIBOR-based (floating)
	- Service Charge	0% per annum
	- Commitment Charge	0.75% per annum
	– Maturity (number of years)	25
	– Grace Period (number of years)	7
8.	Terms of Relending (if any)	
	– Interest Rate	14% per annum
	– Maturity (number of years)	25
	– Grace Period (number of years)	3
	– Second-Step Borrower	0

9. Disbursements

a. Dates

Initial Disbursement	**Final Disbursement**	**Time Interval**
30 May 2000	30 June 2011	135 months
Effective Date	**Original Closing Date**	**Time Interval**
29 October 1999	30 June 2006	80 months

b. Amount ($)

Cat No.	Description	Original Allocation	Last Revised Allocation	Amount Cancelled[a]	Amount Disbursed	Undisbursed Balance[b]
01A	Civil works (NIA)	23,312,400	25,300,000	(1,987,600)	22,089,032	3,210,968
01B	Civil works (MDFO)	1,353,600	800,429	553,171	704,957	95,472
01C	Civil works (indigenous people plan)	327,000	0	327,000	0	0
02A	Surveys and studies (NIA)	501,600	1,163,002	(661,402)	1,157,405	5,597
02B	Surveys and studies (MDFO)	86,400	60,000	26,400	65,569	(5,569)
03	Materials(schistosomiasis control)	998,000	527,072	470,928	327,812	199,260
04A	Equipment and vehicles (NIA)	982,000	1,000,000	(18,000)	962,108	37,892
04B	Equipment and vehicles (MDFO)	200,000	120,000	80,000	148,009	(28,009)
04C	Equipment and vehicles (schistosomiasis)	500,000	505,478	(5,478)	256,754	248,724
04D	Equipment and vehicles (indigenous peoples plan)	236,000	0	236,000	0	0
05A	Consultant (NIA irrigation)	4,153,000	6,478,413	(2,325,413)	6,416,758	61,655
05B	Consultant (watershed management)	443,000	370,000	73,000	294,225	75,775
05C	Consultant (resettlement)	180,000	75,000	105,000	71,306	3,694
05D	Consultant (indigenous peoples plan)	84,000	0	84,000	0	0
06	Training	424,000	600,000	(176,000)	523,866	76,134
07	Extension and training of irrigator associations	3,186,000	3,204,707	(18,707)	2,774,046	430,661
08	Community action (watershed management)	2,992,000	2,042,923	949,077	1,928,708	114,215
09A	Administration (watershed management)	340,000	560,000	(220,000)	450,996	109,004
09B	Administration (resettlement)	60,000	1,500,000	(1,440,000)	1,066,701	433,299
10	Interest during construction	14,400,000	11,861,006	2,538,994	10,775,120	1,085,886
11	Unallocated	5,241,000	1,236,000	4,005,000	0	1,236,000
	Total	**60,000,000**	**57,404,030**	**2,595,970**	**50,013,372**	**7,390,658**

NIA = National Irrigation Administration.
MDFO = Municipal Development Fund Office.
[a] There was one partial cancellation of $2,596,000 on 26 February 2010.
[b] The undisbursed loan balance of $7,390,000 at loan closing date was cancelled on 30 June 2011.

10. Local Costs (Financed)
    - Amount ($) 18,312,353
    - Percent of Local Costs 37.19%
    - Percent of Total Cost 22.62%

C. Project Data

1. Project cost ($'000)

Cost	Appraisal Estimate	Actual
Foreign Exchange Cost	44,600	31,701
Local Currency Cost	57,400	49,234
Total	**102,000**	**80,935**

2. Financing plan ($'000)

Cost	Appraisal Estimate	Actual
Implementation Costs		
Borrower Financed	33,090	29,948
ADB Financed	45,552	39,238
Beneficiaries[a]	8,894	974
Total	**87,536**	**70,160**
IDC Costs		
Borrower Financed		
ADB Financed	14,464	10,775
Other External Financing		
Total	**102,000**	**80,935**

ADB = Asian Development Bank, IDC = interest during construction.
[a] Actual excludes right-of-way contribution by beneficiaries of about $1.18 million.

3. Cost Breakdown by Project Component ($'000)

Component	Appraisal Estimate	Actual
A. Participation and transfer	**6,938**	**4,145**
Irrigator association organization and capacity building	2,358	
Participatory planning and facilitation	1,616	
Transfer of completed systems	2,964	
B. Physical infrastructure	**47,360**	**41,618**
Communal irrigation projects	2,237	1,341
National irrigation projects	33,118	18,002
Small river irrigation projects	10,150	21,706
Access roads	1,854	568
C. Environmental and social measures	**9,484**	**3,934**
Watershed management	4,926	3,012
Schistosomiasis control	1,540	374
Resettlement compensation	2,166	547
Indigenous peoples plan	852	0
D. Project management	**8,371**	**20,464**
Training of agency staff (PMO)	83	661
Vehicles and equipment	428	1,489
Consulting services (PMO)	1,888	6,833
Support and administration	5,972	11,481
Physical contingencies[a]	**9,372**	
Price contingencies[b]	**6,012**	
Total project cost before service charge	**87,536**	**70,160**
Interest during construction	**13,325**	**10,775**
Commitment charge	**1,138**	
Total project cost	**102,000**	**80,935**

PMO = Project Management Office.
[a] At 10% for civil works, vehicles, and equipment; 5% for other items.
[b] Annual factor of 2.2% for foreign exchange costs and 8.0% for local currency costs.

4. Project Schedule

Item	Appraisal Estimate	Actual
Date of Contract with Consultants	Q1 1999	19 May 2000
Date of Fielding of Consultants	Q2 2000	5 June 2000
Completion of Engineering Designs	Q4 1999	Q3 2002
Civil Works Contract		
Date of Award	Q1 2000	6 March 2001[a]
Completion of Works	Q4 2004	30 June 2010[b]
Equipment and Supplies		
First Procurement	Q1 1999	23 January 2002
Last Procurement	Q2 2000	1 June 2010
Vehicles		
First Procurement	Q1 1999	8 June 2002
Last Procurement	Q2 2000	30 June 2002
Start of Operations		
Completion of Tests and Commissioning		Various
Beginning of Start-Up		Various
Other Milestones[b]		
First partial cancellation		26 February 2010
Second partial cancellation and loan closing		30 June 2011

[a] First civil works contract awarded.
[b] Binalawan Dam of Magballo subproject was still ongoing at the time of project completion review mission.

5. Project Performance Report Ratings

Implementation Period	Ratings	
	Development Objectives	Implementation Progress
31 October 1999 to 31 December 1999	Satisfactory	Satisfactory
1 January 2000 to 31 December 2000	Satisfactory	Satisfactory
1 January 2001 to 31 December 2001	Satisfactory	Satisfactory
1 January 2002 to 31 December 2002	Satisfactory	Satisfactory
1 January 2003 to 31 December 2003	Satisfactory	Satisfactory
1 January 2004 to 31 December 2004	Satisfactory	Satisfactory
1 January 2005 to 31 December 2005	Satisfactory	Satisfactory
1 January 2006 to 31 December 2006	Satisfactory	Satisfactory
1 January 2007 to 31 July 2007	Satisfactory	Satisfactory
1 August 2007 to 30 November 2007	Partly Satisfactory	Partly Satisfactory
1 December 2007 to 31 December 2007	Satisfactory	Satisfactory
1 January 2008 to 31 December 2008	Satisfactory	Satisfactory
1 January 2009 to 31 December 2009	Satisfactory	Satisfactory
1 January 2010 to 31 December 2010	Satisfactory	Satisfactory

D. Data on Asian Development Bank Missions

Name of Mission[a]	Date	No. of Persons	No. of Person-Days	Specialization of Members[b]
Fact-finding	18 May–5 Jun 1998	6	114	a, b, c, d, e, q
Pre-appraisal	6–28 Jul 1998	5	45	a, c, d, e, f
Inception	7–17 Dec 1999	2	22	a, g
Loan review No. 1	30 Nov–1 Dec 2000	2	4	g, h
Loan review No. 2	18–30 May 2001	2	22	a, g
Special loan administration	2–11 Dec 2001	1	10	a
Midterm review	8–22 Nov 2002	3	45	e, i, l
Loan review No. 3	31 Jul–14 Aug 2003	2	30	i, l
Loan review No. 4	20–31 Aug 2004	2	24	I, l
Loan review No. 5	31 May–15 Jun 2005	2	32	i, l
Loan review No. 6	9–18 Aug 2006	3	30	i, l, m
Loan review No. 7	22 Aug–27 Sep 2007	4	40	c, m, n, o
Loan review No. 8	12 Nov–16 Dec 2008	5	25	c, g, k, n, o
Loan review No. 9	4 May–2 Jun 2009	5	40	c, g, k, n, o
Loan review No. 10	6–20 Oct 2009	4	60	g, k
Loan review No.11	22 Feb–4 Mar 2010	2	22	g, k
Project completion review[c]	8–16 Mar 2011	4	24	m, p, q
	Total		**589**	

[a] Includes identification, fact-finding, pre-appraisal, project inception, review, special loan administration, project review mission. Where more than one of each type of mission, they are numbered consecutively.

[b] a = senior project engineer, b = senior environment specialist, c = social development specialist, d = programs officer, e = project economist, f = counsel, g = assistant project analyst, h = senior project specialist, i = associate operations analyst, j = project engineer, k = rural development economist, l = senior water resources specialist, m = associate project analyst, n = senior water resources engineer; o = water resources management specialist, p = natural resources and agriculture economist, q = consultant.

[c] The project completion review mission comprised B. Giap, natural resources and agricultural economist (mission leader); E. Tayao-Castro, associate project analyst; K. Rutter and O. Cablayan, staff consultants.

I. PROJECT DESCRIPTION

1. The rationale for the project was founded upon the Government of the Philippines' development objective of poverty reduction, increased farm productivity, and diversity of its rural economy. The project objective was to increase incomes of about 10,000 farm households through increased agricultural production and crop diversification resulting from investment in irrigation infrastructure and measures to promote user participation in project development and subsequent system management supporting irrigator associations to undertake operations and maintenance of their systems.[1]

2. The project was implemented by the National Irrigation Administration (NIA) and the provincial government of Agusan del Norte (PGAN) as a sector modality project in which subproject preparation and subsequent construction was carried out during implementation of the overall project.

3. Components designed to achieve the objective included

(i) beneficiary participation in subproject design and transfer, including capacity building for irrigator associations, operational support for irrigator associations to achieve greater participation in subproject design and operation and maintenance (O&M), and transfer of completed facilities;
(ii) physical infrastructure, including national irrigation system (NIS) schemes,[2] communal irrigation system (CIS) schemes, small reservoir irrigation system (SRIS) schemes,[3] and rural access roads;
(iii) environmental and social measures, including initiatives in watershed management, resettlement, schistosomiasis control, and associated indigenous peoples development plans; and
(iv) project management, including support for a central project management office (CPMO) and provincially located subproject coordinating offices and subproject management offices (SPMOs).

4. The participation and transfer component (implemented by the NIA) involved development, field testing, documentation, and implementation of participatory processes to facilitate greater participation of beneficiaries in the feasibility study preparation, detailed design, financing, implementation, and system management and agricultural development.

5. The physical infrastructure component (implemented by the NIA and PGAN) involved developing communal, national, and small reservoir irrigation systems together with providing farm-to-market and access roads where appropriate.

6. The social and environmental component (implemented by the NIA, the Department of Environment and Natural Resources [DENR], and the Department of Health [DOH]) involved

[1] ADB. 1998. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the Republic of the Philippines for the Southern Philippines Irrigation Sector Project.* Manila.
[2] Under the overall project 15 subprojects were initially proposed but only 11 materialized—six NIS subprojects covering 8,610 hectares (ha) in Agusan del Sur, Surigao del Sur, and Lanao del Sur; two CIS subprojects with a combined service area of 297 ha in Agusan Del Norte; and three SRIS subprojects with a combined service area of 1,675 ha in Cebu, Negros Oriental, and Negros Occidental.
[3] NIS schemes have irrigation service areas of greater than 1,000 ha, CIS schemes are generally run-of-the-river gravity diversion systems of less than 1,000 ha, and SRIS schemes comprise storage dams with wall heights of less than 25 meters (m) and storage volumes of less than 50 million cubic meters.

developing and implementing measures to avoid or mitigate adverse environmental and/or social impacts, and executing a schistosomiasis control program.

7. The project management component (implemented by the NIA) involved establishing and operating management structures from central to subproject levels, training agency staff, providing consulting services, and a centralized procurement facility for vehicles and equipment and civil works, particularly for national and international competitive bidding.

8. At appraisal it was intended that 15 subprojects with a total command area of 17,500 hectares (ha) would be developed, and within this, about 70 irrigator associations would be strengthened to form 15 federated irrigator associations (FIAs) (the amalgamation of participating irrigator associations). The project was intended to protect around 40,000 ha of catchment above rehabilitated or constructed reservoirs, destroy snail colonies[4] in schemes financed under the project, and implement necessary subproject resettlement and indigenous people's plans. The project framework at appraisal is presented in Appendix 1, together with achievements against design targets.

II. EVALUATION OF DESIGN AND IMPLEMENTATION

A. Relevance of Design and Formulation

9. The project was consistent with the government's strategy of poverty reduction that sought to expand effective agriculture production areas through, among other things, increasing production intensity as well as crop diversification with the expansion and rehabilitation of irrigation systems under the Medium-Term Philippine Development Plan.[5] The designed implementation arrangements were consistent with the Local Government Code of 1991 that sought the devolution of operations and ownership of irrigation services and supported the government's initiatives under the Agriculture and Fisheries Modernization Act of 1997 to commit significant resources to irrigation rehabilitation and development.

10. The project was also consistent with the operational strategy of the Asian Development Bank (ADB) for the Philippines that focused on poverty reduction through social development.[6] Its strategy at the time of project formulation recognized the role of irrigation infrastructure as a means of addressing rural poverty that provides a more assured supply of water for cropping activities, thereby reducing farmers' exposure to droughts, which impact most severely upon the poor. The focus on capacity building of irrigator association members to facilitate their increased responsibility for O&M was consistent with ADB's desire to empower local communities to determine their own development. Furthermore, the geographic focus in the Visayas and Mindanao contributed to more equitable development of these less-developed areas of the Philippines.

11. The design was also highly relevant in that it went further with institutional development efforts on the transfer of costs and responsibilities of irrigator associations. The original intent in the design was also to pilot innovative engineering designs to address common problems such

[4] Snails are the vector for the transmission of the schistosomiasis parasite that causes itching of the skin and a slight rash in humans. If not treated in this early stage, the worm can migrate to other organs where more permanent damage can result.

[5] National Economic and Development Authority. 2003. *Medium-Term Philippine Development Plan, 2004–2010*. Manila.

[6] Poverty rates in the project area were estimated at 44.3% at appraisal.

as excessive silt loads in natural stream flows. In this sense, the project has initiated many new designs for adoption elsewhere in the country.

B. Project Outputs

12. The revised scope of the project included 11 subprojects with a firmed-up service area[7] of 11,279 ha, 64% of the appraisal estimate of 17,500 ha from the 15 subprojects envisaged. At the time of the project completion review mission, physical works were completed in five of the 11 subprojects, the remaining six being largely completed. Subproject details and completion status are presented in Appendix 2.

13. **Participation and transfer.** Forty six irrigator associations were supported and amalgamated into seven FIAs, all of which are registered with either the Securities and Exchange Commission or the Cooperative Development Authority. A total of 8,784 farming households are members of irrigator associations (88% of the target farming household beneficiaries). Ownership and management of Can-asujan SRIS has been fully transferred to its irrigator association. Management of Calayagon and Aclan-Amontay CISs has been transferred to the respective irrigator associations but ownership will only be transferred after irrigator associations have repaid outstanding loans for their equity contribution.[8] For NIS subprojects, responsibility for O&M of secondary and tertiary canals and associated water management structures has been transferred to the respective irrigator associations in accordance with the Irrigation Management and Transfer Policy of the NIA.[9]

14. **Physical infrastructure.** Physical infrastructure included three reservoirs with a storage capacity of 10.7 million cubic meters, seven diversion intakes, and four standard intakes. Under the project, five pumping stations were constructed and pumping equipment installed. Sixty-three km of main canals and 51 km of secondary canals were constructed, and 25 km of existing main canals and 98 km of secondary canals were rehabilitated. Fifteen km of main pipelines and 50 km of lateral pipelines were installed, 189 km of canal were lined, and 1,247 canal structures constructed. Under the project, 48 km of drainage canals, 349 km of main farm ditches, 98 km of supplementary ditches, and 20 km of on-farm drainage ditches with associated ditch structures were constructed. Some 127 km of service roads were constructed and/or upgraded together with 27 km of intrasite rural access roads, both with associated drainage structures; these roads have proved invaluable in reducing transport costs from farmers' fields to main roads for the sale of produce. A summary of infrastructure constructed is in Appendix 3.

15. **Environmental and social measures.** In cooperation with the DENR and with the participation of catchment resident communities, watershed management plans were prepared for 35,946 ha in core subprojects and 39,880 ha in noncore subprojects, compared to an appraisal target of 40,000 ha in both. More intensive interventions within catchments included high-value agroforestry (5,052 ha), natural vegetation strips (3,431 ha), and stream bed stabilization (224 ha). Monitoring of the impact of such interventions is continuing under routine DENR surveillance.

[7] The firmed-up area is the irrigation service area that can actually be covered from the newly rehabilitated or constructed irrigation scheme.

[8] Advanced to the project by the PGAN to facilitate construction of the subprojects.

[9] Memorandum Circular no. 47 in respect of the NIA's Irrigation Management and Transfer Policy and Implementing Guidelines.

16. At project completion, 231 project-affected persons (compared with an estimated 140 at appraisal) were resettled in two sites following inundation of houses in reservoir impoundment areas. The two resettlement villages have been developed with associated public services and handed over to local government authorities. Resettlement activities were widely discussed with project-affected persons and local administrations and, without exception, have resulted in affected persons being better off than in their previous locations. Income-generating initiatives that were very effective in improving household net incomes—including livestock rearing, crop diversification, and nonagricultural activities—were provided to both resettlers and nonresettlers to assist them in adjusting to the impact of project activities.

17. Five subprojects are located in areas where schistosomiasis is considered endemic, four of those being found in the Caraga Region and one in the Autonomous Region of Muslim Mindanao. Initially, the design included chemical control to eradicate snail vectors. With the banning of the active chemical by the World Health Organization and, at the request of the DOH, a new program was developed that included social mobilization, capability building, case detection and treatment, snail control, provision of equipment, monitoring and surveillance, research and evaluation, and project management. In the Caraga Region, 143,474 persons were examined and 7,295 treated. The outcome of the program has been a reduction in the incidence of the parasite in confined areas only, although across broader areas there have been little impact because of the continual cross infection from adjacent nontreated areas. Elimination of the snail vector has not been achieved.

18. The executing agencies (EAs) (see related para 27) facilitated women's participation in project activities. Based on available sex-disaggregated data compiled by the CPMO, the following observations were made: (i) 8,784 farm households joined irrigator associations, of which 1,504 (17%) were headed by women; (ii) 596 (31%) of 1,932 officers of FIAs, irrigator associations, and turnout service area group (TSAG) were women; (iii) 34 institutional development officers (IDOs) were engaged under the project, of whom 23 (68%) were women; and (iv) 38,505 farmer beneficiaries attended various trainings, of whom 15,603 (41%) were women. Women officers were very active in the running of irrigator associations' affairs and activities and were instrumental in the irrigator associations not giving up, despite delays in the completion of the subprojects. In the Rugnan subproject, the Maranao women's group, with initial membership of 32, was organized and trained for livelihood activities—Botika ng Barangay[10], mini grocery, and farm equipment. A total of P1.0 million was allocated under the project to such activities, with the money used for construction of the Botika structure and procurement of initial medicine supplies and grocery stacks.

19. There was initial concern during project design that some subprojects might impact upon ethnic minority groups, particularly in Region 13, necessitating the preparation of indigenous peoples development plans. However, during feasibility studies and detailed designs, it was confirmed that the ethnic minority beneficiaries were fully integrated as beneficiaries of the subprojects in question, negating the need for a specific subproject indigenous peoples development plan. In the Caraga Region, "free and prior informed consent" was obtained from the National Commission of Indigenous Peoples for the Baobo NIS subproject.

20. **Project management.** Management structures were established to implement the project, with staff being appointed 8 months after loan effectiveness. This contributed to delays

[10] Botika ng Barangay refers to a drug outlet managed by a legitimate community organization, non-government organization and/or the local government unit, with a trained operator and a supervising pharmacist (Department of Health Administrative Order No. 144 s. 2004).

in preparing, implementing, and coordinating subprojects. Despite the extensive capacity building program undertaken, there was also a capacity issue that was addressed through the extension of implementation consultants (Supplementary Appendix C).

C. Project Costs

21. At appraisal, the project cost was estimated at $102.0 million, consisting of $44.6 million in foreign exchange and the equivalent of $57.4 million in local costs. Financing arrangements included (i) a $60.00 million loan from ADB, of which $44.60 million was allocated to foreign costs and the equivalent of $15.40 million to local costs; (ii) $33.10 million being made available from government sources for local costs that included $26.70 million from the national government, $5.60 million advance equivalent to 10% equity of irrigator associations, $0.25 million advance for farmer equity for CIS subprojects, and $0.44 million from local government units; and (iii) $8.90 million from beneficiary contributions. At official closure of the loan account in June 2011, project expenditures totaled the equivalent of $80.93 million, with ADB contributing $50.01 million, representing 62% of total costs. The government contributed local currency costs equivalent to $29.95 million, while $0.97 million in cash was contributed by beneficiaries. If the value of rights-of-way[11] is added, the total contribution of beneficiaries utilized during construction was equivalent to 3.3% of investment cost. Summary cost allocations by component and disbursement accounts are presented in Appendixes 4 and 5.

22. The main deviation from the financing arrangements envisaged at appraisal reflects the difficulties experienced in raising beneficiary contributions, a situation that was hampered by the use of construction contracts. Contractors prefer to use their own labor resources, as this is generally cheaper than recruiting local labor through irrigator associations at the government minimum wage rate. This effectively limited the beneficiary contributions to 3.3% of the investment cost compared to 10.2% at appraisal. The delays in construction had a significant impact upon costs as the delays coincided with a period of large construction material price increases that significantly added to subproject costs.

D. Disbursements

23. The full disbursement of the loan was targeted by 2005 at appraisal. With the length of time needed to prepare subprojects and due to other reasons detailed in para. 26, commitment of loan funds was seriously delayed. Even though the loan became effective on 29 October 1999, actual disbursement began only in 2000 and final payment from the loan for activities completed in June 2010 was made in June 2011. One partial loan cancellation of $2,595,970 was approved in February 2010. The total amount of the loan utilized was $50,013,372. Appendix 6 presents the actual disbursements of the loan funds.

24. The disbursement schedule was ambitious given that, during appraisal, only three of the 11 subprojects had been prepared to feasibility level. The time estimated for detailed design of the three core subprojects was only 12 months in the original schedule, which was unrealistic. The feasibility studies for the noncore subprojects were scheduled to be completed in 3 years under the original schedule but actually took twice as long. Based on actual achievements, the preparation per subproject (including recruitment of contractors) required 48 months from

[11] The CPMO has reported that right-of-way contribution of beneficiaries is valued at P56.5 million (about $1.18 million. It was also reported that the total cash contribution was equivalent to P74.649 million but expenditure reports showed that only P55.850 million was utilized for physical works, indicating that part of the equity contribution might have been utilized for other expenditure items such as personnel expenses. The CPMO is in the process of reconciling equity contributions.

commencement of the feasibility study. One of the main difficulties that impacted upon disbursement was the requirement for beneficiary contributions (paras. 21–22) that placed a constraint on the capacity to generate funds.

E. Project Schedule

25. Implementation was initially planned for 7 years, 1999–2005, with closure on 30 June 2006. After two extensions, loan closure was deferred until 30 June 2010 to allow the completion of major and minor civil works for most subprojects (except for CIS schemes and the Can-asujan subproject, which were substantially completed by the end of 2006). Appendix 7 shows the original and actual implementation schedule.

26. Implementation delays were widespread due to

(i) delays in appointing staff to, and the achievement of full operational status of, the CPMO and SPMOs (positions were only approved by the Department of Budget and Management on 5 July 2000, 8 months after the loan was declared effective); this delayed the preparation of detailed design work and construction of core subprojects by 1–2 years;
(ii) relatively slow preparation of detailed designs due to a lack of trained and/or experienced personnel, particularly for the design of irrigation facilities at regional offices where the work was to be performed (section F);
(iii) shortages of beneficiary contributions of the 15% equity required to be raised during construction by irrigator associations (except for Can-asujan and CIS subprojects);
(iv) poor performance of contractors, particularly in Gibong subprojects, Cantilan subproject, and Binalawan Reservoir of Magballo-Balicotoc-Canlamay subproject;
(v) slow liquidation and replenishment of funds, which impacted upon cash availability;
(vi) adverse weather conditions that affected progress of civil works contracts in Gibong, Baobo, Cantilan, and Magballo-Balicotoc-Canlamay subprojects;
(vii) concerns raised by a nongovernment organization to Binalawan Reservoir in relation to water availability (the impact this might have on Dacong-Cogon sugar mill) and compensation of affected persons; and
(viii) delays in the start-up of the Rugnan subproject.

F. Implementation Arrangements

27. Implementation arrangements were generally satisfactory, with some operational weaknesses noted. The NIA was the EA for NISs and SRISs while the PGAN was the EA for CISs in accordance with government devolution policy under the Local Government Code of 1991. [12] Under memoranda of agreement with the NIA, the DENR was responsible for implementing watershed management initiatives and the DOH was responsible for schistosomiasis control activities. Funding from loan proceeds for the CIS schemes was disbursed through the Municipal Development Fund Office, which entered into an onlending agreement with the PGAN. A weakness in the implementation of the DOH component was observed with respect to coordination between the DOH's Unified Project Management Office with those responsible for the Schistosomiasis Control Program at central office and those responsible for implementation at project sites. This delayed the finalization of the work program, with actual implementation starting only in 2004.

[12] Supported by the national irrigation administration in technical areas.

28. A project steering committee was established in Manila, chaired by the NIA's administrator, with responsibility for overall project monitoring, supervision, and interagency coordination. A project management committee, chaired by the governor of the PGAN, was also established in Agusan del Norte to monitor and supervise CIS subprojects. Regular meetings of the steering committee were held but other agencies often failed to attend, particularly in later years. A CPMO was established at NIA's central office and SPMOs were established in each subproject site. Detailed designs of reservoirs and major irrigation facilities such as diversion dams were the responsibility of the CPMO (supported by the implementation consultant and the NIA) while for other facilities responsibility lay with the NIA regional offices. Although the CPMO and the SPMOs worked effectively, implementation delays could have been reduced if NIA management provided consistent and stronger guidance to push for quicker action and decisions on the more serious issues encountered during the project (design issues, poor performance of civil works contractors, and slow liquidation of funds). Farmer beneficiaries, through their irrigator associations, were actively involved in the various stages of subproject preparation, including feasibility studies, detailed design, construction (including monitoring), and system management and agriculture development.

G. Conditions and Covenants

29. The condition for loan effectiveness on the execution of onlending financing agreements with the PGAN for farmer equity contributions was met in a timely manner. The government fully complied with all loan covenants, apart from one instance of partial compliance and one of noncompliance (Appendix 8). Transfer of irrigation facilities to irrigator associations within 3 years of completion was partially complied with (Schedule 5, para.10). Schedule 5 para. 14(i) required that "NIA will complete implementation of an approved time bound action plan for transfer of assets of CIS schemes by NIA to LGUs [local government units] concerned no later than 1 March 2003." The extent to which this is possible reflects the resources that are available within each local government unit (that are essentially political administration offices), regardless of capacity building provided. In practical terms, transfer of CISs' amortization collection to local government units is unlikely to generate sufficient funds to support future repair and improvement costs. Transfer of CISs has not been effected as of this date. The partial compliance and noncompliance had little or no impact on intended benefits.

H. Consultant Recruitment and Procurement

30. Consultants were recruited by May 2000 and mobilized the following month to provide 146.5 person-months of international inputs and 273.0 person-months of national inputs in accordance with design provisions. By project completion, and after seven contract variations, consultant inputs were 733.69 person-months (157.19 person-months of international and 576.50 person-months of national services), nearly double the original contract requirement (Appendix 9). The initial reshuffling of inputs and subsequent extensions were necessary to carry out activities envisaged to be performed by the NIA and PGAN in respect of detailed design of subprojects, the skills for which were found wanting. Most of the extra person-months were for technical engineering input to support detailed design activities.

31. Procurement was carried out in accordance with ADB's Procurement Guidelines (revised January 1994, as amended from time to time). Contracts for the construction of small reservoir impounding dams were tendered using international competitive bidding procedures while other civil works contracts were awarded using local competitive bidding. Small civil works of less than $100,000, such as concrete lining lateral canals, were implemented by force account by

the NIA or with irrigator associations providing labor and/or aggregates under the supervision of NIA engineers. The list of civil works contracts awarded and financed by ADB is shown in Supplementary Appendix A. The supply of irrigation pipes for the Dauin SRIS was procured using international competitive bidding procedures. A list of equipment procured is presented in Supplementary Appendix B. In accordance with the desire for decentralized implementation, most works for NIS and SRIS contracts were procured from NIA's regional offices and the PGAN (for CIS subprojects). For civil works and supply contracts for packages requiring national and international competitive bidding, procurement was managed by the CPMO.

32. Procurement was generally well handled although procurement of civil works contracts in Caraga (Region 13) suffered from external influences. Despite poor contractor performance on Gibong Right and Left Bank subprojects, the same contractor was awarded some civil works packages for construction of the Cantilan subproject. These contracts had to be terminated by mutual agreement and without penalty, the unfinished works being completed by the NIA under force account.

I. Performance of Consultants, Contractors, and Suppliers

33. Overall, the performance of the consultants was satisfactory. Consultants were engaged to support project implementation as well as to supervise the preparation of detailed engineering designs and construction of works. They performed an essential role in providing technical input in areas where local capacities were underdeveloped, and carried out their terms of reference responsibly. They prepared manuals on participatory approaches at different stages of the project cycle, which could be used as templates for future projects. However, the resources available under the initial package and the extensive area covered by the project caused logistical problems that diminished their attention to detail when reviewing detailed designs. Delays in the preparation of feasibility studies and detailed designs required revisions to consultant inputs, with seven variations being approved, initially without addition to overall costs but later requiring additional funding.[13]

34. This timing issue was confounded by poor-quality information gathered during site investigations that led to basic design flaws. Specifically, there were several instances where geotechnical investigations failed to identify areas of peat soils underlying canal alignments. In these locations, canals have progressively subsided, disrupting water flows to downstream users. Similarly, topographical surveys were of variable quality, with instances where parts of the command area cannot be irrigated from the lateral passing in the immediate vicinity because of a significant height differential (requiring pumping to elevate the water). The poor quality of site investigations was due in part to the more extreme conditions found in some subproject site—in some cases for security reasons and, in others, the inability to gain access to waterlogged areas with the associated fear of disease. Consequent deficiencies have been rectified in some instances while in others the inadequate data contributed to unachievable command area estimates.

35. The performance of contractors was mixed but satisfactory overall. Contractors of civil works procured by the NIA central office through national and international competitive bidding procedures performed well, other than the contractor of the Binalawan dam in the Magballo-Balicotoc-Canlamay subproject. Performance of a number of locally selected contractors, particularly in Region 13, was unsatisfactory. In terms of quality of works, contractors

[13] The initial consulting services contract was for 419.5 person-months and was valued at $5.80 million; by project completion, 733.69 person-months of services were provided with a total contract value of $6.78 million.

maintained adequate standards in accordance with designs. Generally speaking, the delays in construction increased subproject costs and delayed benefits being achieved. They also contributed to some significant disruption of livelihood activities in some sites as farmers were prevented from planting wet season crops while construction was ongoing.

36. The performance of suppliers was satisfactory with timely delivery of equipment and materials in accordance with specified delivery arrangements. The delivery of local materials (mainly sand and gravel) by beneficiary farmers as a means of generating farmer equity contributions was also achieved in a timely manner, and so construction was not delayed in this aspect.

J. Performance of the Borrower and the Executing Agency

37. The performance of the borrower, the NIA, and the PGAN were satisfactory. The EAs had adequate authority to implement the project, which ensured coordination of project activities and liaison with ADB. The borrower and EAs (i) followed procedures for procurement of goods, equipment, and the recruitment of consulting services; (ii) maintained and effectively managed separate accounts for the project; (iii) demonstrated appropriate financial management, as confirmed in audited financial reports; (iv) submitted implementation and progress reports in a timely manner, although audited financial reports were a little delayed; and (v) facilitated the timely provision of counterpart funds. In general, all agencies involved in the project worked effectively. Cooperation between the EAs and the DENR were notably strong and effective. Coordination with the DOH was more problematic and reflects the more centralized nature of the schistosomiasis control program, to which the project contributed relatively little financially. Delay in completion of the project also reflects factors outside the control of the EA, primarily (i) delay in approval of staffing positions for the CPMO and SPMOs; (ii) the time-consuming participatory approach, because irrigator associations and/or farmers had to be involved in decision making from project preparation to construction and monitoring; and (iii) limited equity contribution of farmers.

K. Performance of the Asian Development Bank

38. ADB appointed three different project officers during implementation. These changes had little impact on the interpretation of objectives or implementation direction for the project. Approvals needed during subproject preparation were responded to in a timely manner, although in some cases guidance was lacking, necessitating multiple reviews of one document (resettlement plans). ADB conducted 14 progress review missions excluding the inception mission. It was quick to respond to requests for the reallocation of loan proceeds and effected one variation to the Loan Agreement. In view of the numerous delays in project implementation, which were substantially due to factors outside the control of the EAs, ADB was quick to approve two extensions to facilitate the completion of the civil works program and generally responded in a timely manner to requests formalized through review memoranda of understanding. The final extension of the loan was considered invaluable in allowing the completion of works to recover what could have been a very ineffective investment had the loan been terminated earlier. ADB's performance is rated *satisfactory*.

III. EVALUATION OF PERFORMANCE

A. Relevance

39. At both appraisal and completion, the project concept was highly relevant to government and ADB policies and priorities to develop rural communities and reduce poverty. The project was in accordance with the Medium-Term Philippine Development Plan, which at the time of formulation promoted sustainable economic growth and poverty reduction as the foundation for regional and sector policies, programs, and projects. The project was also consistent with the government's Medium-Term Agricultural Development Plan 1993–1998 and the subsequent 1999–2004 plan that highlighted the importance of rural infrastructure, market assistance, and technical extension services. ADB's strategy for agricultural and rural development in the Philippines was to increase agricultural production and productivity by developing rural infrastructure such as roads, irrigation, and agricultural support services, as well as seeking an increased role of local communities in the operation and management of smaller-scale irrigation facilities to increase rural incomes, and sustainable approaches to watershed management.

40. The original project design was well prepared although somewhat ambitious in a number of areas. The first of these was the irrigated area to convert to high-value vegetables, given the high costs of production and farmers' limited access to financing. The second was the time needed to prepare subprojects to conform with the participatory approach, and the social and environmental safeguards of the government and ADB that contributed to much lower disbursements than first estimated. The other area where the design was ambitious related to the contributions expected of beneficiary farmers. The locations where interventions were planned had poverty rates as high as 44% at appraisal. To propose that such farmers could contribute 25% equity for the development of irrigation schemes was unrealistic.[14]

41. Finally, a sector modality was appropriate given the existence of a sector development strategy, considerable experience in one of the EAs in implementing internationally financed development projects, and the EAs having adequate technical skills in identifying, preparing, and implementing subprojects. The sector modality also provided the flexibility given the security status in areas of the Autonomous Region of Muslim Mindanao, allowing subprojects to be replaced so as not to impede implementation. The preparation of the Rugnan NIS subproject was not contemplated in the initial design but was completed in record time after the approval of the feasibility study. Overall, the project is rated *relevant.*

B. Effectiveness in Achieving Outcome

42. The overall outcome of the project at appraisal was to increase agricultural production and crop diversification through user participation in irrigation development projects and subsequent system management, and the overall assessment for achieving this outcome is *less effective*. The criteria for assessing this are the achievements under the four contributing component outputs. For the participation and transfer component, there have been sound achievements in developing the capacities of implementing agencies and a generally positive outcome in respect of their ability to assume O&M responsibilities for completed subprojects. Their ability to collect irrigation service fees has been more problematic, reflecting the incomplete state of irrigation development as well as the lower utilization rates in irrigated vegetable areas. The performance of different implementing agencies remains variable and

[14] The figure of 25% was unrealistic even though it was split into 15% to be achieved during construction and 10% to be contributed during scheme operation.

reflects the character of the people appointed to implementing agency management positions, some being able to achieve close to 100% payment of irrigation service fee with incomplete water services and others struggling to reach 50% with much-improved water delivery (Appendix 11). The appointment of community development officers in the NIA to support this component has not only contributed to this positive outcome but has also effectively raised awareness throughout the institution of the need for thorough beneficiary consultation at all stages of preparation, implementation, and operation.

43. The physical infrastructure component was less effective, with only five of 11 subprojects being completed at loan closure. Delays have contributed to increasing subproject costs with rising material prices, disrupted livelihood activities of beneficiaries, and delayed potential benefit streams. Achievements have also been affected by poor engineering designs that were based on poor site investigations, and these have repercussions for the effective operations of the subprojects. Finally, the effectiveness has been reduced by the lower levels of planting that are currently evident as schemes are only now nearing completion. For the overall project, irrigation facilities (delivery canals and water management structures) have been developed on 10,608 ha, yet in 2010 the irrigated area was only 5,040 ha in the wet season and 6,024 ha in the dry season, representing a cropping intensity of 0.98. Full production and productivity gains are yet to be achieved.

44. The social and environmental component was able to achieve greater success, with about double the area of catchments being covered by conservation plans and demonstrations. These activities have been effectively implemented by the DENR, and the affected catchments now form part of the overall area receiving routine monitoring. Demonstrations of vegetation strips, agroforestry, and stream stabilization were introduced on areas larger than were intended at appraisal, and these are being monitored by the DENR to assess their impact. The schistosomiasis control program met with less success because of the cross infestations of snails from surrounding areas where control measures were not practiced. While the impact was effective in small areas in the short term, advances made were soon lost and no significant change has been recorded. Resettlement initiatives were carried out with great impact on relocated project-affected persons as well as those not resettled but still affected. Finally, the indigenous peoples plan was not needed because, in those locations where ethnic groups were identified, minority groups represented the majority of beneficiaries. While an indigenous peoples framework was prepared, it was not needed in any of the subprojects. Overall, the component impact is considered to be *effective*.

45. Project management also suffered from delays in the establishment of national, regional, and subproject management structures. Procurement at the NIA central office was well handled but devolved procurement of civil works at the regional offices, particularly in the Caraga Region, was influenced by external factors that impaired the appointment of quality contractors. With the late delivery of withdrawal applications and financial reporting requirements, the achievements in project management can only be assessed *less effective*.

46. The combined achievement from the four components is therefore mixed, but dominated by the relatively poor achievements of infrastructure development, hence a rating of *less effective*.

C. Efficiency in Achieving Outcome and Outputs

47. Efficiency was aided by screening of subprojects during loan preparation. During project design, four core subproject feasibility studies were prepared to guide the preparation of subsequent feasibility study documents by the EAs. The economic analyses prepared for these subprojects estimated the economic internal rate of return of 17.1% for Calayagon CIS, 18.9% for Can-asujan SRIS, 15.1% for Gibong Right Bank Extension, and 18.6% for the Malaig NIS, although the last of these was subsequently dropped. The reassessed internal rates of return have been less impressive, mainly because the schemes are not enjoying the full extent of benefits following the delays but also because of the lower-than-anticipated cropping intensities. Equivalent reestimates of the economic internal rate of return are 10.1% for Calayagon CIS and 8.5% for Can-asujan SRIS; there is no estimate for the Gibong Right Bank Extension as completed facilities have major deficiencies.[15] Being a sector modality project, it was not possible to estimate the overall project economic internal rate of return. The actual net benefit streams were delayed by delayed preparation of subprojects that also reduced disbursements in the first 4 years of implementation.

48. Two representative subproject economic internal rates of return have been reestimated (Appendix 10) based on actual disbursements and the physical development program using similar identified benefits. Benefits from irrigation rehabilitation have been estimated from incremental crop income and increased cropping intensity. Benefits from rural access roads have not been included in the two subprojects analyzed but transport costs are estimated to be 40% lower than rates prior to rehabilitation. Based on interviews during the project completion review mission, it was clear that, where facilities had been completed, particularly in areas where rice was grown, there was a high level of appreciation of the benefits from the project. These not only included irrigation and the more secure supply of water that permitted greater cropping intensity and improved market access that have been included in overall net benefit streams, but also other notable benefits, such as ease of access to public services (education and health services) and, equally significant, household access to water that previously did not always exist. Despite these significant benefits, overall efficiency in achieving the outcome is assessed *less efficient*.

D. Preliminary Assessment of Sustainability

49. Sustainability of the overall project is considered less likely, based on two key considerations: (i) the capacity of the government (national and local) together with irrigator associations to operate and maintain the rehabilitated or newly constructed irrigation facilities and rural access roads; and (ii) the capacity of institutions to support system management and agriculture development initiatives, particularly where crop diversification is being attempted. Despite effective and, in many cases, repeated training, there is wide variation in the capacities of irrigator associations to operate facilities[16] and to achieve the necessary water management to enable collection levels to meet their obligations for O&M and equity contributions.

[15] The Gibong Right Bank Extension was reported as being physically completed. However, the main farm ditch from lateral I to its service area of about 245 ha, representing about 37% of the firmed-up service area of the whole subproject, is nonfunctional (farms are at higher elevation than the main farm ditch). Also, a section of lateral I passing through a creek a few hundred meters from the head-gate collapsed due to flooding in February 2011.

[16] In one rehabilitated scheme, proportional weirs have been knocked down to allow greater volumes of water to reach farmers at the end of delivery canals. This reflects limited understanding by the farmers of the operations of the irrigation system, the excessive siltation in the main canal, and possibly some design considerations.

50. Levels of collection recorded by the CPMO between 2004 and 2009 for completed systems indicate an average collection efficiency of 64%; this level was maintained consistently during the time that records were kept. In 2009, the Can-asujan scheme recorded collection efficiency of 75.0% while the lowest achieved was 52.2% in the Gibong Left Bank Extension, largely because it had not been completed (Appendix 10). Figures obtained for the two functioning core subprojects during the project completion review mission reported current collection efficiency of 93% (in Can-asujan) and 74% (in Calayagon).

51. Responsibility for maintenance of new and rehabilitated roads has been passed to the local government units or the irrigator association concerned, depending on the type of road. Contributions to maintenance from both sources have been difficult to realize given the limited budgets of local government units and collections of irrigation service fees and the priority accorded to irrigation maintenance compared to roads. It was noted that road user charges were being applied with the installation of a toll system levied on external users such as trucks extracting timber from the forested areas of catchments. However, the charges were so low that they provided no deterrent to the activity nor did they meet the cost of road repairs from the heavily overloaded vehicles. Roads are also vulnerable to flash flooding that causes widespread damage as it not only damages the road alignment but also relocates aggregates onto fertile paddy areas. The roads are a significant part of the overall benefit from scheme investments but these benefits quickly dissipate following extreme climate events.

52. While the revenue-raising capacity of irrigator associations and resources of local government units, provinces, and regions remain limited, it is unlikely that sufficient funds will be allocated for the maintenance of new and rehabilitated infrastructure. Failure to provide for routine and periodic maintenance of irrigation facilities and access roads could see the benefits dwindle following rehabilitation. This failure threatens the long-term gains in poverty reduction made possible through the rehabilitation. For this reason, the sustainability of the project is assessed *less likely*.

E. Impact

53. The construction of new irrigation infrastructure and roads and the rehabilitation of existing schemes have had a moderate impact on the socioeconomic conditions of the target communities. Unfortunately, not all schemes have been completed to the extent where identified benefits are being appreciated; these will only be realized once local funds are made available to complete the works program.[17] The project was implemented in areas prioritized because they (i) had a high incidence of poverty; and (ii) were partly in the Autonomous Region of Muslim Mindanao, where investment levels reflect recent political instability; and had significant ethnic minority populations. Apart from the very real economic benefits from an assured supply of water to finish wet season crops and even entertain dry season production on irrigated areas, improved access from new and rehabilitated roads has significantly reduced transport costs and improved market efficiency in sending price signals to farmers. The improved road network has opened commercial opportunities in previously remote areas, contributing to economic growth and effectively reducing poverty. In terms of capacity building, the project demonstrated effectively that, with training and support, irrigator associations have the ability to operate and manage smaller irrigation systems. It was found that the earlier the communities became involved in subproject preparation, the better their level of engagement. The associated

[17] The memorandum of understanding drafted after the project completion review mission identifies the works to be completed with estimates of resources required that total the equivalent of $2 million. The government has undertaken to provide such resources. As of the middle of June 2011, the Binalawan dam, one of the remaining works as of the project completion review mission, was substantially completed.

initiatives of catchment management have also demonstrated that agencies can work effectively together to serve a common objective. The limited success with snail eradication would suggest that interventions need to be of appropriate scale to achieve the desired impact.

IV. OVERALL ASSESSMENT AND RECOMMENDATIONS

A. Overall Assessment

54. The project has exceeded its physical targets in some areas and underachieved in others, and this has impacted upon the achievement of its immediate objective. It was implemented as designed, although some modifications were introduced because of poor security in some proposed subprojects. Otherwise, institutional and implementation management arrangements were executed as proposed. In hindsight, the design could be criticized for being rather ambitious given the capital-intensive nature of reservoir subprojects, while crop diversification initiatives took some farmers outside their boundaries of risk aversion, leading to a much-reduced impact from high-value crops than was initially envisaged. It was also unrealistic to assume poor farmers could contribute 25% of the capital cost of irrigation systems, even with generous government-financed advances. This also limited the resources available to carry out the works program. Despite these design challenges and the delays in implementation, the beneficiaries remain adamant that the overall impact has been positive, and this is supported by the economic reevaluation of subprojects. Perhaps the greatest success has come in the area of institutional development, which resulted in irrigator associations assuming greater operational and management functions of rehabilitated schemes. The innovative designs that have been trialed to address the wider issues of river silt loads will guide future irrigation design in the country, and these cannot be overlooked. Concerns remain over sustainability, with high routine and periodic maintenance requirements that, if not addressed, will see the benefits achieved progressively diminish. Overall, the project is rated *partly successful*.

B. Lessons

55. The following lessons learned should be taken into account in designing future projects of a similar nature:

(i) Participation of beneficiaries at an early stage of subproject preparation will enhance the chance of success where beneficiaries are to assume control of O&M.

(ii) Beneficiary contributions must be set at a level that reflects their capacity to pay, and it is considered inappropriate to overload farmers with higher costs where poverty remains an issue.

(iii) Quality subproject feasibility and detailed engineering designs, based on solid geological and topographic surveys, are necessary prerequisites to successful irrigation and road subprojects. Without these, unachievable targets will be established that cause subprojects to be assessed *less successful*.

(iv) The role of local government units must be understood, given their limited resources and their primary function as a political institution. While they remain an important inclusion from a lobbying perspective, they cannot adopt roles beyond the level for which they have human and financial resource capacity.

(v) Further capacity building must be undertaken in procurement and bid evaluation if provincial and regional procurement is to be continued in similar future projects. While there is a certain autonomy in regional centers, the central government

and ADB should adopt a stronger procurement monitoring role, if only to prevent repetition of previous mistakes.

(vi) A realistic evaluation of institutional capacities is needed during project preparation for the tasks expected of them. This is particularly important with the proposed downsizing of the NIA that is currently taking place.

(vii) Stronger links with technical support and input supplies such as credit should be part of the training of irrigator associations during subproject implementation. While attempts at coordinating technical support were envisaged, much of this came down to personal relationships, and that varied widely between subprojects.

C. Recommendations

56. The recommendations (Table 1) are based on the evaluation of the performance and the lessons learned from implementation of the project.

Table 1: Summary of Recommendations

Suggested Action	Institution Responsible	Suggested Timing	Monitoring Responsible
Project-Related Recommendations			
Future monitoring. The key to achieving sustained benefits from investments lies in the maintenance of irrigation facilities. The condition of rehabilitated systems and the utilization of these facilities should be monitored annually as a routine responsibility of the NIA to better appreciate the relationship between design parameters and maintenance undertaken in different institutions and type of scheme, be they NISs, CISs, or SRISs.	NIA regional offices with the assistance of NIA provincial staff	Ongoing but at least annually	NIA
Covenants. Future covenants should incorporate a requirement for the allocation of an appropriate level of budgetary resources to maintain rehabilitated infrastructure for a specified period of, say, at least 5 years after project completion that should be reported to the NIA and ADB. Such requirements should incorporate allocations for routine maintenance, emergency repairs in an increasingly volatile climate, and periodic maintenance.	Central and regional NIA in association with budget authorities	Effective immediately annual reports generated to confirm	NIA and ADB
Additional assistance. Given the extent of poverty found in rural areas and the current poor state of infrastructure in the areas of the ARMM where social unrest prevails, further development assistance to rehabilitate irrigation and rural access road infrastructure is considered appropriate given their impact on poverty reduction. Rural infrastructure rehabilitation should remain a priority area of support by ADB and be confirmed in the upcoming country operations business plan.	ADB and its country partnership strategy developed with the government	Country program-ming mission	ADB
General Recommendations			
When designing beneficiary contributions for irrigation systems in poor communities, the level of counterpart contributions should be realistically assessed and	NIA central office, provincial implementation	Immediate	NIA and provincial agencies

Suggested Action	Institution Responsible	Suggested Timing	Monitoring Responsible
collection mechanisms identified during the design and consultation phase of subproject design.	units		
Where equity is to be raised by beneficiary contribution, the method of procurement used to secure contractors to complete civil works must be consistent with the participation of those who are to provide equity contributions.	NIA central office, ADB procurement specialists	Immediate	ADB COSO
Designers should maintain a clear focus on the issues at hand and challenge resources to address the intended issues. Such polarization increases the chance of success, whereas multiple objectives often dilute the development impact, as in the case of schistosomiasis.	NIA central office	Immediate	ADB
Project design teams should be encouraged to develop mechanisms for maximizing benefits from investments in rural infrastructure. They should explore the opportunity for diverse investments, such as potable water from irrigation canals, recognizing that the potential benefits of diverse investments are magnified significantly.	NIA central office	Immediate	NIA and NEDA

ADB = Asian Development Bank, COSO = Central Operations Services Office, NIA = National Irrigation Administration Office, NEDA = National Economic and Development Authority.
Source: Asian Development Bank.

57. **Future monitoring**. In view of the incomplete status of five subprojects and the stated position of the government in the project completion review memorandum of understanding, annual reviews should be retained for at least 2 years to ensure subprojects are completed. Another issue that needs to be monitored is the proposed rationalization of the NIA, where staff numbers have been reduced drastically but responsibilities for irrigation operations remain unchanged. This trend should guide future implementation arrangements for irrigation development initiatives.

58. **Covenants**. Covenants are considered adequate for the existing loan. However, the covenant requiring full repayment of beneficiary equity contributions before transfer is effected could be waived without significant impact.

59. **Further action or follow-up**. ADB should maintain close monitoring of subproject completion reports as they are generated. To better understand the sustainability issue in future designs, ADB should request that routine monitoring reports of irrigation service fees achieved for each subproject are supplied.

60. **Timing of the project performance evaluation report**. Given the completion delays and the extent of repairs needed from the recent flooding, the most appropriate timing of a project performance evaluation report would be 5 years after loan closure.

PROJECT FRAMEWORK

Design Summary	Project Targets	Achievements	Assumptions and Risks
1. Sector Area Goal Enhance rural incomes in the southern Philippines	Raise per capita income from P8,000 to P12,500 (1998 price) by 2005 in the project area.	Average per capita farm income was P10,300 in 2009 (1998 price); average per capita income from all sources was P15,500.	**Assumptions** No natural disasters No budgetary constraints No law and order problems
2. Objective/ Purpose Increase agricultural production and crop diversification through user participation in irrigation development or improvement projects and subsequent system management	Raise the production of rice from 21,000 tons (t) to 133,000 t by 2005 in the project area Raise the production of vegetables and other horticultural crops from 5,000 t to 19,000 t over the same period in the project area	Total rice production in 2009 was about 47,000 t No conclusive evidence because facilities are not yet fully utilized. In Can-asujan subproject, more than two-thirds of the irrigated vegetable area was still planted with corn but 2010 preliminary data showed that average yield of irrigated eggplant and bitter gourd were about two times the average yield before the project.	**Assumptions** Prices for rice, vegetables and horticultural crops don't fall significantly Infrastructure is fully utilized, managed, and maintained by beneficiaries Agricultural extension is effectively in place
3. Components / Outputs **3.1 Participation and Transfer** Irrigator association organization and capacity building Genuine user participation Transfer of completed systems to irrigator associations	About 15 apex irrigator associations organized in federated pyramid structure User participation in decision making during development of about 15 subprojects Participatory planning and implementation of operation plans for about 15 systems Participatory planning and implementation of agricultural improvement program for 15 systems About 15 irrigation systems of less than 3,000 hectares (ha) transferred to irrigator associations by 2005	Seven federations of irrigator associations (FIAs) and 46 irrigator associations organized. The irrigator associations actively participated in decision making during development of their respective subprojects. Each FIA signed construction MOA with the concerned EA. System management and agricultural development plans, which also cover operation and maintenance, were prepared and being implemented by the FIAs and irrigator associations in each of the 10 subprojects, with NIA assistance. **Small river irrigation systems (SRISs)**: Ownership and management of one SRIS, except the reservoir and main canal, turned over to the irrigator associations. One still to be turned over pending reconciliation of	**Assumptions** National Irrigation Administration (NIA) and irrigator associations work effectively together to facilitate genuine user participation 3 years of intensive support following project completion is sufficient to build self-reliant irrigator associations capable of sustained operation and maintenance

Design Summary	Project Targets	Achievements	Assumptions and Risks
		costs. Another one is not yet completed. **CIS**. The management of two CISs has been fully turned over to the concerned irrigator associations; ownership of these CISs shall be transferred to them after full payment of their equity loan of 10%. **NIS**. National irrigation systems and/or subprojects are under joint system management of the irrigation management transfer program of the NIA.	
3.2 Physical Infrastructure			
Communal Irrigation Systems	About three new projects constructed or existing systems improved to serve additional 700 ha by 2005	Two new CIS subprojects with aggregate firm service area of 297 ha constructed or improved.	Memorandum of agreement signed between provincial government of Agusan del Norte and NIA
National Irrigation Systems	About eight new projects constructed or existing systems improved to serve an additional 15,000 ha by 2005	Five subprojects comprising three existing systems rehabilitated or expanded and one new irrigation system constructed, with aggregate firm service area of 8,610 ha.	Budget, equipment, and personnel available on time and effectively deployed
Small Reservoir Irrigation Systems	About four new projects built to serve 1,800 ha by 2005	Two new systems with aggregate firm service area of 1,675 ha built. Another SRIS with design service area of 211 ha is under construction, integrated with seven schemes completed with about 468 ha service area.	
Access roads	About 60 km of access road constructed or upgraded by 2005	127.08 km of canal service roads and 26.60 km of access roads constructed and upgraded by June 2010.	
3.3 Environmental and Social Measures Watershed Management	About 40,000 ha of watershed area protected	About 75,826 ha of watershed area protected; about 8,807 ha rehabilitated through various interventions (high-value agroforestry, natural vegetation strip, and stream bank stabilization).	
Resettlement	About 140 households within reservoir impoundment area resettled	231 project-affected households or persons resettled and/or compensated.	Communities in the catchments cooperate with the Department of Environment and Natural Resources Resettlement plans are acceptable to residents

Design Summary	Project Targets	Achievements	Assumptions and Risks
Schistosomiasis Control	Snail colonies destroyed in about 15 irrigation systems	Department of Health (DOH) changed strategy from provision of chemicals and equipment to protective measures, concentrating on public awareness and training of staff and the public. Information and education campaign were carried out in five subprojects; 143,474 persons were examined, of whom 7,295 were treated.	Proposed control measures are implemented
Indigenous Peoples Development Plan	About 4,000 Maranao and other indigenous households plan and implement their own development programs	Indigenous peoples located in two subprojects already mainstreamed with beneficiary communities when the project started.	Muslim women participate in project activities
3.4 Project Management	Established project management system	Project management system established. Project implementation, monitoring, and evaluation regularly undertaken and progress reports submitted to ADB and NIA management. Benefit monitoring and evaluation system established.	Central Project Management Office is set up on time with a competent project director. Competent consultants are recruited and fielded on time. Counterpart funds are made available on a timely basis.
4. Activities **4.1 Users Participate and Systems Transferred**	$8.2 million	$4.145 million	**Assumptions** Effective participatory process developed and implemented to facilitate on-the-job training of farmers and IAs capacity building
Pilot field test and document improved participatory process	9,600 participant-days of agency staff training 41,200 participant-days of farmer training	9,518 participant-days of staff training. 1,441,543 participant-days of farmers training.	
Irrigator associations formation and capacity building	70 irrigator associations provided with buildings and facilities	15 irrigator associations provided with building and facilities.	
Users participate in decision making for project development, system management, and agricultural improvement	Consulting services (40 person-months international and 110 person-months national)	A total of 36.60 person-months international and 155.07 person-months national.	
Systems transferred to self-reliant irrigator associations	130 motorbikes for institutional development officers, water resources facilities technician, and	123 motorcycles (99 for males, 24 for females) procured and distributed to subprojects.	

Design Summary	Project Targets	Achievements	Assumptions and Risks
	other subproject management office field staff		
4.2 Physical Infrastructure Developed	$58.2 million	$41.618 million	
Communal irrigation projects: survey, feasibility studies, detailed design, and construction or improvement of communal irrigation systems	Contracts for detailed topographic survey and parcel mapping for improved design of terminal facilities	Surveys for design of canals were done by the NIA. No parcelliary mapping done, farmers relying on practical experience and NIA technical assistance in the construction of terminal facilities.	Farmers agree to make equity contributions to the cost of construction including provision of right of way
National irrigation projects: survey, feasibility studies, detailed design, and construction or improvement of national irrigation systems	2,500 participant-days of agency staff training in improved procedures and practices, e.g., for design of proportional flow division structures	5,963 participant-days of agency staff training.	
	Consulting services (20 person-months international and 70 person-months national)	Total of 11.33 person-months international and 130.27 person-months national services.	
Small reservoir irrigation projects: survey, feasibility studies, detailed design, and construction of small reservoir irrigation systems	Site investigation for SRISs	Site investigation for three SRISs undertaken.	
Access roads: survey, design, and construction of roads and bridges	Survey and design by NIA staff	Survey and design undertaken by NIA staff.	
4.3 Environmental and Social Measures	$11.1 million	$3.934 million	
Community-based watershed management and reforestation programs implemented	Study tour for agency staff concerned with watershed management	One study tour training workshop conducted at Los Baños, Laguna.	Communities in the catchments cooperate
Residents of reservoir impoundment areas are resettled with productive enterprises	Negotiation and payment of resettlement compensation including provision of alternative sources of livelihood	231 project-affected persons resettled and/or compensated. P4.25 million worth of livelihood programs provided, and now being rolled over by the project-affected persons themselves.	Resettlement plans are acceptable to residents
Schistosomiasis controlled by	Supply and application of schistosomiasis control	DOH changed strategy to protective measures,	Proposed control measures effective in

Design Summary	Project Targets	Achievements	Assumptions and Risks
improvement of drainage and use of biological methods and chemicals for eradication of snails	equipment and chemicals	concentrating on public awareness and training of staff and the public. Other activities included case findings and treatment, and environmental sanitation to control snails through creek and canal clearing and provision of clean water supply and toilet bowls.	eradicating snails
Indigenous peoples development plans agreed with those of local communities and implemented	Appropriate development interventions	Indigenous peoples located in two subprojects already mainstreamed with beneficiary communities when the project started.	Development of effective mechanism to include Muslim women
	Consulting services (15 person-months of international and national)	A total of 12.47 person-months of foreign and 86.57 person-months of national services.	
4.4 Project Management	$9.9 million	$20.464 million	
	Study tour for agency staff concerned with participatory irrigation management and transfer	12 person-days to Thailand; 48 person-days to Taipei, China; 12 person-days to Los Baños; 4 person-days to Japan; and 36 person-days to Italy.	
	Management consulting services (70 person-months international and 78 person-months national)	A total of 96.79 person-months international and 204.6 person-months national services.	

COMPLETION STATUS AND IRRIGATED AREA OF SUBPROJECTS

Subproject	Provinces / Municipalities Covered		Physical Status (as of June 2010)	Appraisal Target (ha)			Generated/ Rehab Area (ha)	Firmed-up Service Area (ha)			Area Irrigated in 2010 (ha)			
	Provinces	Municipalities		New	Rehab	Total		New	Rehab	Total	Wet	Dry	Third Crop	Total
Core Subprojects						**4,615**	**1,667**	**1,530**		**1,530**	**733**	**750**		**1,483**
1. Calayagon CIS	Agusan del Norte	Buenavista	Completed			250	230	190		190	186	190		376
2. Can-asujan SRIS	Cebu	Carcar City	Completed			950	772	675		675	462	475		937
Rice Area							369	361		361	276	276		552
Vegetable Area							403	314		314	186	199		385
3. Gibong Right Bank (New)	Agusan del Sur	Prosperidad	Completed			665	665	665		665	85	85		171
4. Malaig NIS						2,750								
Non-Core Subprojects						**12,885**	**8,941**	**3,955**	**5,794**	**9,749**	**4,306**	**5,274**		**9,581**
5. Aclan-Amontay CIS	Agusan del Norte	Nasipit	Completed				130	107		107	63	63		126
6. Baobo NIS	Agusan del Sur	Veruela	96%				1,300	1,600		1,600	687	621		1,308
7. Cantilan NIS	Surigao del Sur	Cantilan, Madrid	89%				1,800	0	2,000	2,000	1,796	1,369		3,165
8. Dauin SRIS	Negros Oriental	Dauin	Completed				1,000	1,000		1,000	185			185
9. Gibong Left Bank NIS	Agusan del Sur	Prosperidad, San Francisco	96%				1,077	642	435	1,077		350		350
10. Gibong Right Bank (Existing)	Agusan del Sur	Prosperidad	98%				1,816		1,918	1,918	1,427	1,723		3,149
11. Magballo-Balicotoc-Canlamay	Negros Occidental	Kabankalan City, Ilog	93%				468	606	91	697	149	149	297	594
12. Rugnan NIS	Lanao del Sur	Taraka	94%				1,350		1,350	1,350		1,000		1,000
Total						**17,500**	**10,608**	**5,485**	**5,794**	**11,279**	**5,040**	**6,024**		**11,064**

CIS = communal irrigation system, NIS = national irrigation system, SRIS = small reservoir irrigation system.
Notes: Generated Area - area provided with irrigation facilities, Firmed-up service area - the area that is being irrigated for crop production and is net of areas that cannot be irrigated, including those converted to other uses such as areas planted to trees and/or coconuts which owners decided not to convert to irrigated rice and/or vegetable production.

SUMMARY OF INFRASTRUCTURE CONSTRUCTED

	Component	Unit	Can-asujan	Dauin	Magballo-Balicotoc-Canlamay Subproject: Binala-wan SRIS[a]	Magballo CIS Extension	Magballo New	Pump Schemes	Isam	Calayagon	Aclan-Amontay	Baobo	Cantilan[b]	Rugnan[c]	Gibong Left Bank	Gibong Right Bank Existing	Gibong Right Bank Extension	Total
I.	**DAMS**																	
1.	Reservoir Type	no.	1.00	1.00	1.00													3.00
	Storage Capacity	mcm	7.65	1.14	1.90													10.70
2.	Diversion/Intake Type	no.																0
3.	Diversion Type	no.				1.00	1.00		1.00	1.00	2.00	1.00						7.00
4.	Intake	no.		2.00									1.00	1.00				4.00
II.	**PUMPS**																	
1.	Pumping Station	no.						5.00										5.00
2.	Pump	no.						5.00										5.00
III.	**CANAL NETWORK**																	
1.	Supply Canal	km	3.10	1.60														4.70
2.	New																	
	a. Main Canal	km	3.22	3.00			14.77			3.27		21.72			13.39		3.60	62.97
	b. Lateral Canal	km	22.69					6.77		4.16		7.84			3.86		5.60	50.93
3.	Rehabilitation																	
	a. Main Canal	km						2.18			1.89		12.10			8.44		24.60
	b. Lateral Canal	km	3.08					0.32			1.89		43.91	27.71		21.05		97.96
	c. Main Pipeline	km	10.19	4.02				0.97										15.18
	d. Lateral Pipeline	km	40.21	10.16														50.37
	e. Main Farmline	km		2.76														2.76
	f. Canal Structures	no.	249.00	20.00				518.00		28.00	17.00	61.00	162.00	57.00	39.00	60.00	36.00	1,247
	g. Canal Lining	km	13.87	2.86				25.07		7.43	2.78	29.18	38.46	24.11	7.26	29.49	8.60	189.11
IV.	**ROAD SYSTEM**																	
1.	Service Roads	km	1.25	0.24						1.25		30.41	26.64	9.45	17.19	32.22	8.44	127.08
2.	Access/Intrasite Roads	km	1.50	0.32				15.70				5.58		1.20	1.80		0.50	26.60
3.	Overflow Bridge	no.			2.00													2.00
4.	Road Structures	no.	3.00	4.00								125.00			51.00	58.00	13.00	254.00
V.	**DRAINAGE FACILITIES**																	
1.	Drainage Canal	km	11.45	0.55								0.77	0.09		11.72	6.50	16.80	47.88
2.	Drainage Structures	no.										55.00			20.00	24.00	13.00	112.00
3.	Main Farmditches	km	14.10	73.36				9.16		4.92	1.51	28.58	3.87	85.20	88.72	32.65	6.54	384.62
4.	Supplementary Farmditches	km	6.26	37.77				0.44		9.05	0.65			43.95				98.12
5.	Farmdrain	km	4.94														15.25	20.19
6.	Turnouts	no.	15.00	8.00				129.00		7.00	6.00	66.00	27.00	43.00	33.00	106.00	13.00	453.00
7.	Farmditches Structures	no.	26.00					50.00				34.00						110.00
8.	Farmdrain	km	9.39											14.53			15.25	39.17
VI.	**BUILDING**	no.	4.00	4.00				4.00		1.00		3.00	6.00	3.00	6.00		2.00	33.00

Km = kilometer, mcm = million cubic meters.
[a] Dam for reservoir 90% complete; construction ongoing.
[b] Intake structure 77% complete; construction ongoing.
[c] Intake structure 73% complete; construction ongoing.
Source: Final inventory Report, Central Project Management Office, National Irrigation Administration.

PROJECT COST
($'000s)

	Project Component	Appraisal			Actual		
		Foreign Exchange	Local Currency	Total Cost	Foreign Exchange	Local Currency	Total Cost
A.	**Participation and Transfer Component**						
1.	IA Organization and Capacity Building	814	1,544	2,358			
2.	Participatory Planning/Facilitation	290	1,326	1,616			
3.	Transfer of Completed System	186	2,778	2,964			
	Subtotal A	**1,290**	**5,648**	**6,938**	**0**	**4,145**	**4,145**
B.	**Physical Infrastructure Component**						
1.	Communal Irrigation Projects	858	1,379	2,237			1,341
2.	National Irrigation Projects	12,978	20,140	33,118			18,002
3.	Small River Irrigation Projects	4,173	5,978	10,150			21,706
4.	Access Roads	742	1,113	1,854			568
	Subtotal B	**18,751**	**28,609**	**47,359**	**15,610**	**26,008**	**41,618**
C.	**Environmental and Social Measures Component**						
1.	Watershed Management	290	4,636	4,926			3,012
2.	Schistosomiasis Control	1,386	154	1,540			374
3.	Resettlement Compensation	696	1,470	2,166			547
4.	Indigenous Peoples Plan	492	360	852			
	Subtotal C	**2,864**	**6,620**	**9,484**	**260**	**3,674**	**3,934**
D.	**Project Management Component**						
1.	Training of Agency Staff (PMO)	83		83			661
2.	Vehicles and Equipment	385	43	428			1,489
3.	Consulting Services (PMO)	1,408	480	1,888			6,833
4.	Support and Administration	0	5,972	5,972			11,481
	Subtotal D	**1,876**	**6,495**	**8,371**	**5,056**	**15,408**	**20,464**
	Physical Contingencies	**3,323**	**6,049**	**9,372**			
	Price Contingencies	**2,032**	**3,980**	**6,012**			
	Interest During Construction & Commitment Charges	**14,464**		**14,464**	**10,775**		**10,775**
Grand Total		**44,600**	**57,400**	**102,000**	**31,701**	**49,234**	**80,935**

IA = irrigators association; PMO = project management office.
Sources: ADB's Loan Financial Information System; National Irrigation Administration's Government and beneficiary data.

ANNUAL EXPENDITURES BY LOAN CATEGORY
($'000)

Category/Description		Original Allocation	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
A. Loan[a]															
01A	Civil works (NIA)	23,312		48.1	365.1	989.5	1,778.4	2,352.8	1,676.5	3,105.4	4,166.3	3,463.9	4,081.1	61.9	22,089.0
01B	Civil works (MDF)	1,359			38.1	209.5	97.2	163.6					196.5		705.0
01C	Civil works (IPP)	327													
02A	Surveys and studies (NIA)	508		76.6	225.9	150.4	212.6	115.8	179.1	53.4	51.5	60.5	31.8		1,157.4
02B	Surveys and studies (MDF)	80			2.4	17.3	20.9	14.0					11.0		65.6
03	Materials (schistosomiasis control)	336							10.6	66.1	54.0	146.9	50.2		327.8
04A	Equipment and vehicles (NIA)	1,918			544.5	105.9	67.9	93.7	73.3	32.4	27.3	7.0	10.1		962.1
04B	Equipment and vehicles (MDF)	200			18.9	18.9	72.7	0.8					36.8		148.0
04C	Equipment and Vehicles (schistosomiasis)	500								13.4	227.0	11.1	5.3		256.8
04D	Equipment and Vehicles (IPP)	238													
05A	Consultant (NIA, irrigation)	4,153	1,223.2	661.4	466.1	174.2	642.6	984.8	657.9	417.7	833.2	271.4	65.6	18.9	6,416.8
05B	Consultant(Watershed management)	443			56.1	27.1	7.9		123.8	80.4					295.3
05C	Consultant (Resettlement)	180			3.0	40.0	16.0		8.1	3.1					70.2
05D	Consultant (IPP)	84													
06	Training	424		5.7	80.6	61.9	30.5	11.9	42.0	58.6	102.6	73.4	56.7		523.9
07	Extension and training of IAs	3,185		35.4	239.1	240.7	285.7	266.4	334.6	260.2	419.4	429.8	262.7		2,774.0
08	Community Action Plan(Watershed Management)	2,992		0.1	20.4	79.2	170.3	75.9	281.1	246.0	487.4	314.2	254.1		1,928.7
09A	Administration (WMP)	340			46.1	59.3	61.0	62.7	81.6	14.3	12.8	56.9	56.2		451.0
09B	Administration (Resettlement)	80		1.8	1.0		2.0	35.1	107.3	86.9	187.5	196.1	443.2	5.8	1,066.7
10	Interest during construction	14,100	134.8	371.3	636.1	933.0	962.4	1,072.3	1,432.8	1,761.1	1,732.6	1,341.2	397.4		10,775.1
11	Unallocated	5,241													
	Subtotal (A)	**60,000**	**1,358.0**	**1,200.4**	**2,743.5**	**3,106.8**	**4,428.2**	**5,249.7**	**5,008.7**	**6,199.1**	**8,301.5**	**6,372.3**	**5,958.7**	**86.6**	**50,013.4**

Category/Description		Original Allocation	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
B. Government[b]															
01A	Civil works (NIA)		10.4	94.4	544.0	774.4	1,732.3	1,285.0	1,924.0	1,949.6	4,209.8	2,618.0	38.6		15,180.6
01B	Civil works (MDF)			106.6	103.3	112.9	26.9	71.3	35.2						456.2
01C	Civil works (IPP)														
02A	Surveys and studies (NIA)		55.8	227.9	1.7	247.9	102.9	83.0	(8.0)	79.5	59.9	(30.2)	13.5		834.0
02B	Surveys and studies (MDF)			14.7	17.0	11.7	26.2	40.9	3.9	0.1					114.4
03	Materials (schistosomiasis control)						12.9	2.2	11.8	5.2	25.6	39.4	(50.8)		46.4
04A	Equipment and vehicles (NIA)		18.9	27.8	62.4	38.7	(31.5)	(69.9)	23.4	16.9	(10.9)	8.6	(8.2)		76.1
04B	Equipment and vehicles (MDF)		0.0	2.9	2.1	8.4	0.2	3.1	1.0						17.7
04C	Equipment and Vehicles (schistosomiasis)												28.2		28.2
04D	Equipment and Vehicles (IPP)														
05A	Consultant (NIA, irrigation)				(60.5)	56.0	287.4	121.0	288.7	(187.2)	(457.4)	1.8	0.4		50.3
05B	Consultant(Watershed management)														
05C	Consultant (Resettlement)														
05D	Consultant (IPP)														
06	Training		2.0	48.2	42.3	45.3	(128.3)	28.4	9.1	96.5	12.9	(7.7)	(11.3)		137.3
07	Extension and training of IAs		23.8	138.3	140.0	261.7	250.6	87.2	85.7	210.4	169.5	(15.5)	18.7		1,370.5
08	Community Action Plan(Watershed Management)		0.1	5.4	51.2	146.7	80.1	207.9	4.5	451.1	133.5	17.1	(14.3)		1,083.3
09A	Administration (WMP)		26.8	20.5	83.6	53.4	88.6	11.0	(21.6)	(32.9)	(132.0)	(49.1)	323.2		371.5
09B	Administration (Resettlement)		1.7	0.9	1.9	11.7	45.7	85.0	32.4	139.0	29.5	270.0			617.8
	Administration (CPMO)		81.5	320.6	643.8	500.8	469.5	489.6	763.5	643.6	510.3	497.3			4,920.5
	Land Acquisition				50.9	229.8	7.9	4.5	49.2	43.5	10.0	184.1	10.0		589.9
10	Interest during construction														
11	Unallocated														
	Management Fee		85.7	74.9	239.5	111.1	157.0	694.9	845.6	610.1	865.5	369.4			4,053.9
	Subtotal (B)		**306.6**	**1,083.1**	**1,923.4**	**2,610.5**	**3,128.4**	**3,145.1**	**4,048.7**	**4,025.3**	**5,426.2**	**3,903.3**	**348.0**		**29,948.5**
C. Beneficiaries[b c]															
01A	Civil works (NIA)						67.7	108.6	137.1	58.1	236.5	234.0	131.5		973.3
01B	Civil works (MDF)				0.1	0.1	0.0	0.0	0.0						0.2
	Subtotal (C)				0.1	0.1	67.7	108.6	137.1	58.1	236.5	234.0	131.5		**973.5**
	Total		**1,664.6**	**2,283.5**	**4,667.0**	**5,717.3**	**7,624.3**	**8,503.4**	**9,194.4**	**10,282.5**	**13,964.1**	**10,509.6**	**6,438.1**	**86.6**	**80,935.4**

CPMO = central project management office, IA = irrigators' association, IPP = indigenous peoples plan, MDF = municipal development fund, NIA = national irrigation administration, WMP = watershed management plan.

Note: NIA explained that negative figures in some categories under Government expenditures in some years reflect reimbursement of excess expenditures.

[a] Loan data is from ADB's Loan Financial Information System (LFIS) at actual loan closing date: Southern Philippines Irrigation Sector Project.

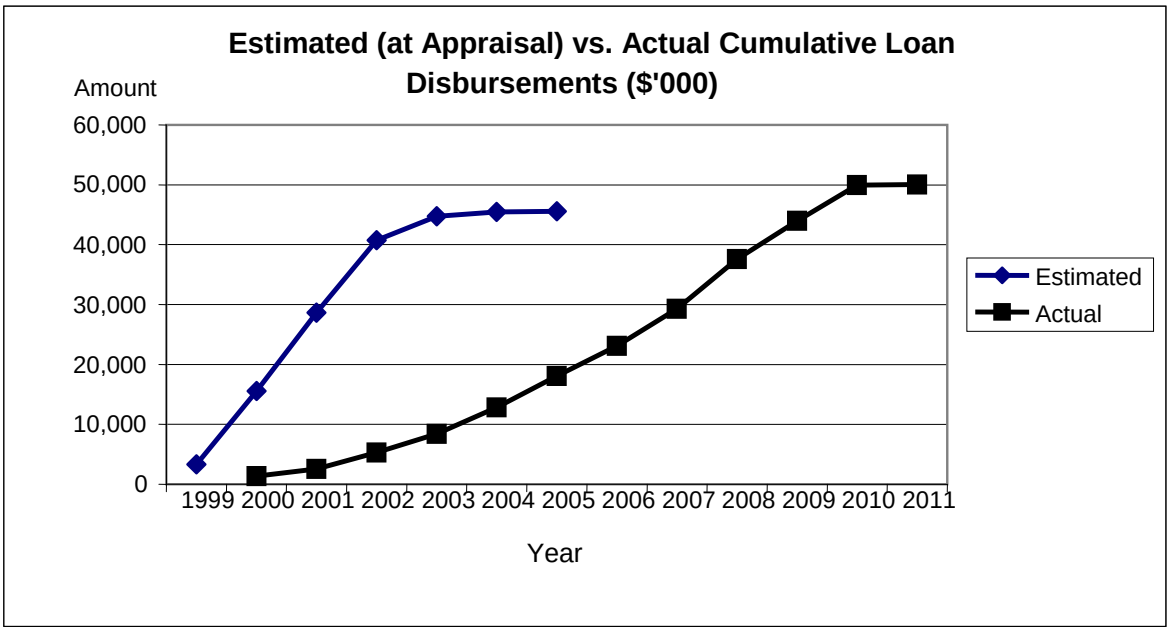
[b] Government and beneficiary data from National Irrigation Administration.

[c] Does not include right-of-way contribution by beneficiaries in the amount of about $1.8 million.

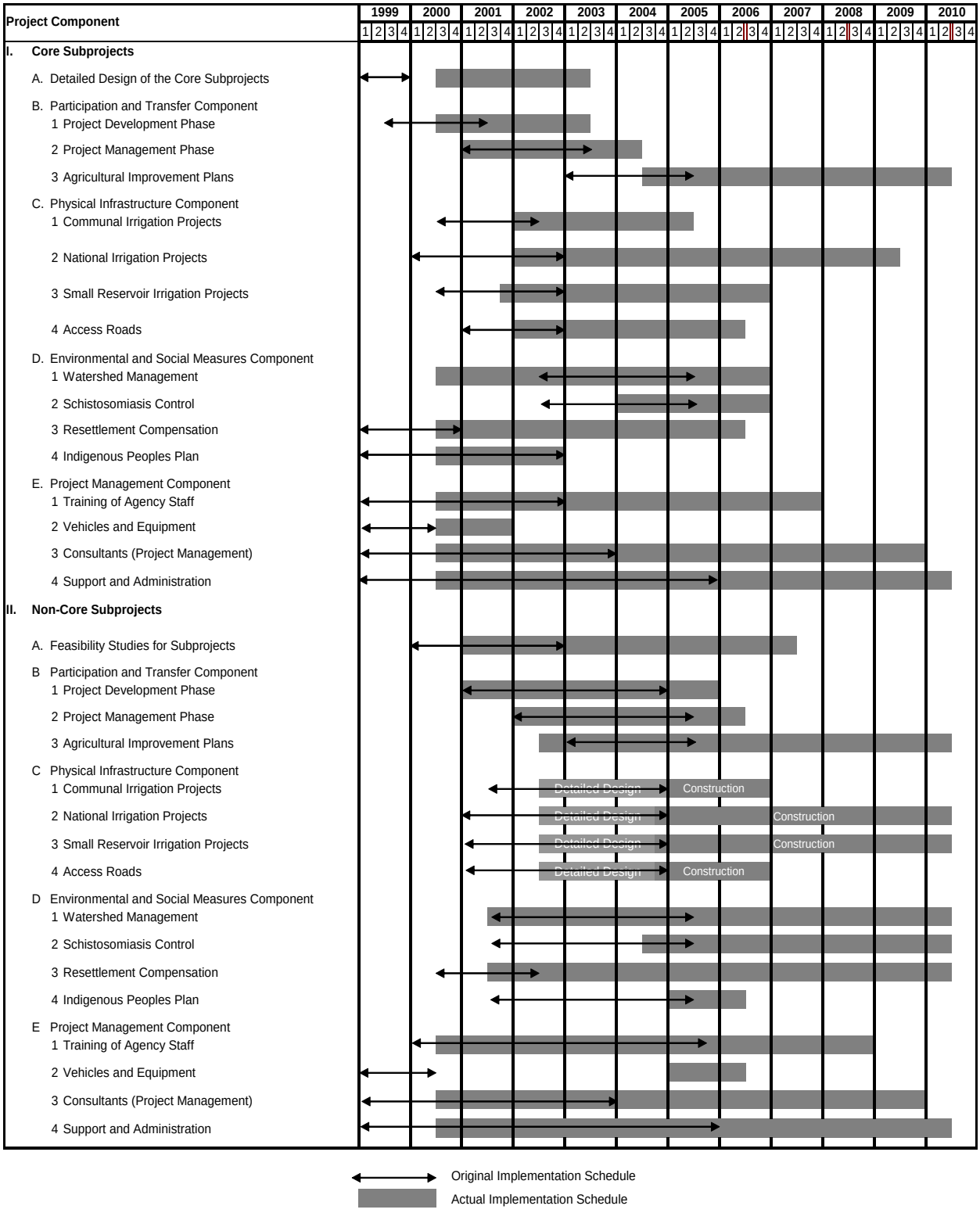
PROJECTED AND ACTUAL DISBURSEMENTS
($'000s)

Estimated Year	Estimated Disbursement	Year	Actual Year	Actual Disbursement	Cancellations
1999	3,343	1	1999		
2000	15,585	2	2000	1,358	
2001	28,649	3	2001	2,558	
2002	40,756	4	2002	5,302	
2003	44,725	5	2003	8,409	
2004	45,476	6	2004	12,837	
2005	45,552	7	2005	18,087	
		8	2006	23,095	
		9	2007	29,294	
		10	2008	37,596	2,596
		11	2009	43,968	
		12	2010	49,927	
		13	2011	50,013	7,391

Notes: Estimated disbursements was computed by multiplying projected annual expenditures at appraisal per component/sub-component by the corresponding financing ratios.
The figures exclude interest during construction.
First cancellation of $2.596 million was effective on 26 February 2010.
Final cancellation of $7.391 million was effective upon loan closing on 30 June 2011.



PROJECT IMPLEMENTATION SCHEDULE



STATUS OF COMPLIANCE WITH LOAN COVENANTS

Covenant	Reference in Loan Agreement	Status of Compliance
The Borrower shall make available, promptly as needed the funds, facilities, services, and other resources, which are required, in addition to the proceeds of the Loans, for the carrying out of the Project and for the operation and maintenance of the project facilities.	Article IV Sec. 4.02	Complied with. Counterpart fund requirements were less than estimated at appraisal and amounts provided satisfied the requirements given the absorptive capacity of the Project.
The Borrower shall cause competent and qualified consultants and contractors, acceptable to the Borrower and ADB to be employed to an extent and upon terms and conditions satisfactory to ADB.	Article IV Sec. 4.03(a)	Complied with. Post and prior review of contracts were in accordance with the Loan Agreement. Some external interference is apparent in the procurement of some contracts in Region XIII.
The Borrower shall maintain records and accounts adequate to identify the goods and services financed out of the proceeds of the loan.	Article IV Sec. 4.06(a)	Complied with.
The Borrower shall maintain separate accounts for the Project. Have such accounts audited manually and furnish ADB a copy of the audited reports, including auditors opinion on the use of the Loan proceeds and compliance with the covenants of the Loan Agreement as well as on the use of the procedures for Imprest Account/ Statement of Expenditures, all in English language, 12 months after the end of each related fiscal year.	Article IV Sec. 4.06(b)	Complied with. Audited annual financial statements for CY 2000 to CY 2008 have been submitted to ADB. CY 2009 is under preparation. Audit reports were submitted with some delays.
The Borrower shall furnish ADB quarterly reports on the carrying out of the Project and on the operation and management of the project facilities.	Article IV Sec. 4.07(b)	Complied with. Some 39 quarterly reports for the period 30 Sep 2000 to 31 Mar 2010 submitted.
The Borrower will prepare a Project Completion Report for submission to ADB 3 months after the loan closing date.	Article IV Sec. 4.07(c)	Complied with but delayed. Project loan closed on 30 June 2010. Project Completion Report by the EA has been completed.
Project Implementation Within three months of the Effective Date, the Borrower shall establish (a) a Project Steering Committee (PSC), chaired by NIA Administrator, for project monitoring supervision and interagency coordination; and (b) a Project Management Committee chaired by the Governor of Agusan del Norte, for monitoring and supervision of Communal Irrigation System (CIS) subproject implementation under Part B of the Project.	Schedule 5 Paragraph 2.	Complied with. PSC was established on 27 Mar 2001 and met on 10 occasions. A Project Management Committee in PGAN was formed in the last quarter of 2000 and met regularly once every quarter.

Covenant	Reference in Loan Agreement	Status of Compliance
The Borrower shall establish the Central Project Management Office (CPMO) within NIA's Project Development Department. The CPMO shall be headed by Project Director, whose qualifications and experiences are acceptable to ADB.	Schedule 5 Para graph3 (i)	Complied with. A CPMO was established in July 2000.
The Borrower shall cause the establishment of Subproject Management Offices (SPMOs) in Agusan del Sur, Agusan del Norte, Lanao del Sur, Cebu, Iloilo, and to the extent subprojects are identified in other provinces concerned. The SPMOs shall be responsible for the implementation of subprojects within their respective jurisdiction and shall be headed by Project Managers who shall report to the Project Director of the CPMO.	Schedule 5 Paragraph 3(ii)	Complied with. Except Iloilo as the subproject in that location was dropped.
The Borrower shall ensure that all incremental staff required for project implementation shall be engaged on a contract basis or through redeployment of NIA staff only for the duration of project implementation.	Schedule 5 Paragraph 4	Complied with.
Project Financing For construction or rehabilitation under any CIS subproject under Part B (ii), the borrower shall: (a) re-lend the proceeds of the Loan up to the amount of $820,000 to the Provincial Government under a Financing Agreement on MOF terms and conditions prevailing on the date of execution thereof, satisfactory to the Bank, and with the Borrower bearing the foreign exchange risk; and (b) ensure that the Provincial Government shall have entered into tripartite MOA with the Irrigators' Association (IA) and municipality concerned.	Schedule 5 Paragraph 8	Complied with. (a) Financing agreement executed between the PGAN and the Borrower, represented by the DOF/MDFO. Total financing from loan proceeds is up to $1,640,000 consisting of $820,000 sub-loan and $820,000 grant. (b) Construction MOA executed between the IAs and PGAN Financing Agreement was executed between the PGAN and the Borrower on October 20, 1999. Tripartite MOA with the IA and municipality concerned was signed in June 2000. Construction MOA between the IAs and the PGAN was executed: Calayagon subproject Dam in Apr 2002; Irrigation facilities in Oct 2003; Aclan-Amontay subproject: 7 Jun 2004.
For construction or rehabilitation under any National Irrigation System (NIS) or Small Reservoir Irrigation Systems (SRIS) subproject, the Borrower shall ensure that NIA shall have entered into a MOA with IA concerned on the terms and conditions of ADB.	Schedule 5 Paragraph 9	Complied with. The Construction MOA between NIA and concerned IAs/FIAs of the subprojects were signed as follows: Can-asujan: Rice area - Aug. 2001 Vegetable area - Aug 2001 Gibong Right Bank: Sep 2002; Non-core - Mar 2004;

Covenant	Reference in Loan Agreement	Status of Compliance
		Magballo-Balicotoc-Canlamay: Apr 2004; Baobo: May 2004; Dauin: Jun 2004; Cantilan: Apr 2005; Gibong Left Bank: Jun 2005; Rugnan: 28 Oct 2008.
Transfer of Project Facilities to Irrigators' Associations The Borrower shall ensure that all the assets and management of the completed Project facilities under each subproject, except reservoirs under Part B (iii) of the Project, shall be transferred to the IAs concerned within three years of completion thereof.	Schedule 5 Paragraph 10	Partly complied with. Calayagon - Civil works completed in Jul 2005; under full management of IA; Ownership of canal facility was transferred to IA on 11 Jul 2005; assets of diversion dam will be transferred after full amortization of 10% equity. Aclan-Amontay - completed in Oct 2006; under full management of IA; assets will be transferred only after full amortization of 10% equity. Can-asujan - physical facilities were completed in Dec 2006. NIA manages the dam, reservoir, and part of the main canal; IAs manages the irrigation facilities after NIA's responsibility; Turnover of the irrigation facilities' ownership to the IAs was done on 24 Oct 2009. For existing NIS schemes, irrigation assets are registered as an asset of NIA and cannot be transferred to beneficiaries.
Land Prior to the commencement of construction and/or rehabilitation of any subproject under Part B of the Project, the Borrower shall ensure timely acquisitions of all land necessary for such subproject in accordance with applicable laws and procedures.	Schedule 5 Paragraph 11	Complied with. The right-of-way land acquisition is part of the Land Acquisition and Resettlement Plan for all subprojects implemented.
NIA Schemes The Borrower shall ensure that NIA will (i) facilitate the establishment of IAs within the Project area and elsewhere; and (ii) continue to levy and collect ISF from farmers under those NIS schemes, or parts thereof, that remain under ownership and control of NIA.	Schedule 5 Paragraph 12	Complied with.
Irrigation Service Fees (ISF) Within 6 months after the Effective Date, the Borrower shall complete a comprehensive review of the application of ISF and submit to ADB a written report that will include	Schedule 5 Paragraph 13	Complied with. The final report of TA on Review of Cost Recovery Mechanisms for National Irrigation Systems submitted to ADB in

Covenant	Reference in Loan Agreement	Status of Compliance
recommendations for improvement of existing ISF policies and procedures. The Borrower shall, no later than one year after submission of such written report, implement appropriate and effective measures in order to promote 100 percent O&M cost recovery for each NIA-owned irrigation scheme.		Sept. 2000. In line with this, the Borrower, through NIA, implemented a pilot volumetric pricing of ISF in selected irrigation systems from 2000 to 2004. Results from this pilot have been inconclusive and require further objective evaluation.
LGUs The Borrower shall ensure that (i) NIA will complete implementation of an approved time bound action plan for transfer of assets of CIS schemes by NIA to LGUs concerned no later than 1 March 2003; (ii) the LGUs concerned will be strengthened to undertake effective collections of amortized amounts of principal payable by the relevant IAs to such LGUs under loans taken by the relevant IAs for funding their respective equity contributions for the construction and/or rehabilitation of such CIS schemes.	Schedule 5 Paragraph 14	Not complied with. Countrywide, this has not been achieved. Per MOA between the IAs and PGAN, the assets shall be turned over to the IAs after full amortization of 10% equity loan. As of Dec 2009, the IA of Calayagon had amortized a total of P630,000. Aclan-Amontay Multi-Purpose Cooperative, Inc. will start to amortize in 2011.
Empowerment of IAs The Borrower shall take necessary measures to strengthen and empower the IAs so that IAs can effectively (i) undertake collection of dues, fees and other amounts payable from the members through application of appropriate enforcement mechanisms; and (ii) make payment of any such amounts that are, or may become, due and payable by such IAs for O&M of the reservoir constructed or rehabilitated under the SRIS schemes financed under the Project.	Schedule 5 Paragraph 15	Complied with. Capacity building activities were provided to IAs/FIAs from feasibility study phase up to the system management and agricultural development phase. The activities were focused on organizational development, financial management, operation and maintenance, crop production technology, resource mobilization, networking, linkages and livelihood generation. The IAs/FIAs of subprojects in NIS schemes are under Irrigation Management Transfer contracts with the concerned PIMOs/RIOs including the collection of ISFs. The IAs of SRIS schemes are likewise collecting fees and share in the O&M costs of the reservoirs.
Training The Borrower shall ensure that (i) Project training activities are facilitated by allocation of adequate time and opportunity for relevant NIA and LGU staff to obtain training under the Project; and (ii) the NIA and LGU staff trained under the Project continue to remain assigned to staff positions relevant to the training provided for the maximum period permitted under the relevant laws and regulations of the Borrower in order to promote effective Project	Schedule 5 Paragraph 16	Complied with. Yearly allocation was provided for the training activities of agency staff as well as LGU staff under the Project.

Covenant	Reference in Loan Agreement	Status of Compliance
implementation.		
Environment The Borrower shall ensure, that (i) for each approved subproject, environmental assessment reports will be prepared as part of the detailed design and feasibility of each subproject, in accordance with applicable environmental laws and regulations of the Borrower and relevant Bank guidelines, and each subproject will be designed on the basis of environmental standards acceptable to the Bank; and (ii) the Initial Environmental Examination or Summary Initial Environmental Examination, as the case may be, of each subproject will be approved by the authorities concerned, and endorsed by the CPMO, prior to submission to ADB for approval. The Borrower shall facilitate the timely issuance of environmental compliance certificates (ECC). Further, the Borrower shall ensure that all subprojects are implemented in accordance with the conditions of their respective ECCs, the applicable environmental rules and regulations of the Borrower and relevant Bank guidelines.	Schedule 5 Paragraph 17	Complied with. Environmental Compliance Certificates for each subproject were issued by Environmental Management Board - DENR, as follows: Can-Asujan - 15 Aug 2001; Calayagon - CNC granted in 2002; Gibong Right and Left Bank – 1 Oct 2003; Baobo - 12 Dec 2003; Dauin - 03 May 2005; MBCIIS - 17 May 2005; Cantilan - 23 May 2005; Aclan-Amontay - CNC issued by EMB-DENR; and Rugnan - 29 Sep 2008.
Monitoring and Evaluation The Borrower shall establish a project monitoring and evaluation system within 12 months of the Effective Date.	Schedule 5 Paragraph 18	Complied with. The system was established in May 2001. Physical progress and financial status is being reported in quarterly basis. The indicators for monitoring socio-economic and environmental impacts have been established but impact monitoring has been overlooked. Quarterly progress reports (physical and financial) were prepared and copies submitted to ADB.
Operations and Maintenance (O&M) The Borrower shall ensure, or cause to ensure, that the IAs make satisfactory arrangements for ongoing O&M of all project facilities constructed or rehabilitated under the Project, including access and service roads.	Schedule 5 Paragraph 19	Complied with.
Beneficiary Participation The Borrower shall ensure that all beneficiaries, including leaseholders, share-tenants, landowners, and women, have equal opportunities to participate in project activities. To facilitate full participation by women in Project activities, the Borrower shall ensure that	Schedule 5 Paragraph 20	Complied with. (i). 8,784 farm households joined IAs, Of this number, 1,504 or 17% were headed by women; (ii) 596 or 31% of 1,932 officers of FIA/ IAs/TSAG were women; (iii) 34 IDOs were engaged by the

Covenant	Reference in Loan Agreement	Status of Compliance
(i) female household heads are permitted to be enlisted as IA members; (ii) women constitute at least one-fourth of officers if IAs established, and at one-half of the IDOs assigned, under the Project; (iii) rural credit and training programs under the Project are equally accessible to both men and women.		Project, of which 23 or 68% were women. (iv) 38,505 farmers-beneficiaries attended various trainings, of which 15,603 or 41% were women.
Indigenous Peoples The Borrower shall ensure that, to the extent any indigenous peoples are likely to be affected significantly by the Project, appropriate measures, including development of a specific indigenous peoples' plan addressing the concerns of such indigenous peoples, will be taken in accordance with the Bank's Policy on Indigenous Peoples.	Schedule 5 Paragraph 21	Complied with. In certain subprojects, the minority groups represent the majority of beneficiaries and no special arrangements have been needed. In watershed stabilization initiatives, specific activities have been targeted for local indigenous people.
Resettlement The Borrower shall use its best efforts to avoid or minimize resettlement, to the extent reasonable in the circumstances, by making appropriate adjustments to the design of subprojects. To the extent, resettlement is required under the Project, the Borrower shall ensure that any such resettlement will be in accordance with the Bank's Policy on Involuntary Settlement.	Schedule 5 Paragraph 22	Complied with. The Land Acquisition and Resettlement Plans were completed and submitted to ADB as follows: Can-asujan: 2004 Gibong Right Bank: Jul 2005 Magballo-Balicotoc-Canlamay: May 2005 Dauin: Apr 2005 Gibong Left Bank: Jul 2005; Feb 2007 (revised) Baobo: Jul 2005 Aclan-Amontay: Feb 2007 Cantilan: Jul 2005; Feb 2007 (revised) - Category C subproject Calayagon: Feb 2007 Rugnan: Mar 2009
Beneficiary Contribution For the costs of construction and/or rehabilitation under Part B (I), (ii), and (iii) of the Project, the Borrower shall ensure that the relevant subproject beneficiaries contribute, in cash or in kind.	Schedule 5 Paragraph 23	Complied with. As of December 31, 2010, the actual equity contributions of farmer-beneficiaries in % of the chargeable cost are as follows: Can-Asujan - 25.0% Gibong Right Bank - 12.7% Calayagon - 15.9% Dauin - 10.5% Magballo - 14.0% Baobo - 16.1% Aclan-Amontay - 15.0% Gibong Left Bank - 8.2% Cantilan - 11.7%

Covenant	Reference in Loan Agreement	Status of Compliance
		Rugnan - 8.6%
Counterpart Funds The Borrower shall ensure that, for each year of the Project implementation, the Project shall be accorded high priority for the purpose of budgetary allocations. To this end, the Borrower shall ensure (i) timely preparation and submission of Annual budgets and requests for disbursement of counterpart funds necessary for Project implementation; (ii) timely and regular release of counterpart funds by the authorities concerned for approved Project activities.	Schedule 5 Paragraph 25	Complied with.

ADB = Asian Development Bank, CIS = communal irrigation system, CNC = certificate of non-coverage, CPMO = central project management office, CY = calendar year, DOF = Department of Finance, EA = executing agency, ECC = environmental compliance certificate, FIA = federation of irrigators associations, IA = irrigators association, IDO = institutional development officer, ISF = irrigation service fee, LGU = local government unit, MDFO = Municipal Development Fund Office, MOA = memorandum of agreement, NIA = national irrigation administration, NIS = national irrigation systems, O&M = operation and maintenance, PGAN = Provincial Government of Agusan del Norte, PIMO = provincial irrigation management office, PSC = Project Steering Committee, RIO = regional irrigation office, SPMO = subproject management office, SRIS = small reservoir irrigation system, TA = technical assistance, TSAG = turnout service area group.

IMPLEMENTATION SUPPORT CONSULTING SERVICES

(in person-months)

Consultant Position	Appraisal	Original Contract	Actual
International Consultants			
Team Leader (Irrigation Management Specialist)	60.00	60.00	78.53
Community Development Specialist	35.00	35.00	33.47
Dam Engineer	15.00	10.00	3.17
Tender Document Specialist			2.33
Construction Training Specialist			0.60
Dam Hydraulic Engineer		5.00	2.47
Geologist	5.00	5.00	2.43
Participatory Training Specialist	10.00	10.00	3.13
Irrigation Agronomist	10.00	10.00	2.07
Hard-fill Dam Specialist			0.33
Structural Design Engineer			2.93
Environmental Specialist	10.00	10.00	10.47
Construction Management Engineer			9.57
Mechanical Engineer			0.73
Participatory Design Engineer			1.50
Project Director		1.50	1.45
Micro-enterprise and Financial Specialist			2.00
Young Professional Intern			
Subtotal	**145.00**	**146.50**	**157.19**
National Consultants			
Institutional Development Specialist	72.00	72.00	82.73
Hydrologist	8.00	8.00	7.97
Environmentalist	11.00	11.00	22.83
Rural Sociologist	8.00	8.00	26.53
Agricultural Economist	6.00	6.00	2.20
Sprinkler Irrigation Engineer	15.00	15.00	9.30
Hydraulic Structure Engineer	30.00	30.00	67.60
Fisheries Specialist	18.00	18.00	7.53
Watershed Management Specialist	24.00	24.00	36.67
Monitoring and Evaluation Specialist	6.00	6.00	54.50
Irrigation Management Advisor 1	21.00	21.00	50.63
Agriculturalist	21.00	21.00	37.93
Community Development Specialist	33.00	33.00	53.93
Participatory Training Specialist			25.83
Mid-level Technical Support Staff			20.30
High Level Engineer 1 - Construction Supervision			36.90
High Level Engineer 2 - Irrigation System Design			15.10
Construction Engineer			10.00
Mechanical Engineer			1.50
Irrigation Management Advisor 2			6.50
Subtotal	**273.00**	**273.00**	**576.50**
TOTAL	**418.00**	**419.50**	**733.69**

ECONOMIC REEVALUATION

A. Introduction

1. The Southern Philippines Irrigation Sector Project was implemented under a sector modality, where subprojects were identified and formulated during project implementation. This modality was selected because of the existence of a well-articulated sector development strategy as outlined in the Medium-Term Philippine Development Plan[1] and further described in the National Irrigation Strategy, and because the EA (the National Irrigation Administration [NIA]) had considerable experience with internationally financed development initiatives. The project, involving 11 subproject investments, was implemented by the NIA and the provincial government of Agusan del Norte in the Visayas and Mindanao. The overall objective of the project was to "increase incomes of about 10,000 farm households through increased agricultural production and crop diversification resulting from investment in irrigation infrastructure and measures to promote user participation in project development and subsequent system management supporting irrigator associations to undertake operations and maintenance of their systems".[2]

2. Investments incorporated (i) beneficiary participation in subproject design and transfer, including capacity building for irrigator associations, operational support for irrigator associations to achieve greater participation in subproject design and operation and maintenance (O&M), and transfer of completed facilities; (ii) physical infrastructure, including national irrigation systems (NISs),[3] communal irrigation systems (CISs), small reservoir irrigation systems (SRISs),[4] and rural access roads; (iii) environmental and social measures, including initiatives in watershed management, resettlement, schistosomiasis control, and associated indigenous peoples development plans; and (iv) project management, including support for a central project management office (CPMO) and provincially located subproject coordinating offices and subproject management offices (SPMOs).

3. With more than $41 million equivalent of the total investment of $70 million (excluding interest during construction) being directed at irrigation and rural road development, the economic analysis focuses on the impact on agricultural productivity of rehabilitated and newly constructed irrigation facilities. The analysis evaluates two subprojects (of four core subprojects) as representative examples of the overall project impact. Only two have been analyzed as one of the core subprojects was dropped because of security considerations and the other was not reviewed because, given its current state of development, the analysis would present a negatively biased picture of the overall success of the project.[5] The two subprojects that were

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[1] National Economic and Development Authority. 2003. *Medium-Term Philippine Development Plan, 2004–2010*. Manila.

[2] ADB. 1998. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the Republic of the Philippines for the Southern Philippines Irrigation Sector Project*. Manila.

[3] Under the overall project, initially 15 subprojects were proposed but only 11 materialized: six NIS subprojects covering 8,610 hectares (ha) in Agusan del Sur, Surigao del Sur, and Lanao del Sur; two CIS subprojects with a combined service area of 297 ha in Agusan Del Norte; and three SRIS subprojects with a combined service area of 1,675 ha in Cebu, Negros Oriental, and Negros Occidental.

[4] NIS schemes have irrigation service areas of greater than 1,000 ha, CIS schemes are generally run-of-the-river gravity diversion systems of less than 1,000 ha, and SRIS schemes comprise storage dams with wall heights of less than 25 meters and storage volumes of less than 50 million cubic meters.

[5] The Gibong Right Bank Extension subproject was reported as physically completed. However, the main farm ditch from lateral I to its service area of about 245 ha, representing about 37% of the firmed-up service area of the whole subproject, is nonfunctional (farms are at a higher elevation than the main farm ditch). Also, a section of lateral I passing through a creek a few hundred meters from the head-gate collapsed due to flooding in February 2011.

re-analyzed are the Can-asujan SRIS in Carcar in Cebu and the Calayagon CIS in Agusan del Norte in Mindanao.

B. Methodology

4. Only significant benefits and costs are examined to assess subproject viability and to understand the expected impact on different sectors of the local economy and society, particularly the poor. Costs and benefits are calculated for two situations: with-project and without-project scenarios. The same irrigation command area (the firmed-up command area)[6] has been examined in both scenarios, i.e., the full irrigated area after rehabilitation or new construction of weirs, reservoirs, and delivery canals has been completed. In the without-project scenario, this command area is inadequately irrigated and there is a greater dependence on rain-fed agriculture. The analysis takes into account what might be grown on this land without the irrigation development. The intent is to identify the incremental value of production allowed by the subprojects (over their expected useful life) and compare this value to the incremental cost of implementing the subprojects and of operating and maintaining the rehabilitated or new infrastructure over time.

5. To develop a model for the analysis, assumptions are made regarding future practice (both with and without the subprojects) and about the valuation of inputs and outputs:

(i) Subproject life is 25 years, i.e., assuming adequate maintenance, the irrigation system should be able to maintain its expected benefits for 25 years before another major renovation may be required.
(ii) In the without-subproject scenario, present cultivation patterns and technology are expected to continue for the life of the subproject.
(iii) In the with-subproject scenario, the full command area is expected to continue to be irrigated throughout the effective life of the subproject, allowing farmers to adopt higher-value cropping patterns and technology as appropriate.
(iv) Some agricultural outputs may be consumed within the household but are valued as if sold.
(v) Some agricultural inputs such as farm labor are provided by the farm household but are valued at the market rate as if hired.
(vi) Output values are expressed in constant 2010 terms to exclude inflation.
(vii) Costs incurred during construction are converted to constant 2010 pesos (local costs) and constant 2010 US dollars (foreign currency costs) by applying local inflation rates in the Philippines to local costs and the Multipliers Unit Value index as published by the World Bank.[7]
(viii) The peso is the unit of account. The exchange rate used is the mid-year rate with the US dollar.
(ix) Future production on command areas is estimated based on past trends leading to full utilization by 2015. In the case of the vegetable-growing areas of Can-asujan subproject, benefits have been assessed from two crops—eggplants and tomatoes—as proxies for other vegetables grown that include okra, *ampalaya* (bitter melon), squash, bell peppers (capsicum), pole beans, and watermelons.

[6] Between feasibility study and implementation of the subprojects, land initially in the planned command area has been removed from agricultural production in view of higher value of land associated with industrial and residential zonings. In Can-asujan for example, 70 ha of the rice-growing area and 16 ha of vegetable-growing areas have been converted to alternative land uses, of an initial combined benefit area of 537 ha (12%).

[7] http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTDECPROSPECTS/0,,contentMDK:20587651~menuPK:3279864~pagePK:64165401~piPK:64165026~theSitePK:476883,00.html

6. Financial prices used in this analysis were identified through field visits during the project completion review mission. These prices have been cross-checked with prices identified in other projects and secondary sources.

7. To assess subproject contributions (and costs) to the economy of the Philippines, financial values have been converted to their economic equivalents. Economic valuations exclude transfers from one part of society to another (i.e., taxes and subsidies) and attempt to facilitate the comparison of subproject benefits and real opportunity costs to the economy by translating all prices into a common undistorted footing. Basic assumptions (in addition to those above) used in the economic analysis include the following:

(i) A domestic price numeraire is used.
(ii) In the case of major tradable commodities (food grains and fertilizers), economic values are based on border parity prices.
(iii) For nontraded goods and services, a standard conversion factor of 0.9 is used. For rural labor, a shadow wage rate factor of 0.7 is applied. The factor reflects the productivity of rural labor in the area.
(iv) Transfer payments such as taxes and subsidies are excluded in the calculation of economic values.
(v) To calculate the economic net present value of the subproject, a discount rate of 12% is used as representing the opportunity cost of the capital invested.

C. Subproject Benefits

1. Can-asujan Subproject

8. The irrigable area following construction of the Can-asujan Reservoir was identified during the feasibility study at 571 ha for vegetables and 369 for rice. The actual firmed-up service area was 314 ha for vegetables and 361 ha for rice. Scheme construction commenced in 2000 and was completed in 2006, with benefits commencing in the 2007 season. There was a need to desilt the reservoir to reestablish storage capacity; this was undertaken in 2010, further impacting on the area that could be irrigated in that year. The uptake of vegetable production has been slow at best, local farmers claiming that access to finance was constraining their planting program. The benefit stream therefore has been assessed from irrigated rice and vegetables. For rice, planted areas have increased from 180 ha for the wet season crop and 120 ha for the dry season crop prior to the subproject to 222 ha for the wet season crop and 244 ha for the dry season crop in 2007. By 2010, this had reached 276 for the wet season crop and 147 for the dry season crop, the dry season figure reflecting desilting activities of the reservoir in that year. Given current interest, it is likely that the full service area will be planted to rice by 2012 (300 ha in each crop), giving an estimated production of 1,320 tons in the wet season and 1,350 tons in the dry season.

9. The situation with vegetables is more complex, as current planting rates have lagged significantly behind projected plantings at feasibility. In the wet season of 2007, the area planted to vegetables was 42 ha while the dry season area was 67 ha of a firmed-up area of 314 ha. Actual plantings have increased significantly to 186 ha in the wet season and 199 ha in the dry season in 2010 but still represent less than 75% of the potential irrigated area. For this reason, future plantings have been assumed to be lower with a maximum of 280 ha in the wet season and 314 ha in the dry season out being planted to vegetables by 2014. Assuming an approximate 50% being planted to eggplants and tomatoes as proxies for all vegetables, total production of eggplants could reach 4,300 tons and tomatoes could reach 3,800 tons once these levels of plantings have been realized (by 2015). The benefit stream from vegetable

production has an added risk that assumed levels of planting would not materialize. This is of particular concern when vegetables represent 85% of total estimated benefits. Other benefits, such as the delivery of domestic water, have not been estimated in the benefit stream, as these are associated benefits from the investment.

2. Calayagon Subproject

10. This subproject required the construction of a diversion dam to provide adequate water for an enlarged irrigation area. Prior to the subproject, the area irrigated was limited to 80 ha during the dry season, and there was also rain-fed rice (70 ha) and corn (35 ha) produced during the wet season (the remaining land comprised grassland, coconuts, some root crops, and idle land). After construction of the diversion dam and canal, the firmed-up service area was 190 ha for both wet and dry season rice; corn and other crops were replaced by the more profitable rice. The rehabilitation and expansion benefited 197 farm households, increasing household incomes to approximately $785 in 2011 from an average holding of irrigated land of 1.16 ha. Actual planted areas have steadily increased from 2007 when the works were completed, from 117 ha in the wet season and 123 ha in the dry season to 186 ha in the wet season and 190 ha in the dry season in 2010, nearly 100% utilization for both seasons given the firmed-up service area of 190 ha of an irrigable area of 230 ha, the balance being converted to purposes other than agriculture.

11. Based on farmer interviews, yields on the rehabilitated service areas have increased from 60 sacks/ha prior to rehabilitation to 100–120 sacks/ha after rehabilitation. Furthermore, the cropping intensity has increased to 200%, with two crops being grown each year. Minor works completed in 2010 allowed the full irrigation area to be serviced (the extension to main canal 2 that was financed by the local government unit) together with the completion of concrete lining of the outstanding 133 meters of canal. The scheme is now fully operational and is operating effectively under the management of the one irrigator association that has been very effective in irrigation service fee collection, achieving a figure of 95%.

D. Subproject Costs

1. Can-asujan Subproject

12. Infrastructure investment funds from loan and counterpart funding were separated into local and foreign costs, then appropriate inflators were applied to bring costs to constant 2010 terms. Financial costs were converted to economic values with the removal of taxes and duties, and then an estimated 5% was added for management to cover regional and national subproject management. This amount was less than the actual proportional allocation of the $20 million actually disbursed for the management of all subprojects and reflects the consequent cost of maintaining management structures with delayed implementation. The lower figure was used in the analysis, as the actual allocations were unrealistically high. The total investment cost in 2010 constant economic terms was $651,000 and the O&M cost was estimated at 1% of this investment cost.[8] Investment costs were extended over a considerably longer period than first anticipated because of delays in construction and the need to seal the reservoir floor to store water behind the constructed reservoir for dry season irrigation. Based on the effective or firmed-up service area of 675 ha (rice and vegetable area), the unit cost of development was

[8] The use of 1% of investment costs is rationalized on the grounds that the scheme is of low-maintenance design, being an earth-walled reservoir with intake areas being concrete with delivery through sealed pipes. The most vulnerable part of the delivery system is the pipe stands that have been strategically located throughout the command area.

$896/ha, which compares favorably with unit costs on other completed subprojects of the Southern Philippines Irrigation Sector Project.

2. Calayagon Subproject

13. Construction started in 2001 and was completed in 2007, with minor repairs being completed in 2010. In current terms, the cost of construction was P97.7 million (excluding the allocation for project management and interest during implementation) which, after conversion to constant 2010 terms, was P151.4 million (excluding taxes and duties). Operational and maintenance costs have been based on actual irrigation service fee payments at the rate of 200 kilograms (kg) of paddy evaluated at the current price of rice equivalent to P666,000, or about $15,000, in 2010. The development cost in constant 2010 terms is equivalent to $658/ha, which includes the converted area; if the total cost is attributed to the firmed-up service area, the figure becomes $796/ha—again, a relatively low-cost development.

E. Economic Analysis

1. Can-asujan Subproject

14. Given the assumptions of future planted areas, particularly for vegetables, the estimated economic internal rate of return from the investment was 10.1%. The net present value of the investment evaluated at 12% was P55.5 million, and that provided a base-case benefit–cost ratio of 0.83. Benefits in rice production were based on improved yields in both wet and dry seasons with improved irrigation and involved the progressive reduction of rain-fed paddy to zero within the command area. Benefits from vegetable production were generated through expansion of irrigated vegetable production and the associated improved yields with irrigation facilities. As benefits from vegetables are estimated to be 85% of the total benefit, clearly the success of the investment is dependent upon the production of higher-valued vegetables.

2. Calayagon Subproject

15. The economic internal rate of return (EIRR) estimate is firmer for this subproject given the greater certainty over planted areas, demonstrated crop yield achievements, and product prices. Whilst the actual EIRR is only 8.5% and the benefit–cost ratio is only 0.75, the subproject has certainly had a very positive impact upon the livelihoods of its beneficiaries. Farmers have responded to the opportunities to generate incremental incomes by utilizing the maximum area of land possible in both wet and dry seasons. However, the economic net present value at 12% is P24,007, as would be anticipated with an EIRR below the opportunity cost of capital.

F. Farmer Returns

1. Can-asujan Subproject

16. The total number of beneficiaries from the subproject is 885, representing an average farm size of just less than one ha per farming family assuming rice farmers and vegetable farmers farm similar areas. Based on the models developed for irrigated and rain-fed rice, the without-project scenario was for only one crop per year of rain-fed paddy, while in the with-project scenario beneficiary farmers could produce an irrigated rice crop in both the wet season (mainly finishing water) and the dry season (full irrigation), the dry season crop being the higher-yielding one. Based on a farm size of one ha, the net income likely to be achieved from rice

production is estimated at P10,900 in 2010 financial terms, while after the subproject the two crops will generate P17,500, representing an increase of approximately 60%. For vegetable growers the unit hectare net income from rain-fed eggplants was P109,000 during the rainy season and the equivalent with irrigation for the wet and dry season crops combined is P199,000, an increase of 82% in net revenue in financial terms. The equivalent figure for tomatoes is P150,000/ha under irrigated conditions (tomatoes are a new crop and were not grown in significant quantities under rain-fed conditions prior to the subproject).

2. Calayagon Subproject

17. With 197 beneficiary households and an average farmed area of 1.16 ha per farming household with two crops (rice, 0.35 ha wet season and 0.40 ha dry season; and corn, 0.17 ha), the average farming household income prior to rehabilitation is estimated at P20,450 while the post-project estimate is P84,000. These estimates are based on production of two crops on an area of 1.16 ha in each season. There is a fourfold impact on farmer household incomes from the subproject. The significant difference is a result of the increased cropping area made possible by the irrigation and provision of incremental water to the irrigation service area.

G. Poverty Impact

1. Can-asujan Subproject

18. The impact on the poor has been estimated by apportioning net benefits to farmers (40% of farmer beneficiaries were poor at subproject design) at 67%, labor (it was assumed 100% are poor) at 67%, micro-enterprises at 12.5%, utilities at 12.5%, and government at 12.5%. Based on these proportions, the overall poverty impact is estimated at 72% for the subproject. However, additional benefits will accrue to the poor through the provision of clean water to households that is available to both the poor and the nonpoor. Having clean household water has a direct impact on residents' capacity to work (through improved health), particularly for the poor, who suffer from greater health-related problems due to unclean domestic water supplies which affects their ability to gain employment.

2. Calayagon Subproject

19. With a similar apportionment of benefits to farmers, labor, micro-enterprises, utilities, and government, the poverty impact is estimated at 76% for the subproject. The higher impact of this subproject reflects the fact that additional area has been brought into production, which required incremental labor input, leading to reduced underemployment of family labor and increased household returns. As a result of the subproject, therefore, the incidence of poverty is expected to be significantly reduced to a level significantly below the 40% estimated at appraisal.

H. Sensitivity Analysis

1. Can-asujan Subproject

20. As mentioned previously, the economic models used to measure subproject benefits are heavily dependent upon the benefits from vegetable production. The EIRR estimate is not sensitive to small fluctuations in rice and vegetable prices, with the EIRR decreasing to 9.1% with a 10.0% decline in the value of overall benefits. Similarly, the model is robust to delays that were experienced during the construction process, with the EIRR estimate declining to 8.2% if benefits were further delayed by 2 years. However, the main area of concern is the area planted

to vegetables. If dry season vegetables achieve only 50% of anticipated plantings, the EIRR declines to 6.9%. If the level achieved is 75% of the predicted estimates, the EIRR declines to 8.6%, compared with the base-case scenario of 10.1%. The investment has therefore been less than efficient, with implementation delays having an impact on economic efficiency while the overall performance could still be negatively impacted if the assumed level of vegetable production does not materialize. The resultant EIRR is also less sensitive to increases in O&M costs.

2. Calayagon Subproject

21. The models used to assess the economic impact of this subproject are less vulnerable to risk than the previous subproject. Yields have been achieved, payment levels of irrigation service fee are approaching 100% through the irrigator association, and the scheme has been completed in terms of its development requirements. The only variables likely to impact upon the profitability of the investment relate to the international price of rice, which appears robust. The other concern might be the potential further loss of land to nonagricultural pursuits. A 10% decline in the level of benefits results in a decline in the EIRR to 7.5%. The removal of agricultural land from the service area is beyond the influence of the study but, given the high returns to irrigated rice production, it is reasonable to assume that the land will remain under full production for at least the next 10 years, by which time most of the benefits from the investment will have already been captured.

IRRIGATION SERVICE FEE COLLECTION PERFORMANCE

System/Subproject	2004	2005	2006	2007	2008	2009
Gibong Right Bank						
Current Account Collectible (P1,000)	2,311	2,773	2,662	2,877	3,424	4,042
Actual Current Account Collection (P1,000)	1,803	2,298	2,193	2,258	2,147	2,770
Current Account Collection Efficiency	78.0%	82.9%	82.4%	78.5%	62.7%	68.5%
Gibong Left Bank						
Current Account Collectible (P1,000)	300	579	532	334	238	242
Actual Current Account Collection (P1,000)	188	349	359	180	19	126
Current Account Collection Efficiency	62.7%	60.3%	67.4%	54.0%	7.8%	52.2%
Cantilan Irrigation System						
Current Account Collectible (P1,000)	3,479	3,456	3,479	3,418	3,735	5,464
Actual Current Account Collection	1,582	1,740	1,582	1,632	1,817	3,265
Current Account Collection Efficiency	45.5%	50.3%	45.5%	47.7%	48.6%	59.8%
Can-asujan						
Current Account Collectible (P1,000)		43	257	559	617	773
Actual Current Account Collection (P1,000)		24	114	357	417	579
Current Account Collection Efficiency		56.0%	44.4%	63.9%	67.6%	74.9%
All Above Systems						
Current Account Collectible (P1,000)	6,090	6,851	6,931	7,188	8,014	10,521
Actual Current Account Collection (P1,000)	3,573	4,410	4,248	4,427	4,400	6,740
Current Account Collection Efficiency	58.7%	64.4%	61.3%	61.6%	54.9%	64.1%

Source: Central Project Management Office, National Irrigation Administration.

SUPPLEMENTARY APPENDIX A: CONTRACTS AWARDED AND FINANCED BY ADB

Particulars	Contract Number	Mode of Procurement	Original Contract Amount (P million)	Revised Contract Amount (P million)	Contractor	Implementation Schedule			Remarks
						Start	Completion		
							Original	Revised	
NIA									
Construction of Can-asujan Dam and Appurtenant Facilities	SPISP1-C-1	ICB	265.826	333.989	China Electric Power Technology Import and Export Corporation	30-Jul-03	14-May-06	Nov-05	Completed with final acceptance
Construction of Dauin Dam and Appurtenant Facilities	SPISP1-C-2	ICB	158.868	173.641	New Kanlaon Construction Inc. / Markbilt Construction Inc.	1-Sep-06	27-Feb-08		Completed with final acceptance
Procurement of Irrigation Pipes and Pipe Accessories of Dauin SRIP	SPISP-S-1	ICB	68.900	74.278	Moldex Products	6-Nov-07	25-Mar-08		Completed
Construction of Binalawan Concrete Buttress Dam and Appurtenant Facilities, MBCIIP	SPISP1-C-3	ICB	167.797	167.797	New Kanlaon Construction Inc. / J.E. Manalo Construction	18-Jun-09	30-Jun-10		Construction ongoing; cumulative accomplishment at 90% as of PCR Mission
Construction of Baobo Diversion Dam, Right and Left Main Canals including Appurtenant Structures	SPISPD-C-1	LCB	224.599	219.746	P.L. Sebastian Construction	2-Mar-07	23-Jun-08		Completed with final acceptance
Construction/Rehabilitation of Cantilan NIS Laterals A-4, A-5, and A-6 including Appurtenant Structures (Package 1)	SPISP-LCB-CTN-01	LCB	13.936	11.315	C.E. Padilla Construction	19-Nov-07	16-May-08	May-09	Contract terminated at 81%; balance of works completed by force account
Construction/Rehabilitation of Cantilan NIS Laterals B-1, and D including Appurtenant Structures (Package 2)	SPISP-LCB-CTN-02	LCB	14.802	13.841	Regional Infrastructure Development Corporation	10-Oct-07	6-Apr-08	May-09	Contract terminated at 93%; balance of works completed by force account
Construction/Rehabilitation of Cantilan NIS Laterals B-4, and C including Appurtenant Structures (Package 3)	SPISP-LCB-CTN-03	LCB	14.711	12.041	Regional Infrastructure Development Corporation	10-Oct-07	6-Apr-08	May-09	Contract terminated at 82%; balance of works completed by force account
Construction/Rehabilitation of Cantilan NIS Main Canal (sta. 0+000 - 4+623) including Appurtenant Structures (Package 4)	SPISP-LCB-CTN-04	LCB	10.370	3.913	Regional Infrastructure Development Corporation	8-Jan-08	16-Apr-08	May-09	Contract terminated at 38%; remaining works being undertaken by force account
Construction/Rehabilitation of Cantilan NIS Main Canal (sta. 4+623 - 8+930) including Appurtenant Structures (Package 5)	SPISP-LCB-CTN-05	LCB	9.600	3.914	Longwide Builders	12-Feb-08	21-May-08	May-09	Contract terminated at 40%; remaining works being undertaken by force account

Particulars	Contract Number	Mode of Procurement	Original Contract Amount (P million)	Revised Contract Amount (P million)	Contractor	Implementation Schedule			Remarks
						Start	Completion		
							Original	Revised	
Construction/Rehabilitation of Cantilan Lateral A including Appurtenant Structures (Package 6)	SPISP-LCB-CTN-06	LCB	10.346	5.014	Regional Infrastructure Development Corporation	9-Jan-08	17-Apr-08	31-May-09	Contract terminated at 48%; remaining works being undertaken by force account
Construction/Rehabilitation of Cantilan Lateral B including Appurtenant Structures (Package 7)	SPISP-LCB-CTN-07	LCB	11.455	9.302	Serra Ty Construction	12-Feb-08	21-May-08	May-09	Completed
Construction/Rehabilitation of Cantilan NIS Intake including Appurtenant Structures (Package 8)	SPISP-LCB-CTN-08	LCB	8.529	8.539	ADFIL Construction	9-Jan-08	12-Apr-08	May-09	Contract terminated at 45%; remaining works being undertaken by force account
Improvement/Rehabilitation of Existing Gibong Left Bank Main Canal including Appurtenant Structures (Package 1)	SPISP-LCB-GLB-01	LCB	13.800	10.702	Regional Infrastructure Development Corporation	20-Jun-07	16-Dec-07	May-09	Contract terminated at 78%; balance of works completed by force account
Improvement/Rehabilitation of Existing Gibong Left Bank Main Canal including Appurtenant Structures (Package 2)	SPISP-LCB-GLB-02	LCB	14.035	3.057	Regional Infrastructure Development Corporation	3-Oct-07	30-Mar-08	Jul-09	Contract terminated at 22%; remaining works being undertaken by force account
Improvement/Rehabilitation of Existing Gibong Left Bank Main Canal including Appurtenant Structures (Package 3)	SPISP-LCB-GLB-03	LCB	14.449	13.671	Regional Infrastructure Development Corporation	8-Jan-08	5-Jul-08	Jul-09	Contract terminated at 86%; remaining works being undertaken by force account
Improvement/Rehabilitation of Existing Rugnan NIS Lateral Canal and Appurtenant Structure (Package 1)	SPISP-LCB-RUG01	LCB	11.280		MMA Achiever Construction and Development Corporation	27-Mar-09	Jul-09		Completed
Improvement/Rehabilitation of Existing Rugnan NIS Lateral Canal and Appurtenant Structure (Package 2)	SPISP-LCB-RUG02	LCB	11.645		ASAND Construction and Development Corporation	27-Mar-09	Jul-09		Completed
Improvement/Rehabilitation of Existing Rugnan NIS Lateral Canal and Appurtenant Structure (Package 3)	SPISP-LCB-RUG03	LCB	10.627		ASAND Construction and Development Corporation	27-Mar-09	Jul-09		Completed
Improvement/Rehabilitation of Existing Rugnan NIS Lateral Canal and Appurtenant Structure (Package 4)	SPISP-LCB-RUG04	LCB	14.366		ASAND Construction and Development Corporation	27-Mar-09	5-Aug-09		Completed

Particulars	Contract Number	Mode of Procurement	Original Contract Amount (P million)	Revised Contract Amount (P million)	Contractor	Implementation Schedule			Remarks
						Start	Completion		
							Original	Revised	
Provincial Government of Agusan del Norte									
Construction of Calayagon-ogong CIP Dam		LCB	19.000	28.315	Equi-Parco Construction	6-Mar-01	19-Dec-03	17-May-04	Completed
Rechanneling of Tacub Creek		LCB	5.920	1.676	Equi-Parco Construction	15-Feb-06	15-Mar-06	30-Mar-06	Completed
Rehabilitation of Amontay Dam		LCB	0.704		Equi-Parco Construction	28-Feb-06	30-Mar-06	15-Apr-06	Completed
Rehabilitation of Aclan Dam		LCB	1.634	0.274	Equi-Parco Construction	30-Mar-06	30-Apr-06	28-May-06	Completed

CIP = communal irrigation project, ICB = international competitive bidding, LCB = local competitive bidding, MBCIIP = Magballo-Balicotoc-Canlamay Integrated Irrigation Project, NIS = national irrigation system, PCR = project completion report, SRIP = small reservoir irrigation project.

SUPPLEMENTARY APPENDIX B: EQUIPMENT PURCHASED BY THE PROJECT

Particulars	Quantity	Amount (P)	User Agency/Office																
			National Irrigation Administration										DOH	DENR				PGAN
			CO/CPMO	Negros Occidental PIO	Cebu PIO	Negros Oriental PIO	Rugnan NIS	Region 10	Region 13	Agusan del Sur PIO/Baobo	Gibong NIS	Agusan del Norte PIO	Cantilan NIS	Caraga Region	FMB	PENRO-Cebu	PENRO-Agusan del Sur	PENRO-Agusan del Norte	
Airconditioning Unit	39	1,586,325.73	4	8	2	4			1				1	13	1				5
Amplifier	1	92,545.00					1												
Arcinfo Version 4	1	353,100.00													1				
Arcview 3.2 Windows	1	150,000.00													1				
Audio Video System	1	43,900.00							1										
Automatic Level	8	222,600.00		1	3						2		2						
Binding Machine	2	33,295.00		1	1														
Binocular Microscope	4	261,808.58												4					
Biometric	1	43,000.00												1					
Blue Printing Machine	3	425,500.00	1		1														1
Bullbar for Ford Ranger	1	15,500.00	1																
Calculator	9	22,901.50	1	4		3	1												
Canon Camera - prima super	3	53,990.00													1	1		1	
Casette Recorder and Radio Casette	1	15,131.60		1															
Centrifuge EBG 20	1	84,000.00												1					
Chain Block	3	15,850.00				3													
Computer CPU	5	90,103.00			4				1										
Computer Monitor	9	47,590.00			9														
Computer Server	1	285,000.00												1					
Copier/Photocopying Machine	19	1,501,895.00	2	2	2	1	1		2		1	1		6	1				
Current Meter	3	395,448.00		2															1
Desktop/Personal Computer	104	5,740,635.54	23	15	15	6	3		3		3	2	2	19	5	1	1	2	4
Digital Organizer Palm Treo	8	273,152.00												8					
Digital Photo Camera/Camera	40	780,902.69	6	8	9	2	2		1				1	10	1				
Drafting Machine	3	72,700.00		3															
Dumptruck, 10-wheeler	1	3,858,758.00																	1
Duplicating Machine	1	120,000.00												1					
DVD/VCD Player	2	16,493.00												1	1				
DVD/VCD/CD Sound System	4	95,737.00	1		1	1													1
Electric Sewing Machine Hi Speed	13	208,000.00		13															
Electronic Copy Board	3	347,333.31												3					
Electronic Total Station sokia 500	2	890,000.00									1		1						
Fax Machine	10	98,123.00	5	1	1									1	1				1
Generator	2	626,617.00				1	1												
Global Positioning System	17	466,900.00		1	1									9	1	1	2	2	
Grass Cutter	7	135,000.00												7					
High Speed Edging Machine 4 thread	1	27,000.00		1															
L300 Van	1	599,995.00																	1
LCD Monitor	2	15,500.00		1										1					
Leveling Rod	2	8,150.00											2						
Machine for Threading	1	8,500.00				1													
Mechanical Precipitation Recorder	1	9,500.00			1														
Megaphone	2	13,000.00												2					
Microscope Olympus	16	1,052,760.00												16					
Motorcycle (various models)	145	9,885,475.00		8	12	14	14			12	13	17	29	10		8	4	4	
Multicab Suzuki Pick-up	2	200,000.00															1	1	

Particulars	Quantity	Amount (P)	User Agency/Office																	
			National Irrigation Administration											DOH	DENR					PGAN
			CO/CPMO	Negros Occidental PIO	Cebu PIO	Negros Oriental PIO	Rugnan NIS	Region 10	Region 13	Agusan del Sur PIO/Baobo	Gibong NIS	Agusan del Norte PIO	Cantilan NIS	Caraga Region	FMB	PENRO-Cebu	PENRO-Agusan del Sur	PENRO-Agusan del Norte	
Multimedia Projector	12	1,372,362.77		1	2	1	1		1					5						1
Multimedia Projector w/Duo.	2	442,000.00												2						
Multimedia Sound System	2	117,400.00												2						
Notebook/Laptop Computer	36	3,157,972.58	15	3	2		1		3					9	1					2
OR Lights, mobile	2	91,999.95												2						
Overhead Projector	2	53,800.00													1			1		
Pick-up Ford Ranger	20	17,180,000.00	7		2	1	1	1	2	2	2	1	1							
Pick-up Isuzu Fuego	1	911,000.00																		1
Pick-up Strada 4 x 4	4	5,335,313.32												4						
Planimeter, Digital	2	96,855.00		1					1											
Plotter Printer/ Printer Large Format	2	444,000.00												1						1
Printer (various models/brand)	89	1,373,711.50	26	6	18	2	7						2	21	1					6
Proctosigmoidoscope	2	460,000.00												2						
Pump (various sizes)	6	5,030,241.25		6																
Radio Base	1	50,000.00														1				
Radio Transceiver	6	87,000.00														6				
Refrigerator (various sizes/model)	7	93,385.00	1		1	1	1				1				1					1
Remote Rain Gauge	3	13,876.20														1	1	1		
Scanner	3	32,750.00		1										1	1					
Sony Cybershot	1	25,000.00	1																	
Sony DVD/VCD Player	1	10,593.00	1																	
Sound System	1	130,000.00																		1
Sound System, shark HK V350 CD	1	14,850.00															1			
Spiral Binder	1	27,500.00																		1
Sphygmomanometer Bauamameter	8	91,600.00												8						
Steel Chain, 100 m	5	21,595.00			3								2							
Stepboard for Ford Ranger	1	15,500.00	1																	
Stereo Microscope	2	169,000.00												2						
Television set (various sizes/models)	8	257,052.74	2			1			1					2	1					1
Theodolite	3	385,000.00		1	2															
Total Station set topcon	2	548,000.00			1															1
Typewriter, Manual	10	175,282.32	1	3	1	1					1								1	2
Video Camera	16	705,795.54	2	2	1	2			2					5					1	1
Weather Station Equipment Set	1	102,000.00			1															
TOTAL		**70,312,151.12**																		

CO = Central Office, CPMO = Central Project Management Office, DENR = Department of Environment and Natural Resources, DOH = Department of Health

FMB = Forest Management Bureau, NIS = National Irrigation System, PENRO = Provincial Environment and Natural Resources Office, PGAN = Provincial Government of Agusan del Norte, PIO = Provincial Irrigation Office,

Notes: Actual Breakdown: NIA - P45,595,227.62, DOH - P15,143,676.43, DENR - P2,543,382.07, PGAN - P7,029,865.

Appraisal estimate for equipment and vehicles: P101.265 million.

Source of Data: Central Project Management Office, National Irrigation Administration.

SUPPLEMENTARY APPENDIX C: TRAINING COURSES COMPLETED

	Component/Particulars	Duration per Batch (days)	Batches	Number of Persons			Percentage of Female	Total Person Days
				Male	Female	Total		
A. Project Management								
1	Action Planning Workshop for 2001	2	1	14	6	20	30	40
2	Financial Management Orientation Workshop	3	2			60		180
3	Performance Review and Action Planning Workshop	5	10	450	350	800	78	4,000
4	Financial Assessment and Planning Workshop	4	1	21	46	67	69	268
5	Convention of Association of Gov't. Accountants of the Philippines	4	2		5	5	100	20
6	Autodesk Land Desktop	3	1		1	1	100	3
7	Seminar Workshop on RA 9470 (National Archives of the Philippines Act of 2007) and Records Disposition Administration	3	1		3	3	100	9
8	Team Building Workshop (CPMO)	3	4	17	30	47	64	141
	Subtotal (A)			**502**	**441**	**1,003**	**44%**	**4,661**
B. Physical Infrastructure								
1	On the Job Training for LGU-SPMO Staff on Feasibility Study Data Analysis and Interpretation	30	1	3		3	0	90
2	Seminar Workshop on Cost Estimate, Planning, Scheduling & Monitoring of Irrigation Civil Works	5	2	22	26	48	54	240
3	Project Planning, Programming, Monitoring and Evaluation Seminar Workshop	5	1	14	18	32	56	160
4	Consultation Workshop on Detailed Design Phase Implementation CPMO Level	2	1	12	15	27	56	54
5	Phil ESRI GIS User Conference	2	1	1	1	2	50	4
6	Training for Construction of Can-asujan Hardfill Dam.	8	1	45	5	50	10	400
7	Orientation Training on the Design Concepts/Methods of Irrigation and Drainage Networks and Strructures at CARAGA	4	1	16	6	22	27	88
8	OJT on Design of Irrigation Structures for CARAGA	60	3	4	2	6	33	360
9	Orientation Workshop on ADB Procurement Guidelines for Local Competitive Bidding (LCB)	3	3	42	9	51	18	153
10	Hydrologic Supporting Studies in Water Resource Development Planning	9	1	12	6	18	33	162
11	OJT of Design Engineers -Rugnan SP	3	1	1	2	3	67	9
12	Material Testing and Construction Method Seminar	4	1	25	5	30	17	120
	Subtotal (B)			**197**	**95**	**292**	**33%**	**1,840**
C. Participation and Transfer								
1	Organizational Dev"t for IDOs and Technical Staff Training Course	5	1	15	14	29	48	145
2	Participatory Irrigation Management & Transfer for Feasibility Studies Part A	7	1	35	29	64	45	448
3	Participatory Irrigation Management & Transfer for Feasibility Studies Part B	6	1	35	29	64	45	384
4	Assesssment Workshop for Non-Core SPs Participation and Transfer Component	5	1	14	16	30	53	150
5	Irrigation Situation Analysis Level 1 Inputting to IDOs, Technical Staff of SPMOs including LGU Staff	2	8	57	49	106	46	212
6	Irrigation Situation Analysis Level 2&3 Inputting to IDOs, Technical Staff, and LGU Staff	2	8	57	49	106	46	212
7	Gross Margin Analysis Workshop for IDOs	1	1	13	17	30	57	30
8	Inputting and Preparation for System Level Community Review and Endorsement (CRE)	22	8	57	49	106	46	2,332
9	Orientation Workshop for IDOs and TS of the Second Batch of Non-core SPs	5	1	20	22	42	52	210

	Component/Particulars	Duration per Batch (days)	Batches	Number of Persons			Percentage of Female	Total Person Days
				Male	Female	Total		
10	Process Development Workshop for Participatory Planning for Detailed Design of Terminal Facilities of Subprojects	2	8	57	49	106	46	212
11	Re-Orientation Workshop for IDOs of Can-asujan SRIP	2	1		3	3	100	6
12	Start up Workshop for Rugnan SP	2	1	13	15	28	54	56
13	Workshop to Review Experiences on PIM&T Program Implementation	2	1	20	28	48	58	96
14	Training on Basic Community Organizing for IDOs of Non-Core Subprojects	7	2	15	35	50	70	350
15	Project Start up Workshop for Cabadbaran SP	5	1	12	14	26	54	130
16	Organizational Development and Manage-ment Training for Core Subprojects	7	1	8	20	28	71	196
17	Orientation -Workshop on Formulation of Constitution and By-Laws and ISA Level 2 for PGAN IDOs	3	1		5	5	100	15
18	Vision, Mission, Goal Setting Workshop for Magballo, Logum and Baobo SP's IDOs and CPMO Staff	4	1	5	9	14	64	56
19	Workshop to Review Status and Direction of the Participatory Irrigation Management and Transfer (PIMT) Process	2	1	12	17	29	59	58
20	Orientation to System Management and Agricultural Development for IDOs-TS level Core Subprojects	1	2	17	14	31	45	31
21	Symposium on Innovative Approaches to Participatory Irrigation Management & Transfer	1	1			25		25
22	Writeshop on Social Assessment for Cantilan SP	3	1	3	8	11	73	33
23	Training of Trainers for Project Sustainability	5	3	21	30	51	59	255
24	Start up Orientation Workshop for Rugnan Subproject	5	1	10	5	15	33	75
25	Workshop on Construction Working Committees - IDOs, Finance and Technical Staffs of Subprojects	5	8	58	55	113	49	565
26	Study Tour of SPISP Staff and Gibong IAs re: Proportional Flow Divider at Agos RIS	4	1	7	5	12	42	48
27	Participatory Service Area Delineation of Subprojects: Orientation Workshop	2	8	48	42	90	47	180
28	Orientation Workshop on Detailed Design Phase Implementation for Cantilan and Aclan-Amontay SPs	3	1	9	10	20	50	60
29	Institutional Development Organizers' Conference	6	1	30	50	80	63	480
30	SMAD On-the-Job Training Orientation Planning Workshop Gibong Right Bank	5	1	12	14	26	54	130
31	Cost Reconcillation Training Workshop for Subprojects (IDOs,TS, Finance Staff)	2	8	48	45	93	48	186
32	Workshop on Conflict Management - Principled Negotiation	3	4	37	55	92	60	276
33	Orientation and Planning Workshop on Discharge Measurement and Monitoring in Gibong Right Bank	2	1	8	5	13	38	26
34	Orientation Workshop on the Operational Procedures of Diversion Dams (Calayagon SP)	2	1	8	8	16	50	32
35	Training on the Operation and Maintenance of Can-asujan Small Reservoir Irrigation System	5	1	7	11	18	61	90
36	Writeshop to Review Draft PIMT Implementation Manual	3	1	12	9	21	43	63
37	Orientation on Project Benefit Monitoring and Evaluation of SPMOs IDOs	4	3	29	46	75	61	300

	Component/Particulars	Duration per Batch (days)	Batches	Number of Persons			Percentage of Female	Total Person Days
				Male	Female	Total		
38	Educational Enhancement Tour SPMO's Selected FIAs/IAs and Staff	6	6	35	39	74	53	444
39	Asset Management and Farm Business Planning Orientation Workshop	2	1	16	32	48	67	96
40	Season Long Vegetable Production Technology (Magballo-Balicotoc-Canlamay SP)	121	1		5	5	100	605
41	National Vegetable Congress	5	1	8	11	19	58	95
42	Orientation to System Management and Agricultural Development for IDOs-TS level for Non-Core SPs	5	4	29	25	54	46	270
	International Seminars/Conferences							
43	Short Course on Participatory Irrigation Management at Mediterranean Agronomic Institute (Bari, Italy) (2000)	10	1		2	2	100	20
44	Regional Workshop on Asian Irrigation in Transistion Responding to the Challenges Ahead (Thailand) (2002)	4	1	2		2	0	8
45	Asian Regional Workshop of International Commisssion on Irrigation and Drainage on Sustainable Development of Water Resources and Management & Operation of Participatory Irrigation Organization (Taipei, China) (2003)	5	1		4	4	100	20
46	Sixth International Conference in Participatory Irrigation Management (PRC) (2002)	5	1	3		3		15
	Subtotal (C)			**902**	**999**	**1,927**	**52%**	**9,726**
D. Environment and Social Measures								
1	Integrated Rice-Fish-Duck Raising	3	1	9	9	18	50	54
2	Freshwater Fish Culture (Can-asujan SP)	3	1	1	4	5	80	15
3	Resettlement Policy and Program Orientation Workshop	3	1	18	15	33	45	99
4	Land Acquisition and Resettlement Planning Orientation Workshop for Magballo and Dauin SPs	3	1	3	12	15	80	45
5	Training of Advance Community Organizing with Resettlers of Can-asujan, IDOs of Can-asujan and Magballo SPs	4	1	1	10	11	91	44
6	Orientation among School Heads, LGU Officials and Rural Health Unit Personnel (Cantilan SP)	2				90		180
7	Parasitological Training among BHWs (Cantilan SP)	2				40		80
8	Malacological Training	2				45		90
	Subtotal (D)			**32**	**50**	**257**	**19%**	**607**
	Total			**1,633**	**1,585**	**3,479**	**46%**	**16,834**

Source: Central Project Management Office, National Irrigation Administration.