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IMPLEMENTATION COMPLETION REPORT
(SCL-41100)

ON A

LOAN

IN THE AMOUNT OF US\$ 58.0 MILLION

TO THE

REPUBLIC OF THE PHILIPPINES

FOR THE

WATER RESOURCES DEVELOPMENT PROJECT

JUNE 18, 2006

**Rural Development and Natural Resources Sector Unit
East Asia and Pacific Region**

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CURRENCY EQUIVALENTS

(Exchange Rate Effective August 9, 2005)

Currency Unit = Philippine Peso (PhP)

US\$ 1:00 = PhP 55.60 (2005)

FISCAL YEAR

Government: January 1 – December 31

ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank	LGU	Local Government Unit
AFMA	Agriculture and Fishery Modernization Act (1997)	MIS	Management Information System
APL	Adaptable Program Loan	MTDP	Medium Term Development Plan
CAS	Country Assistance Strategy	MTR	Mid-Term Review
CIDP	Communal Irrigation Development Project	NCB	National Competitive Bidding
COA	Commission on Audit	NEDA	National Economic and Development Authority
DANIDA	Danish International Development Agency	NGAS	New Government Accounting System
DBM	Department of Budget and Management	NIA	National Irrigation Administration
DENR	Department of Environment and Natural Resources	NIS	National Irrigation System
DILG	Department of Interior and Local Government	NPV	Net Present Value
DOH	Department of Health	NWDCN	National Water Data Collection Network
DPWH	Department of Public Works and Highways	NWIN	National Water Information Network
EO	Executive Order	NWRB	National Water Resources Board
ERR	Economic Rate of Return	NWRMP	National Water Resources Management Plan
FIO	Farmer Irrigator's Organizer	O&M	Operation and Maintenance
GOP	Government of the Philippines	PAMB	Protected Area Management Board
GTZ	German Development Cooperation (Deutsche Gesellschaft fur Technische Zusammenarbeit)	PAP	Project Affected People
IA	Irrigators' Association	PIDP	Participatory Irrigation Development Project
ICB	International Competitive Bidding	PSIWRM	Philippine Strategy for Integrated Watershed Resources Management
ICC	Investment Coordinating Committee	RAP	Rapid Appraisal Process
IDP	Institutional Development Program	RP	Rationalization Plan
IMT	Irrigation Management Transfer	RPF	Resettlement Policy Framework
IOSP	Irrigation Operations Support Project	SAR	Staff Appraisal Report
ISF	Irrigation Service Fee	USAID	United States Agency for International Development
ISIP	Irrigation System Improvement Plan	WMAC	Watershed Management Advisory Council
JICA	Japan International Cooperation Agency	WRDP	Water Resources Development Project

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PHILIPPINES
WATER RESOURCES DEVELOPMENT PROJECT
IMPLEMENTATION COMPLETION REPORT

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<i>Project ID:</i> P004613	<i>Project Name:</i> WATER RESOURCES DEVELOPMENT PROJECT
<i>Team Leader:</i> Gilbert Magno Braganza	<i>TL Unit:</i> EASRD
<i>ICR Type:</i> Core ICR	<i>Report Date:</i> June 21, 2006

1. Project Data

Name: WATER RESOURCES DEVELOPMENT PROJECT *L/C/TF Number:* SCL-41100

Country/Department: PHILIPPINES *Region:* East Asia and Pacific Region

Sector/subsector: Irrigation and drainage (81%); Central government administration (19%)

Theme: Water resource management (P); Environmental policies and institutions (P)

KEY DATES

	<i>Original</i>	<i>Revised/Actual</i>
<i>PCD:</i> 06/06/1995	<i>Effective:</i> 03/20/1997	03/20/1997
<i>Appraisal:</i> 02/15/1996	<i>MTR:</i> 03/06/2000	06/03/2000
<i>Approval:</i> 11/26/1996	<i>Closing:</i> 12/31/2002	06/30/2005

Borrower/Implementing Agency: Republic of the Philippines/National Irrigation Administration; Department of Environment & Natural Resources; National Water Resources Board; Department of Health

Other Partners: Japan International Cooperation Agency, Danish International Development Agency

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2. Principal Performance Ratings

(HS=Highly Satisfactory, S=Satisfactory, U=Unsatisfactory, HL=Highly Likely, L=Likely, UN=Unlikely, HUN=Highly Unlikely, HU=Highly Unsatisfactory, H=High, SU=Substantial, M=Modest, N=Negligible)

Outcome: S
Sustainability: L
Institutional Development Impact: M
Bank Performance: S
Borrower Performance: S

Quality at Entry: QAG (if available) ICR
S
Project at Risk at Any Time: Yes

3. Assessment of Development Objective and Design, and of Quality at Entry

3.1 Original Objective:

3.1.1 The primary project objectives were to: (a) improve water resources development and management through an appropriate policy and institutional framework; (b) improve watershed management through an integrated and comprehensive approach; (c) improve efficiency of existing irrigation systems to increase agricultural production (mainly rice) and alleviate rural poverty; (d) improve irrigation services through accelerating turnover of irrigation systems to water users and increasing the National Irrigation Administration's (NIA) institutional effectiveness; and (e) improve environment in irrigation areas through control of schistosomiasis.

Assessment of Objectives

3.1.2 Given the serious issues being faced in the water resources sector, this project, which followed a series of irrigation projects, rightly aimed to broaden the Bank's engagement in the water sector. While doing so, as the first broad-based water sector initiative, the project however failed to provide an explicit development objective that would define the intended outcome and impact. What the project intended to achieve was to initiate a comprehensive approach to water resources and watershed management by having the three principal agencies in the water resources sector work together to pursue a river basin approach in the future. As a result, specific objectives of the project were defined to address the broad areas of integrated water resources management. It was thus necessary to design a multiple component project. Each project objective corresponded to a specific project component to respond to specific water resource management issues that were necessary to achieve an integrated strategy to reduce rural poverty and enhance food security. It was already acknowledged during appraisal that the project's multiple and complex objectives would pose a challenge in measuring its development impacts. It was thus proposed in the Staff Appraisal Report (SAR) that proxy indicators, with corresponding weights, be assigned to each project component to facilitate overall assessment of the project's outcomes. These were as follows: Improved Water Resources Management (National Water Resources Board, NWRB) – 20%; Improved Watershed Management (Department of Environment and Natural Resources, DENR) – 15%; Irrigation Systems Improvement and Repair (NIA) – 35%; Institutional Strengthening of the NIA and the Irrigators Association (IA) – 20%; and Environmental Improvement (NIA/Department of Health, DOH) – 10%. Although the weights were approximate, they reflect the significance of each component in meeting the overall development impact of the project. An overall score of 80 and above at completion should be regarded as highly satisfactory project development impact (Annex 13 of the SAR in the Project Files)

3.1.3 Project objectives were consistent with the government's Medium Term Development Plan (MTDP 1996-2000) and the high priority it attached to reducing rural poverty and enhancing food security through improved water supply and irrigation management as features of an integrated approach to water resources management. The project objectives were also strategically linked to the government's recognition of the need to address water resources issues through a cross sectoral and comprehensive strategy. These objectives were also in line with the Bank's Country Assistance Strategy (CAS-1996) of promoting sustainable development and helping to reduce rural poverty through accelerated and environmentally sustainable rural development and infrastructure support. The project objectives were also consistent with the policies of the 1976 Water Code. The objectives are built on the lessons learned from various implementation experiences in Bank and non-Bank projects at the time.

3.2 Revised Objective:

There was no change to the original project objectives throughout project implementation.

3.3 Original Components:

3.3.1 There were five project components which closely corresponded to the project's specific objectives:

- (a) *Improved Water Resources Planning and Management* (US\$4.5 million or 5% of total project cost): preparation of a national water resource plan; improvement of national data collection networks; establishment of a national water information network; and strengthening the NWRB.
- (b) *Improved Watershed Management* (US\$15 million - 14% of total project cost): formulation of a national watershed management strategy and investment and institutional strengthening program; investments for improving watershed management in a number of identified priority watersheds; and capability-building activities for staff of key national government agencies.
- (c) *Improvement of National Irrigation Systems (NISs)* (US\$61.2 million or 72% of the total project cost): improvement of 14 irrigation systems, repair of eight major structures in other NISs, strengthening of the Masiway dam, and construction of sediment exclusion structures in another five NISs.
- (d) *Institutional Strengthening of NIA and IAs* (US\$3 million or 4% of total project cost): provision of staff training, consultancies, and incremental operating costs to facilitate progressive turnover of systems.
- (e) *Environment Improvement* (US\$1.4 million or 2% of total project cost): control of schistosomiasis in three NISs and control erosion in 31 NIS, establishment of an Environment Unit within the NIA and provision for training and consultancy to the Unit.

3.4 Revised Components:

There were no major changes to the project components during project implementation. For component (c), one NIS (AMRIS) out of the originally proposed 14 NIS was dropped and five smaller NISs were added. Irrigation system improvement works added three NISs which were originally included only for structure repairs. Thus, there were eventually 21 NISs under the system improvement sub-component.

3.5 Quality at Entry:

3.5.1 The Quality at Entry of the project is rated as having been satisfactory. The project objectives were consistent with the government's strategic plan for the water sector and rural development. The project design incorporated lessons learned from the Bank-financed IOSP I, IOSPII, and CIDP II, which emphasised a broader-based project to respond to the government's priority to initiate a comprehensive approach to water resources management. As such, the project was innovative in bringing together three principal agencies (NWRB, DENR and NIA) engaged in the water sector; conduct of comprehensive project preparation involved both inter-agency consultation for policy and planning and community participation for watershed and NIS management. Each agency carried out its own project preparation, coordinated by a Project Steering Committee under the chairmanship of NIA, which brought the overall project package to the National Economic Development Authority's Investment Coordinating Committee. For the irrigation components (c) to (e), project formulation was preceded by nine specific technical studies carried out by a consultancy firm engaged by NIA. The project fully addressed the Bank's safeguard

policies.

3.5.2 In terms of design, the project was an effort to bring together the three key agencies in the water resources management sector, namely the DENR, NWRB, and NIA to lay the groundwork and create the enabling institutional and operational environment upon which a long-term strategy and investment may be developed. The project design was not meant to be a straightforward follow-on to previous Bank-supported irrigation projects, but built on these experience to serve as basis for a first-time attempt in integrated water resources management. Through the project, NWRB was expected to be the lead coordinating agency in water resources management using the river basin approach. For the DENR, the project was designed to facilitate watershed management planning capacity that would eventually lead to bigger programs. Hence, the project covered a wide range of policy and institutional improvements and was focused on building a long-term, multi-agency, and multi-phased programmatic water resources management and development strategy.

3.5.3 In terms of implementation capacity, the NIA as the lead agency had good prior experience with the implementation of Bank-financed projects. For the system improvement and repair component, a set of selection criteria was used by NIA to screen a large number of NISs proposed at various levels. A detailed *Irrigation System Improvement Plan (ISIP)* was prepared by NIA with intensive consultation with farmers, and reviewed by the Bank for each NIS prior to commencing improvement works. The ISIP covered engineering design layout, data and cost estimates, Operations & Maintenance plan, projected increase in irrigated area and agreed distribution of O&M responsibilities between NIA and IAs. To minimize the social impact of the project-affected people (PAP) as a result of land acquisition, a Resettlement Policy Framework (RPF) was prepared by the government in consultation with the Bank. At project preparation, it was not considered necessary to include a component for agricultural support services because the Department of Agriculture's (DA) existing programs on agricultural services within the NIS areas were considered to be adequate to meet the project needs.

3.5.4 For components (a) and (b), NWRB and DENR had little or no prior experience with Bank projects, but were competent in their respective sectors. Project preparation included intensive technical assistance studies on the options and measures regarding NWRB strengthening and improvement in watershed management. These studies laid the foundation for the subsequent formulation of detailed project activities. On the other hand, given the limited experience of the DENR in watershed management projects, what was originally intended was to lay the policy, planning and capacity building framework that would eventually lead to follow-on investments in watershed management. A broad based strategic orientation in the DENR's organization and approach, and its relationship with Local Government Units (LGUs) and Peoples Organizations (POs) are essential conditions for sustainable watershed management. However, the government remained committed in pursuing investments in two watersheds. Watersheds were selected as pilot sites using the government's selection criteria and where there was evidence of stakeholders' willingness to participate in a long-term, self-sustaining conservation and management program.

3.5.5 During appraisal, several risks were identified and varied across the different components. Most of these were either negligible or minor and could be reduced during implementation and intensive supervision. The major risk the project faced concerned stability of financial resources from government. It was noted during appraisal that the project would face the possibility of inadequate and delayed fund release from Government. To address this concern, the Bank completed a Public Expenditure Review which resulted in agreements with the Government on adequate and timely funding of priority investments (one of which was WRDP). Moreover, at that time, the Government's Medium Term Public Investment Plan (MTPIP) for 1993-1998 envisaged near doubling of budget allocations to NIA. In fact, the 1995 and 1996 budget

allocations for NIA were already much higher than the 1994 allocation. This demonstrated the Government's commitment to the MTPIP and it was thought then that if the trend continued, counterpart funding would not be a major problem. It was not foreseen however, that changes in national leadership would result in the uncertainties of providing counterpart funding.

4. Achievement of Objective and Outputs

4.1 Outcome/achievement of objective:

4.1.1 The outcome of the project is rated satisfactory (the project's overall score of 70% using the weights/scores proposed in the SAR for measuring output indicators indicates the project as satisfactorily achieving the project's development impacts). Overall, the project was successful in having the three main water resources management agencies of the government to work towards achieving some of the key policy, institutional and technical features of integrated water resources management. As an initial step into integrated water resources management, these gains will need to be sustained to ensure more effective integration across the concerned institutions responsible for managing water resources in the country through a river basin approach. The difficulties of pursuing a river basin management project will be to try to get the key government agencies to plan and implement together on a larger basis and where output indicators and/or plans are integrated. It is evident though that government remains committed to pursuing a river basin project in a rational and programmatic manner. Hence, any future integrated water resources management using a river basin approach will require substantive institutional and government will power to change planning and budgeting frameworks, not only in the short-term, but more so in the long-term given how long it would take to resolve issues in any given basin. The achievements of project objectives are summarized below:

(a) *Improved Water Resources Planning and Management:* The outcome of this component is rated as satisfactory (the score for this component is 15 out of a possible 20). The project was able to improve water resources development planning through the formulation of the National Water Resources Master Plan (NWRMP) which has been used by the NWRB to pursue further assessments of key water resource areas to potentially address water deficit concerns in key urban areas. The project also assisted in developing the National Water Data Collection Networks (NWDCN) and the National Water Information Network (NWIN), with the NWRB acting as a hub to line agencies in terms of collecting, coordinating, consolidating, and disseminating information to the general public. Through the project, the NWRB became a more capable agency with the passage of Executive Order 123 (EO 123) which strengthened the agency's mandate as a water regulatory body and increased its authority to enforce the Water Code. The NWRB was able to improve the collection of water fees and led the successful conduct of the National Water Summit in 2003. As a result, the NWRB has been called to lead major river basin studies and river basin committees and actively participated in the preparation of the Mindanao River Basin Project and the Bicol River Basin Project.

(b) *Improved Watershed Management:* The outcome for this component is rated as marginally satisfactory (The score for this component is 7 out of a possible 15). The project was able to improve watershed management planning through the formulation of the Philippine Strategy for Improved Watershed Resources Management (PSWIRM) and this led to the development of the National Watershed Management Program (1999-2018). Guided by this strategy and program, investments for watershed improvement and capacity building were carried out in two pilot priority watersheds (Kaliwa and Maragang) wherein community-based management approaches were applied. The pilot implementation demonstrated to a certain extent that watershed improvement measures such as reforestation, enrichment planting, riverbank stabilization, cash-generating plantations (such as rattan), and agro-forestry

development could effectively contribute to improving the livelihood of local communities. These livelihood improvement opportunities have led to reducing illegal encroachment and exploitation of the forest resources in the project areas. Land tenure instruments were provided for both the protected and timberland areas thus providing a sense of security for local governments and communities to manage the forest areas in a sustainable way. These investments contributed to supporting the critical irrigation infrastructures in the downstream areas. However, the limited institutional capabilities and financial resources of LGUs and communities constrained them from performing their functions effectively as watershed resources managers. The PSWRIM and the program remain relevant and served as the basis for identifying core activities in identified key watersheds that would be supported under the National Program Support for Environment and Natural Resources, a budget-support program being prepared by the DENR.

(c) *Improvement of NIS*: The achievement of objectives of this component is highly satisfactory (the score for this component is 30 out of a possible 35). The project was able to undertake substantial improvements and repairs in irrigation systems. In all, 21 NISs were improved resulting in a total services area of 142,146 ha. The new area generated (3,249 ha cropped) and the restored area (35,017 ha cropped) have contributed to the increase of cropping intensity from about 141% estimated during appraisal to the weighted average of 176% (compared to 171% projected in SAR – Annex 1). Incremental paddy production was about 170,000 tons/year (compared to 100,000 tons/year projected in SAR – Annex 1). The average paddy yield for the 21 improved NISs was 4.45 tons/ha for the wet season and 4.42 tons/ha for the dry season compared to the national average (2004) of 3.26 and 4.07 tons/ha, respectively (the SAR targets were 4.23 and 4.55 tons/ha for wet and dry seasons respectively – Annex 1). Improved irrigation efficiency has benefited some 86,000 farm families, with over 15,942 families receiving substantial benefits from the increased irrigation areas generated and restored in the 21 NISs. All the necessary equipment and works were provided but some NISs will only be experiencing increase in irrigated areas within 3 years after the project. Major structural repairs were completed in ten NISs (total service area of 17,067 ha) and silt control measures were constructed in five NISs (total service area of 15,479 ha). Overall, this improved the efficiency of existing irrigation systems and increased agricultural production and improved rural income. The farm model analysis shows substantial increase in beneficiary farmer's income.

(d) *Institutional Strengthening of NIA and IAs*: The achievement of objectives of this component is rated as marginally satisfactory (the score for this component is 10 out of a possible 20). The project was able to transfer nine NISs (revised at MTR compared to 19 at appraisal) covering only 9,899 ha compared to 13,650 ha projected at MTR. Of the nine NISs, only seven were fully transferred. Of the 239 lateral canals projected in the MTR, only 227 lateral canals were transferred. Despite the limited success, the ISF collection and income from equipment rental exceeded the MTR target of 100% with a 115% cover for O&M. Though the project was able to improve ISF collection efficiency with 67% increase at completion, this falls short of the 75% projected at MTR and appraisal. In terms of staff improvement, NIA staff and IA personnel improved their capacity in handling accounting and financial management activities. Auditing improved as modern irrigation design concepts and management approaches were applied in their respective systems. Staff operated the computerized management information system (MIS) for Irrigation Service Fee (ISF) collection and billing, thus improving the monitoring of NIA revenues (the steady increase in ISF collection efficiency over the past years contributed to a better billing accounting system). Institutional development for IAs has been substantially achieved as reflected in the willingness of farmers to take over O&M under the Irrigation Management Transfer (IMT) program of the project (92% of the targeted area or about 58,000 ha.). Nine smaller NISs (<3,000 ha of service area) were transferred to IAs and nine larger NISs (>3,000 ha) are now being managed jointly by NIA and IAs. While the project did not fully achieve the component's targets, which had been revised downwards at MTR, the project did create a more positive environment in support of the institutional reforms and hence set the context for the

forthcoming Participatory Irrigation Development Program being prepared by NIA.

(e) *Environment Improvement*: The outcome of this component is rated as highly satisfactory (the score for this component is 8 out of a possible 10). Environmental improvement was carried out through the control of schistosomiasis in three NISs led by DOH, and through erosion control measures in 31 NISs led by NIA. Available survey results show that these measures have led to the substantial reduction in schistosomiasis in these areas. An interim Environment Unit was set up under the project to coordinate and monitor further schistosomiasis and erosion control measures. Supporting the Environment Unit to sustain the progress under this component is uncertain but there are indications that the unit will be regularized as the Environmental and Watershed Management Section of the department's Project Development Department under NIA's Rationalization Plan.

4.2 Outputs by components:

4.2.1 The overall rating for the project is satisfactory, based on the outputs achieved and described below (Annex 1 for details on actual physical targets and accomplishments). The project has largely achieved its expected outputs, with an EIRR at ICR of 25.6% which compares with the expected projection of 26.5% estimated at appraisal.

4.2.2 Improved Water Resources Planning and Management (implemented by NWRB; US\$ 1.14 million actual cost). The physical accomplishment under this component was 95% at completion. The objective outputs were substantially achieved through completion of the following sub-components:

(a) Formulation of a National Water Resources Master Plan, completed in 1998 with grants from the Japan International Cooperation Agency (JICA). The Plan provided baseline information in river basin screening for the preparation of river basin development programs (2000-02) and assessment of water resources in critical regions of Metro Manila and Cebu. A follow-up study recommended by the Plan on "Water Resources Development for Metro Manila" was carried out in 2003.

(b) Establishment of a National Water Information Network (NWIN), a computer-based system that electronically links different databases and information systems of key participating agencies for improved data dissemination. Although with a delay in the first two years it was completed in 2005, linking 16 participating agencies with NWRB as a network hub. Phase 1 connected the system to eight data generating/user agencies (Philippines Atmospheric, Geophysical and Astronomical Services Administration, Bureau of Research and Statistics, Environment Management Bureau, Mines and Geosciences Bureau, Local Water Utilities Administration, National Irrigation Administration, National Economic Development Authority and Department of Interiors and Local Government). Phase 2 expanded the coverage with the inclusion of eight other agencies (Bureau of Soils and Water Management, Forest Management Bureau, Laguna Lake Development Authority, National Mapping and Resources Information Authority, Department of Public Works and Highways-Project Management Office-MFCP I, Department of Environment and Natural Resources, Department of Energy, and ARBDC). The DILG and LWUA have since been publishing their water supply data and research work through the NWIN web page.

(c) Improvement of Water Data Collection Networks. This activity experienced similar delay at the beginning, until the TA funding issue was resolved in 2001. It completed network mapping, network rationalization and design, and phased implementation of three primary water monitoring networks: stream-flow, groundwater and water quality. Three databases were set up in the agencies where the NWIN was installed thereby linking them with their respective regional offices. Staff training was carried out and the agencies are using the databases in their work.

(d) Institutional Strengthening. With support from the oversight agencies (particularly NEDA), a presidential Executive Order (EO) was signed in September 2003 (EO #123), which transferred NWRB from DPWH to the Office of the President, and upon approval by the President of its revised organizational structure, it will be transferred to DENR. The EO reconstituted the membership of the Board and transferred LWUA's tariff regulation for water utilities to NWRB. Today, NWRB has a new Board that excludes entities with direct claims on water resources. Government agencies are no longer exempted from paying water charges as in pre-project situation. NWRB now has increased authority and more effective technical tools in enforcing the Water Code. The project supported installation of a billing system, an intensive public campaign against illegal water users/appropriators, and public consultations on amendments to the Implementing Rules and Regulations of the Water Code. It also supported organizational studies regarding the establishment of regional offices and transition from administrative regions to water resources regions. One obvious development impact was the steady increase in water permit revenue collection over the past years as a result of to the billing system developed and the mass campaign against illegal extraction of water, both of which were activities supported by the project. NWRB's revenue collection from water permits increased substantially from less than PhP2 million in 1995 to PhP30 million estimated for 2005. NWRB is being called upon to lead major river basin studies and to partner foreign investors in important programs involving groundwater management and water assessment for critical regions of Manila, Cebu, Bulacan, Cavite and Laguna. It also organized a major national water forum in 2004. The NWRB was actively engaged in the preparation of the Mindanao River Basin project as a pilot effort in river basin management. However, the escalated conflict in Mindanao prompted government to shift the project to the Bicol River Basin. The NWRB remained as a key partner in the preparation process. Unfortunately, government was experiencing serious fiscal difficulties at that time and this resulted in postponing the completion of the Bicol River Basin project preparation.

4.2.3 Improved Watershed Management (implemented by the DENR; US\$14.98 million actual cost). Objectives under this component were substantially achieved through the following phases.

(a) Phase I resulted in the formulation of a national strategy for improved watershed management. Nine draft working papers were produced, including the Philippines Strategy for Improved Watershed Management (PSIWRM). Based on the PSIWRM, a report – National Watershed Management Program – was produced detailing the anticipated investment from 1999 – 2018. As a result, 20 watershed sites were prioritized and short listed from a long list of watersheds provided by the different agencies and institutions following key parameters and selection criteria indicators.

(b) Phase II activities resulted in the development of a National Watershed Management Programme (1999-2018), a long-term program for investments and institutional strengthening. The Guidelines for Watershed Management and Development in the Philippines was also produced which present a comprehensive discussion of the general and specific guidelines for the preparation and implementation of watershed management plans consistent with the thrust of the DENR and as embodied in the PSIWRM.

(c) Building on the long term program developed under Phase II, Phase III initially identified six priority watersheds which were further subjected to a selection process resulting in the final selection of two priority watersheds for which management plans were developed and specific investments were provided. These sites were the Kaliwa River Watershed located in Tanay, Rizal and General Nakar, Quezon and the Maragang River Watershed in Tigbao, Zamboanga del Sur and Pagadian City. The Kaliwa River Watershed's strategic importance is its potential source of water for Metro Manila's domestic and industrial use, an ecotourism destination and a primary agricultural area for cash crops. The Maragang River Watershed, on the other hand, is the major tributary of a river system that is the main source for the Labangan Irrigation System which is being managed by NIA.

(d) Phase IV of the component mainly enabled the implementation of the management development plans for the Kaliwa and Maragang watersheds. Implementation activities comprised the provision of technical assistance in land use planning, support to livelihood and alternative income-generating activities, establishment of watershed management institutions, and rehabilitation of selected small rural infrastructure. The watershed improvements included reforestation (1,035 ha), enrichment planting (650 ha), riverbanks stabilization (163 ha), rattan plantation (360 ha), agro-forestry (1,227 ha) and agro-forestry demonstration farms (10 ha). Infrastructural facilities completed included rehabilitation of farm roads (42.88 km). Twenty three livelihood projects, mainly involving cash crops, were completed to generate income for the beneficiaries thus contributing to reducing illegal encroachment and over-exploitation of forest resources. Fourteen land tenure instruments were provided to local communities to enable them to sustain the gains achieved and provide post-project management. Interventions in the two watersheds have been completed and handed over to the stakeholders for operation and maintenance. The infrastructural facilities constructed have also been handed over to the local government unit for operation and maintenance. Under this phase, an additional task was undertaken to prepare three Comprehensive Watershed Management Plans for the Bicol River Basin as further expanding the utility of the developed program.

4.2.4 Improvement of NIS (implemented by NIA; US\$33.42 million actual cost). The outputs of this major component were:

- (a) Systems improvement and repair of 21 NISs (142,146 ha of total service area);
- (b) Repair of major structures in 10 NISs (17,067 ha of service area); and
- (c) Construction of silt excluders in five NISs (15,479 ha service area).

4.2.5 System improvement and repair have generated the greatest benefits. The total area cropped under wet and dry seasons has reached a total of 142,146 ha in the 21 NIS. The area is expected to increase further with the recently commissioned (June 2005) pumping system in **MRIIS** (III), the completion of the link canal in Andanan (Wawa) in Region 13, and the conversion of corn field to rice land in three NISs. Among the major structures completed are the remedial works for the Sta Cruz Dam, Pantabangan Dam Complex and the Magat Dam Complex. The last two major dams are now providing irrigation water to about 225,900 ha in Luzon.

4.2.6 Institutional Strengthening of NIA and IAs (implemented by NIA; US\$0.82 million actual cost). Overall, the institutional capability building and strengthening of NIA and IAs was substantial. The following are the component's outputs:

(a) Accounting and financial management: Forty two NIA staff were trained in internal audit in 1998. To improve NIA's accounting and financial management, the NIA worked with the Commission of Audit (COA) to design and prepare a manual for NIA's financial and accounting system and to train staff in use of the system. NIA's draft accounting manuals were revised to follow the New Government Accounting System (NGAS) introduced in 2001.

(b) Establishment and use of a computerized MIS: The MIS was established with the procurement of 266 desktop computers and software for use by the central, regional and selected field offices. With the MIS, two programs have been developed: the ISF billing and collection system and the accounting system for the NIA's Corporate Fund. The ISF program has been installed in 113 NIS field offices with 49 offices fully operational. The remaining 64 offices will become fully operational when their ISF records have been verified and updated. Six training courses were conducted for 487 executives, information technology staff

and end-users of the system

(c) Staff technical training. A total of 649 staff were trained between 1999 and 2005 in accounting, equipment management, irrigation system design and irrigation management. The Bank team was able to obtain trust funds and worked with the Irrigation Training and Research Center in the US and FAO to organize an intensive two-week training on “Irrigation Modernization and Performance Benchmarking” for NIA field managers and designers in 2003. The training was highly appreciated by NIA and proved to be instrumental to NIA, which resulted in several regional managers of NIA introducing the rapid appraisal process (RAP) using their own budget in evaluating their systems’ performance. New measuring devices (Replogle flume) were also introduced for volumetric charging of irrigation water for the first time in the Philippines.

(d) IA Strengthening. The institutional strengthening of IAs was achieved through the Institutional Development Program (IDP) which was conducted for 3,077 turnout service area groups of 232 IAs in 18 NISs. The training built and strengthened the IAs’ capability to facilitate progressive taking-over of operation and management of the NIS from the NIA under the IMT program. The IDP has also trained the IAs in organizational and financial management.

4.2.7 Environment Improvement (implemented by NIA/DOH; US\$ 0.59 million actual cost). Outputs under this component were achieved through:

(a) Schistosomiasis control by DOH: The main outputs achieved were the case examinations conducted and the 100% treatment of schistosomiasis cases, as well as the low cost infrastructure measures (construction of footbridges, toilets and hand pumps) done to reduce the prevalence of schistosomiasis in the Dipolo, M’lang and Andanan systems, which are all in Mindanao where the disease is prevalent. Available survey results showed 50% reduction of prevalence in one area and continued reduction in two other areas. Further reduction within all three areas is expected, with the mass treatment of the population already being enforced by DOH. Public educational and information campaigns were also conducted.

(b) Erosion and sediment control and monitoring by NIA: Some 1,200 km of vetiver grass hedgerows in combination with low-cost engineering measures were established in 31 NISs nation-wide to control soil erosion on vulnerable hill slopes along canals, gullies and canal embankments. Results of an evaluation survey showed that most farmers (90%) and NIA field staff found the measures to be effective. NIA conducted campaigns to promote replication of the measures in other NIS areas, and over 50% of farmers expressed willingness to apply the methodologies. Monitoring of the effects of sediment reduction measures (settling basins, silt excluders) was carried out in four NISs, and the results indicate that the measures remain effective.

(c) An interim Environment Unit was established in the NIA to implement the above activities and monitor watershed management activities of NIA.

4.3 Net Present Value/Economic rate of return:

4.3.1 The Net Present Value and Economic Rate of Return calculation only takes into account the main quantified economic benefits of the project, the increased agricultural production, which have accrued directly from the restored and the newly-developed irrigated areas in 21 irrigation schemes. Other significant but non-quantified benefits of the project included: (a) additional income generation through on-farm crop diversification and off-farm activities; (b) efficiency gains from improved water resources planning, policy and institutional reforms; (c) improved public health through control of schistosomiasis;

and (d) environmental benefits from the reduction of siltation and promotion of sustainable farming practices.

4.3.2 Following appraisal methodology, the NPV and the ERR were re-estimated for 21 NISs selected for system improvement (18 NISs) and repairs (3 NISs) in the project area, and for the project as a whole. The ERR for the project was estimated at 25.6 percent (NPV: US\$32.75 million) which is marginally lower than the 26.5 percent (NPV: US\$49.94 million) estimated at appraisal (Annex 3). The economic analysis shows that the recalculated ERRs for individual NISs are all favorable, ranging from 12 percent in Silbalom-Tigbauan RIS to 43 percent in Batang-Batang RIS. The variation of NIS ERRs reflects the different levels of achievement in key parameters such as crop yields, cropping intensity, the size of the irrigation and planted area, and the investment and O&M costs for each different type of scheme at the time of implementation. A comparison of detailed ERRs between SAR and ICR by each irrigation system is shown in the Working Paper on Financial and Economic Analysis (in project files).

4.4 Financial rate of return:

The farm-level financial analysis was carried out to indicate the project's impact on beneficiary farmers' incomes. The project at ICR is benefiting about 58,245 mostly poor farm families in the project area (42,303 of which are from the rehabilitated area, 14,968 from the restored area and 974 from the new area) compared to the appraisal projection of 20,000 and the 63,368 targeted during MTR. The farm model analysis shows a substantial increase in beneficiary farmers' incomes with comprehensive improvement in irrigation and drainage efficiencies, crop intensities and production. The impact of the project on farm incomes has been substantial and directly helped reduce poverty in the project area. At the ICR, the net annual crop income of farm households from without project to with project (ICR) was raised, in financial terms, from PhP7,850 to PhP13,240 and from PhP15,700 to PhP26,480 for share tenants and owner-operators, respectively, with an average farm size of 1 ha; from PhP15,700 to PhP26,480 and from PhP31,390 to PhP52,960 for share tenants and owner-operators with an average farm size of 2 ha; and from PhP23,440 to PhP39,270 and from PhP47,090 to PhP79,440 for share tenants and owner-operators with an average farm size of 3 ha (Economic and Financial Analysis on file). This represents an increase of 169 percent over the without-project case, and indicates strong financial incentives for farmers to participate in the project. The project has also helped improve the peoples' lives by providing alternative sources of income through employment opportunities. The result of incremental on-farm, direct employment is re-estimated to be 997,510 person-days annually. In addition, substantial new rural employment has been created through project civil works, and watershed management and erosion control activities during the project implementation.

Income Impact on Farm Household (PhP'000)

	Without Project	SAR with Project*	ICR with Project*
1 ha Share - Tenant	7.85	10.45	13.24
2 ha Share - Tenant	15.70	20.9	26.48
3 ha Share - Tenant	23.55	31.35	39.72
1 ha Owner - Operator	15.70	20.89	26.48
2 ha Owner - Operator	31.39	41.78	52.96
3 ha Owner - Operator	47.09	62.67	79.44

4.5 Institutional development impact:

4.5.1 Institutional development was the key to the achievement of the objectives of the project and its impact has been modest, broadly, in three major areas: (a) water resources planning and management; (b) irrigation sector performance; and (c) local watershed management.

4.5.2 Institutional development has been evident on water resources management and planning in NWRB. The transition of NWRB into a water regulating body, the data base network established and the strategic plans developed have enabled the agency to strengthen its work on issues significant to integrated water resources management. However, sustaining and securing these gains through the agency's annual appropriated funds and donors will remain as a key challenge. Moreover, the project originally intended to assist the NWRB to become the lead coordinating agency in the water resources sector especially in river basin management. It was envisioned that NWRB will play a critical role in the management of the Mindanao River Basin. This original objective was not achieved because of the unstable security condition of the area which led to government's decision to select the Bicol River Basin as a substitute. The NWRB remained active all throughout this process but changes in NWRB leadership and fiscal constraints in government placed the preparation of a Bicol River Basin project on hold.

4.5.3 In terms of the irrigation sector, the project has made progress in irrigation reform through IMT. The Agriculture and Fisheries Modernization Act (AFMA) of 1997 mandated NIA to gradually transfer O&M responsibility to IAs in lateral level canals of NIS. This was undertaken through the IMT which was initiated in 1998 under the Bank-funded IOSP-II and continued under WRDP. In total, there are about 100,000 ha of service areas under IMT, 50% of which has been achieved under the project. Notably, IMT fundamentally differs from NIA's past practices of contracting IAs in O&M for the following reasons: (a) irrigation rehabilitation and modernization has been a first step to improve functionality of the physical systems and to simplify operations; (b) the IMT contracts were signed after improvement works were completed, which greatly improved the sustainability of O&M after turnover and IMT was on a mutually-agreed basis between NIA and IAs; (c) federation of IAs was encouraged to facilitate more professional management; (d) simple cost sharing was adopted to replace the previously cumbersome ISF sharing arrangements; and (e) a two-year transition was built in where technical assistance was provided by NIA to IAs for basic O&M and financial management training. In parallel to physical improvement and rehabilitation in irrigation systems, the organization and training of IAs were carried out during the project following an intensive consultation process. Upon acceptance by each IA, an IMT contract was signed between NIA and the IA, often following a two-year transition period during which technical assistance would be provided by NIA to the IAs in formulating O&M plans and in enhancing basic knowledge in maintenance and operations, as well as book keeping. In total, 98 contracts were signed, covering 239 lateral canals (secondary level, and in some cases main canals also) and 57,500 ha, which is 92% of the targeted area under IMT.

4.5.4 A three-phase IMT performance review study, carried out in 2003-2004 by the Bank, confirmed the above and showed that IMT requires adequate physical and institutional investments, both by NIA as the organizer and by the IAs as partners, and that NIA financial and institutional issues, especially staff redundancy, must be addressed to ensure the sustainability of IMT. IMT has been considered as a critical step in the irrigation reform process in the Philippines. Although the IMT survey showed many positive trends, the fundamental issue of NIA staff redundancy was identified as the leading factor impacting further expansion of IMT and its long-term success which depends on the healthy financial conditions of both IAs

and NIA, and on ISF cost sharing between NIA and IAs. A follow-up sector restructuring project, Participatory Irrigation Development Project (PIDP), is under preparation. Unlike WRDP or previous Bank projects with NIA, PIDP has a distinctive institutional objective involving the rationalization of NIA, the elimination of government subsidies, and building farmers financial capacity to manage the transferred systems.

4.5.5 In watershed management, at the agency level, institutional development is evident in the agency's focused orientation towards watersheds as a unit of natural resources management. The frameworks and plans developed under the project should provide the basis for strategic investments in watershed management projects in the future. However, the DENR remains constrained to effectively engage in watershed management because of limited budgets, limited capacities at the field level to work with LGUs and POs and broad mandates. At the grassroots, the project was able to strengthen local ownership and accountability of watershed resources management through the establishment of a Watershed Management Advisory Council (WMAC) and the strengthening of the Protected Areas Management Board (PAMB). These two multi-agency bodies have defined roles and responsibilities critical to ensuring overall attention to natural resources management and local development strategies. The active involvement of Local Government Units (LGUs), including commitment in allocating some resources by the LGUs, were positive signs for sustaining the functions of the PAMB and the WMAC though this may be difficult in the long term given the possible shift in priorities with changes in the LGU leadership.

5. Major Factors Affecting Implementation and Outcome

5.1 Factors outside the control of government or implementing agency:

A major factor that affected implementation was the South East Asia 1997/99 financial crisis and the consequent economy downturn and slow recovery which caused severe government budget shortfalls. This had an impact on the project's budget releases during this period. Implementation progress and the achievement of outputs were also hampered by natural calamities. The project areas were subjected to frequent floods and typhoons. Typhoon Senang in November 2000, Typhoon Juan in July 2002, and Typhoon Rosing in October 2004 produced heavy floods and caused damage to some works in NIS and DENR project sites. Additional investment funds were later allocated for repair.

5.2 Factors generally subject to government control:

5.2.1 The project faced counterpart funding constraints from the start. This was reflected in the severely reduced annual cash releases for both counterpart and loan funds, which were merely 50-60% of the budget required for annual program of works for the year 1999-2001. Inadequate annual budget releases were the main factor causing implementation delay and the subsequent extension of the loan. Inadequate counterpart funds also hampered the availability of funds for technical assistance, for which the government decided at negotiations to use its own funds. It should, however, be noted that the Department of Budget and Management (DBM) eventually allocated and released the budget for the project. In 2000, the Investment Coordinating Committee (ICC) of the NEDA also eventually requested that the technical assistance be funded under the loan.

5.2.2 The government was not able to provide the funds for NIA staff who were made redundant under the IMT. This affected the intended reduction of O&M costs to NIA and the objective of increasing the institutional and financial strength of IAs.

5.3 Factors generally subject to implementing agency control:

For activities being implemented by the NIA, the small and scattered nature of the NISs, especially in areas with security problems discouraged contractors to bid under International Competitive Bidding (ICB) and National Competitive Bidding (NCB). NIA had to use local minor contracts for small works, force account and beneficiary participatory works to carry out most of the system improvement and small repair works. Some of the ISIP prepared by the NIS field officers were technically inadequate, resulting in revisions to costing, investment priority and delayed implementation. In the IMT areas, more attention should have been provided by the implementing agency to disseminate information and build farmer capacity at the IA level and at the turn-out service area group levels to enable smooth transfer of management. For the DENR component, frequent changes in project leadership caused uncertainty, discontinuity and lack of accountability during project implementation.

5.4 Costs and financing:

The total project cost at appraisal was estimated at US\$85.2 million (PhP2,418 million), and the Bank loan of US\$58 million was intended to finance 68% of the project cost. At completion, the total project cost is estimated at US\$58.5 million (PhP2,663 million), with actual Bank financing of US\$39.6 million, or 68% of the total costs (Annex 2). This was primarily the result of the progressive depreciation of the Peso against the US\$ since 1997. The total project cost, expressed in PhP, had a marginal increase of 10%. A total amount of US\$18.38 million was cancelled in August 1999, June 2002, and June 2005. With the Bank's latest issuance of notice of final closure of loan account, about US\$0.7 million was cancelled effective January 31, 2006. Hence the total cancellation amounted to around US\$19.1 million and the Bank loan was around US\$38.9 million.

6. Sustainability

6.1 Rationale for sustainability rating:

6.1.1 The sustainability of the project is rated as likely based on the increased revenue from water charges and ISF collection, strong policy and program development in respective agencies, provision of tenure to communities, established institutional arrangements at the local level, and strong community organizations. The institutional reform of NIA and the IMT efforts initiated under the project will continue to receive World Bank support under the forthcoming PIDP thus ensuring continuity and scaling up of impacts. The potential for sustainability would be further enhanced if there is clearer indication of budget support from the agencies for some of the key activities initiated. Specifically, the likelihood for sustainability is discussed below per component.

6.1.2 Under the Improved Water Resources Planning and Management Component, sustainability is likely but may further be enhanced if key issues are addressed. The NWRB was able to undertake studies of major water resource regions and urbanized areas which served as the basis for long-term sustainable development and management. This is contained in the NWRMP. The water charge billing system developed under the project had been effectively used and is intended to be sustained. So far, this has resulted in the substantial increase of water permit revenue from less than PhP2.0 million in 1995 to PhP30 million projected in 2005. This increase in revenue is expected to enable the NWRB to sustain the gains resulting from key policies and institutional changes and further build partnerships with other fund sources. Further studies and technical assistance from external sources supporting the NWRB include: (a) the study on raw water pricing funded by German Development Cooperation (GTZ) to formulate the National Integrated Water Resources Management Plan (NIWRMP) (b) the study on the establishment of Water Resources Regional Council in Region 7 funded by the United States Agency for International Development (USAID), and (c) the master plan study of the Agusan River to be possibly assisted by Asian

Development Bank (ADB). Other water resources management activities being proposed for funding by donors are the Integrated Water Resources Management (IWRM) studies of the Pampanga River Basin in Rizal/Quezon Provinces and the Maragang watershed in Zamboanga del Sur. However, there needs to be greater assurance of funding for these key activities other than those coming from donors. Maintenance of the NWDCN is now the responsibility of the agencies where the equipment was transferred and installed but a monitoring system is not in place to ensure effective O&M. Maintaining the operations of the NWIN will be difficult given the limited and uncertain financial resource of the agency. Limited funds for the O&M of the NWIN for 2006 were mainly sourced from the share of the revenue generated from the improved billing system. This however was not enough to provide the funds needed to sustain the internet link and as a result, updating of the data sets were discontinued.

6.1.3 Under the Improved Watershed Management component, sustainability is uncertain. The provision of tenure instruments ensures that watershed management activities will be continued by communities and local governments. Community-based Forest Management Agreements were provided to communities and serve as an incentive to improve and sustain watershed and natural resources management. Established agro-forest plantations and livelihood programs (bee hives, fish ponds and small cash-crop farms) are being operated by local community organizations and already generate cash incomes for the beneficiaries and indirectly reduce the prevailing encroachment and illegal exploitation of the protected and unprotected forest areas. They are expected to be sustained by the PAMB and WMAC established in the areas. Concerns over sustainability are mainly on the capacity of the DENR and LGUs. Firstly, the budget of running the PAMB and WMAC (although the requirement is small) and sustaining focused attention to watershed management will remain a cause of concern after the project given the uncertainties of LGU's priorities for funds allocation. Secondly, O&M for small rural infrastructure investments (rural roads, check dams, water points, hanging bridges, etc), which were handed over to beneficiary communities, remains uncertain. Although memorandums of agreements (MOAs) were signed between the stakeholders and the DENR, the funds to maintain these infrastructures may be too much for the LGUs and stakeholders to afford.

6.1.4 For the Improvement of NIS component being implemented by NIA, sustainability is likely but may further be strengthened. Sustainability is likely because the project was able to build critical capacities in NIA, improve revenue generation from ISF and achieve progress in irrigation reform and IMT. But it is not clear that sustained O&M of these systems will be undertaken by the IAs given their limited technical capacities.

(a) The viability index shows that the 21 NIS under the project have an overall index greater than 1 (Annex 3), i.e., income from ISF collection is greater than current O&M expenditures. Some NISs however have an index of less than one. While ISF collection has increased over the years and since IMT in most all systems, and while O&M costs are less under IA managed systems, the expenditure of NIA has not reduced much due to the lack of funds to provide incentives for staff who are willing to leave. NIA should make efforts to reduce its operating costs while continuing its programs of increasing ISF collection. The overall viability index would be greatly increased if the issue of NIA staff redundancy were to be resolved

(b) A lot of NIS maintenance costs relate to silt removal. The project supported silt reduction measures, including silt excluders, settling basins, canal bank stabilization and sediment monitoring, together with a cost-benefit study. These initiatives should be integrated into other NIS maintenance efforts and also include watershed management best practices.

(c) The current IMT contracts do not have a built-in mechanism to ensure that systems handed over to

farmers are maintained properly. To avoid leaving maintenance as a voluntary activity of IAs, NIA should require, under future IMT and incorporating into IAs' by-law, earmarking a portion of the IA's share of ISF only for routine maintenance. Future IMT contracts should formalize O&M planning as agreed by IA/NIA as a hand-over process. Some field observations indicated that some IAs kept 10%-30% of their budgets for maintenance. There is also a need for IAs to build-up capital reserves for emergencies.

6.1.5 Sustaining the progress achieved under the Institutional Strengthening of NIA and the IAs is likely under the proposed Participatory Irrigation Development Project being prepared and the agency's Rationalization Plan (RP). NIA already submitted its RP to the DBM and essentially contains a phased approach that would address staff redundancy and capacity building. In the RP, it is proposed over a five-year period that a substantial number of staff (from 5,640 to about 3,700) be reduced and that there would be training of IAs to take over the management of the systems. It is envisioned under the PIDP that further reduction (about 20% more) take place which would result to significant savings (around PhP 4 million) and this would help establish a more sustainable financial framework for the irrigation sector.

6.1.6 For the Environmental Improvement component, sustainability is likely. Activities will be continued by the DOH for schistosomiasis control and by NIA for erosion and sediment control. Subject to further monitoring and survey, the levels of schistosomiasis prevalence reduction in the three selected NISs show positive trend. Further improvements are expected with the 100% coverage mass vaccination and construction of 4,050 toilets completed. The schistosomiasis control program is already a regular DOH program with line budget. The project areas are already included among the target areas under the DOH's "FOURmula One Initiative" program for possible declaration as "Schistosomiasis Free Zones". The erosion and sediment control measures completed would be continued through the existing NIA operation and maintenance setup. An Environment Unit has also been proposed within NIA to institutionalize environmental and watershed management and to integrate all environmental activities among various units within NIA although establishment of the unit would depend on the outcome of the rationalization of the NIA.

6.2 *Transition arrangement to regular operations:*

6.2.1 It is likely that water resource management activities and approaches achieved under the project will continue as regular operations in the respective agencies. There is a strong indication that water resource planning, management, enhanced revenue generation, and water resources data base management will continue to function as regular operations of the NWRB. The DENR remains focused on community-based natural resources management, co-management of watersheds, and multi-sector partnerships and arrangements. These features will be supported under the forthcoming National Program Support for Environment and Natural Resources Management Project, a budget support initiative that will ensure further strengthening of the agency's core functions and regular operations.

6.2.2 The accomplishments in the irrigation sector under the project and the strong attention of government to ensure successful IMT show that NIA's regular operations will be enhanced. NIA already has extensive field presence to operate and maintain the NIS, assist the IAs, and collect ISF. The smaller NISs transferred to IAs under the IMT program are being operated and maintained by the IAs with technical support from NIA field officers. For large NISs, O&M is jointly carried out by NIA field offices for the main canals and structure, and by IAs for the laterals and below. Over 160,000 ha have been rehabilitated. ISF and other incomes of NIA pay for NIA's operating expenditures, and a viability index was introduced to measure the financial performance of each NIS. NIA's ISF collection has doubled over the last ten years and is increasing steadily. In 2003, for the first time, NIA's income balanced its expenditure, without direct government subsidies (compared to PhP 220/ha received from the government

as subsidies in 1998). These gains are expected to be sustained as part of the agency's regular operations and scaled up under the forthcoming PIDP.

7. Bank and Borrower Performance

Bank

7.1 Lending:

7.1.1 Bank lending performance has been rated as satisfactory. The lending preparation underwent thorough concept development, incorporating various water sector issues under the project design, involving both macro-water resources and watershed management issues at the national level, and specific irrigation water management and particular watershed management issues at local levels. It was facilitated by the good preparation work of the Borrower. The project was prepared and the loan processed in 17 months from Project Concept Document to Board approval. Mission members were of appropriate disciplines. The Task Manager at that time and some team members had been involved in an earlier Bank project (IOSPII Loan 3607-PH) of a similar nature, thus providing valuable inputs and project lessons and experiences that helped address sector issues.

7.2 Supervision:

Bank performance in supervision is rated as satisfactory. In all, the Bank carried out 15 supervision missions at six-month intervals. Each mission usually comprised 6-7 members of appropriate disciplines (Annex 4). Wrap-up meetings were held at the end of each mission with the core implementing agencies and a mission Aide Memoire, containing key findings and agreed next steps, were promptly provided to the Borrower for follow-up actions. Due to the progressive depreciation of domestic currency against the US dollar after the South-East Asian financial crisis, the mission urged the Borrower promptly to cancel the excess loan amount on three occasions, amounting to a total US\$18.38 million in order to avoid commitment charges. The Bank supervision missions also carried out reviews on safeguards compliance, especially on resettlement. There was continuity of task managers and some team members during supervision. This has proved to be valuable to the implementing agencies.

7.3 Overall Bank performance:

Overall Bank performance is rated as satisfactory. The Bank responded promptly to the Borrower's request to help prepare the project and provided key technical inputs and guidance into the project concept and design based on experiences from other Bank-supported water resources management projects. It provided effective supervision and maintained close interaction and a collaborative relationship with all the implementing agencies. The Bank took initiative in assisting the Borrower in upgrading technical knowledge and in introducing new technologies in irrigation water management.

Borrower

7.4 Preparation:

The performance of the Borrower in project preparation is rated as satisfactory. NIA, the lead agency with the biggest component in term of project cost, has intensive experience with Bank projects. It is backed by competent technical staff at the various levels for project planning and preparation. Project formulation and planning was preceded by nine specific technical/subject studies carried out by consultants engaged by NIA. Lessons learned from the previous Bank-assisted projects (IOSPII Loan 3607-PH) were incorporated in the project design. The other three agencies (NWRB, DENR and DOH) had less or no prior experience with Bank-supported projects, but were competent and capable in their respective sectors. Each agency

carried out its own project preparation, and a Steering Committee under the chairmanship of NIA coordinated the overall preparation up to appraisal.

7.5 Government implementation performance:

The government's implementation performance is rated as satisfactory but with some concerns. The GOP ensured that implementation of project activities achieved expected outputs but was unable to provide the timely provision of adequate annual allocation of funds to the implementation agencies. The project experienced shortfalls of annual fund allocation and release at the start until the year 2000, resulting in implementation delay. The situation improved in 2001. In 2003, the GOP allocated enough funds to NIA, which in turn provided full internal budget support to this project. However, funding constraints persisted (especially with the DENR), despite the Bank's alert to the government, thus resulting in significant implementation delay and the need to extend the Loan Closing Date by two years. Throughout the project, the government remained committed to pursuing integrated water resources management, accomplishing project outputs and sustaining project gains but could have been more firm and supportive in fund commitment and allocation.

7.6 Implementing Agency:

7.6.1 The performance of NIA is rated as satisfactory. The main project objectives have been achieved, with the projected outputs fully or substantially accomplished (Annex 1). Project implementation supervision and management by NIA's central and regional PMOs were effective as evidenced by the outputs and outcomes achieved. NIA has maintained good cooperation with the Bank in resolving project implementation issues in a timely manner.

7.6.2 The implementation performance of NWRB is rated as satisfactory. NWRB has fully achieved the respective project objectives and physical targets despite initial implementation delays.

7.6.3 The implementation performance of the DENR is rated as satisfactory. The constant change in DENR's leadership and the uncertainty of budget allocation affected the pace of implementation but the agency was able to accomplish its component objectives and achieve its expected outputs.

7.6.4 The performance of DOH in project implementation is rated as satisfactory. Programs were essentially carried out by the local DOH units in the three selected NISs, mostly in the Southern Philippines where schistosomiasis is prevalent. Progress reports submitted by DOH show successful reduction of schistosomiasis (3 to 6%) in the three NISs.

7.7 Overall Borrower performance:

Overall borrower performance is rated as satisfactory, consistent with the ratings above. Despite funding constraints, the four main project implementing agencies were able to achieve the project objectives and their respective component outputs resulting in substantial benefits and, in some cases, exceeded the original targets.

8. Lessons Learned

8.1 Water resources management remains a priority of the national government and will continue to be an important element in the country's development strategy. The project provides key lessons in attaining an integrated approach to water resources management and serves as a sound basis for ensuring the success of

future initiatives.

8.2 Technical

- The success of any IMT initiative must include skills and technical capacity-building for farmers especially in aspects of irrigation modernization, monitoring and evaluation, operations and maintenance, and funds management. Securing the operations and maintenance of systems requires strategic re-orientation and capacity-building activities for both farmers and irrigation association leaders. This should include knowledge on IMT policies, physical system maintenance, basic financial management skills and book keeping. IMT contracts should thus have a built-in mechanism to ensure systems handed over to farmers are maintained properly. This should also include the development of specific O&M policies and plans that are backed up by budgets and funding source.
- Uniform IMT policies applied to all systems, regardless of funding sources, lead to effective overall management of irrigation systems. Leaving policies to the discretion of individual NISs resulted in inconsistent interpretation and application of IMT policies in projects funded by different donors, especially with regard to cost-sharing between NIA and IAs. Some NIS managers changed IMT policies after contracts were signed with IAs, with mixed results and weak impacts.
- Watershed management can be effective if activities and investments are linked to local priorities, make use of local knowledge and experiences, and are oriented towards an ecosystem approach. Traditional watershed management activities, such as contract-based reforestation and tree plantations in watersheds, show very weak opportunities for sustainability because of the lack of ownership by communities. The incentive under such a scheme is mainly through the wage paid for labor in planting and maintenance. What may be more appropriate is an incentive scheme to attract communities and local governments to “buy-in” to watershed management. One incentive scheme could make use of water as an environmental “currency” – a commodity that has value across along the uplands and lowland areas and cuts across different sectors of the community. Another incentive scheme is to design and implement livelihood activities that are based on the sustainable management of the forest and watershed resources. Experience from other related projects show the potential of agroforestry as a means of providing communities alternative sources of income and at the same time encourage them to protect and manage the natural resources.
- Accurate information and a complete data base significantly contribute to sound decision-making, networking, and planning. The establishment of a hub for water resources information, if optimized, may lead to better integration of programs, more focused policies and develop partnerships.

8.3 Strategies and Approaches

- A key factor that contributes to the success of any IWRM effort is the strong partnership among the different agencies and sectors involved in water resource management and one that is based on a clear and comprehensive arrangement/plan agreed upon and provided with substantial financial and technical resources.
- Undertaking a long-term programmatic approach at the national and local levels will ensure and sustain the positive impacts of IMT which has been a positive step towards empowerment of farmers promoting active involvement of beneficiaries in decision-making relating to irrigation system management. It is also a move to reduce government budgetary burden and facilitate rationalization of NIA. It is a

critical step in the country's irrigation reform process, which includes four strategic steps: (a) irrigation system rehabilitation and modernization; (b) increasing ISF collection, and thus NIA's operation income to cover O&M; (c) building farmer capacity, and strengthening NIA's technical capacity, and moving towards public-private partnership in irrigation management through IMT; and (d) reducing operating expenditures of NIA by sector restructuring.

- Effective watershed management requires a highly participative and "bottom-up" approach that begins with multi-sectoral consultations, planning, priority setting, implementation and monitoring and evaluation with technical guidance from the DENR. Working with communities and LGUs, at both the municipal and provincial levels, will require specific capacities and orientation from the DENR in terms of approaches and activities. These are key inputs to the National Program Support for Environment and Natural Resources presently being prepared as a budget support to DENR's priority and core functions, one of which is integrated ecosystem management.

8.4 Institutional

- Adequate and timely release of counterpart funds is critical for ensuring project success. The project was delayed for more than two years primarily because of the government's funding constraint. The non-availability of government funds for technical assistance was the main cause of delay for the DENR and NWRB components. Grant funds were sought during implementation after the government decided during negotiations not to use loan funds for TA. This could have been avoided should the prospect of using the loan for TA had been carefully evaluated during preparation.

- Sustaining the gains in the irrigation sector requires institutional re-orientation and broader water resources management. The viability index shows that the 21 NISs under the project have an overall index greater than 1, (i.e., income from ISF collection is greater than current O&M expenditures). Some NISs however have an index less than one. While ISF collection has increased over time, and while O&M costs are less under IA managed systems, the expenditure of NIA has not been reduced much mainly as a result of the lack of funds to provide incentives for staff who are willing to leave. This shows that NIA should exert efforts to reduce its operating costs, while improving ISF collection. The overall viability index would be greatly increased if the issue of NIA staff redundancy were to be resolved.

9. Partner Comments

(a) Borrower/implementing agency:

Comments were received from NIA, NWRB, DENR (FASPO and FMB) and DOH and the government's overall Project Completion Report (consolidated by NIA) can be found in the Project Files.

(b) Cofinanciers:

DANIDA provided US\$1.2 million for technical assistance under the Improved Watershed Management Component, and Japan International Cooperation Agency (JICA) provided PhP50.4 million for the Water Resources Planning and Improvement Component.

(c) Other partners (NGOs/private sector):

There were no other partners in the project.

10. Additional Information

N/A

Annex 1. Key Performance Indicators/Log Frame Matrix

Outcome/Impact Indicators:

Indicator	Projected at SAR a/	Actual/Last Estimate /b
Farmers benefited (no. of families) c/	20,000	15,942
Farm (rice) net income (P/ha/year)		
Share tenants	10,445 d/	17,407
Owner-operators	20,890 d/	34,819
Paddy average yield (t / ha)		
Wet Season	4.23	4.45
Dry Season	4.55	4.42
Cropping intensity (%)	171	176
Incremental rice production (t/year) c/	100,000	170,000

Output indicators:

Indicator	SAR		Revised @ Mid-Term Review (12 /1999)	Actual (06
	Baseline (1995)	Projection (2002)		
A. Improved Water Resources Planning and Management				
1. Formulation of a National Water Resources Plan	None	Formulation (1999)	Formulated (1998)	Formul:
2. Strengthening of NWRB	Weak	Strengthening (2002)	Strengthening (2002)	Strength
3. Improvement of national water data collection - study and equipment	None	Completion (2002)	Completion (2002)	Comple
4. Establishment of a national water information network - study and equipment	None	Establishment (2002)	Establishment (2002)	Establis
B. Improved Watershed Management				
1. Formulation of a national strategy and long-term investment and institutional strengthening program for watershed management	None	Formulation (1999)	Formulated (1998)	Formul:
C. Increase in Agricultural Production and Poverty Alleviation (through Irrigation Systems Improvement and repair)				
1. Increase in irrigated area				
No. of NIS under systems improvement	0	14	21	
Wet Season (ha)	73, 850 e/	95,700 e/	84,304 f/	72.:
Dry Season (ha)	71,330 e/	92,000 e/	80,222 f/	69,:
1.1 Drainage canals excavated or improved				
- No.	0	45	105	
- Length (Km)	0	292	284	
1.2 Irrigation canals and laterals improved				
- No.	0	255	300	
- Length (Km)	0	1,272	869	
2. Repairs to major structures				
- No.	0	9	10	
3. Construction of silt excluders				
- No.	0	5	5	
D. More Efficient, Equitable and Sustainable Delivery of Irrigation Services (through Institutional Development of NIA a				
1. Percent recovery of O&M cost of 14 NIS from ISF and equipment rental income.	86	100	100	
1.1 Percent increase in ISF collection efficiency	59	75	75	
2. Transfer of smaller NIS to IAs				
- No.	0	19 h/	9	
- Area	0	N.A.	13,650	9
3. Transfer of O&M of improved laterals and sub-laterals in larger NIS				
- No.	0	215	239	
- Area	0	N.A.	48,679	4'
E. Environmental Improvement				
1. Schistosomiasis control in 3 NIS				
1.1 Percent reduction in schisto prevalence in Andanan NIS	6	3	3	
1.2 Percent reduction in schisto prevalence in Dipolo NIS	8	4	4	5.
1.3 Percent reduction in schisto prevalence in M'Lang/Malasila NIS	1 j/	1 j/	2.2	4

- a/ - Based on 14 NISs.
- b/ - Based on 21 NISs.
- c/ - Based on new and restored areas.
- d/ - Computed using 1995 prices.
- e/ - 14 Systems including AMRIS irrigated area of 24,500 ha wet season and 28,900 ha. dry season.
- f/ - Area reduced due to the exclusion of AMRIS and the inclusion of 5 other small NISs and another 3 NIS under Repair of Major Structures.
- g/ - The area is expected to increase further with the recently commissioned (June 2005) pumping system in MRIIS (III), the completion of the link canal in Andanan (Wawa) in Region 13, and the conversion of corn field to rice land in three NISs.
- h/ - Including 6 NISs from the project and 13 NISs continue from IOSP II.
- i/ - Out of 9 NISs, 7 are full transfer and the other 2 are partial transfer.
- j/ - SAR figure was based on the wider Provincial area and completed data was based on specific Project area data.
- k/ - Based on Rapid Appraisal Survey on specific Project area conducted in 2002. Prevalence Survey still being conducted for the year 2005.

Annex 2. Project Costs and Financing

Project Cost by Component (in US\$ million equivalent)

Component	Appraisal Estimate US\$ million	Actual/Latest Estimate US\$ million	Percentage of Appraisal
Improved Water Resources Planning & Management ^{1/}	4.30	2.90	0.68
Improved Watershed Management ^{2/}	13.40	6.60	0.49
Systems Improvement and Repair	53.20	46.90	0.88
Institutional Development of NIA/IAs	2.80	1.30	0.46
Environment Improvement	1.30	0.80	0.63
Total Baseline Cost	75.00	58.50	
Physical Contingencies	6.10		
Price Contingencies	4.10		
Total Project Costs	85.20	58.50	
Total Financing Required	85.20	58.50	

1/: Actual to include grant fund from JICA Japan

2/: Actual to include grant fund from DANIDA, Denmark

Project Costs by Procurement Arrangements (Appraisal Estimate) (US\$ million equivalent)

Expenditure Category	Procurement Method ¹			N.B.F.	Total Cost
	ICB	NCB	Other ²		
1. Works	10.00 (10.00)	29.60 (21.20)	29.70 (21.20)	0.00 (0.00)	69.30 (52.40)
2. Goods	2.40 (2.40)	1.80 (1.40)	0.80 (0.70)	0.00 (0.00)	5.00 (4.50)
3. Services	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	4.60 (0.00)	4.60 (0.00)
4. Miscellaneous	0.00 (0.00)	0.00 (0.00)	4.50 (1.10)	1.80 (0.00)	6.30 (1.10)
Total	12.40 (12.40)	31.40 (22.60)	35.00 (23.00)	6.40 (0.00)	85.20 (58.00)

Project Costs by Procurement Arrangements (Actual/Latest Estimate) (US\$ million equivalent)

Expenditure Category	Procurement Method ¹			N.B.F.	Total Cost
	ICB	NCB	Other ²		
1. Works	0.00 (0.00)	4.30 (2.50)	42.60 (31.10)	0.00 (0.00)	46.90 (33.60)
2. Goods	1.60 (1.30)	1.90 (1.50)	0.00 (0.00)	0.00 (0.00)	3.50 (2.80)
3. Services	0.00 (0.00)	1.00 (1.00)	0.00 (0.00)	2.10 (0.00)	3.10 (1.00)
4. Miscellaneous	0.00 (0.00)	1.60 (0.30)	3.50 (1.70)	0.04 (0.00)	5.14 (2.00)
Total	1.60 (1.30)	8.80 (5.30)	46.10 (32.80)	2.14 (0.00)	58.64 (39.40)

^{1/} Figures in parenthesis are the amounts to be financed by the Bank Loan. All costs include contingencies.

^{2/} Includes small works and goods to be procured through national shopping, consulting services, services of contracted staff of the project management office, training, technical assistance services, and incremental operating costs related to (i) managing the project, and (ii) re-lending project funds to local government units.

Project Financing by Component (in US\$ million equivalent)

Component	Appraisal Estimate			Actual/Latest Estimate			Percentage of Appraisal		
	Bank	Govt.	CoF.	Bank	Govt.	CoF.	Bank	Govt.	CoF.
Water Resources Planning/Management1/ Watershed Management Improvement2/ Irrigations Systems Improvement and Repair Institutional Strengthening of NIA/IA Environment Improvement TOTAL3/	1.30	3.20		1.10	0.50	1.30	84.6	15.6	
	8.70	5.10	1.20	3.40	2.40	0.80	39.1	47.1	66.7
	45.40	15.80		33.40	13.50		73.6	85.4	
	1.90	1.10		0.80	0.50		42.1	45.5	
	0.70	0.70		0.60	0.20		85.7	28.6	
	58.00	26.00	1.20	39.31	17.10	2.10	67.8	65.8	175.0

1/ Actual CoF: Grant Fund from JICA, Japan

2/ Appraisal CoF: Grant Fund from DANIDA, Denmark

3/ Appraisal Bank Total: A total of USD13.83M of the Bank loan was cancelled as agreed between the Bank and the Borrower

Annex 3. Economic Costs and Benefits

3.1 **Overall Project Benefits:** The proposed project contributed to the government's overall goals of poverty alleviation and improved food security. The major quantified economic benefits of the project were the increased agricultural production resulting from the restoration, rehabilitation and/or completion of 21 irrigation schemes. Specifically the increase of production was achieved through enhanced cropping intensity and crop yield increases. Other quantified benefits include the savings in future repairs or savings in O&M through the improvement of operation and maintenance practices and irrigation efficiencies. Other significant but non-quantified benefits of the project included: (a) additional income generation through on-farm crop diversification and off-farm activities; (b) efficient gains from improved water resources planning, policy and institutional reforms, (c) improved public health through control of schistosomiasis; and (d) environmental benefits from reduction of siltation and promotion of sustainable farming practices.

3.2 **Agricultural Benefit:** The major quantified economic benefits of the project were the increased agricultural production accrued directly from the restored and newly developed irrigated areas in 21 irrigation schemes. At project completion, the project overall had a significant impact on agricultural production compared to the case without the project. Some indicators approached or even exceeded the targets set at appraisal, although the actual baseline service area for irrigation system improvement was reduced by 18 percent. Comparing the with-project and without-project scenarios estimated at the SAR and ICR, the total originally expected NIS benefited service area has been revised from 109,470 ha for 14 NISs at SAR to the actual 87,653 ha for 21 NISs (about 80 percent of the without-project case and the expected targets at SAR). This is a result of adjusting the component design for irrigation system improvement and repairs during project implementation. Under the system improvement component, the AMRIS system identified at appraisal was dropped (covering 31,485 ha of benefited service area). The benefited service area in the MARIIS system was also reduced by 10,495 ha and another five relatively small NISs were substituted. In the major repair component, restored, newly generated and improved areas were added to 3 NISs. As a result of excluding the AMRIS system and benefited service area from MARIIS, the actual/firmed up benefited service area with the project for 21 NISs was about 90,228 ha (82 percent of the SAR estimate). Based on these features, the baseline SAR figures for benefited service areas for the selected irrigation systems, the crop areas, yields and production targets estimated at SAR are not relevant to the actual targets achieved due to adjustments made during project implementation. The agricultural benefit analysis at the ICR is based on the actual targets revised for the without-project case and achieved at the ICR. The detailed comparison of the benefited service areas and crop areas with and without project for each NIS between SAR and ICR are presented in the working paper on economic and financial analysis (Working Paper on Economic and Financial Analysis).

3.3 The project made a significant impact on agricultural production compared to the case without the project and quantitative targets set at project appraisal. In the project area, the crop intensity (CI) increased substantially due to the improvement in irrigation efficiency and increases in restored and newly generated irrigated area. At the ICR, the CI for the 21 NISs was re-estimated to be 172.1 percent, which constitutes a 16.8 percent increase from the without-project case in 1995, exceeding the SAR target (171.5 percent). This constitutes a 19-percent margin over the nationwide CI (153 percent in 2004). At project completion, the irrigated CI had increased by 21.6 percent, from 65.2 in 1995 to 86.8 percent in 2005, for the wet season. It had increased by 20.9 percent, from 64.4 to 85.3 percent, over that period for dry-season cropping. Both these figures exceeded the expected targets at the SAR (19.4 and 19 percent for wet and dry season, respectively). Based on the substantially increased CI, the total irrigated crop area of 21 NISs increased from 57,164 ha to 78,320 ha for the wet season (137 percent of the without-project case), and 56,469 ha to 76,951 ha for the dry season (136.3 percent of the without-project case). In addition, about 22,399 ha of rainfed rice has been converted to fully irrigated rice area, and the newly-generated benefited

service area has expanded by 2,575 ha, based on the newly generated irrigated areas.

3.4 Compared to the without-project case, improvements in yield levels of paddy for both the wet and dry seasons were observed in all the NISs where rainfed land had been converted to fully irrigated land. With the project, the average yield per hectare of 4.22 tons for the wet season and 4.3 tons in the dry season are notably higher than the average of 2.9 tons for rainfed rice in without-project case, and the present nationwide average of 3.26 tons and 4.07 tons for the wet and dry seasons, respectively. At the ICR, the total crop area for paddy increased from 131,605 ha to 155,271 ha (118 percent of the baseline), and annual paddy production increased from 536,130 tons to 658,944 tons. The incremental paddy production under the project is estimated at 122,814 tons/year or 123 percent of the without-project case, and the incremental rice production is estimated at 79,829 ton/year based on the conversion factor (0.65) used at the appraisal. Overall, total incremental annual production under the system improvement component is valued at about PhP1,237 million.

3.5 **Project Costs:** Project costs included (a) investment costs for the 21 NISs, which were used for construction of silt excluders, new regulating and control structures, resectioning of the canals, repairing damaged structures etc.; (b) operation and maintenance costs, which covered maintenance of canals, service roads, control gates and structures. O&M costs are phased in, based on the percent of incremental area generated in each system after project implementation; and (c) paddy production costs, which included cash costs for materials and inputs in kind. Project costs for institutional strengthening and environment improvements, which were not directly linked to the generation of quantifiable benefits, were excluded from ERR/NPV calculation.

3.6 At the ICR, total actual investment cost for the systems improvement and repair component was about PhP2,061.5 million (77 percent of the total project cost, and 149 percent of the SAR). This was invested mainly in the original 13 NISs and the five additional NISs for system improvement, and eight additional NISs for repairs. The increased investment costs in Pesos occurred for the System Improvement and Repairs component despite a reduction in the investment cost in U.S. dollars (from US\$53.2 million to 46.89 million, 88 percent of the SAR estimate), mainly due to the devaluation of the Peso. There was a substantial increase of IDA funds anticipated in Peso terms, from PhP26=US\$1 in 1996, averaging PhP55 in year 2005 at the ICR.

3.6 All investment costs for improvement and repairs of the 21 systems had been included in the analysis, except a small portion of the investment cost and benefit for five small repair NISs (about 2 percent of the total costs for the repairs component). These were excluded because the only benefits derived from these were the savings in costs in future repairs and in O&M for corresponding irrigation facilities with no incremental irrigated area, and the information for the specific benefits in five NISs was not available from local authorities at the ICR. At project completion, the total actual investment cost for 21 NISs was PhP1,833.2 million (US\$40.68 million, about 70 percent of the total project cost), of which 62.9 percent (PhP1153.6 million, 144 percent of SAR) was invested in the original 12 NISs, 23.9 percent (PhP437.5 million) in the six additional expansion NISs, and 13.2 percent (PhP242.1 million, about 85 percent of the total repair component and 178 percent of the SAR) for three NISs in the repairs component with expansion in irrigated area. All investment costs for system improvement and repairs in 21 NISs, agricultural production costs and O&M costs were considered in estimating the economic costs of the project in constant 2005 prices. The investment costs for improved water resources planning and management, watershed management, institutional strengthening of NIS and IAs, and the environmental improvement component (PhP601.58 million, about 22.6 percent of the total project cost), taxes, duties, and other charges were omitted, as assumed in the SAR.

3.7 **Valuation of project economic costs and benefits:** The World Bank Commodity Price projections dated May 2005 were used to estimate the economic farm-gate prices in constant 2005 terms for traded inputs and outputs (paddy, corn and fertilizers) with domestic and international transport and handling. The basic daily wage for farm labor in Philippines is PhP130 per day at the ICR based on a proportion of 66 percent hired labor in the project area. The shadow wage rate applied in the economic analysis is 0.6. The farm-gate prices in 2005 were applied to the other non-traded inputs and outputs in the crop budgets directly (this is more conservative than using a conversion factor of 0.83). A standard conversion factor of 0.78 was applied to the other non-traded items. A discount rate of 12 percent was applied to approximate the opportunity cost of capital in the Philippines.

3.8 **Economic Rate of Return Analysis:** Following appraisal methodology, the NPV and the ERR were re-estimated for 21 NISs selected for system improvement (18 NISs) and repairs (3 NISs) in the project area, and for the project as a whole. The ERR for the project was estimated at 25.6% (NPV: US\$26.22 million), which is highly acceptable, although it is lower than the 26.5 percent (NPV: US\$49.94 million) estimated at appraisal.

3.9 The major factors contributing to the lower ERR at completion were: (a) the irrigated crop areas in the dry and wet season were reduced from 187,700 ha to 155,100 ha (82.6% of the SAR estimate) due to the adjusted service area; (b) the actual average yield of paddy was reduced from 4.6 to 4.3 ton/ha in the wet season (93% of the SAR estimate); (c) the total crop output was reduced from 823,400 tons to 657,300 tons (80% of the SAR estimate) in the project area; and (d) the actual investment costs in Peso for some individual components (NISs) had increased significantly. The increased investments costs occurred despite a reduction in the investment cost in US\$ terms (from US\$53.2 million to US\$46.89 million, about 88% of the SAR estimate) for the Systems Improvement and Repair component, mainly because of the devaluation of the Peso that resulted, in turn, in a substantial increase of IDA funds anticipated in Peso terms, from PhP26=US\$1 in 1996 to an average of PhP55 in year 2005 at the ICR.

Annex 4. Bank Inputs

(a) Missions:

Stage of Project Cycle	No. of Persons and Specialty (e.g. 2 Economists, 1 FMS, etc.)		Performance Rating		
	Month/Year	Count	Specialty	Implementation Progress	Development Objective
Identification/Preparation					
	10/28/1994	3	TTL/EC(1); IR (1); PAS (1)		
	07/02/1995	4	TTL/EC (1); WR (1); EC (1); IS (1)		
Appraisal/Negotiation					
	03/03/1996	5	TTL/EC (1) IR (1); PAS (1); WR (1); EC (1)		
Supervision					
	07/12/1997	4	TTL/EC (1); IR (1); WR (1); PAS (1)	S	S
	03/30/1998	4	TTL (1); IR (1); WR (1); OPO (1)	S	S
	11/22/1998	4	TTL (1); WR (1); IR (1); PO (1)	S	S
	04/04/1999	2	TTL/EC (1); IR (1)	S	U
	09/30/1999	4	TTL (1); IR (1); FMS (1); WR (1)	S	S
	10/16/2000	5	SR. EC (1); OPO (1); FMC (1); PS (1); NRM (1)	S	S
	04/02/2001	5	TTL (1); PAS (1); FMC (1); PS(1); NRM (1)	S	S
	11/25/2001	6	TTL (1); WR (1); PAS (1); PS (1); FMC (1); IRC (1)	S	S
	04/17/2002	5	TTL (1); NRM (1); EC (1); PS (1); FMS (1)	S	S
	04/17/2002	8	TTL (1); IRC (1); ISC (1); FMC (1); PS (1); FOR (1); SO (1); FAO- IR (1)	S	S
	03/28/2003	8	TTL/WR (1); IS (1); IR (1); OPO (1); WSM/FOR (1); FMS (1); PS (1); SO (1)	S	S
	11/07/2003	9	TTL /WR (1); IS (1); IR (1); PS (1); FMS (1); SO (1); IMT (1); FOR (1); NRM (1)	S	S
	04/02/2004	6	TTL (1); NRMO (1); IS (1); NRM/FOR (1); PS (1); FMS (1)	S	S
	10/08/2004	6	TTL/ WR (1); IS (1); FMS (1); NRM (1); PS (1); IR (1)	S	S
	03/03/2005	5	TTL (1) IS/EC (1); NRM (1), FMS (1), PAS (1)	S	S
ICR					
	October 2005	8	TTL/WR (1); IR (1); NRM (1); FMS (1); SO (1); ENV (1); EC (1); WSM (1)	S	S

EC	Economist
ENV	Environment specialist
FAO-IR	Food & Agriculture Organization Irrigation Specialist
FMC	Financial Manmanagement Consultant
FMS	Financial management specialist
FOR	Forester
IMT	IMT Specialist
IR	Irrigation specialist
IRC	Irrigation Consultant
IS	Institutional specialist
ISC	Institutional Consultant
NRM	Natural resources management specialist
OPO	Operations Officer
PAS	Participation Specialist
PO	Procurement Officer
PS	Procurement Specialist
SO	Sociologist/Resettlement Specialist
SR EC	Senior Economist
TTL	Task team leader
WR	Water resources management specialist
WSM	Watershed management specialist

(b) Staff:

Stage of Project Cycle	Actual/Latest Estimate	
	No. Staff weeks	US\$ ('000)
Identification/Preparation	-	569.6
Appraisal/Negotiation	-	-
Supervision	-	822.0
ICR	-	-
Total		

Above included Bank-financed and Trust Fund consultants. All costs incurred prior to the introduction of SAP in FY00 were marked up 25% to reflect full costs.

Annex 5. Ratings for Achievement of Objectives/Outputs of Components

(H=High, SU=Substantial, M=Modest, N=Negligible, NA=Not Applicable)

	<u>Rating</u>				
<input checked="" type="checkbox"/> <i>Macro policies</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input checked="" type="radio"/> NA
<input checked="" type="checkbox"/> <i>Sector Policies</i>	<input type="radio"/> H	<input type="radio"/> SU	<input checked="" type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input checked="" type="checkbox"/> <i>Physical</i>	<input type="radio"/> H	<input checked="" type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input checked="" type="checkbox"/> <i>Financial</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input checked="" type="radio"/> NA
<input checked="" type="checkbox"/> <i>Institutional Development</i>	<input type="radio"/> H	<input type="radio"/> SU	<input checked="" type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input checked="" type="checkbox"/> <i>Environmental</i>	<input type="radio"/> H	<input type="radio"/> SU	<input checked="" type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA

Social

<input checked="" type="checkbox"/> <i>Poverty Reduction</i>	<input type="radio"/> H	<input type="radio"/> SU	<input checked="" type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Gender</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Other (Please specify)</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input checked="" type="checkbox"/> <i>Private sector development</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input checked="" type="radio"/> NA
<input checked="" type="checkbox"/> <i>Public sector management</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input checked="" type="radio"/> NA
<input checked="" type="checkbox"/> <i>Other (Please specify)</i>	<input type="radio"/> H	<input checked="" type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA

Socio-economic Benefits

Annex 6. Ratings of Bank and Borrower Performance

(HS=Highly Satisfactory, S=Satisfactory, U=Unsatisfactory, HU=Highly Unsatisfactory)

6.1 Bank performance

Rating

- | | | | | |
|---|--------------------------|------------------------------------|-------------------------|--------------------------|
| <input checked="" type="checkbox"/> Lending | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input checked="" type="checkbox"/> Supervision | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input checked="" type="checkbox"/> Overall | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |

6.2 Borrower performance

Rating

- | | | | | |
|---|--------------------------|------------------------------------|-------------------------|--------------------------|
| <input checked="" type="checkbox"/> Preparation | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input checked="" type="checkbox"/> Government implementation performance | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input checked="" type="checkbox"/> Implementation agency performance | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input checked="" type="checkbox"/> Overall | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |

Annex 7. List of Supporting Documents

(Documents in Project Files Available upon Request)

Bank:

1. Staff Appraisal Report (No. 15297-PH)
2. Mid-Term Review Supervision Report (March 2000)
3. ICR Mission Aide-Memoire (October 2005)
4. Irrigation Management Transfer (MIT) – Performance Survey Study (2004)
5. Economic and Financial Analyses (January 2006)
6. Notes on Social and Environmental Safeguards and other issues (October 2005)
7. Lessons Learned and Recommendations from the Implementation of the Watershed Component of WRDP (December 2005)

Borrower:

1. Government Project Completion Report (Overall) and Annexes – Coordinated by NIA
2. Agency Specific ICR by National Water Resources Bureau (NWRB)
3. Agency Specific ICR by Department of Environment and Natural Resources (DENR)
4. External Monitoring and Evaluation of Project Affected Families by Commission of Audit (COA) (June 2005)
5. Sediment Monitoring Report by NIA
6. Erosion Control Report by NIA
7. Letter and Comments from NIA
8. Letter and Comments from DoH
9. Letter and Comments from DENR
10. Letter and Comments from NWRB

