(On-site evaluation: July 2006)

Ex-Post Monitoring for Completed ODA Loan Projects

Evaluator: Kenji Momota (IC Net, Ltd.)

Project Name: Indonesia: "Bila Irrigation Project Phases (I) (II)" (L/A No. IP-364, IP-388)

Loan Outline

Loan Amount/Disbursement Amount:	Total	10,248 million yen/8,971 million yen
	Phase I	6,460 million yen/6,073 million yen
	Phase II	3,788 million yen/,898 million yen
Loan Agreement:	Phase I	December 1990
	Phase II	October 1992
Loan Completion	Phase I	December 1997
	Phase II	November 1998
Ex-Post Evaluation	FY 2000	
Executing Agency	Directorate of Water Resources Development, Ministry of Public Works	

Project Objective:

By constructing irrigation facilities, including intake weirs, dams, aqueducts, and drainage channels for rice paddies in the central Bila river basin of South Sulawesi province, the project aims to increase rice production by enabling irrigation of fields throughout the year, and thereby contribute to raise farmer incomes and contribute to regional economic growth.

Consultants: Nippon Koei Co Ltd., PT. BINA KARYA, PT. DARCEA, PT. IDAH KARYA (local businesses)

Contractors: PT. WIJAYA KARYA (Indonesia), Others (Phase I), PT. SAC NUSANTARA (Indonesia), Others (Phase II)

Overview of Results

Item	At time of Ex-post evaluation	At time of Ex-post Monitoring
Effectiveness & Impact **Effectiveness**	(1) Results of Irrigation (Benefited Area Measured in ha)	**Compared to conditions at the time of the ex-post evaluation, planted area and unit yield showed steady increases, and thus effectiveness is deemed high. In addition, the project has clearly helped to improve farmers' livelihoods through higher income, etc, and thus a favorable impact has likewise been secured.**

By 2000, the planted area had increased favorably when compared with levels at operation start-up (1996), the end of Phase I (1997), and the end of Phase II (1998).

Table 1: Annual Planted Acreage

		Target	1996	1997	1998	1999	2000
Annual Planted Acreage	ha	17,404	14,240 (82%)	14,193 (82%)	17,815 (102%)	18,160 (104%)	19,045 (109%)

Note: Percentages in parentheses are relative to target.
Data obtained from the South Sulawesi Water Resources Bureau branch office.

(2) Increase in Production and Productivity

As shown in the table below, both rice production and unit yield have increased since the time of ex-ante evaluation. At the time of the ex-post evaluation, target rice production levels had been achieved.

Table 2:Actual Results for Production and Unit Yield

	Target	1992 Ex-ante evaluation	1996 Start of operations	2000 Ex-post evaluation
Rice production (ton)	89,734	33,520 (-)	76,174 (85%)	106,412 (93%)
Unit rice yield in the rainy season (ton/ha)	5.0	3.1 (-)	5.5 (110%)	6.0 (120%)

(1) Results of Irrigation (Benefited Area Measured in ha)

At 121% of target levels, the total planted area has increased consulting. In the dry season especially, a large increase in the planted area attests to the project's efficacy.

Table 1: Annual Planted Acreage

	Target	2000 Ex-Post Evaluation	2006
Annual planted acreage (ha)	17,404 -	19,045 (109%)	20,994 (121%)
- Rainy season	9,747 -	11,187 (115%)	11,247 (115%)
- Dry season	7,657 -	7,858 (103%)	9,747 (127%)

Note: Percentages in parentheses are relative to the target.
Source: Bila Irrigation Project Office (Directorate of Water Resources Development, Ministry of Public Works)

(2) Increase in Production and Productivity

Both rice production and unit yield have increased favorably. In particular, dry season production has showed an especially large increase, reaching 172% of the target. This can be attributed to improved seed quality and efforts on the part of farmers to safeguard against disease, in addition to the benefits of the irrigation project.

Table 2: Actual Results for Production and Unit Yield

	Target	2000 Ex-ante evaluation	2006
Rice production (ton)	89,734	106,412 (119%)	144,312 (161%)
- Rainy season	47,620	67,122 (141%)	71,980 (151%)
- Dry season	42,114	39,290 (93%)	72,332 (172%)
Unit rice yield in	5.0	6.0	6.4

Unit rice yield in the dry season (ton/ha)	5.5	2.8 (-)	5.0 (91%)	5.0 (91%)

Note: Figures in parentheses are relative to target.

(3) Recalculation of EIRR
12.4% (at time of ex-ante evaluation 7.2%)

(4) Evaluation by Local Residents
a) Estimation of overall condition of irrigation facilities: over 60% indicated that they are satisfied.
b) Present status of irrigation facilities: over 60% responded that the sluice gates are not functioning properly.
c) Poor drainage issues: over 70% responded that their crops are being damaged by poor drainage.
d) Degree of satisfaction with the project as a whole: 97% expressed satisfaction, with 33% “very satisfied” and 64% “satisfied.”

the rainy season (ton/ha)		(120%)	(128%)
Unit rice yield in the dry season (ton/ha)	5.5	5.0 (91%)	7.42 (135%)
Total net income from rice (million rupiah/year)	N/A	91,416	144,379 (158%)*

Note: Percentages in parentheses are relative to the target.
Source: Bila Irrigation Project Office (Directorate of Water Resources Development, Ministry of Public Works)

(3) Recalculation of EIRR
EIRR was recalculated based on actual figures for the year 2006. Accordingly, EIRR increased from 7.2% at the time of the ex-ante evaluation and 12.4% at the time of the ex-post evaluation to 20.8% at the present time. These positive results may be attributable to a favorable increase in the planted area, unit yield, and harvest output.

(4) Evaluation by Local Residents (No. of Respondents: 80)
Over 90% of respondents expressed satisfaction with the irrigation project as a whole. While a high degree of satisfaction was generally expressed, when it came to the condition of facilities, some respondents felt that the functionality of aqueducts had deteriorated.

a) Estimation of the overall condition of irrigation facilities: approx. 90% of respondents indicated that they were satisfied.
b) Present status of irrigation facilities: 78% indicated that aqueducts were not performing as well, due to sedimentation deposits, and 35% indicated that sluice gates were not functioning properly.
c) Poor drainage issues: approx. 70% of respondents indicated that drainage was poor during heavy downpours. Specific damage resulted from overflowing of the Tedon River in which drainage flowed (In the Kechamatan Chulias regency downstream of the river, homes are also being flooded).
d) Degree of satisfaction with the project as a whole: The level of satisfaction was

		91%, with 23% “very satisfied” and 68% “satisfied.”
Impact	(1) Environmental Impact a) There are no problems with lake water pollution due to agricultural chemicals. b) In a survey of beneficiaries, no one indicated that the present project had adverse effects on the environment. (2) Impact of Resident Relocations and Land Acquisition a) The government has offered suitable substitute lands and has responded appropriately. (3) Improvement in People’s Welfare (Raised Incomes) a) Proceeds for the current project increased from 13.679 billion rupiah at operation start in 1996 to 19.110 billion rupiah in 2000 (both figures given in the nominal value of rupiah as of 1996). Thus, the project has contributed to higher and more stable farmer incomes. In a survey of beneficiaries, 99% of residents indicated that the present project had had a favorable impact on the regional economy. (4) Regional Economic Growth No particular description given at the time of the ex-post evaluation.	(1) Environmental Impact No problems in particular (response from executing agency). (2) Impact of Resident Relocations and Land Acquisition There are no particular problems (response from executing agency). (3) Improvement in People's Welfare a) At 157.413 billion rupiah (corresponding to 39.297 billion rupiah in 1996 rupiah terms), proceeds from the present project have more than doubled since the time of the ex-post evaluation. The project has clearly helped increase and stabilize farmer incomes. b) It was not possible to obtain income figures for individual households, but according to a questionnaire submitted to 100 farmers, 83% responded that their incomes had improved as a result of greater productivity. As a concrete example, residents were of the opinion that their living environment had improved thanks to machinery for business use (such as tractors (75%) and motorcycles (41%)), the purchase of household electrical appliances, and increased expenditure on education. (4) Regional Economic Growth Both overall GRDP and the agriculture sector have exhibited stable growth rates. The rise in agricultural production, which accounts for 46% of GRDP, has contributed to economic growth in the region.

Table 3: Changes in GRDP in Project Region
(Two Regencies of Wajo and Sidrap)

Unit: million rupiah

	Fiscal Year	2001	2002	2003	2004
All Industries	Total for both regencies	2,698,704 -	2,892,108 (7.2%)	3,098,874 (7.1%)	3,380,351 (9.1%)
	Wajo regency	1,689,314 -	1,767,848 (4.6%)	1,908,596 (8.0%)	2,079,286 (8.9%)
	Sidrap regency	1,009,390 -	1,124,260 (11.4%)	1,190,279 (5.9%)	1,301,066 (9.3%)
Agriculture	Total for both regencies	1,400,551 -	1,455,570 (3.9%)	1,513,232 (4.0%)	1,558,478 (3.0%)
	Wajo regency	836,759 -	824,238 (-1.5%)	864,782 (4.9%)	893,909 (3.4%)
	Sidrap regency	563,792 -	631,332 (12%)	648,449 (2.7%)	664,569 (2.5%)

Note: The lower figure in each cell shows the percentage change over the previous year.
Source: Wajo Regency in Figures

Sustainability

(1) Water Storage Facilities
a) Technial capacity: The Bila Irrigation Project Office takes care of operation and maintenance. They handle everything from large-scale repairs to daily activities such as cleaning and the opening and closing of dams and gates.
b) Structural organization: After project completion, project was to be

Problems such as damage to aqueducts and insufficient budgeting for operation and maintenance (which was pointed out in the ex-post evaluation) remain. Daily operation and maintenance can be managed by farmers themselves, but the central government needs to take a more active role in budgetary allocations and operation and maintenance for the main facilities.

(1) Water Storage Facilities (Dams/Intake Weirs)
a) Technical capacity: The central government (and specifically, the Bila Irrigation Project Office) takes care of operation and maintenance. They handle everything from large-scale repairs to daily activities such as cleaning and the opening and closing of dams and gates.
b) Structural organization: No change since the time of the ex-post evaluation.

	transferred to the state government, but because of its financial difficulties transfer was never completed. c) Financial status: N/A d) Operation and Maintenance: Erosion was found in a part of the water reservoir. In addition, the small hydraulic power unit for opening and closing dams and gates broke down shortly after beginning operation (At the time of the ex-post evaluation, staff are opening and closing the gates manually). (2) Main and Branch Irrigation Channels a) Technical capacity: After control of operation and maintenance was transferred to the state government, they set up branch offices in each district, and staff training was conducted properly. b) Structural organization: After project completion, control was transferred	c) Financial status: Budgetary allocations from the central government are insufficient. In comparison with the 3.5 billion rupiah needed for operation and maintenance of irrigation facilities (including the main line and secondary channels), greatly decreased figures of 900 million rupiah (25% of the required amount) are continuing (Over the years 2001-2005, only 35% of the necessary budget was allocated on average). Budgetary allocation priority is lower than neighboring irrigation projects, but at the present time, there are no major problems with the facilities. d) Operation and Maintenance: There have been no major increases or decreases in the main indicators of water storage volume or discharge flow volume, and at the present time there are no major problems. However, the central government is continuing to fall short in its budgetary allocations. No small hydraulic power units are being used, and the opening and closing of sluice gates is being performed either manually or using diesel generators. The farmers are shouldering the operating costs for such things as fuel. Table 4: Main Efficacy Indicators for Water Storage Facilities Source: Bila Irrigation Project Office (2) Main and Branch Irrigation Channels a) Technical capacity: No technical problems have arisen in operation and maintenance. b) Structural organization: No changes since the time of the ex-post evaluation.

	Target	2001	2002	2003	2004	2005
Water storage volume (million m^3)	58	63.22	74.59	65.75	63.64	62.24
	Relative to target	109 %	129%	113%	110%	107%
Discharge flow volume (m^3/s)	37.32	32.42	37.12	34.73	37.67	28.86
	Relative to target	86.9 %	99.5%	93.1%	100.9%	77.3%

	from the Bila Irrigation Project Office to the South Sulawesi Provincial Government Directorate of Water Resources Development. c) Financial status: Relative to the 760 million yen required, actual distributions came to only 130 million rupiah, or 17% of the required amount (1999). d) Operation and Maintenance: Cracks and other damage have appeared in the concrete of parts of the main and branch channels. (3) Watercourses a) Technical capacity: The irrigation associations that handle operation and maintenance positively take part in watercourse cleaning and operation. b) Structural organization: Irrigation associations are organized by farmers. As of the year 2000, 141 associations had been established, and 206 are expected, meaning that only 70% of the target had been established.	c) Financial status: The local government is in charge of operation and maintenance for branch channels. Regional tax revenue (PAD/Pendapatan Asli Daerah) is allotted as a revenue source, and 30,000 rupiah is levied from farmers each harvest. d) Operation and Maintenance: Some channels have experienced lowered functionality due to leakage and silt. This means that not enough water is discharged from water sources to distant farmlands. Electric pumps are needed to draw water. Table 5: Proportion of Water Channels Having Decreased Functionality Year / Secondary Channels / Watercourses 2003 / 14.0% / 9.0% 2004 / 18.0% / 10.0% Source: Bila Irrigation Project Office (3) Watercourses a) Technical capacity: The irrigation associations are actively taking part in daily maintenance, and there are no major technical problems. b) Structural organization: Some 114 irrigation associations have been established, which is only 55% of the target. The low rate at which associations have been established is attributed to the low functionality of watercourses. Moreover, the number of beneficiary farming households has largely leveled off over the past few years. Table 6: Change in No. of Beneficiary Farming Households (Two Regencies/Four Districts) Regencies / 2001 / 2002 / 2003 / 2004

	c) Financial status: Whereas 134 million rupiah in irrigation fees was expected to be levied, actual collection came to only 74 million rupiah. The collection rate is only around 55%, but is rising slightly each year. d) Operation and maintenance: According to information from the executing agency, parts of the watercourses have been damaged to the extent that some functionality has been lost.	<table><tr><td>Sidrap</td><td>9,534</td><td>9,461</td><td>9,449</td><td>9,496</td></tr><tr><td>Wajo</td><td>9,883</td><td>9,932</td><td>9,982</td><td>10,032</td></tr><tr><td>Total</td><td>19,417</td><td>19,393</td><td>19,431</td><td>19,528</td></tr></table> c) Financial status: Fees of around 30,000 rupiah/ha are levied against beneficiaries each harvest. There are no accurate statistics on the actual collection figures, but according to a questionnaire survey with 100 subjects, 75% of farmers responded that they do pay the full amount. d) Operation and maintenance: All irrigation association members engage in operation and maintenance in one form or another. In a questionnaire survey, roughly 70% of respondents participate in association activities, performing daily checks and maintenance. As shown in the table below, some watercourses suffer from decreased functionality.
Lessons Learned, Recommendations, Information Resources and Monitoring Methods (1) Follow up on lessons learned and recommendations made in ex-post evaluation report or in later evaluations (2) Proposals for securing sustainability and instructions given at time of follow-up monitoring	(1) Recommendations ・ Irrigation associations handle operation and maintenance for watercourses, but only 70% of the number of associations has been established. Over the entire project region, there is a concern as to whether the facilities concerned are being properly maintained. ・ In addition, the operation and maintenance system needs to be stabilized and made more reliable by, for instance, securing sufficient budgetary allocations from the central and regional government for operation and maintenance and by strengthening the organization of collecting water fees.	**It is possible that operation and maintenance will not continue to be reliable owing to the fact that the body legally in charge of management—namely, the central government—is not playing a sufficient role, and because of the fact that the operation and maintenance budget is too low, as was pointed out earlier under the section on sustainability. We are presenting the following recommendations for further improvement.** (1) Recommendations ・ Irrigation associations are shouldering some of the operation and maintenance for reservoirs and secondary channels—things which ought to be the responsibility of the government. The division of responsibility and system for enforcing operation and maintenance among the central government, regional governments, and water associations need to be sorted out. To that end, budgetary provisions from the central government need to be secured for the operation of large-scale facilities, such as reservoirs and main irrigation channels. ・ In addition to the financial troubles of the government itself, the insufficient budgeting for operation and maintenance can also attributed to a lack of

		awareness of the need to perform preventive maintenance. Technical transfers and educational activities to promote efforts for preventive maintenance are needed.