

Republic of the Philippines

Ex-Post Evaluation of Japanese ODA Loan Project
Bago River Irrigation System Rehabilitation and Improvement Project

External Evaluator: Kenichi Inazawa, Octavia Japan Co., Ltd.

0. Summary

With an aim to increase agricultural production, this project rehabilitated the Bago River Irrigation System while strengthening irrigator’s associations for smooth operation and maintenance (O&M) in Negros Occidental Province located in the western part of Negros Island. Both at the times of project appraisal and ex-post evaluation the project is consistent with the development policy of the Philippines as seen in the irrigation development policy. Similarly, the project is consistent with the needs of the Philippines, such as to increase agricultural production. As a result of the rehabilitation of a weir, main, and secondary canals by the project, almost 80% of the targets were achieved for cropped area and benefited area. Target was achieved for rice output, and moreover, targets were exceeded for per-hectare yield of rice, gross annual farm income, and irrigation service fee collection rate. Based on the beneficiary survey, positive project impacts are observed, including high level of satisfaction and increase in come among farmers. Although the project period was slightly longer than planned, the project cost was lower than planned. No major problems are observed in the institutional, technical, and financial aspects of the O&M carried out by the executing agency. In light of the above, the project is evaluated to be highly satisfactory.

1. Project Description



Project Location



Rehabilitated Secondary Canal

1.1 Background

Negros Occidental Province is located in the western part of Negros Island, the central part of

the Philippine. In the 1970s the province was known for sugar cane production and exports. In the early 1980s, however, international sugar prices dropped, and the economy stagnated in the province. Although rice was another main crop grown in the province, its production could not keep pace with consumption. One of the main reasons was the aging of irrigation systems. The “Bago Irrigation System,” the largest in the province, was more than 30 years old. There were problems with water management as well as O&M. It had low capacity to distribute irrigation water, and as a result, benefited area diminished. In particular, flood and erosion were serious problems. The Bago River, which runs through the center of the irrigation system, would flood and wash away the main canal tunnels. Thus there was an urgent need to rehabilitate the water canals and thereby rebuild the irrigation system.

The Bago Irrigation System has a designed area of 13,277ha, which accounts for one-quarter of the total irrigated area (52,335ha) overseen by the National Irrigation Authority (NIA)’s the Sixth Division (NIA-6)¹. Considering its scale, rehabilitating the Bago Irrigation System and strengthening the institutional aspects of O&M were viewed important in increasing agricultural production in Negros Occidental Province.

1.2 Project Outline

The objective of this project is to increase irrigated area and agricultural production by rehabilitating the aging Bago Irrigation System and by strengthening irrigator’s associations, thereby contributing to improving farmers’ incomes and alleviating poverty.

Loan Approved Amount/ Disbursed Amount	3,224 million yen / 2,990 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	March 2002 / March 2002
Terms and Conditions	<p>< Construction > Interest Rate: 2.2% Repayment Period: 30 years (Grace Period: 10 years) Conditions for Procurement: General Untied</p> <p>< Consulting Service > Interest Rate: 0.75% Repayment Period: 40 years (Grace Period: 10 years) Conditions for Procurement: Bilateral Untied</p>

¹ Panay (4 provinces), Guimaras Island (Guimaras Province), and Negros Occidental Province

Borrower / Executing Agency(ies)	The Government of the Philippines / National Irrigation Administration (NIA)
Final Disbursement Date	February 2010
Main Contractor (Over 1 billion yen)	China International Water & Electric Corporation (China)
Main Consultant (Over 100 million yen)	NTC International Co., Ltd. (Japan) / KRI International Corp. (Japan) / Hydroterre Consultants, Inc. (the Philippines)
Feasibility Studies, etc.	F/S, NIA, 1999
Related Projects	Dispatch of Irrigation Management Transfer (IMT) expert (September 2010 – September 2012)

2. Outline of the Evaluation Study

2.1 External Evaluator

Kenichi Inazawa, Octavia Japan Co., Ltd.

2.2 Duration of Evaluation Study

Duration of the Study: September 2012 – July 2013

Duration of the Field Study: 11-24 November 2012, 31 March – 6 April 2013

3. Results of the Evaluation (Overall Rating: A²)

3.1 Relevance (Rating:③³)

3.1.1 Relevance to the Development Plan

The Philippines was under Arroyo administration at the time of project appraisal. The government was implementing the Medium-Term Philippine Development Plan (2001-2004) with an ultimate goal to reduce poverty. A number of priority areas were identified in the plan, including: (1) macroeconomic stabilization and sustainable economic development; (2) social development, and human resource development; (3) rural development; and (4) correction of disparities among regions. With a view of reducing poverty, the plan placed a special emphasis on developing economic and social infrastructures as well as supporting the poor, who accounts for 34%⁴ of the population.

At the time of ex-post evaluation, the Government of the Philippines is implementing the

² A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

³ ③: High, ② Fair, ① Low

⁴ Data from 2000

Medium-Term Philippine Development Plan (2011-2016). In this plan, development of infrastructures, including irrigation facilities for the whole regions in the country, is recognized as one of the key strategies for economic growth. Concerning agricultural development, the plan emphasizes the need to develop irrigation facilities so as to increase agricultural production and farmers' income levels. In addition, the Ministry of Agriculture of the Philippines has developed the Food Staple Self-Sufficiency Program (2011-2016). Pointing out that rice production is not keeping pace with consumption in the Philippines, the program urges the importance of increasing rice acreage, per-hectare yield, and output. It stresses that irrigation facilities need to be rehabilitated and developed in order to increase irrigated area. In view of the above, the project remains consistent with the development policy of the Philippines.

3.1.2 Relevance to the Development Needs

At the time of project appraisal, the Bago Irrigation System, the largest in Negros Occidental Province, was more than 30 years old. There were many problems with water management and O&M. It had low capacity to distribute irrigation water, and as a result, benefited area was shrinking. The Bago River, which runs through the center of the irrigation system, would flood and erode the main canal tunnels. Thus there was an urgent need to rehabilitate the irrigation canals thereby redevelop the irrigation system.

As a result of the rehabilitation of a weir, main, and secondary canals by the project, farms in the area served by the Bago Irrigation System ("the Bago irrigation area") now receive stable water supply with efficient distribution of irrigation water. Through the ex-post evaluation it was learned that NIA was planning to expand the irrigated area of the Bago Irrigation System further from 2013 onwards⁵. Additionally, the Provincial Government of Negros Occidental continues to make efforts toward increased rice production and stable food self-sufficiency based on their Program for Agricultural Production Improvement and Food Security developed in 2010. In view of the above, the project remains consistent with the development needs of the Philippines at the time of ex-post evaluation.

3.1.3 Relevance to Japan's ODA Policy

Based on the Official Development Assistance (ODA) Charter of Japan endorsed by the Cabinet and the Medium-Term Policy on Official Development Assistance issued in 1999, JICA developed the Medium-Term Strategy for Overseas Economic Cooperation Operations in 1999. This strategy lays out overall policy directions and priority areas for Japanese ODA loans. In the

⁵ NIA is planning to self-finance the irrigation development covering 600ha.

strategy the following fields were identified as priorities: (1) making economies more resilient and overcoming constraints in order to achieve sustainable growth (e.g., appropriate macroeconomic management, reinforcing industrial structures, and developing economic infrastructures); (2) poverty alleviation and correction of regional disparities; (3) environmental protection and disaster prevention; and (4) human resource development and system building. In 2000 another document was issued by JICA entitled, “The Assistance Program for the Philippines.” It aims to reduce poverty and correct regional disparities while emphasizing the importance of infrastructure development in agriculture and rural development.

This project supports infrastructure development in the Philippines, which aims to stabilize food supply, to end poverty, and to correct urban-rural disparities. It is clearly in line with the priorities described above, and thus the project is consistent with the assistance policy of Japan.

In light of the above, the project has been highly relevant with the country’s development plan, development needs, as well as Japan’s ODA policy; therefore its relevance is high.



Figure 1: Project Location

3.2 Effectiveness⁶ (Rating:③)

3.2.1 Quantitative Effects (Operation and Effect Indicators)

• Data concerning Irrigated Area and Increase in Agricultural Production in Project Area

At the time of ex-post evaluation, rice is harvested 5 times in 2 years in the project area (the Bago irrigation area)⁷. The Bago River divides the irrigation system into two parts: the north and the south parts of the river. When double cropping is practiced in the north side, triple cropping is practiced in the south side. In the following year, the practice is switched between the north and the south: triple cropping is practiced in the north while double cropping in the south⁸. Table 1 shows the changes in cropped area, benefited area⁹, per-hectare yield, output, gross farm income per hectare, and irrigation service fee collection rate.

Table 1: Data concerning Irrigated Area and Increase in Agricultural Production (actuals at project appraisal, after project completion, and targets after project completion)

Indicator	Crop Type	Actual				Target
		2002 (At Project Appraisal)	2010 (Upon Project Completion)	2011 (1yr after Project Completion)	2012 (2yrs after Project Completion)	2012 (2yrs after Project Completion)
1) Cropped area (ha)	Rice (Wet season ¹⁰)	8,900	9,374	9,117	N/A	11,485
	Rice (Dry Season)	8,500	8,000	9,180	8,972	11,351
	Sugar Cane	170	N/A	N/A	6.5	390
2) Benefited area (ha)	Rice (Wet season)	6,893	9,374	9,076	N/A	10,759
	Rice (Dry Season)	6,101	7,991	9,180	8,945	10,495
	Sugar Cane	170	N/A	N/A	N/A	390
3) Per-hectare yield (ton/ha)	Rice (Wet season)	3.2	4.64	3.78	N/A	3.7
	Rice (Dry Season)	2.5	3.74	3.32	4.35	4.2
	Sugar Cane	75	N/A	N/A	N/A	80
4) Outputs of major crops (ton/year)	Rice (Wet season)	21,446	43,556	34,382	N/A	37,555
	Rice (Dry Season)	20,403	29,894	30,519	38,909	38,950
	Sugar Cane	12,600	N/A	N/A	N/A	27,550
5) Gross farm income per hectare (peso/ha/year)		41,779	100,651	85,352	N/A	61,359
6) Irrigation service fee collection rate (%)		40	45.35	48.36	67.02	60

Source: JICA document (actuals at the time of project appraisal, targets after project completion) and responses to the questionnaire (actuals after project completion)

The analysis of the data in Table 1 is found below:

⁶ Sub-rating for effectiveness is to be put with consideration of Impact.

⁷ According to NIA, rehabilitation of the weir and irrigation canals enabled the upgrading from double cropping to multiple cropping.

⁸ This alternation system allows longer fallow period and thereby would prevent soil degradation and erosion.

⁹ According to the executing agency, "cropped area" refers to an area where rice is planted out of the irrigable area served by the Bago River. "Benefited area" refers to the area with a yield of more than 2 tons per hectare out of the cropped area. (i.e., Benefited area never exceeds cropped area.)

¹⁰ The wet season is from May to early November while the dry season is from mid November to April.

1) Cropped Area and Benefited Area

As shown in Table 1, cropped area is larger at the time of project completion (2010) than it was at the time of project appraisal. It is because the project, through the weir rehabilitation and concrete-lining of main and secondary canals, made the opening-and-shutting of the floodgate easier at the weir. The project also made water distribution to irrigation farms more efficient (i.e., improved water speed and less delay in water distribution). Cropped area two years after project completion was 9,117ha in the wet season 2011 and 8,972ha in the dry season 2012, achieving 79.3% (target for wet season 2011: 11,485ha) and 79.0% (target for dry season 2012: 11,351ha) of the targets respectively. Benefited area was 9,076ha in the wet season 2011 and 8,945ha in the dry season 2012 two years after project completion, achieving 84.4% (target for wet season 2011: 10,759ha) and 85.2% (target for dry season 2012: 10,495ha) of the targets respectively. Bad weather had a considerable influence on these results. According to the Negros Occidental Province Irrigation Management Office (NOIMO) under NIA-6, the province suffered from unstable rainfall and temperature throughout the year starting from the dry season 2011 until the dry season 2012. This caused crop acreage to decrease across the province, which also affected the Bago irrigation area.

With regard to sugar canes, cropped area was 6.5ha in 2012, which is below the target. This is mainly because rice is currently more profitable for farmers in the Bago irrigation area. As mentioned earlier, rice can be harvested 5 times over a 2-year period now, while sugar canes can be harvested only once a year¹¹. It is also because farmers started to see the advantages of cultivating rice as the project brought stable water supply to the area. Furthermore, with multiple cropping, farmers can better manage weather-related risks and volatility in profits.



Figure 2: Before and After the Rehabilitation of Main Canal

¹¹ More precisely, sugar canes have a 10-11 month cycle from planting to harvest. They are used to make sugar, other food, and ethanol.



Figure 3: Before and After the Rehabilitation of Secondary Canal¹²

2) Per-Hectare Yield

Regarding per-hectare yield, target was met in the wet season 2011. In the wet season 2012 the actual yield exceeded the target. According to NOIMO, per-hectare yield is expected to improve even further with the introduction of rice seeds more resistant to natural hazards. Data on per-hectare yield was not available for sugar canes.

3) Outputs of Major Crops

Rice output is determined by cropped area and yield per hectare (i.e., output is cropped area multiplied by per-hectare yield). Target was met in the dry season 2012. In the wet season 2010 target was exceeded. Although rice output dropped in 2011 (1 year after project completion) as compared to the previous year, it was due to bad weather. Data on output was not available for sugar canes.

4) Gross Farm Income per Hectare

Target was almost achieved for gross farm income per hectare in 2010-2011 as it will be explained below. Essentially, gross farm income per hectare is determined by two factors: output and farm gate price.¹³ (i.e., Gross farm income per hectare is output multiplied by farm gate price.) In Negros Occidental Province farm gate price of rice grew at the rate of 5.96% per year¹⁴ over the period of 2002-12. Applying this 5.96% to the target for 2012 (61,359 peso/ha) and calculating the increment up to 2012 (2 years after project completion), one can estimate an adjusted (assumed) target, which is 104,000 peso/ha. Comparing this adjusted (assumed) target to the actuals shown in Table 1, which are 100,651 peso/ha (2010) and 85,352 peso/ha (2011), one can see that 96.8% and 82.1% of the target was achieved respectively. Thus it can be said

¹² The photos of Figure 2 and 3 were provided by NIA.

¹³ The farm gate price is calculated based on price index, such as agriculture price statistics and wholesale market price statistics.

¹⁴ Source: Philippines Bureau of Agricultural Statistics (BAS)

that the project is contributing to the improvement in farmers' incomes in the Bago River Irrigation area.

5) Irrigation Service Fee Collection Rate

The irrigation service fee collection rate has been increasing since the project appraisal. Then in 2012, it exceeded the target of 67.02%. According to NOIMO, it was thanks to the training and workshops¹⁵ which were given to irrigator's association members. Through the training association members learned about effective ways to collect irrigation service fees and how to work more efficiently. As a result, the institutional aspects of the associations were reinforced. In addition, associations began to take irrigation service fee collection more seriously as they progressed to Model No.1 and No.2 of the Irrigation Management Transfer (IMT). (IMT will be discussed in more detail in 3.5.1.) According to the interviews, farmers residing in the project area rightly understand the importance of paying irrigation service fees for proper usage and maintenance of irrigation facilities.

3.2.2 Qualitative Effects

• The Level of Satisfaction and Increase in Rice Output

Questionnaire-based interviews were conducted with farmers residing in the Bago irrigation area during the evaluation study ("beneficiary survey"). The sample size of the beneficiary survey was 100¹⁶, out of which 54 were drawn from the north side of the Bago River while 46 from the south side of the river. As mentioned above, the river runs across the Bago irrigation area, dividing the area into the north and the south parts. The survey targeted rice farmers who have been cultivating rice since before project completion in the Bago irrigation area.

Figure 4 shows farmers' satisfaction levels. The level of satisfaction is generally high among farmers with the majority responding that they were either "very satisfied" or "satisfied" with the project. Figure 5 suggests that the high level of satisfaction can be attributed to the project as many respondents mentioned sufficient water supply and efficient water distribution through rehabilitated canals as the reasons for their satisfaction. Figure 6 shows that for the majority of farmers rice output either "largely increased" or "increased" after the rehabilitation of water canals. Most of the respondents said that it was because water supply improved as shown in Figure 7, suggesting that the project is greatly contributing to increasing rice production in the project area.

¹⁵ It is one of the project outputs. Refer to the "Efficiency" section under "Output."

¹⁶ A total of 7,700 farming households reside in the area served by the Bago River Irrigation System.

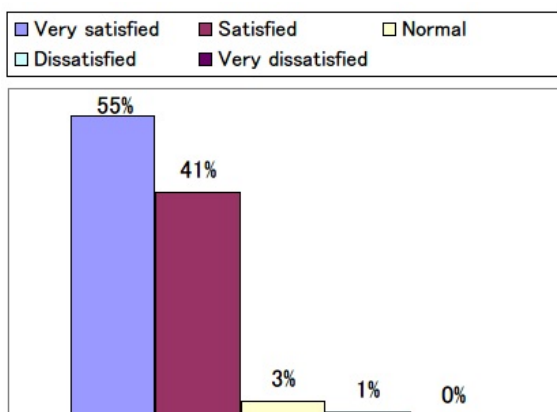


Figure 4: Are you satisfied with the project?

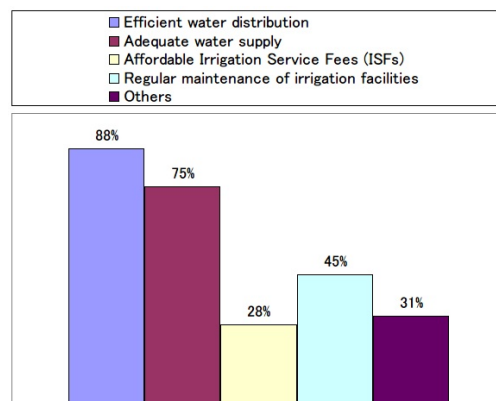


Figure 5: Why are you “very satisfied” or “satisfied” with the project? (multiple answers allowed)

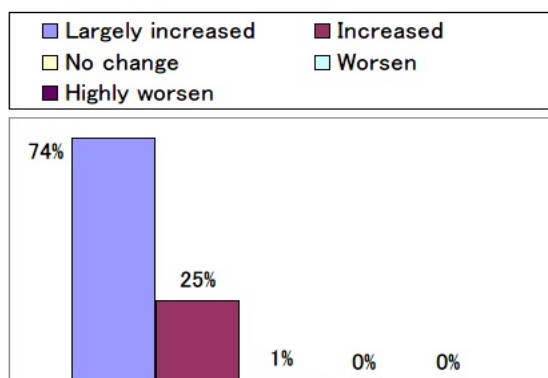


Figure 6: Did rice production (output) increase after the rehabilitation of water canals?

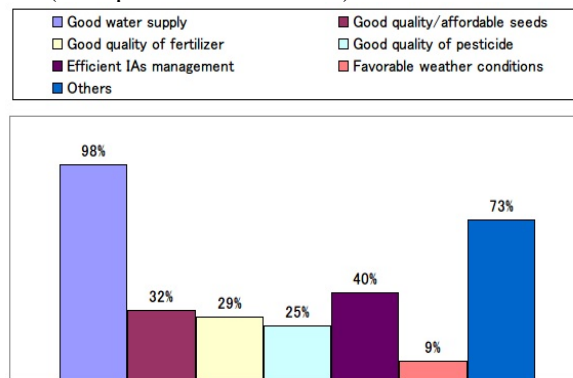


Figure 7: Why do you think rice production “largely increased” or “increased”?

3.3 Impact

3.3.1 Intended Impacts (increase in agricultural income and poverty alleviation)

The beneficiary survey was also designed to measure project impacts other than effectiveness and qualitative effects. The results are found below.

Figure 8 shows the result on income level. The majority of interviewees responded that their incomes either “largely improved” or “improved.” In addition, their living standards seem to have improved along with the incomes as seen in Figure 9. How their living standards improved are shown in Figure 10. Many of the respondents pointed to the improvement in diet and housing, better education for children, and purchasing of vehicles, including automobiles and motorbikes. It seems that beneficiaries enjoy choices and options in their lives now as compared to before the project implementation. Interviewees were also asked whether they were satisfied with the current living environment although it might not be directly linked to the project. As shown in Figure 11 and Figure 12, beneficiaries are generally satisfied with the living

environment.

The above results suggest that the project is playing an important role in the betterment of farmers' lives in the Bago irrigation area.

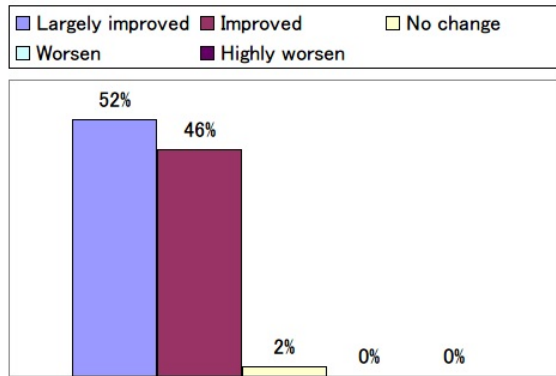


Figure 8: Did your income improve as compared to before the project?

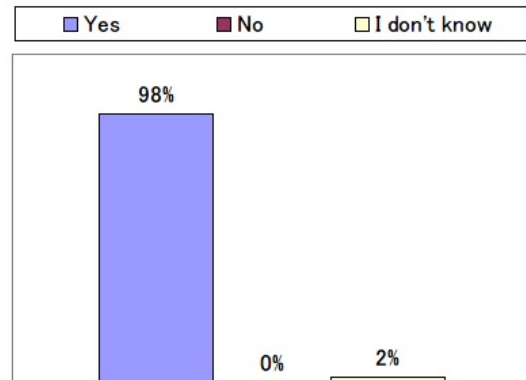


Figure 9: Did your living standard improve along with the income?

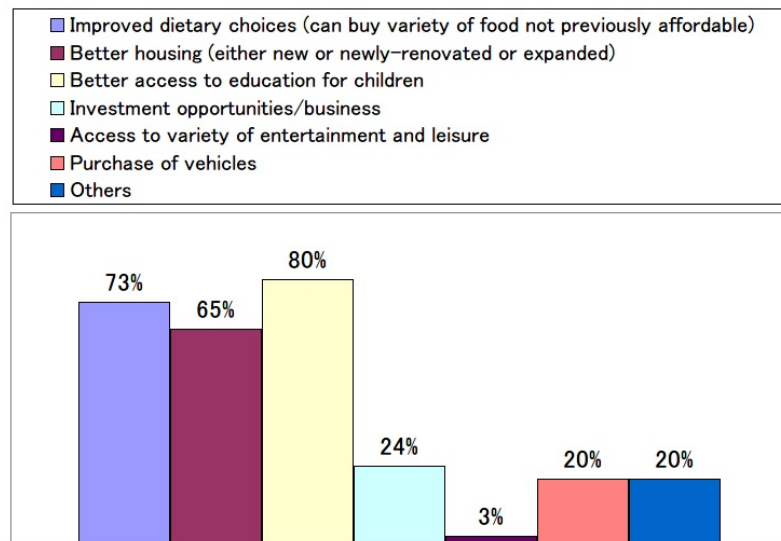


Figure 10: Reason(s) for answering "yes" to the question in Figure 9 (multiple answers allowed)

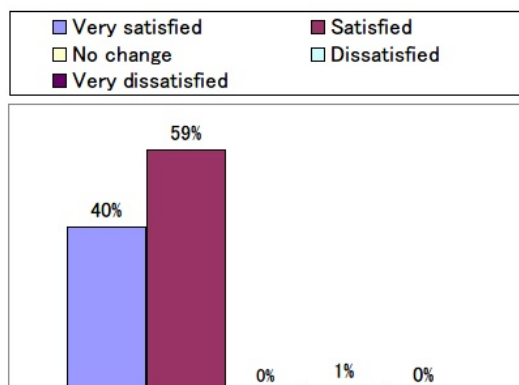


Figure 11: Are you satisfied with the current living environment?

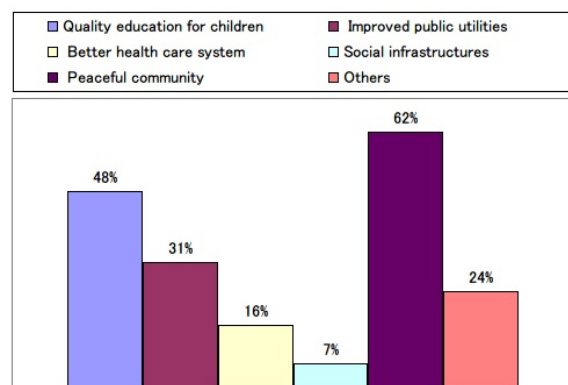


Figure 12: Reason(s) for answering "very satisfied" or "satisfied" to the question in Figure 11 (multiple answers allowed)

3.3.2 Other Impacts

3.3.2.1 Impacts on the Natural Environment

For the tunnel construction an open-cut construction method was planned. This method excavates from the surface, lays a culvert¹⁷, and covers it with soil. For the temporal placement of soil the project needed to secure 30ha of farmland. Thus compensate was required for the land and missed crops. Similarly it was the responsibility of the project to restore the farmland after the construction. According to NIA, compensation was to be paid before project completion based on the market values of land and crops¹⁸. The interviews and field visits confirmed that the compensation was paid during project implementation indeed. According to NIA, although negotiations with the landowners took time, there was no problem with the process itself. While it was not possible to verify the exact amount of compensation (data was not available), it was confirmed through the interviews that compensation was paid at rates slightly higher than market values of relevant commodities, such as trees, fruits, and vegetables. (According to NIA, farmers agreed on the proposed rates during the negotiation. NIA also stated that payment was made without delay.) It was also confirmed through the evaluation study that the farmland has been duly restored.

The project needed to obtain the Environmental Compliance Certificate (ECC) from the Department of Environment and Natural Resources (DENR) for the tunnel construction. In fact, NIA duly received ECC from DENR as planned before project commencement¹⁹.

DENR and other related institutions formed a team and conducted environmental monitoring regularly during project implementation. At each stage (before project commencement, during implementation, and after the commencement of O&M), environmental monitoring plans were developed with key information, such as responsible body, frequency, and budget. In fact, monitoring was carried out as planned. Within NOIMO, O&M Engineering Division is in charge of environmental monitoring to date. They monitor items, such as air pollution, dust caused by passing vehicles, and water pollution. According to the interviews, no problems have been observed on these items in the project area.

3.3.2.2 Land Acquisition and Resettlement

As the project needed to resettle squatters (105 households) residing inside the project area, NIA secured approximately 5ha of land before project implementation and built housings and

¹⁷ It is a structure used to lay irrigation canals underground.

¹⁸ The negotiation with landowners began at the time of project commencement.

¹⁹ NIA obtained ECC in March 2002. As it will be explained later in the "Efficiency" section under "Output," there was a design change from tunnels to culverts, as a result of which NIA renewed ECC in February 2005.

while developing necessary infrastructures, such as access roads, school, piped water, sewage, and church. The resettlement was carried out based on the Resettlement Action Plan (RAP). The squatters moved out based on the mutual agreement with NIA, and no complaints have been received thus far. Therefore, no major problems are observed in the resettlement²⁰.



Figure 13: Rehabilitated Main Canal



Figure 14: Rehabilitated Weir and Bago River

(Conclusion on Effectiveness and Impact)

Due to bad weather, only about 80% of the targets set at project appraisal were achieved for cropped area and benefited area in 2012 (two years after project completion). On the other hand, target was exceeded for per-hectare yield of rice, while target was close to being achieved for rice output. The actual irrigation service fee collection rate was 67% in 2012, which is higher than the target rate of 60%. For gross farm income per hectare, target set at appraisal was close to being achieved based on the estimation, Furthermore, positive project impacts, such as improved rice output, incomes, and living standards, are observed according to the beneficiary survey. In view of the above, this project has largely achieved its objectives; therefore its effectiveness is high.

²⁰ The City Government of Bago constructed electricity supply facilities for these squatters. Currently, the city government is managing the site by patrolling the area and listening to the resettlers.

3.4 Efficiency (Rating: ②)

3.4.1 Project Outputs

The planned and actual outputs of the project are shown in Table 3.

Table 3: Planned and Actual Project Outputs

Plan (At Project Appraisal)	Actual (At Ex-Post Evaluation)
<p>1) Construction Work</p> <ul style="list-style-type: none"> ■ Rehabilitation of Existing Irrigation System (designed area: 13,277ha) <ul style="list-style-type: none"> • Rehabilitation of weir accessories • Construction of main canal tunnels: 1,600m • Rehabilitation of main canals: 30.31km • Rehabilitation/lining of some secondary canals: 95.29km • Repair of service roads: 120.81km ■ Water Management Improvement <ul style="list-style-type: none"> • Diversion work • Intake structures for terminal canals <p>2) Institutional Development</p> <ul style="list-style-type: none"> ■ Training and workshop for the members of irrigator's association (17 groups) and staff of NIA's Bago River Irrigation System Office in order to strengthen organizational operation and functions <p>3) Consulting Service</p> <ul style="list-style-type: none"> ■ Main TOR: detailed design, preparation of procurement document, assisting bid evaluation, construction management, and support in environmental monitoring as well as training of irrigator's associations and NIA's System Office. Total: 331MM 	<p>1) Construction Work</p> <ul style="list-style-type: none"> ■ Rehabilitation of Existing Irrigation System (service area: 12,529ha) <ul style="list-style-type: none"> • Rehabilitation of weir accessories: as planned • Construction of main canal tunnels: 1,532m (tunnels were changed to closed conduits) • Rehabilitation of main canals: 29.86km • Rehabilitation/lining of some secondary canals: 108.77km • Repair of service roads: 177.78km ■ Water Management Improvement <ul style="list-style-type: none"> • Diversion work: as planned • Intake structures for terminal canals: as planned <p>2) Institutional Development</p> <ul style="list-style-type: none"> ■ Training and workshop were held as planned for irrigator's associations and NIA's Bago River Irrigation System Office (currently known as NOIMO). 44 associations participated. (Although 17 groups existed at the time of project appraisal, they have been divided into smaller groups.) <p>3) Consulting Service</p> <ul style="list-style-type: none"> ■ As planned. Total: 447.82MM (International: 139.88MM, Local: 307.94MM) <p>【Additional Output】</p> <ul style="list-style-type: none"> • Construction of irrigator's association offices (10m²): 44 offices (for 44 associations) • Construction of rice drying and storage facilities: 2 places • Buffalo wallows: 49 places

There were some deviations from the original outputs. Explanations are found below.

1) Construction Work

There is a difference of 750ha between designed area (13,277ha) and service area (12,529ha). It is because some non-farm land, such as roads and houses, was included in designed area, whereas it is excluded from service area.

Tunnels along main canals (1,600m) were changed to closed conduits (1,532m). This change was made because the strata of the sites were found to be loose at the stage of detailed design. In

addition, closed conduits are less costly than tunnels. Considering all aspects, it was deemed feasible to change the construction method to closed conduits.

With regard to the rehabilitation and concrete-lining of some parts of secondary canals, more kilometers were covered than planned because irrigator's associations and farmers requested to expand the project area. NIA considered this request reasonable.

2) Institutional Development

Training and workshops were held as planned for irrigator's associations and NIA's Bago Irrigation System Office (currently known as NOIMO). The purpose was to enhance the institutional aspects and to improve irrigation service fee collection. The number of irrigator's associations was 17 before the project, which increased to 44 during project implementation. It is because associations were considered too large in size to implement the planned measures for institutional enhancement. According to the interview with NOIMO, "associations were divided up to optimize organizational functions. As a result, training and workshops were carried out more efficiently. (i.e., Trainers/facilitators were able to get to know the participants better, and the participants could concentrate on the sessions thanks to the small group size.)"

3) Consulting Service

For consulting services, more man-months were required than planned due to the delay in construction, which will be discussed later in the "Project Period" section under "Project Input."

4) Additional Outputs

Some outputs were added after project appraisal in order to accommodate the requests from irrigator's associations and farmers. Office buildings were constructed for irrigator's associations as shown in Table 3 because the number of associations increased from 17 to 44 during implementation. Rice drying and storage facilities were constructed because farmers were burdened with expensive services of private operators before project implementation. It was believed that such burden would be relieved if drying facilities were constructed inside the Bago irrigation area. Additionally, Buffalo wallows (see Figure 16) were constructed because it was worried that buffalos, as they typically used main and secondary canals for bathing, might get trapped in concrete-lined canals after the project. The wallows are designed to allow buffalos to go in and out easily for the purpose of bathing.



Figure 15: Institutional Enhancement
(Photo provided by NIA)



Figure 16: Example of Additional Output
(Buffalo Wallow)

3.4.2 Project Inputs

3.4.2.1 Project Cost

The actual project cost was 3,504 million yen (out of which 2,990 million yen was in ODA loan) as compared to the plan of 4,298 million yen (out of which 3,224 million yen was in ODA loan). Thus it is less than planned (82% of the planned amount). One reason is that international competitive bidding enabled an efficient procurement of contractors. Another reason is that tunnels were changed to closed conduits for main canals (change of construction method) as explained above, saving project cost.

3.4.2.2 Project Period

The project period was planned to be 5 years and 9 months (69 months) from March 2002 to November 2007. On the other hand, the actual project period was 8 years and 4 months (100 months) from March 2002 to June 2010, which is longer than planned (145% of the planned period). The reasons are as follows: (1) It took time for the technical review of construction methods at the stage of detailed design; (2) Contractor selection was delayed; (3) Currency fluctuations during project implementation delayed the budget allocation by the central government; (4) Unreasonably bad weather caused delays in construction schedule; (5) Preparation for the institutional enhancement training required longer time because the number of irrigator's associations increased from 17 to 44; and (6) Construction work for the additional outputs lasted until June 2010 although the original outputs were completed in August 2009. The duration of consulting services was extended in accordance with the delay in construction.

Although the project cost was within the plan, the project period slightly exceeded the plan; therefore efficiency of the project is fair.

3.4.3 Results of Calculations of Internal Rates of Return (IRR)

Economic Internal Rate of Return (EIRR)

The economic internal rate of return (EIRR) of the project is 10.04% when recalculated by considering increase in yield (rice and sugar canes) as a benefit, construction and maintenance expenses as costs, and the life of 50 years. It is slightly lower than the rate estimated at the time of project appraisal, which is 14.00%, because the actual cropped area and benefit area were slightly smaller than what was estimated at the time of project appraisal.

3.5 Sustainability (Rating: ③)

3.5.1 Institutional Aspects of Operation and Maintenance

The executing agency of this project is NIA. It is NOIMO under NIA-6 that is responsible for O&M concerning the project. In addition to O&M of the Bago Irrigation System, NOIMO collects irrigation service fees from affiliated irrigator's associations while supporting them with institutional reinforcement.

NOIMO has 37 employees at the time of ex-post evaluation. Under the leadership of Representative Director (Head), two departments (Department of Operation, Maintenance and Engineering, and Department of Administration and Finance) are responsible for O&M of the project facilities, irrigation service fee collection, procurement, and accounting. NOIMO's Operation and Maintenance Division (11 staff members) is in charge of O&M of the project outputs, such as the weir, main canals, secondary canals, and service roads. Irrigator's associations are also responsible for O&M of some outputs based on their abilities, which will be discussed later in the "Irrigator's Associations and IMT." NOIMO's Operation and Maintenance Division (11 members) is composed of well-experienced staff²¹, and the staffing level is deemed sufficient.

【Irrigator's Associations and IMT】

With a view to improving national irrigation systems, NIA launched IMT in 2008 to transfer responsibilities of irrigation maintenance to irrigator's associations in stages. Irrigator's associations would sign four-phased IMT contracts with NIA (Model No.1-4) according to their maintenance abilities²². NIA would then transfer maintenance-related functions, such as

²¹ The team seems to be well-organized; staff members patrol around the project sites every day and address problems in a timely manner by communicating among themselves using mobile phones. It was also observed that they maintain good relationships with irrigator's associations by communicating as appropriate.

²² The higher the model number is, the greater the responsibilities of irrigator's associations would be, and the higher the required levels of maintenance abilities would be.

irrigation facility maintenance and collection of irrigation service fees, to associations based on IMT contracts.

Irrigator’s associations carry out tasks, such as cleaning of canals and protective walls, de-weeding, de-silting, and small repairs (e.g., repair on cracks in protective walls) as per IMT contacts. Out of 44 irrigator’s associations that exist in the Bago irrigation area, 35 associations are at the stage of Model No.1 while 9 are at the stage of Model No.2 as at November 2012²³. Table 4 summarizes the roles and responsibilities of NIA-6, NOIMO, and irrigator’s associations (Model No.1 and No.2)²⁴.

Table 4: Roles and Responsibilities of NIA, NOIMO, and Irrigator’s Associations (IMT Model No.1 & No.2)

NIA-6	
Responsible for supervising and guiding NOIMO.	
NOIMO	
Responsible for O&M of the entire Bago Irrigation System and irrigation service fee collection. It is to supervise and support 44 irrigator’s associations in an effort to realize effective O&M and efficient fee collection based on IMT contracts.	
Irrigator’s Associations within the Project Area	
【Model No.1】	【Model No.2】
While NOIMO is responsible for managing the entire irrigation system, irrigator’s associations are tasked to: (1) maintain canals of designated or extended sections by de-weeding, removing trash, lubricating gate hoisting machines, and doing temporary repairs for canal overflows; (2) monitor water levels and flows at designated places, submit data on irrigated and cropped areas; and (3) issue and send water bills while promoting irrigation service fee payment and assisting fee collection ²⁵ .	While NOIMO is responsible for managing main canal system, from the intake weir to secondary canal intake gates, irrigator’s associations are in charge of the management of secondary canals, secondary diversion canals, and all terminal facilities. Associations are tasked to: (1) distribute water fairly in the area served by secondary canals; (2) submit data on irrigated and cropped areas to NOIMO; (3) prepare and send water bills; (4) collect irrigation service fees; and (5) transfer collected irrigation service fees to NOIMO.

Before the project commencement irrigator’s associations had low participation rates because

²³ As for the associations that are in IMT Model No.2, their performance is currently being observed and monitored by NOIMO as they progressed to this level as recently as August 2012. Their performance will be monitored into the first half of 2013, and the new transfer and/or modification will be considered based on the results.

²⁴ Information was taken from JICA’s document. At the stage of Model No.3 “NOIMO manages the main canal from the intake weir to the first intake gates for the secondary canals, while irrigator’s associations manage all the downstream system. NOIMO collects irrigation service fees at pre-agreed seasonal rates (different rates for the dry season and the rainy season).” At the stage of Model No.4, “NOIMO transfers the responsibility of managing the entire irrigation system to irrigator’s associations. NOIMO merely provides technical support for effective maintenance and fund for facility repair/restoration upon requests from associations.” At the time of the ex-post evaluation, none of the irrigator’s associations in the project area have progressed to No.3 or No.4.

²⁵ Depending on the interests and capacities of irrigator’s associations, they also take responsibility for irrigation service fee collection.

water distributed through irrigation canals was insufficient. Similarly, not many farmers were willing to pay irrigation service fees or enthusiastic about cultivating before the project. Sufficient irrigation water became available following the project completion. In addition, farmers became increasingly willing to take charge in maintenance work as a result of the introduction of IMT according to the interviews.

3.5.2 Technical Aspects of Operation and Maintenance

Many training and workshops have been offered to NOIMO employees after project completion in an effort to enhance staff skills. For example, lecturers were invited from the Department of Social Welfare and Development (DSWD) to hold sessions on organizational development and efficiency improvement. Additionally, an ODA loan expert, dispatched by JICA from August 2010 to August 2012 after project completion, organized training sessions for many NOIMO employees and association members. The topics covered were water distribution management, financial management, irrigation service fee collection, and IMT implementation & evaluation²⁶. When interviewed during the evaluation study, training participants commented, “The training was useful in improving O&M skills. While associations progressed to IMT Model No.1 and No.2, the topics covered in the training turned out to be practical and useful for day-to-day tasks.” The work of this JICA expert is also utilized for training of new employees through on-the-job training (OJT). During project implementation, on the other hand, irrigator’s association members were trained on O&M through the “Institutional Development” sub-component of the project, when interviewed, leaders of irrigator’s associations gave positive comments about the training, such as this: “Organizational enhancement training gave us a chance to re-acknowledge the importance of O&M in irrigation management. The training content was highly relevant, and it is useful for association management.” NOIMO’s O&M Division has many experienced employees, and irrigator’s associations have members who are well-equipped with maintenance skills. Maintenance work, the details of which will be described later in “3.5.4 Current Status of O&M,” is carried out without problems. In light of the above, no major problems are observed in the technical aspects of O&M carried out by NOIMO employees and irrigator’s association members.

3.5.3 Financial Aspects of Operation and Maintenance

Table 5 shows NOIMO’s O&M budgets for the past 3 years. It has been increasing since

²⁶ There were 7 training sessions in 2011 with a total of 210 participants. In 2012 there were 9 sessions with 159 participants in total.

project completion, and thus no major problems are observed in the financial aspects. Figure 17 shows fund flows concerning collected irrigation service fees, O&M budget, and budgets allocated to irrigator’s associations. Collected irrigation service fees flow into the national treasury, which is in turn paid out to NOIMO via NIA as O&M budget. O&M budget can be categorized into salaries and O&M costs. “Regular budget” shown in Table 5 is used for routine maintenance, fuel, utilities, and repairs. According to the interview with NOIMO, the level of regular budget has been sufficient to carry out the necessary maintenance work. In addition, there is the National Irrigation Management Fund (NIMF). This special purpose money is allocated to NIA’s Head Office for the following purposes: (1) monetary compensation for association members who carry out cleaning and de-weeding of irrigation canals; and (2) incentive bonuses for associations with high irrigation service fee collection rates.

Now that all irrigator’s associations have progressed to IMT Model No.1 or No.2 in the project area, they can access additional fund from NIMF depending on there performance in irrigation service fee collection. It is provided as an incentive bonus on top of the budget allocated for cleaning and de-weeding of irrigation canals. The amount of incentive is determined by the amount of fees collected by irrigator’s associations, and it is only granted if the fee collection rate of 56% or higher is achieved in case of IMT No.1 and 65% or higher in case of IMT No.2. Moreover, incentives are paid at higher rates for associations that are at the stage of IMT Model No.2. This means that associations are rewarded more if they progress from Model No.1 to Model No.2. This incentive bonus is designed to be used for training and purchasing of machines and equipment. It was not possible to verify or evaluate the actual uses of O&M budgets by irrigator’s associations as data was not available on associations’ finances.

Table 5: NOIMO’s O&M Budget

(Unit: thousand pesos)

		2010	2011	2012
Salaries		4,101	5,553	5,430
O&M Costs	Regular Budget	2,764	2,135	2,982
	NIMF	N/A	3,047	4,578
Total		6,865	10,736	12,990

Source: questionnaire responses

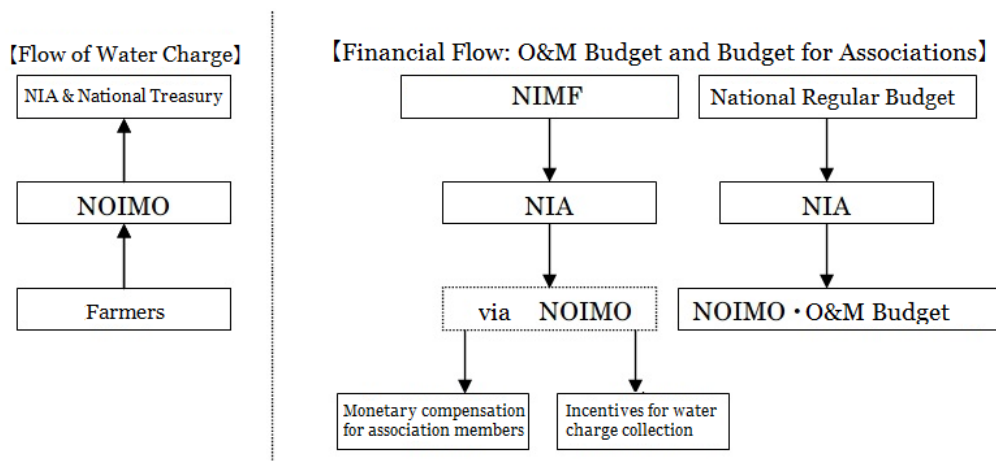


Figure 17: Flows of Irrigation Service Fees, O&M Budget, and Irrigator's Association Budget

3.5.4 Current Status of Operation and Maintenance

No problems were observed through the field study in the status of maintenance of the weir, main and secondary canals, and service roads. The facilities are being utilized properly. Concerning the weir developed by the project, NOIMO is monitoring and adjusting the volume of discharged water, conducting necessary maintenance, and opening and shutting the intake weir as needed. NOIMO operates and maintains the entire main and secondary canals in case of IMT Model No.1. In case of IMT Model No.2, NOIMO manages limited sections of main canals, from the intake weir to the intake gates of the secondary canals. (The tasks include: distribution of irrigation water and opening-shutting of sluice-gate for diversion canals.) Irrigator's associations are responsible for maintaining secondary canals, secondary diversion canals, and all terminal facilities. (The tasks include: cleaning and de-silting of canals, channels, and ditches). No major problems are observed in the status of O&M based on field visits and interviews. Regarding the service roads, NOIMO is graveling and repairing them as needed.

NOIMO procures spare parts based on the annual procurement plan that they develop. Although O&M staff normally works 8 hours a day from Monday to Friday, they come into work on weekends if needed. As for the weir, full-time maintenance staff is always present (24 hours a day, 365 days a year) at an adjacent office as it could require urgent attention.

No major problems have been observed in the O&M system; therefore sustainability of the project effect is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

With an aim to increase agricultural production, this project rehabilitated the Bago River Irrigation System while strengthening irrigator's associations for smooth operation and maintenance (O&M) in Negros Occidental Province located in the western part of Negros Island. Both at the times of project appraisal and ex-post evaluation the project is consistent with the development policy of the Philippines as seen in the irrigation development policy. Similarly, the project is consistent with the needs of the Philippines, such as to increase agricultural production. As a result of the rehabilitation of a weir, main, and secondary canals by the project, almost 80% of the targets were achieved for cropped area and benefited area. Target was achieved for rice output, and moreover, targets were exceeded for per-hectare yield of rice, gross annual farm income, and irrigation service fee collection rate. Based on the beneficiary survey, positive project impacts are observed, including high level of satisfaction and increase in income among farmers. Although the project period was slightly longer than planned, the project cost was lower than planned. No major problems are observed in the institutional, technical, and financial aspects of the O&M carried out by the executing agency. In light of the above, the project is evaluated to be highly satisfactory.

4.2 Recommendations

(Recommendations to the Executing Agency)

NOIMO is currently monitoring the activities of irrigator's associations which have progressed to IMT Model No.1 or No.2 by signing IMT contracts. It is recommended that NOIMO examine the status of O&M and irrigation service fee collection thereby carefully evaluate the performance of associations under Model No.1. If the monitoring and evaluation results suggest that associations are ready for higher levels of responsibilities, the upgrade to Model No. 2 should be processed in a timely manner. With more associations progressing to Model No.2, NOIMO would have less O&M burden. Moreover, it would nurture ownership of irrigator's associations and open up new possibilities for them. Consequently, it would motivate farmers to cultivate and help attain higher irrigation service fee collection rates.

4.3 Lessons Learned

JICA's ODA loan expert conducted a series of training and workshops for NOIMO staff after project completion. According to the interviews, training given by this expert was well received

not only by NOIMO staff but also by irrigator's association members as it contributed to improving irrigation service fee collection in the project area. It is believed that the work of this expert has successfully motivated irrigator's association members to collect irrigation water fees. It has also contributed to the improvement in fee collection methods. The assistance reinforced the project's effort to strengthen the institutional aspects of irrigator's associations. It was also effective in improving the practice of irrigation service fee collection. Therefore, a lesson can be drawn that it is possible to enhance projects effects by providing relevant follow-up assistance such as this after project completion.

Comparison of the Original and Actual Scope of the Project

Item	Original	Actual
1. Project Outputs	<p>[Construction Work]</p> <p>1) Rehabilitation of the existing irrigation system (designed area: 13,277ha)</p> <p>a) Rehabilitation of weir accessories</p> <p>b) Construction of main canal tunnel: 1,600m</p> <p>c) Rehabilitation of main canals: 30.31km</p> <p>d) Rehabilitation/lining of some secondary canals: 95.29km</p> <p>e) Repair of service roads: 120.81km</p> <p>2) Water Management Improvement</p> <p>a) Diversion work</p> <p>b) Intake structures for terminal canals</p> <p>[Consulting Service] Total: 331MM (International: 119MM, Local: 212MM)</p>	<p>[Construction Work]</p> <p>1) Rehabilitation of the existing irrigation system (service area: 12,529ha)</p> <p>a) Rehabilitation of weir accessories: as planned</p> <p>b) Construction of main canal tunnel: 1,532m (tunnel was changed to closed conduit)</p> <p>c) Rehabilitation of main canals: 29.86km</p> <p>d) Rehabilitation/lining of some secondary canals: 108.77km</p> <p>e) Repair of service roads: 177.78km</p> <p>2) Water Management Improvement</p> <p>a) Diversion work: as planned</p> <p>b) Intake structures for terminal canals: as planned</p> <p>[Consulting Service] Total: 447.82MM (International: 139.88MM, Local: 307.94MM)</p> <p>【Additional Output】</p> <p>a) Construction of irrigator's association offices (10m²): 44 offices (for 44 associations)</p> <p>b) Construction of rice drying and storage facilities: 2 places</p> <p>c) Buffalo wallows: 49 places</p>
2. Project Period	March 2002 – November 2007 (69 months)	March 2002 – June 2010 (100 months)
3. Project Cost		
Amount paid in Foreign currency	1,199 million yen	2,492 million yen
Amount paid in Local currency	3,099 million yen	1,012 million yen
Total	4,298 million yen	3,504 million yen
Japanese ODA loan portion	3,224 million yen	2,990 million yen
Exchange rate	1US Dollar = 122 JPY 1peso=2.3JPY (as at March 2002)	1peso=2.23 JPY (Average over the project period)