Ex-Post Project Evaluation 2011
(The Republic of the Philippines)

November 2012

JAPAN INTERNATIONAL COOPERATION AGENCY

IC NET LIMITED

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Preface

Ex-post evaluation of ODA projects has been in place since 1975 and since then the coverage of evaluation has expanded. Japan's ODA charter revised in 2003 shows Japan's commitment to ODA evaluation, clearly stating under the section "Enhancement of Evaluation" that in order to measure, analyze and objectively evaluate the outcome of ODA, third-party evaluations conducted by experts will be enhanced.

This volume shows the results of the ex-post evaluation of ODA Loan projects that were mainly completed in fiscal year 2009, and Technical Cooperation projects and Grant Aid projects, most of which project cost exceeds 1 billion JPY, that were mainly completed in fiscal year 2008. The ex-post evaluation was entrusted to external evaluators to ensure objective analysis of the projects' effects and to draw lessons and recommendations to be utilized in similar projects.

The lessons and recommendations drawn from these evaluations will be shared with JICA's stakeholders in order to improve the quality of ODA projects.

Lastly, deep appreciation is given to those who have cooperated and supported the creation of this volume of evaluations.

November 2012

Masato Watanabe
Vice President
Japan International Cooperation Agency (JICA)

Disclaimer

This volume of evaluations, the English translation of the original Japanese version, shows the result of objective ex-post evaluations made by external evaluators. The views and recommendations herein do not necessarily reflect the official views and opinions of JICA. JICA is not responsible for the accuracy of English translation, and the Japanese version shall prevail in the event of any inconsistency with the English version.

Minor amendments may be made when the contents of this volume is posted on JICA's website.

JICA's comments may be added at the end of each report when the views held by the operations departments do not match those of the external evaluator.

The Republic of the Philippines

Ex-Post Evaluation of Japanese ODA Loan
Arterial Road Links Development Project (VI)

External Evaluator: Ryujiro Sasao, IC Net Limited

0. Summary

This project is aimed at making passenger and freight transportation in the Philippines-Japan Friendship Highway Visayas Section more efficient, less expensive, and more convenient and safe by improving the section, an arterial road leading to local economic bases for agriculture, fishery, manufacturing, commerce, tourism, and other industries.

The relevance of this project is high, as it is fully consistent with the Philippines' policy and development needs, as well as Japan's ODA policy. This project has produced effects as expected in the original plan, such as shorter transit times and increased traffic volumes. Economic, health and other impacts have also been confirmed in this evaluation study as, among others, farmers, fishermen, and other residents living along the road have seen their incomes increase and they have better access to large hospitals. However, the efficiency of this project is low, as it was completed with the project expenses slightly larger than planned after a project period that greatly exceeded the original plan. The overall sustainability of this project is fair, as maintenance for this project is performed at the minimum necessary level, even though this is not necessarily ideal in terms of the institutional, technical, and financial aspects.

In light of the above, this project is evaluated to be (C), partially satisfactory.

1. Project Description

Project Site

Project Road in Calbiga

1.1 Background

In the Philippines, road transport is the major means of transportation, accounting for 90 percent of the passenger transport and 50 percent of the freight transport (at the time of the project appraisal in 2002). Up to the early 1980s, the country had invested heavily in the construction of national arterial and secondary roads, arteries of its road network. However, it could not afford to regard the functionality and quality of these roads as more than a problem of secondary importance. As of 2000, only 70 percent of its national arterial roads and 51 percent of the national secondary roads were paved, with merely 21 percent of the pavement ratio of the entire road network. Thus, these roads failed to work effectively as traffic arteries. In addition, damage from natural disasters, and lack of alternative routes often impaired traffic efficiency.

The road for which this project was carried out (hereinafter the "project road") is a part of the Philippines-Japan Friendship Highway, an arterial road completed in 1979 (total length of 2,100 km). One of the longest highways in the country, it runs through the three regions of Luzon (northern part of the Philippines), Visayas (central part), and Mindanao (southern part), and it has played a critical role in their economy and society. However, in the many years since its completion, the highway has been suffering rapid deterioration due to growing traffic volumes and natural disasters. In order to recover the functionality of the Friendship Highway, the main artery for physical distribution in the country, and to ensure safety, large-scale strengthening and upgrading have been required. The project road is a part of the Friendship Highway that goes through the Visayas region.

1.2 Project Outline

The objective of this project is to make passenger and freight transportation in the Philippines-Japan Friendship Highway Visayas Section[1] more efficient, less expensive, and more convenient and safe by improving the section, an arterial road[2] leading to local economic bases for agriculture, fishery, manufacturing, commerce, tourism, and other industries, thereby contributing to the development of the local economy.

Loan Approved Amount/ Disbursed Amount	6,723 million yen/6,624 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	March, 2002/March, 2002
Terms and Conditions	(Civil Work) Interest Rate: 2.2% Repayment Period: 30 years (Grace Period: 10 years) Conditions for Procurement: General Untied (Consulting Service) Interest Rate: 0.75% Repayment Period: 40 years (Grace Period: 10 years) Conditions for Procurement: Bilateral tied
Borrower/Executing Agency	Government of the Republic of the Philippines/ Department of Public Works and Highways (DPWH)
Final Disbursement Date	September, 2009
Main Contractors	Sumitomo Mitsui Construction, China Road and Bridge Corporation (People's Republic of China), and E.C. de Luna Construction Corp. (the Philippines)
Main Consultant	1. For construction work for the Philippines-Japan Friendship Highway Visayas Section: Katahira & Engineers International (Japan), Proconsult, Inc. (the Philippines), Development Engineering and Management Corp., Techphil Inc. (the Philippines), Engineering and Development Corp. of the Philippines (EDCOP) (the Philippines), Multi-Infra Konsult, Inc. (the Philippines), and Filipinas Dravo Corporation (the Philippines)(JV);

[1] This project includes some work for the "Cebu North Coastal Road," but this is just research for the road. No construction work for this road is included.

[2] The section for which this project was carried out is composed of two sub-sections in the Visayas region, "Allen - Calbayog - Calbiga, Samar Island" (190 km) and "Agas-Agas Bridge, Leyte Island" (about 1.5 km which includes a bridge part of about 350 meters).

	2. Cebu North Coastal Road (detailed design, etc.) Pacific Consultants International (Japan), Philipp's Technical Consultants Corp (the Philippines), and Cebu Engineering and Development Corporation. Inc. (the Philippines) (JV);
Related studies (Feasibility studies (F/S), etc.)	In 1985, JICA performed a feasibility study for the Philippines-Japan Friendship Highway Visayas Section; In 2000, DPWH prepared an implementation program for the Philippines-Japan Friendship Highway Visayas Section; and In 2000, DPWH performed a feasibility study for the Cebu North Coastal Road;
Related Project	Arterial Road Links Development Project (I) - (V)

2. Outline of the Evaluation Study

2.1 External Evaluator

Ryujiro Sasao, IC Net Limited

2.2 Duration of Evaluation Study

The following are the duration of this ex-post evaluation study and that of the field study for it.

Duration of the Study: November 2011 - September 2012 (from the month of the contract coming into effect to the month of the deliverables being submitted)

Duration of the Field Study: February 4 - March 3, 2012; and April 22 - May 7, 2012;

2.3 Constraints during the Evaluation Study

There was no specific constraint.

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

3.1 Relevance (Rating: 3)

3.1.1 Relevance with the Development Plan of the Philippines

The Medium-Term Development Plan 2001 - 2004, formed under the Arroyo administration and effective at the time of project appraisal, stated the "delivery of safe and reliable transportation services for supporting the social and economic development of the Philippines" as one of the development objectives in the transportation sector. Specifically, the plan set the target of the percentage of paved roads to be achieved by 2004 through appropriate construction and maintenance. It said that 90 percent of the entire national arterial roads should be paved (70 percent paved as of 2000), and that 65 percent of the national secondary roads should also be paved (51 percent paved as of 2000). As a priority task to achieve the target, the plan pointed out the development of higher-standard arterial roads to link local cities, that are regional economic centers, and neighboring areas. The project road is a main highway in Eastern Visayas.

The Philippine Development Plan 2011 - 2016, effective at the time of this ex-post evaluation study, has a section on the "Strategic Plan and Focus" in "Chapter 5 Accelerating Infrastructure Development," and in this it refers to "Develop strategic transport infrastructure and maintain/manage transport infrastructure assets." It states that while transport connectivity is of utmost importance, the upgrading of the quality and capacity of existing transport infrastructure will be prioritized before expanding the coverage of the networks. The strategy covers roads, as well as seaports, airports, and railways. In terms of the maintenance of roads, the plan specifically mentions a policy of additional funding for maintenance.

The Eastern Visayas Regional Development Plan (2011 - 2016) also emphasizes the importance of the development of roads for promoting the distribution of agricultural produce and other goods.

In light of the above, this project was relevant to the development policy of the Philippines for the road sector from the time of the project appraisal through to the time of ex-post evaluation study.

3.1.2 Relevance with the Development Needs of the Philippines

At the time of the project appraisal, the project road had related development needs for each of its sections as described below.

(1) Philippines-Japan Friendship Highway Visayas Section

① Allen - Calbayog - Calbiga, Samar Island

The main industries of Samar Island are agriculture and fishery. The island lagged behind in economic and social development[3], partly because it is located in the path of typhoons. After the completion of the Philippines-Japan Friendship Highway in 1979, only parts of the sub-section were repaired. The road was severely damaged, with cracks opening in the pavement, parts of the asphalt coming off, and depressions found in its surface level. Urgent restoration was needed.

② Agas-Agas Bridge, Leyte Island (Tacloban - Liloan)

The Agas-Agas sub-section is in the province of Southern Leyte, in the southern part of Leyte Island. The sub-section located between Tacloban and Liloan in the Philippines-Japan Friendship Highway Visayas Section, had been closed since mid-2001 due to a landslide caused by a typhoon. As vehicles going between the two cities had no choice but to take a long way around, going along the coast in the southwestern part of the island, urgent restoration was needed.

(2) Cebu North Coastal Road, Cebu Island

Metro Cebu, an area that extends around Cebu City, had only one arterial road going through it, linking the northern and southern parts of Cebu Island, and suffered chronic heavy traffic congestion.[4] The Cebu North Coastal Road, for which this sub-project was carried out, extends from Mandaue, a city next to Cebu City in the north, to Liloan, a town located further north. It was expected to work as a bypass for the existing arterial road, helping alleviate its congestion.

As seen in data provided later in "3.2 Effectiveness," traffic increased after the implementation of this project. A source of transportation demand in the region is the number of cars registered there. As shown in the table below, a constantly increasing number of cars were registered in Eastern Visayas (Region III). Between 2005 and 2009, the total number of registered cars grew 4.7 percent year by year on average.

[3] The average annual GDP growth of the Philippines as a whole between 1995 and 2000 was 12.0 percent, while Region 8 (Eastern Visayas), which includes Samar Island, saw its economy grew merely 3.7 percent during the same period. (The project appraisal was conducted in November 2001.)

[4] According to interviews with members of a DPWH's District Office, before this project it took around 45 minutes to go through an about 13-km part of the existing arterial road due to traffic jams. After the construction of the bypass (Note: Only a bridge has been completed, and construction of the road has not been finished.), some of the traffic is diverted, and cars can pass through the section in a shorter time, some 15 minutes.

Table 1: Number of cars registered in Eastern Visayas

Year	Private sector	Government	Others (for hire & diplomat cars)	Total
2005	88,355	2,182	15,337	105,874
2006	93,952	2,053	14,891	110,896
2007	102,851	2,066	15,029	119,946
2008	107,221	1,999	14,788	124,008
2009	109,970	2,189	15,195	127,354

Source: LTO (Land Transport Office), Region III
Note: The entire road project was completed in 2010.

In addition to the direct development needs mentioned in documents filed for the project appraisal, transportation demand was confirmed in the region along the project road after the appraisal, as demonstrated above. Therefore, a need for this project was evident.

3.1.3 Relevance with Japan's ODA Policy

According to documents filed for the project appraisal, JICA had a policy of supporting the Philippines in developing its economic infrastructure especially in the transportation sector to relieve bottlenecks in its economic growth for the purpose of securing sustainable development of the Philippines. In terms of the development of arterial road networks, JICA had been engaged in the construction of north-south arterial road networks, including projects related to the Philippines-Japan Friendship Highway, focusing on the structure of its land, extending from the north to the south. JICA also formed a policy of helping the country develop in a well-balanced way by constructing arterial roads going through the country from east to west in addition to those running north to south, as well as ring roads linking islands.

Based on the development themes of the Philippines and the policy of the Japanese government on aid for the country, JICA formed the "Policy for Overseas Economic Cooperation Operation" in December 1999, selecting the four issues below as priority areas for its aid to the Philippines: (1) Strengthening economic fundamentals for sustainable growth, and overcoming constraints on growth (operating the macro economy appropriately, strengthening the industrial structure, and developing the economic infrastructure); (2) Alleviating poverty, and narrowing the gaps between regions; (3) Working on environmental preservation, including disaster prevention, and measures to mitigate damage due to natural disasters; and (4) Developing human resources and institutions. This project was carried out for "developing the economic infrastructure" mentioned above in (1). The improved road, when used in an effective manner, is expected to contribute to economic growth in the Philippines. Therefore, the project is relevant to Japan's ODA Policy.

In light of the above, this project has been highly relevant to the country's development plan, development needs, as well as Japan's ODA policy. Therefore its relevance is high.

3.2 Effectiveness (Rating: 3)

3.2.1 Quantitative Effects (Operation and Effect Indicators)

The targets set at the time of the project appraisal and the actual results are shown below. As the construction work was completed two years behind the plan schedule, the results should not be evaluated against the figures as of 2009 (2nd year after the completion), for which original targets were set. However, with traffic volumes on the project road in 2010, after the completion of the

construction work, larger than the targets set at the time of project appraisal even before the second year after the completion, the targets were substantially achieved.

Table 2: Operation indicators for the project

Indicator	Road	Baseline[*1]	Target[*1]	Results[*2]	Remarks (when completed, etc.)
		2001	2nd year after completion (2009)	2010	
Traffic (cars/day)	1) Allen (north end of the project road) - Calbayog	1,088	1,570	3,721	Allen - Malaga (September 2010) Malaga - Calbayog (November 2010)
	2) Calbayog - Gatanguit (middle section of the project road)	932	1,342	2,372	Section to the left completed in November 2009
	3) Gatanguit - Calbiga (south end of the project road)	932	1,394	2,372	Section to the left completed in December 2009
	4) Agas-Agas Bridge	953	1,386	Unavailable	Section to the left completed in August 2009

*1. Source: Ex-ante evaluation table
*2. Source: DPWH

Table 3: Effect indicators for the project

Indicator	Road	Results[*1]	Targets[*1]	Results
		Present state (2001)	2nd year after completion (2009)	2010
Reduction in vehicle operation cost (million peso/year)	1) Allen - Calbayog	–	164.90	771*[2] (Total of 3 sections left)
	2) Calbayog - Gatanguit	–	125.63	
	3) Gatanguit - Calbiga	–	153.03	
	4) Agas-Agas Bridge	–	66.94	Unable to estimate
Reduction in driving time (minutes)	1) Allen - Calbayog	96	62	60*[3]
	2) Calbayog - Gatanguit	70	45	Unavailable
	3) Gatanguit - Calbiga	86	56	Unavailable
	4) Agas-Agas Bridge	99	29	Unavailable

*1. Source: Ex-ante evaluation table
*2 Estimated by a consultant based on data provided by the DPWH. However, the figure should be treated as reference information as details of the calculation method adopted at the time of the project appraisal cannot be confirmed, and a direct comparison between the estimate and the actual results is impossible.
*3 Not an actual measurement, but an estimate based on the opinions of (interviews with) the stakeholders.

The table above shows some figures that suggest effects produced by the project[5], although only insufficient data are available in terms of actual results in the effect indicators.

3.2.2 Qualitative Effects

A questionnaire survey was conducted with respondents[6] selected randomly as samples among the beneficiaries (residents) living along the project road at the sub-section of "Allen - Calbayog - Calbiga, Samar Island" of the Philippines-Japan Friendship Highway Visayas Section. According to the findings of the survey, this project produced results almost as originally expected; it reduced the time and cost needed to go through the sub-section, promoted the transportation of goods, and offered better access to facilities. Specifically, 81.5 percent of the respondents said it took a shorter time to go through this road section. (77.1 percent of them said that while it had taken one hour to go through a part of the sub-section, now they could go more than 20 minutes faster.) A significant number of respondents pointed out effects to reduce maintenance and fuel costs for their cars. Almost 90 percent of them recognized this project had helped increase the amount of agricultural produce shipped. Many respondents pointed out better access to markets and stores as effects of the project, and some of them also mentioned easier access to schools for children and hospitals. (Details of the survey findings can be found in Appendix 1.)

In addition, the External Evaluator interviewed five respondents living along the project road at the subsection of "Agas-Agas Bridge, Leyte Island." In the interviews, achievement of the effects originally expected - shorter time needed to go through the sub-section, promotion of the transportation of goods, and better access to facilities - was confirmed.

3.3 Impact

3.3.1 Intended Impacts

(1) Philippines-Japan Friendship Highway Visayas Section

The agriculture and fishing industry is expected to benefit clearly from the development of the roads.[7] The amount of rice and corn produced in Samar, the province which the project road goes through, is increasing year by year. (See Appendix 3.) However, given that the entire project road was completed only in 2010 (partially finished in 2009), it cannot be concluded that the good harvest in 2010 in Samar was delivered due to this project.

Findings of the beneficiaries survey (questionnaires survey of local residents) and interviews with the stakeholders are summarized below.

① Findings of the beneficiaries survey

As described above, a beneficiaries survey was conducted among 168 respondents selected from residents living along the Philippines-Japan Friendship Highway Visayas Section, and below are the results of their evaluation of the impacts delivered by the project. (Details of the survey findings can be found in Appendix 1.)

Economic impacts have been achieved for residents living along the road, as originally expected. Growth in income is observed, and it is delivered mainly by the shorter time needed to go through the section, and reduced driving costs. As the survey was conducted among people living along the road, increased sales of stores there are also counted as benefits of the project. The

[5] For reference: According to interviews with stakeholders, this project has succeeded in reducing the average time needed to go through the 250-km section between Allen and Tacloban, 190 km of which was upgraded in this project, from eight hours to six hours.

[6] A total of 168 respondents.

[7] In addition to the agriculture and fishing industry, "manufacturing, commerce, tourism and other industries" were mentioned as objectives for this project. However, data for industries other than agriculture and fishery were unavailable.

External Evaluator visited a local police station to obtain statistics on traffic accidents, but no data were available. However, more than 70 percent of the residents pointed out an increase in accidents, and many were concerned about this. Asked about environmental issues, a rather large number of respondents chose an option better then "neutral" for most of the issues, suggesting there are no specific environmental problems. For a general evaluation of the benefits of the project,[8] more than 70 percent of the respondents chose "Excellent," or "Good," which is quite a positive evaluation.

Most of the respondents of the beneficiaries survey were chosen from people living along the road. An additional interview survey was conducted with interviewees selected only from farming and fishing households living along the project road (20 interviewees from each household group). In both of the groups, all the 20 interviewees said their annual income increased after the project. The growth in income came mainly from higher prices for agricultural or marine products that they sold to dealers. The selling prices became higher because better road conditions allowed dealers to bring agricultural and marine products to large cities far from where they were produced or caught, and sell them at a higher price, which in turn enabled them to offer a higher buying price to farmers and fishermen. This additional survey was conducted with a small number of samples, and answers obtained in the survey should not be generalized. However, if they actually reflect typical benefits farmers and fishermen living along the road received, it can be assumed that the project generated a great amount of benefits all around the area along the road. (Details of the survey findings can be found in Appendix 4.)

② Findings of interviews with other stakeholders

Interviews with parties related to local governments, transportation companies, businesses located along the road, the Department of Health, hospitals, and other institutions suggest that this project is beneficial to local communities. Among the aspects pointed out as specific benefits the project had produced are the active distribution of agricultural produce, an increase in the number of customers for transportation companies, and a larger number of people who were taken to large hospitals among the residents (patients) living along the load. (Details of the interviews can be found in Appendix 2.)

(2) Agas-Agas Bridge

Interviews with members of the local governments and local residents have revealed that they rate the project highly not only because the project has shortened the time needed to go through the sub-section and reduced driving costs, but also because landslides by rain no longer occur along the bridge section. It should be concluded that the project has had a substantial positive impact. No specific negative impacts on the number of traffic accidents or environmental issues have been observed. (Details of the interview survey can be found in Appendix 5.)

This project road (the section of Allen - Calbayog - Calbiga and the Agas-Agas Bridge) is part of what is called the Pan-Philippine Highway. This 2500-km highway is a transport artery of the Philippines, which starts from Northern Luzon, going through Manila, and leading to Davao. This project has not only made traffic in Eastern Visayas smoother, but also shortened the time needed to go through the sections before and after passing through the region, promoting the long-distance transportation of people and goods. Specifically, after the project more people go by bus from Tacloban to Manila (changing to a Roro boat[9] on the way). As shown in Appendix 2, the numbers of bus companies and buses in service have clearly increased.

[8] On a scale of five, Excellent, Good, Neutral, Slightly negative, and Very negative.

[9] A Roro (roll on roll off) ferry is designed to allow cars to go into and out of it by themselves, and carries passengers as well.

Changes in the traffic measured in vehicle-kilometers[10] on a 380-km section of the Pan-Philippine Highway between Northern Samar and Southern Leyte, which includes this project road, show that traffic volume grew between 2006, before the project, and 2010, after the project, at an annual rate of 8.6 percent on average. It is well known that traffic is closely correlated with economic indicators, such as GDP. In this regard, the growth in traffic implies that the development of the Pan-Philippine Highway, the contribution of this project, has stimulated economic activity in regions along the highway.

3.3.2 Other Impacts

(1) Impacts on the natural environment

For the Cebu North Coastal Road, a study was conducted to choose a route. Environmental impact study was conducted for the finally selected route in May 2004 and an Environmental Compliance Certificate (ECC) was issued in November 2004.

With regard to impacts on the environment during the engineering (construction) period, the executing agency says all conducted measures corresponded with the descriptions in the ECC.

As seen in the findings of the beneficiaries survey mentioned above, no specific negative impacts on the natural environment occurred. The External Evaluator personally visited a point of the site survey to examine its actual state, and found the natural environment there was generally maintained in good conditions in terms of air, water quality, noise, vibration, and other aspects.

(2) Land Acquisition and Resettlement

The table below outlines cases of land acquisition and resettlement for this project. Consequently, work for land acquisition started later than originally planned and took longer. However, delays in land acquisition had only a limited impact on the construction work itself, as it also got started largely behind schedule due to a substantial delay in the preceding processes. As is also seen in the table, the compensation policy for land acquisition and resettlement was well designed and in accordance with the Philippines' legal system. It is estimated that explanation to residents and procedure were implemented appropriately[11]. No serious problems occurred during or after the resettlement. Therefore, it should be concluded that, except for some delay in work, land acquisition was generally carried out in an appropriate manner.

[10] The number of vehicles multiplied by the distance (km). Here passenger car units (PCU), which translates the number of vehicles in different categories into that of passenger cars, is used to measure traffic volumes.

[11] There are records of related activities in "Implementation of the Resettlement Action Plan Final Report".

Table 4: Outline of land acquisition and resettlement

Issue	Plan (Resettlement Action Plan, February, 2002)	Results (Implementation of the Resettlement Action Plan Final Report)	Difference analysis
No. of households affected	5,336	2,831 (This is the total of affected houses. 1,829 out of these are for pure residence and others are for commercial use and other purposes.)	Among four contract packages for the project road, CP1 and 2*, two packages carried out directly under the control of the Philippine government, focused on construction of the main part of the road to save construction costs, and work for the shoulders and gutters was limited to the minimum level, with fewer households affected by the construction work in consequence. The left figure of affected houses includes relocation within the relocatees' land and relocation to other places. Cases of relocation to other places are 246 out of the total relocation. (Source: "Implementation of the Resettlement Action Plan Final Report")
Compensation policy	According to documents filed for the project appraisal, applicable Philippine laws, the Republic Act (RA) 8974 and RA 7297, had no detailed rules at that time, and a compensation policy was prepared for this project.	After the policy mentioned to the left came into effect, the DPWH introduced detailed rules as Implementation Rules and Regulations (IRR) attached to RA8974.	The left compensation policy includes both resettlement and land acquisition. The compensation policy*[1] set out at the time of the project appraisal complies with the IRR mentioned to the left. * It has detailed rules on the amount of compensation to be paid for sites acquired by type of land. For instance, for a permanent structure the owner receives 6,000 pesos per square meter, while for a temporary structure 2,000 pesos is paid per square meter.

Total compensation	327,205,862.28 pesos	106,273,594.92 pesos	The left compensation amount includes both resettlement and land acquisition. As stated above, with fewer households affected, total compensation was less than planned. Payment is underway, but only a portion of the eligible residents have filed the required documents, with no more than 42 million pesos paid out so far.
Period of Land acquisition*[2]	February 2002 - December 2003 (23 months)	July 2003 - August 2007 (50 months)	Land acquisition took longer than planned because: • A consultant was chosen behind schedule, which delayed the start of the land acquisition work; • Delay in the payment of compensation due to financial difficulties of the government led to a delay in land acquisition at the early stage; and • It often took a long time to identify the landowner.

* Note
1. CP is the abbreviation for contract package, referring to a construction section. This project was divided into five CPs: CP1: Allen - Malaga; CP2: Malaga - Calbayog; CP3: Calbayog - Gatanguit; CP4: Gatanguit - Calbiga; and CP5: Agas-Agas Bridge.
2. Detailed information on resettlement was not obtained.

(3) Other impacts

As described above, this project had impacts on many aspects, including the economy, health, and mitigation of damage from bad weather.

However, although no statistical data are available, a questionnaire survey and interviews suggest that many residents are concerned about the increasing number of traffic accidents. Not a few of them insist that some measures should be taken, such as the installation of more traffic signs along the road.

In light of the above, this project has largely achieved its objectives. Therefore, its effectiveness is high.

3.4 Efficiency (Rating: 1)

3.4.1 Project Outputs

(1) Civil work: Philippines-Japan Friendship Highway Visayas Section

① Allen - Calbayog - Calbiga (about 190 km)

(a) Repair of the pavement: Almost as planned;

(b) Construction of the shoulders: Work for CP 3, 4 and 5 was completed as planned, but work for CP 1 and 2 was limited to the minimum necessary level due to the lack of funds;

(c) Bridge: “Repair of 28 bridges and the rebuilding of five” was planned, and “Repair of 23 bridges and the rebuilding of two” was completed.

② Construction of the Agas-Agas Bridge section (about 1,500 m, of which the bridge span is 350 m): As planned

Construction of the road was completed almost as planned, except for the shoulders, with no major change made to the scope of the project. Some minor changes were made in the specifications based on items identified in the course of formulating a detailed plan.

However, construction work originally planned for the bridges in PC 1 (Allen - Malaga) and PC 2 (Malaga - Calbayog) was canceled due to the lack of funds of the Philippine government.[12]

As described above, almost all of the project objectives have been achieved. It should be concluded that changes in the scope of the project had only a slight impact on the objectives of the entire project.

(2) Consulting services

① Philippines-Japan Friendship Highway Visayas Section

The planned tasks were as below:

(a) Revision of the detailed design (Calbayog - Calbiga);
(b) Support for procurement;
(c) Supervision of the work;
(d) Support for the implementation of action plans for land acquisition and resettlement;
(e) Monitoring of the implementation of considerations for the environment and the terms and conditions attached to the ECC;
(f) Provision of necessary support for the DPWH; and
(g) Training of staff members of the DPWH;

The tasks above were carried out as planned.

② Cebu North Coastal Road

The planned tasks were as below:

(a) Support for implementation of a study for route selection;
(b) Support for implementation of an environmental impact assessment (EIA); and
(c) Detailed planning (including support for the preparation of action plans for land acquisition and resettlement).

The above tasks were carried out as planned.[13] The executing agency says constructors and consultants generally performed well. Reviewing records of the project (JICA's internal documents), the External Evaluator has concluded that the Pre Qualification (P/Q) was conducted in an appropriate manner according to evaluation criteria established in advance.

[12] At that time, the bridges, though still old and decrepit, were considered to remain passable. In the sub-section of "Allen - Malaga," the bridges are being repaired or rebuilt. In the other sub-sections of this project road, repair and rebuilding work has been completed.

[13] Products of the consulting services for the Cebu North Coastal Road were effectively used in implementing this project. Based on the detailed design (D/D), the government of the Philippines carried out the construction work. However, the Philippine government was short of funds, and completed none of the planned scope of the project except for the bridges. With regard to road, only the existing routes are now under construction to expand their width.

3.4.2 Project Inputs

3.4.2.1 Project Cost

The original plan estimated that the project cost would be 8,964 million yen in total, 4,894 million yen in foreign currency and 1,770 million pesos in the domestic currency (4,070 million yen[14]). It assumed 6,723 million yen would come as a yen loan, and that the remaining 2,241 million yen would be financed by the Philippine government.

Actually, the project was completed with a project cost of 10,452 million yen in total, 3,538 million yen in foreign currency and 3,578 million pesos (6,914 million yen[15]). Of the amount, 6,624 million yen came as a yen loan, and the remaining 3,828 million yen was financed by the Philippine government.

On a yen basis, the actual project cost was slightly higher than planned, 116.6 percent of the original plan.

Table 5: Comparison between the planned and actual project costs

(Unit: Million Yen)

Items	Original plan (project appraisal)			Results		
	Foreign currency	Local currency	Total	Foreign currency	Local currency	Total
Civil work*	4,173	2,267	6,440	3,115	6,099	9,214
Contingency	209	113	322	423	436	859
Consulting services	512	629	1,141	0	299	299
Land acquisition expenses	0	262	262	0	80	80
Administration cost	0	225	225	0	299	299
Tax	0	574	574			
Total	4,894	4,070	8,964	3,538	6,914	10,452

Note: The exchange rate at the time of the project appraisal (August 2001) was 1 peso = ¥2.3, while the actual rate (weighted average) was 1 peso = 1.9323.

* The actual cost of the civil work includes taxes.

Although some of the project scope were canceled, the project cost exceeded the budget mainly due to increased civil work. civil work cost 40 percent, 1254 million pesos, more than the budget, given that taxes were almost the same as the original plan. Specifically, civil work expenses increased mainly because:

- Calbayog - Gatanguit: Fine cracks recognized at the time of the project appraisal widened over time, and larger-scale work was required (up 386 million pesos);
- Gatanguit - Calbiga: Same as the section above: (up 225 million pesos);
- Agas-Agas Bridge: In the detailed design, the need to reinforce its strength was recognized, and a stronger structure was adopted for its piers. To meet requests from the local municipalities, toilets and parking lots were built around the bridge, and street lamps were installed along it (up 155 million pesos);
- Restoration work was added at some points due to typhoons and landslides that occurred after the project review (up 136 million pesos);

A significant part of the increased cost seems to have been inevitable as it was needed to repair cracks widening over the time after the project appraisal and damage to the road caused by typhoons and landslides.

[14] Exchange rate: 1 peso = ¥2.3 (August 2001)
[15] Exchange rate: 1 peso = ¥1.9323 (weighted average)

As stated above in the section on outputs, part of the project scope was canceled. Even compared with a budget revised to reflect the change, the actual project cost was slightly higher at 121.5 percent of the revised budget.

3.4.2.2 Project Period

This project was designed to be completed in five years and two months, from the conclusion of the loan agreement (L/A) due in March 2002 to the completion of civil work due in April 2007.[16] The loan agreement was actually concluded in March 2002 as planned. However, civil work was completed in November 2010. The project period, estimated to be 62 months in the original plan, actually lasted for 105 months, or 169.4 percent of the plan, significantly longer than planned.

The project was delayed mainly due to the factors below:

- Delay in the start of the activity of the consultant due to financial difficulties of the Philippine government (delay of about one year);
- Delay in the choice of constructors (delay of 19 months). This was caused by (1) that it took longer to confirm the qualifications of the applicants for the bidding for CP5 (Agas-Agas Bridge), (2) that at first no applicants had previously participated in work for building a bridge high enough to satisfy the standards set for this project, and that the standards needed to be relaxed as a result, and (3) that it took time to obtain ICC-CC's approval for a change in the scope[17] and project costs for CP 3, 4 and 5; and
- Delays in the start of the construction work for CP1 and 2 due to financial difficulties of the Philippine government (delay of about two years and a half).

3.4.2.3 Consulting services

The plan and actual results of the man-months for consulting services are as follows.

(1) Philippines-Japan Friendship Highway Visayas Section

With a trimmed project scope and other factors, the section was completed with fewer man-moths than originally planned.

Table 6: Man-months for consulting services
(Philippines-Japan Friendship Highway Visayas Section)

Category	Plan	Result
1. Foreign engineers	122	100
2. Philippine engineers	625	588
3. Assistants	738	664

(2) Cebu North Coastal Road

The section was completed with the man-months almost as planned, as detailed below.

[16] In general, the project period starts on the day a loan agreement is concluded. However, the appraisal document did not refer to the date of the loan agreement in their descriptions about the project period. Nevertheless, regarding the first activity for this program, the "choice of a consultant," as the start of the project period would deny this project consistency with others. Therefore, this project should also be dealt with as having started on the date of the conclusion of the loan agreement, just as in normal cases.

[17] Investment Coordination Committee, Cabinet Committee. The committee, chaired by the Minister of Finance, is composed of several cabinet ministers and holds meetings to give approval to any project with a budget of 500 million pesos or more.

Table 7: Man-months for consulting services
(Cebu North Coastal Road)

Category	Plan	Result
1. Support for the implementation of a study for the route selection and an environmental impact assessment (EIA)		
A. Foreign engineers	24	22
B. Philippine senior staff	86	85
2. Detailed design (including support for the implementation of action plans for land acquisition and resettlement)		
A. Foreign engineers	23	21
B. Philippine senior staff	61	59
C. Technical support staff (for A & B)	228	211

3.4.3 Economic internal rate of return

The table below shows the original estimation of the economic internal rate of return (EIRR) and the EIRR recalculated based on data and information received.

Table 8: Calculation of the EIRR of the project for Allen - Calbiga[18]

	Estimation at a project appraisal	Recalculation at the ex-post evaluation
EIRR	24.5%	19.8%
Project life	20 years	20 years
Cost	Construction and maintenance costs	Construction and maintenance costs
Benefit	Lower vehicle operation and maintenance costs, as well as shorter traveling time delivered by the road constructed	Lower vehicle operation and maintenance costs, as well as shorter traveling time delivered by the road constructed

Although traffic on the project road grew faster than expected, the actual EIRR was slightly less than originally estimated, as the construction costs were much higher than originally planned.

As described above, the project costs slightly exceeded the plan, and the project period significantly exceeded the plan. Therefore the efficiency of the project is low.

3.5 Sustainability (Rating: 2)

3.5.1 Structural Aspects of Operation and Maintenance

As originally planned, maintenance after completion of the project is under the charge of a Regional Office of the DPWH, and is carried out by three District Offices under the supervision of the Regional Office. The three District Offices are responsible for the sections below:

(1) Allen - Calbayog: 1st Samar District Office;
(2) Calbayog - Gatanguit: 2nd Samar District Office;
(3) Gatanguit - Calbiga: 2nd Samar District Office;
(4) Agas-Agas Bridge: Southern Leyte District Office;

Below are the descriptions of the District Offices.

[18] EIRR of the Agas-Agas Bridge section could not be recalculated since the necessary information, such as traffic data, was unavailable.

① 1st Samar District Office

The Office has 32 full-time employees, among which four workers for the Maintenance Department. They have ten years or more of work experience, and expertise (diplomas) and the qualification needed for their job. The annual turnover among the employees is 10 percent or less. They said that the number of employees working for the office is not necessarily sufficient for maintenance. However, it satisfies the national standard (one worker per 3.5 km)

② 2nd Samar District Office

The Office has 60 full-time employees, among which 19 workers for the Maintenance Department. The annual turnover among its employees is five percent or less, which helps keep the organization stable. Its employees have qualifications or an academic background that is sufficient for their job. They say the number of staff is sufficient for ordinary times, but that more are needed in the event of an emergency.

③ Southern Leyte District Office

The Office has 66 full-time employees, among which 24 workers for the Maintenance Department, with a clear division of duties. The annual turnover among its employees is virtually nil, which helps keep the organization stable. Its employees have qualifications or an academic background that is sufficient for their job. The current number of employees is not sufficient for the entire range of maintenance required for the roads according to the interview, although it satisfies the national standards. (The Office has a plan to increase its staff.)

As stated above, the District Offices are stable organizations, but seem to be slightly short of manpower.

3.5.2 Technical Aspects of Operation and Maintenance

Regular maintenance of the roads is carried out according to the manuals[19] in the manner as shown below (in almost the same way among the Offices). When necessary, emergency repair work is also carried out.

Table 9: Regular maintenance work

Activity	Frequency
Work to fill in holes in the roads (asphalt or concrete surface)	Monthly
Vegetation management	Daily (regularly)
Cleaning of gutters	Daily (regularly)
Management of road signs	Daily (regularly)
Maintenance of bridges	Quarterly

Below are additional descriptions of the District Offices.

(1) 1st Samar District Office

The Office has no specific technical weaknesses. It also gives training to its maintenance workers on an as-needed basis. Its machines and equipment are old, although they work properly.

[19] "Activity Standard Book and the DPWH Standard Specification", "List of Activity Standards on the New Highway Maintenance Management System, Revised 1985", "New Highway Maintenance Management System (NHMMS) & Road Board Manual", and other manuals are used.

(2) 2nd Samar District Office

The Office has no specific technical weaknesses. Several members of the Maintenance Department have more than 20 years of work experience. The Office also gives training to its maintenance workers, although not on a regular basis. Its machines and equipment are very old. The office has service vehicles, trucks, payloaders, and road graders.[20] However, they were all obtained in the 1970s or 1980s. They often break down, causing delays in the maintenance work. Spare parts for such old vehicles and machines and equipment are difficult to procure from local suppliers.

(3) Southern Leyte District Office

Its core employees have a certain level of work experience, and some have been working for the Office for more than 20 years. However, the Office itself considers the technical level of its workers to be insufficient. It is also short of machines and equipment. The office has service vehicles, loaders, road graders, and other machines, but they are old and have some problems. Spare parts are difficult to obtain from local suppliers because they do not have enough stock. Especially when a disaster occurs, the office has difficulty in working properly to repair the roads only with the vehicles and machines it owns at present.

Employees of the District Offices have a sufficient level of experience and skills for practical operations. However, it is pointed out that two of the three Offices use old machines and equipment, and are short of machines and equipment in the first place. The overall conditions are not ideal.

3.5.3 Financial Aspects of Operation and Maintenance

Below are the financial conditions of the District Offices.

(1) 1st Samar District Office

Expenditures for the maintenance of the roads under the charge of the District Office in 2011 amounted to 10 million pesos for regular maintenance and 2 million pesos for the maintenance of road shoulders. (Data for up to 2010 are unavailable.) The Office says the amount was the minimum level of expenditures needed for the maintenance of the road.

(2) 2nd Samar District Office

Expenditures for the maintenance of roads under the charge of the District Office in 2011 amounted to 15.5 million pesos for regular maintenance. The budget was below the sufficient level, and the Office had difficulty in carrying out repair work for eroded sections of the roads.

(3) Southern Leyte District Office

Expenditures planned for maintenance of the roads under the charge of the District Office in 2010 and 2011 were 4 million pesos and 2.6 million pesos, respectively. However, the funds have not yet been paid out, and the Office is still waiting for their appropriations as of May 2012. The Office is obviously short of funds, unable to buy the necessary machines and equipment.

As described above, two of the three District Offices are obviously short of funds for maintenance, and indeed have difficulty in conducting the maintenance work. However, in its latest development plan, the government has set out a policy of increasing the maintenance budget for roads,[21] and some improvement in the conditions is likely to take place.

[20] A payloader, or loader, is a type of tractor designed to scoop up and carry soil and sand with a shovel attached to its front part. A road grader is a machine used to level the ground for road construction and other work.

[21] As mentioned in the section on relevance (3.1.1), the Philippine Development Plan 2011 - 2016 refers to the issue in "Chapter 5 Accelerating Infrastructure Development."

3.5.4 Current Status of Operation and Maintenance

Road conditions are generally good, although only a few sections of the road have an eroded surface, which should be repaired immediately. (Summary of the opinions of the External Evaluator and surveyors who went to see the roads.)

In the beneficiaries survey for this project, 127 out of 168 respondents (75.6%) said they were satisfied with the maintenance of the road, while slightly more than 20 percent of them answered that maintenance was insufficient.

In light of the above, the operation and maintenance is not ideal with regard to any structural, technical or financial aspects. However, the minimum necessary level of maintenance is being carried out, and the road is generally kept in good condition at present. Therefore the sustainability of the project effects is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The relevance of this project is high, as it is fully consistent with the Philippines' policy and development needs, as well as Japan's ODA policy. This project has produced effects as expected in the original plan, such as shorter transit times and increased traffic volumes. Economic, health and other impacts have also been confirmed in this evaluation study as, among others, farmers, fishermen, and other residents living along the road have seen their incomes increase and they have better access to large hospitals. However, the efficiency of this project is low, as it was completed with the project expenses slightly larger than planned after a project period that greatly exceeded the original plan. The overall sustainability of this project is fair, as maintenance for this project is performed at the minimum necessary level, even though this is not necessarily ideal in terms of the institutional, technical, and financial aspects.

In light of the above, this project is evaluated to be (C), partially satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

- As stated above in the section on sustainability, the three District Offices in charge of the project road all have some challenges to resolve in structural (human resources), technical (sufficiency of the machines and equipment), and financial (sufficiency of the budget) aspects. In its latest development plan, the government has set out a policy of increasing the maintenance budget. The government should secure a budget that is sufficient to strengthen the overall sustainability. With this budget, the District Offices should repair roads that have an eroded surface immediately.
- Although no statistical data are available, a questionnaire survey and interviews have revealed that many residents are concerned about the increasing number of traffic accidents. It is desirable that field surveys be carried out to discuss appropriate measures, such as installing road signs, if necessary.

4.2.2 Recommendations to JICA

To help the executing agency carry out the recommendations above, JICA should monitor the state of its implementation.

4.3 Lessons Learned

One of the factors that caused a substantial increase in construction costs for this project was the great number of minor changes in the project scope were necessary, because the situation which was not recognized initially was revealed at the time of the detailed design (D/D) study. Over a long period of time after the feasibility study (F/S), the environment of the road changed due to typhoons and other events in a manner that had not been anticipated. As a result, the project was forced to make large-scale modifications in terms of construction methods and project costs. This kind of situation has a negative impact on the project in the form of a shortage of funds.

Efforts should be made to prevent such a delay in the first place. However, once a delay arises and any increase in costs becomes inevitable at the time of the detailed design, work should be carried out to reconsider the scope of the project and help the executing agency to secure the additional budget as soon as possible, taking into consideration the effects the project is expected to produce.

Comparison between the plan and the results

Item	Plan	Result
(1) Output		
1. Civil work		
1-1 Repair of the pavement, and construction of the shoulders		
1) Allen - Malaga	35.70 km	34.46 km
2) Malaga - Calbayog	36.76 km	38.10 km
3) Calbayog - Gatanguit	52.70 km	52.70 km
4) Gatanguit - Calbiga	59.35 km	59.35 km
5) Agas-Agas Bridge	1 bridge 350 m	1 bridge 350 m
1-2 Other bridges (total along the project road)		
• Repair	28	23
• Rebuilding	5	2
2. Consulting services (total man-months)		
2-1 Philippines-Japan Friendship Highway Visayas Section	1,485	1,352
2-2 Cebu North Coastal Road	422	398
(2) Period	March 2002 - April 2007 (62 months)	March 2002 - November 2010 (105 months)
(3) Project costs		
Foreign currency	4,894 million yen	3,538 million yen
Domestic currency	4,070 million yen (1,770 million pesos)	6,914 million yen (3,578 million pesos)
Total	8,964 million yen	10,452 million yen
of which the yen loan	6,723 million yen	6,624 million yen
Exchange rate	1 peso = ¥2.3 (As of August 2001)	1 peso = ¥1.9323 (weighted average)

Appendix 1 Findings of the beneficiaries survey (Philippines-Japan Friendship Highway Visayas Section: Allen - Calbayog - Calbiga, Samar Island)

The survey was conducted with a total of 168 respondents chosen from the residents living somewhere along and around the project road. More than half of them (52.4%) were women. Major occupations among them were self-employed persons, farmers, no regular job, and (private-sector) company employees. About half of the respondents, 76, said they used the road every day.

Asked about direct benefits brought by this project, they pointed out:

- That this project helped increase the shipment of goods, especially agricultural produce (89.3% of the respondents);
- That the project made traffic smoother, helping goods, especially agricultural produce, to be shipped to and carried from more distant places (59.5% and 58.9%, respectively);
- That after the project, they can pass through the road section in a shorter time (81.5%. And 77.1 % of the respondents said that while it had taken one hour to go through a certain section, now they could go more than 20 minutes faster.);
- That the project helped reduce driving costs (Reduced maintenance and fuel costs for vehicles were pointed out by 38.1 % and 52.4 % of the respondents, respectively); and
- That access was improved as shown below in Table 1.

Table 1: Improved access after the project

Destination	Percentage of respondents who recognized improvement in access (%)
Market/Store	75.0
School (commute of children)	25.0
Hospital	23.2
Government office	8.3
Workplace	11.9

Below are specific answers to questions about the impacts of this project.

(1) Benefits: No specific change is seen in the work, but better road conditions brought benefits in terms of reduced time and costs (48.2%), Respondents' business has grown (13.7%),[22] After this project, respondents had a new job opportunity (3.6%).[23]
(2) Change in income: (Do you earn more income on a household basis after the project?) Yes (78.0%), No (10.1%), NA (11.9%)
(3) Change in the number of traffic accidents: Increased (72.6%), No change (26.2%), Decreased (1.2%)
(4) Impacts on land owned for business and/or houses: Yes (29.8%). Specifically, their land was acquired for the construction.
(5) Change in the environment after the construction work (percentage among the respondents: %)

[22] A typical example is the increased sales of stores located along the road.
[23] This is because improved traffic access allows people to commute within a wider area.

Table 2: Changes in the environment after the construction work

Item	Much worse	Slightly worse	No change	Slightly better	Much better
Air	1.2	24.4	33.9	25.0	15.5
Noise	0.6	30.4	7.1	37.5	24.4
Water quality	0	2.4	70.8	16.1	10.7

6) Overall evaluation of the benefits obtained from the project

Table 3: Overall evaluation

Item	% among the respondents*
Excellent	6.0
Good	67.3
Neutral	17.9
Slightly negative	3.0
Very negative	0.0
No reply	6.0

*Note: Total exceeds 100 percent due to rounding.

Appendix 2 Findings from interviews with the parties concerned on the impacts of the project road

1. Province and municipal governments

- Samar province government: The chief of the Planning and Development Department rated the project high, saying the project road contributed to communities in terms of their economy, healthcare, education, and other aspects. No specific trouble was reported between DPWH and the residents in terms of land acquisition.
- Jiabong Samar: The chief of the city's Planning and Development Department, responsible for part of the project road, praised the project, saying it helped promote the distribution of agricultural produce.

2. Transport operators: The External Evaluator visited a service counter at a bus terminal in Tacloban to ask about the operation of buses going on the project road before and after the project, and found there were evidently more bus companies in the market and more buses in service after the project. In the interviews that the External Evaluator had with six companies operating buses and/or vans separately, the Evaluator also found they all benefited from the project in the form of increased net profits. However, three of them pointed out increasing traffic accidents as a negative impact of the project.

3. Companies located along the road (four companies): They all benefited from the project in the form of increased net profits. Half of them, or two companies, pointed out increasing traffic accidents as a negative impact of the project.

4. 8th Regional Office of the Department of Health: No statistical data suggested any effect produced by the improved project on, among others, the transportation of patients in a serious condition. However, a medical officer whom the External Evaluator interviewed said that the project road has district hospitals, a provincial hospital, and Tacloban's regional hospital along it, and that better access provided by the upgraded road for seriously ill patients taken to such rather large hospitals seemed to be a contribution that this project had produced.

5. A hospital in Tacloban: Clerks that the External Evaluator interviewed at one of the largest hospitals in the city, Divine Word Hospital (with 140 beds in total), said the hospital saw an increasing number of outpatients coming to it, 11,689 persons in 2009, 16,642 in 2010, and 33,592 in 2011*. At least half of them probably came from Samar. This suggests that the improved road conditions led to an increase in the number of outpatients.

*Note: A sharp increase in outpatients in 2011 came from an outbreak of dengue fever.

Appendix 3 Trends in production of rice and corn

Year	2004	2005	2006	2007	2008	2009	2010
1. Production of rice							
Eastern Visayas (ton)	721,932	788,857	830,808	948,827	1,030,621	952,220	964,145
Year-on-year		109.3%	105.3%	114.2%	108.6%	92.4%	101.3%
Eastern Samar	31,875	34,772	39,529	43,734	47,153	46,291	51,795
Year-on-year		109.1%	113.7%	110.6%	107.8%	98.2%	111.9%
Samar	66,347	68,218	71,673	86,768	105,896	114,168	124,084
Year-on-year		102.8%	105.1%	121.1%	122.0%	107.8%	108.7%
2. Production of corn							
Eastern Visayas (ton)	59,906	68,416	76,162	88,252	96,594	94,821	90,215
Year-on-year		114.2%	111.3%	115.9%	109.5%	98.2%	95.1%
Eastern Samar	170	227	280	364	433	495	559
Year-on-year		133.5%	123.3%	130.0%	119.0%	114.3%	112.9%
Samar	4,808	5,596	5,776	6,814	7,227	8,318	9,129
Year-on-year		116.4%	103.2%	118.0%	106.1%	115.1%	109.7%

Source: "2011 Regional Social and Economic Trends", NSCB (National Statistical Coordination Board)

Appendix 4 Findings of a questionnaires survey of the farmers and fishermen living along the project road

(Farmers: 20 respondents)

- They grow: upland rice (14 respondents), coconut (3), and pineapple (3);
- Their produce is sold to: local stores (10) and dealers (10);
- Annual income after the project: increased for all of the respondents, among whom a more than 20 percent increase for two, a 10 to 20 percent increase for 11, and a less than 10 percent increase for seven;
- Income increased due to: higher selling price (5 respondents. Specifically, this is because improved road conditions allow dealers to carry and sell their produce to large towns along the road at a higher selling price.), as well as expanded farmland and a consequent increase in production (4), less produce is thrown away (4), and no answer (7);
- Others: Dealers have also benefited from the project (16);

(Fishermen: 20 respondents)

- Their products are sold to: dealers (6), local stores (13)[24], and directly to consumers (1);
- Annual income after the project: increased for all of the respondents, among whom a more than 20 percent increase for one, a 10 to 20 percent increase for 11, and a less than 10 percent increase for eight;
- Income increased due to: higher selling price (14 respondents. Specifically, this is because dealers buy fish from fishermen at a higher price than before.), as well as increased catch (2), and less catch is thrown away (1);
- Others: Dealers have also benefited from the project (14);

[24] Many of the 13 respondents also sell to dealers.

Appendix 5 Findings of interviews of the staff of the local government in charge of the Agas-Agas Bridge and residents living around the bridge

(1) Sogod, municipality responsible for the bridge

The municipality has a population of 43,000. The chief of its General Affairs Department said the bridge contributed much to the distribution of goods and traffic, mainly because the bridge mitigated the impact of weather conditions, such as heavy rain and consequent landslides. The bridge has become a kind of tourist spot, probably visited by 100,000 people a year. The municipality rates the project highly, expressing its gratitude to the government of Japan.

(2) A barangay around the bridge[25]

Its head rates the bridge highly as it provided the district with more convenience in transportation and made it less vulnerable to bad weather. People in the barangay used to suffer from landslides, and seven residents were killed in 2006. Since the completion of the bridge, no such disasters have occurred.

(3) Residents around the bridge (five respondents)

① Benefits: Improved road conditions produced benefits in less travel time (all 5 respondents). They also rate the bridge highly in that they are free from the risk of landslides.

② Change in the number of traffic accidents: Increased (Nil); No change (3); and Decreased (2);

③ Impacts on land owned for business and/or houses: Yes (1);

④ Change in the environment after the construction work (number of respondents)

Item	Much worse	Slightly worse	No change	Slightly better	Much better
Air	0	2	3	0	0
Noise	0	0	5	0	0
Water quality	0	0	5	0	0

⑤ Overall evaluation of the benefits from the project

Item	No. of respondents
Excellent	3
Good	2
Neutral	0
Slightly negative	0
Very negative	0
No reply	0

[25] A barangay, the smallest administrative unit in the Philippines, is administered and managed by its head (barangay captain), who is elected by popular vote, and other members functioning as a contact point for administrative services.

The Republic of the Philippines

Ex-Post Evaluation of Japanese ODA Loan
Batangas Port Development Project (Phase II)

External Evaluator: Ryujiro Sasao, IC Net Limited

0. Summary

This project aimed to raise the logistical efficiency of the Philippines. It worked to achieve this goal by equipping the Batangas Port in the Calabarzon region of Luzon to be an international trade port capable of handling container cargo for foreign trade. This project has been consistent with the Philippines' policy, development needs as well as Japan's ODA policy; therefore its relevance is high. However, the operating ratio of the container terminal constructed by this project remains low, falling far short of the target volume of container cargo to be handled. For this reason, the project has shown only an extremely limited effect on local employment and the economic growth of local businesses; therefore its effectiveness and impact is low. Although the project cost was within the plan, the project period significantly exceeded the plan; therefore efficiency of the project is fair. There are no problems with the facility operation and maintenance. Nor are any particular problems observed on an organizational or technical level. Overall, however, with its financial uncertainties, the External Evaluator deems that sustainability of the project is fair.

In light of the above, this project is evaluated to be unsatisfactory.

1. Project Description

Project Location

Rubber Tired Gantry Crane

1.1 Background

Located 110 km south of Metro Manila, Batangas Port is situated in the northeastern part of Batangas Bay in southwestern Luzon. A highway opened between Manila and Batangas makes up part of what is called the SCMB[1] Corridor. The three regions (Central Luzon, Metro Manila, and Calabarzon[2]) connected by the SCMB Corridor are said to contribute two-thirds of the total

[1] SCMB refers to Subic-Clark-Manila-Batangas.
[2] This is composed of Batangas province, where Batangas Port is located, and four additional provinces.

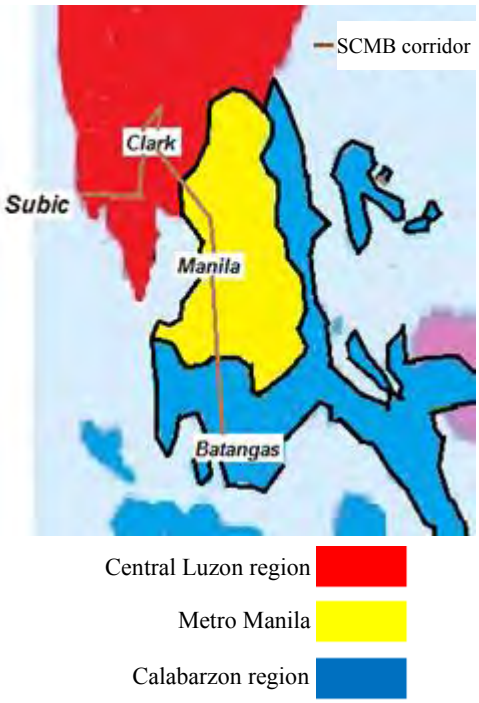

Figure 1: Part of Luzon

GDP of the Philippines[3].

With a certain level of water depth, Batangas Port is located inside a bay (Batangas Bay) which provides the geographical features that shield ships from bad weather. Thus it is equipped with the properties of a natural good harbor, which lend themselves to large-scale port development.

Large-scale port development plans were already in place in the 1980s to ensure that Batangas Port would possess the following functions for promoting regional development.

1. Further function as a gateway port to Mindoro Island: Contribute to enhancing logistics with and development of Mindoro, which serves as an agricultural supply base for both Metro Manila and the Southern Tagalog region.
2. Function as a central port of the region that contributes to the economic development of the hinterland: Stimulate regional economic development of the Southern Tagalog region, which is a key industrial area for the Philippines.
3. Function related to Metro Manila: Serves as secondary port to complement the Port of Manila in increasingly overcongested Metro Manila.

Against the backdrop of the development policies above, JICA, having received a request from the Philippine government, conducted a feasibility study (F/S) on Batangas Port development in 1984. The development plans within this F/S were divided into short-term and long-term ones. The objective of the short-term plan was first to improve and expand the now extremely deteriorated and confined port facilities in an attempt to improve logistical efficiency. The long-term plan called for the port to be expanded to include substantial facilities for foreign trade in the hope that such facilities would increase the port's ability to complement the Port of Manila. Within the entirety of this development plan, the short-term plan corresponds to Batangas Port Development Project Phase I, which saw port construction completed in March 1999. This project (Phase II) corresponds to a portion[4] of the long-term plan.

1.2 Project Outline

The objective of this project is to raise the logistical efficiency of the Philippines by improving the Batangas Port in the Calabarzon region as an international trade port capable of handling container cargo for foreign trade, thereby contributing to the alleviation of traffic congestion that

[3] Source: p. 129, "Philippine Development Plan 2011-2016"
[4] Components that make up the long-term plan include RO-RO ship and ferry piers, foreign cargo terminals, domestic cargo terminals, steel piers, fertilizer piers, etc. Among these, foreign cargo terminals seem to be the component related to this project.

stems from overconcentration in Metro Manila[5] and balanced development of the Calabarzon region.

Loan Approved Amount / Disbursed Amount	14,555 million yen / 14,527 million yen
Exchange of Notes Date / Loan Agreement Signing Date	September, 1998 / September, 1998
Terms and Conditions	(Construction/Procurement) Interest Rate: 2.2 % Repayment Period: 30 years (Grace Period: 10 years) General untied (Consulting service) Interest Rate: 0.75 % Repayment Period: 40 years (Grace Period: 10 years) General untied
Borrower / Executing Agency	Philippine Ports Authority (PPA)
Final Disbursement Date	January, 2008
Main Contractors	Joint Venture: Shimizu Corporation (Japan) / F.F. Cruz and Company, Incorporated (Philippines)
Main Consultants	Joint Venture: Pacific Consultants International (Japan) / Basic Technology and Management Corporation (Philippines)
Feasibility Studies, etc.	PPA drafted Phase II F/S in 1996
Related Projects (if any)	Batangas Port Development Project (Phase I)

2. Outline of the Evaluation Study

2.1 External Evaluator

Ryujiro Sasao (IC Net Limited)

This project was jointly evaluated with the Philippines' National Economic and Development Authority (NEDA).

2.2 Duration of Evaluation Study

The External Evaluator performed an evaluation study as follows in the course of this ex-post evaluation:

Duration of the Study: November 2011 - September 2012 (from the beginning of the contract through the month in which finished products were delivered)

Duration of the Field Study: February 4 - March 3, April 22 - May 7 and July 8 - 22, 2012

2.3 Constraints during the Evaluation Study

Resettlement during this project peaked around 1998, more than ten years before the ex-post evaluation was conducted. For this reason, main office personnel who participated in the

[5] "Alleviation of traffic congestion that stems from overconcentration in Metro Manila" references descriptions of project objectives found in documents at the time of the appraisal. However, this section was not clarified in the Minutes of Discussion (M/D), and it was confirmed at the time of the ex-post evaluation that the section was not distinctly recognized as a project objective by the implementing agency.

resettlement that took place when the project was underway have retired or are no longer at the PPA for other reasons. In tandem with a lack of relevant data written to describe the particulars of the move, this made it exceedingly difficult to confirm the facts. Also, failure to acquire detailed financial information on the company responsible for facility maintenance prevented the External Evaluator from analyzing sustainability in detail.

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

3.1 Relevance (Rating: 3)

3.1.1 Relevance with the Development Plan of the Philippines

At the time of the appraisal, the Medium-term Philippine Development Plan (MTPDP) 1993 - 1998 was promoting investment in the maritime sector to encourage the movement of people and the distribution of goods. It was also moving the Philippines toward maritime sector development to improve the efficiency and safety of transport services.

At the time of the ex-post evaluation, two policy objectives related to the development of Batangas Port had been raised in "Chapter 5: Accelerating Infrastructure Development" in the latest MTPDP 2011 - 2016. The first objective is the maintenance and enhancement of the SCMB Corridor. Batangas Port is located at the end of this corridor. As previously mentioned, the corridor is a path that connects the three regions of Central Luzon, Metro Manila, and Calabarzon that are said to contribute two-thirds of the total GDP of the Philippines. The government has expressed the importance of further improving distribution and exchange among these regions by the maintenance and enhancement of the corridor. The second objective is to enhance maritime traffic safety. The Philippine government has set forth policies that adhere to the international safety standards for maritime traffic. The total port security system[6] introduced to the port during this project is in line with these policies. Also, according to the Calabarzon Regional Development Plan 2011 - 2016, Batangas Port is expected to serve as a substitute for the Port of Manila by connecting travelers and transshipping international cargo.

3.1.2 Relevance with the Development Needs of the Philippines

At the time of the appraisal, the Port of Manila's insufficient processing capacity was a concern as indicated in Tables 1 and 2. This insufficiency arose from a sharp increase in the handling of container cargo for foreign trade that accompanied the economic development of the Philippines. There was strong demand for the establishment of a port that could serve to substitute or complement the Port of Manila in the hope that it would both optimize logistics for the entire nation and correct the overconcentration in Metro Manila.

As touched on in the project background, Batangas Port is a natural good harbor and the most appropriate to substitute for or complement the Port of Manila; it would be both the cornerstone of the Calabarzon region that is seeing continued development as an industrial belt for outer Manila and also a gateway into the Visayas and Mindanao regions in the south. It was necessary to establish a safe and efficient transportation system by developing Batangas Port into an international trade port capable of handling container cargo for foreign trade and by consolidating land and sea transport.

[6] Detailed descriptions are available in "3.4.1 Project Outputs."

Here are the ex-post evaluation results of the Port of Manila's aforementioned cargo processing capacities. Although the Port has improved its processing capacity for container cargo by improving the facilities and equipment to handle it, the situation has not improved and the Port is still becoming increasingly congested.

Table 1: Port of Manila's (three ports) handling capacity of container cargo for foreign trade

Unit: one million tons

Year	1994	1998	2005	2010
Estimate[*1]	7.7	11.1	23.4	-
Actual	-	13.4	18.4	22.8

*Note 1: Assumes that this project had not been implemented

Source: PPA

Table 2: Demurrage time

Unit: amount of time per ship

Year	1998	2005	2010
Estimate[*1]	3.36	16.80	-
Actual[*2]	4.06 (2001)	3.15	7.69

*Note 1: Assumes that this project had not been implemented

*Note 2: Figures from Manila International Container Terminal (MICT)[7]

Source: PPA

As discussed later, the necessity of the project remains, as the Port of Manila is still congested. This is partly due to the failure to fully realize the project objective of transferring a portion of cargo handling concentrated on the Port of Manila.

3.1.3 Relevance with Japan's ODA Policy

The following is an excerpt from the Foreign Economic Cooperation Project Policy (developed in 1999):

"3. Assistance by Region/Country: V. Philippines

The focus is on assistance toward strengthening the economic structure of the Philippines for sustained growth; mitigating restrictive factors of poverty and regional disparities; providing support that benefits environmental preservation measures that include disaster management; developing human resources and establishing systems."

The objective of this project is to develop a port in a way that will improve the logistical efficiency of the Philippines while also promoting the economic development of the Calabarzon region. This objective correlates to the aforementioned policy of strengthening the economic structure for the sustainable growth of the Philippines.

In light of the above, this project has been relevant to the Philippines' development plan, development needs as well as Japan's ODA policy. Therefore its relevance is high.

[7] Composing the Port of Manila with North Harbor and South Harbor. MICT handles the largest volume of container cargo of the three ports.

3.2 Effectiveness (Rating: 1)

3.2.1 Quantitative Effects (Operation and Effect Indicators)

During the appraisal process, estimates of volume of cargo to be handled are calculated using the GDP of the Philippines and other economic indicators[8]. The targets[9] of volume of cargo handled eight years after completion in 2010 and the results are given in Tables 3 and 4. This project's level of achievement in terms of targets for volume of cargo handled[10] is exceedingly low.

In truth, due to the factors described in Figure 2, start of full-scale operations at Batangas Port was significantly delayed beyond the original plan and did not occur until March 2010. With that in mind, a comparison of the plan values of handled container cargoes for 2005 (three years after completion) with the actual values of 2011 (one year and nine months after start of full scale operation) shows that the plan value was 6,372,000 tons, compared to actual results of 123,000 tons. Even taking the three years versus one year and nine months difference in elapsed time between the two, the project's level of achievement in terms of its targets is exceedingly low. Currently, the number of container ships scheduled for service at Batangas Port sits at only one ship per week.

Table 3: Project Goal Indicators

Unit: 1,000 tons

Type of cargo	Port Cargo of Batangas Port in 2010					
	Domestic			Foreign		
	Inbound	Outbound	Total	Imports	Exports	Total
Container	1,530	2,004	3,534	3,230	2,990	6,220
Other	1,390	710	2,100	890	10	900
Total	2,920	2,714	5,634	4,120	3,000	7,120

Source: Data at time of appraisal

Table 4: Actual Values Compared to Project Goal Indicators

Unit: 1,000 tons

Type of cargo	Port Cargo of Batangas Port in 2010					
	Domestic			Foreign		
	Inbound	Outbound	Total	Imports	Exports	Total
Container	21.2	37.8	59.0	8.2	0.5	8.7
Other	191.6	148.9	340.5	456.7	0.8	457.5
Total	212.8	186.7	399.5	464.9	1.3	466.2

Source: PPA

The background behind the aforementioned low level of achievement involves a variety of

[8] Luzon's yearly volume of cargo was first calculated with a multivariate regression analysis that included GDP growth rate. Then, dividing that estimated volume of cargo among Luzon's Northern, Central, and Southern regions based on each region's GDP share (estimate), a fixed percentage of 56.7% from within Southern Luzon was calculated as the demand for use (or share) of Batangas Port. This fixed percentage is based on a trial calculation that from within the 120 km stretch between Manila and Batangas, there is a point 68 km away, or 56.7% of the total distance from Batangas Port, where transportation costs are exactly the same whether from Manila or Batangas. Analysis of industry trend such as enterprises and factories, which were expected to be invited or to move into Calabarzon, was not reflected in the forecast of cargo volume very much.

[9] As explicit target indicators were not implemented in the project, demand forecast figures calculated at the time of appraisal are used as target indicators to conduct the analysis of effectiveness.

[10] Because the main output of this project was the construction of container terminals, the volume of container cargo handled constitutes the project's goal indicator.

factors described in Figure 2[11]. However, the following two points are the most direct of the causes.

- The total amount of container cargo handled on Luzon has plateaued.
- A shift in the handling of container cargo from the Port of Manila to Batangas Port has not occurred.

[11] Sources of the information shown in "Description" of Figure 2 include PPA, PEZA (Philippine Economic Zone Authority), the Japanese Chamber of Commerce and Industry of the Philippines (JCCIPI), industrial park development companies, and shipping companies.

Factor	Description	Degree of Negative Impact
Macro-level		
Slowdown in economic growth	In contrast to the average growth rate of 6.3% estimated for the Philippines from 1995 - 2010, the actual rate was confined to 4.4% because of the influence of Asian Economic crisis and the “Lehman Shock”. However, the total volume of cargo handled on Luzon in 2010 (97.2 million tons) exceeded the estimate (73.3 million tons) made at the time of the appraisal.	Small
Stagnated production at industrial parks of items intended for containers	The establishment of the Philippine Economic Zone Authority Law in 1995 saw acceleration in the construction of industrial parks in the Calabarzon region. Prior to 1995, there were only a few such parks. By 2005, the number of industrial parks had reached 44. However, many of the products produced by the companies in operation are IT-related and are more suitable for air transport than sea transport.	Medium
Weak governmental policy action toward the utilization of Batangas Port	The container terminal of the Port of Manila has been expanded after the implementation of this project. The terminal will be expanded further.	Large
Delays in transportation infrastructure development	At the time of the appraisal, an extension to the South Luzon Expressway that had been estimated for completion in 2000 was instead finished in April 2008. This extension added highway infrastructure between Manila and Batangas. Until 2008, the unfinished road affected the competitiveness of Batangas Port.	Medium
Micro-level		
Delays in civil engineering works	Although the container terminal was initially planned for completion in 2002, it was not completed until 2005 due to delays in land acquisition and other issues. With additions made to the project scope after that, construction was not fully completed until December 2007.	Large
Delays in gantry crane* installation	While the year initially planned for installation is not entirely clear, installation of the cranes was not totally completed until January 2008.	Medium
Delays in the selection of port operator	Impacted by decisions related to land acquisition, the selection of port operator was frozen from August 2007 until June 2009. Present operator ATI (Asian Terminals, Inc.) entered into a long-term contract in March 2010. However, it should be noted that this does not mean the port was completely without operation up until then. During the aforementioned freeze, a temporary outsourcing agreement was in place with ATI.	Large
Uniform charges for port usage, etc.	Public ports in the Philippines levy a uniform charge for port usage. Note: If the factors related to comprehensive port services beyond the above one are considered (via field surveys/hearings), ・ATI has been offering a comparatively lower handling service charge than the Port of Manila since around 2005. ・Compared to the Port of Manila, there are no qualitative issues with handling services and no particular issues with customs or other procedures.	Small
Insufficient interest from companies operating in industrial parks, transport companies, and shipping companies	Due to the reasons like those described in the box* on the right, the left stakeholders have been taking a wait-and-see approach.	Large

Plateau in the total amount of container cargo handled on Luzon: Although the volume of container cargo to be handled in the Luzon region estimated at appraisal was 51,513,000 tons in 2010, the actual result of that year was considerably lower at just 33,575,000 tons.

Delays in the start of full-scale operation at Batangas Port: A long-term outsourcing agreement with a private enterprise was established in March 2010.

The strengths of Batangas Port compared to the Port of Manila are insufficient.

A shift in the handling of container cargo from the Port of Manila to Batangas Port has not occurred.

The volume of container cargo handled at Batangas Port was much lower than initially planned.

***Factors for the lukewarm interest in using Batangas Port displayed by stakeholders:**

- Companies situated between Manila and Batangas do not personally transport their cargo. Rather, they contract the job to shipping companies who are then the ones who actually select which port will handle the cargo.
- **For shipping companies, the factors involved in selecting a port to handle cargo are not simply the overland transport costs between Manila and Batangas as had been assumed at the time of the appraisal.** In choosing the deployment route for a container ship, they take into account all costs, including those for maritime transport. For example, according to estimates based on interviews with stakeholders, overland transport across Luzon is only a small fraction of the total transport cost that includes sea routes between the Philippines and destinations like Hong Kong, Europe, and Japan.
- The Philippines-based offices of shipping companies fundamentally do not select the routes for container ships. The companies' main offices select them. Therefore, having the port operator contact Philippines-based offices of shipping companies would have only limited effect.
- Because of the large risk associated with changing container cargo shipping routes, shipping companies are extremely cautious when it comes to adjusting routes or changing the port to handle cargo.

*Note: a large portal crane.
Possesses wheels on the bottom of both of its long legs that allow it to move along a set of tracks.

Figure 2: Adverse Factors that Affected the Operational Status of Batangas Port's Container Terminal

The first point is striking when confirmed using the actual statistics[12]. In terms of numbers from 2010, the results for volume of container cargo handled on Luzon were limited to just 65.2% of the initial plan. The External Evaluator surmises that the primary cause of this is that, as opposed to a general economic trend, the increase in IT companies in the Calabarzon region has increased products such as semiconductor products, electronic components, etc. in the makeup of products produced in the region. Those products are better suited for air transport than container transport[13]. When including all non-container cargo, the total cargo volume actually exceeds the values estimated at the time of the appraisal. In conducting demand forecast at the appraisal time, they could have conducted not only macro simulation based on GDP estimates but also 10 years span of analysis of industry trend, that is to say, enterprises and factories expected to be invited or to move into the Calabarzon region and the resulting kind of cargo movement.

The second point appears to primarily be the result of three factors. The first was the delayed start of full-scale operations at Batangas Port resulting from delays in civil engineering works and port operator selection and other factors. The second was the insufficient overall strength of Batangas Port in terms of port facilities and quality of service as compared to the Port of Manila. The third was that companies operating in industrial parks, transport companies, and shipping companies showed lukewarm interest in using Batangas Port[14].

Further impact on the port operations of Batangas Port resulted from facility expansion at the Port of Manila that increased that port's cargo handling capacity. As described previously, the Port of Manila used its increased capacity to absorb most of the increases in volume of container cargo handled on Luzon at the sacrifice of increased congestion[15]. If the PPA would have provided political support for Batangas Port, it is possible that circumstances may have unfolded differently. Since October 2012, however, the promotional measure such as reducing the port charges against vessels to half has been implemented.

This time, for the sake of reference, the External Evaluator compared this project to port projects in other countries that are also based on yen loans. Specifically, the External Evaluator compared this project with two projects that were implemented under similar circumstances involving existing large-scale ports. These projects were the Laem Chabang Commercial Port Project in Thailand and the Cai Lan Port Expansion Project in Vietnam.

Although both of those projects were implemented successfully, the biggest difference between the Batangas project and these two projects can be summed up in the following two points.

- In the cases of both Thailand and Vietnam, the water depths of the existing large-scale ports

[12] Source: PPA website: http://www.ppa.com.ph/ppa%20web/portstat.htm

[13] This information was taken from interviews with sources that include the JCCIPI and industrial park development companies (two Japanese companies).

[14] However, personnel from the Japanese Embassy, JICA, JCCIPI, PEZA, and other organizations have constantly showed great concern in the operational status of the container terminal at Batangas Port and occasionally hold conferences, seminars, and other activities in hopes of promoting use of the port. In March 2012, JCCIPI and the JICA Philippines office jointly held the Seminar on the Improvement of Logistics through the Utilization of Batangas Port, and with presentations from the port operator, shipping companies, trucking companies, and others, this seminar was by far the most thorough and practical of its kind to date.

[15] Although the Port of Subic is also located on Luzon, its effect is limited, as the volume of container cargo it handled as of 2011 was only 289,600 tons, or approximately 1% of the Port of Manila's total (Source: Subic Bay Metropolitan Authority: SBMA).

were too shallow to accommodate large container ships. The newly established ports were deep-sea ports that possessed strengths that the existing ports did not, that is, the ability to accommodate large container ships. Because the Port of Manila also maintains a certain level of water depth, this was not a strength possessed only by Batangas Port.

- In the cases of both Thailand and Vietnam, industrial parks were adjacent to the ports, allowing those ports to monopolize the handling of industrial park-related cargo. Because the nearest industrial park (Lipa) was 35 km away from the port for this project, the Batangas location could hardly be called an absolute strength.

In terms of future expectations, some of the aforementioned major adverse factors such as delays in civil engineering works and delays in the selection of port operator are already things of the past, and the current situations for which are improved. However, if the persistent issues, "Batangas Port's insufficient strengths compared to those of the Port of Manila" and "the lukewarm interest toward using Batangas Port of companies operating in industrial parks, transport companies, and shipping companies", are not resolved or improved, there will not likely be any dramatic improvement in the port's operating ratio in the future.

3.2.2 Qualitative Effects

In this study, the External Evaluator conducted questionnaire survey and got 137 respondents, comprised of area residents, stores, and others. However, only a few of the respondents in either group mentioned the benefits or drawbacks of this project. 25 respondents, or 18.2% of the total, said they had benefitted from the project. Normally, the benefits for area residents that accompany port development include increased employment, increases in the number of port workers, and a resulting increase in the benefits of local stores. However, the operating ratio of the container terminal was exceedingly low in this project, so the appearance of effects such as these was limited. Also, of the 18 respondents who sold land to the government for this project, the majority felt dissatisfied with the sale price.

Vocational training programs, which are another major part of project implementation, are established to offer employment opportunities to people in regions affected by resettlement and other factors of the project and to increase the income of the unemployed[16]. Vocational training was offered to 1,009 individuals, based on a target of 1,000 individuals (February 2002 - July 2005). The program included 39 training courses and 53 classes. The trainees included residents of seven different barangays, with approximately 60% of them residing in the barangays[17] of Balete[18]. The ex-post evaluation (degree of satisfaction) conducted one year after the training saw the majority of students give the training favorable reviews (Details on the vocational training in terms of efficiency are described in "Project Outputs", while impacts are described in "Impact").

[16] This program was not simply about vocational training as it was also implemented to include organizational enhancements for the local community. In this case, organizational enhancement to the local community specifically refers to the establishment of the Relocation Development Committee (RDC), which has reportedly helped increase the training program's participation rate and sustainability.

[17] A "barangay" is the smallest administrative unit, managed and operated by the barangay captain, who is appointed in elections within the realms of cities and towns, and functions as a liaison for various government services.

[18] Seven barangays were targeted for this vocational training program. Individuals targeted were not confined to those affected by this project but rather, included individuals affected in the first phase.

3.3 Impact

3.3.1 Intended Impacts

The intended impacts of this project are reduction of traffic congestion caused by an overconcentration in Metro Manila and balanced development in the Calabarzon area. However, as stated above, the operating status of the container terminal for this project is extremely low, and there has yet to be an apparent impact socially or economically in the Calabarzon area according to interviews with the City Planning and Development Department in Batangas City Hall. Thus, there has been little improvement in unemployment in the local community and few economic benefits for corporations with this project. According to interviews with the PPA, although there was an improvement in employment as a whole at Batangas Port—for example, there was increased employment of workers at the port and attached facilities—most of this was related to Phase I, the precursor to this project. Furthermore, traffic congestion around the Port of Manila appears to have not decreased[19].

The monitoring result of the vocational training program shows that 742 trainees, or 73.5% of 1,009 have obtained some sort of job, whereas the initial employment rate target was 90%. Although the reality did not meet the initial target, the result was relatively good compared to other training projects considering the fact that the years 2003 and 2004 when this project was taking place showed the highest unemployment rate in the past 10 years in the Philippines[20,21]. Besides, the following socio-economic benefits were reported in a final report by a consultant:

- Economic benefit: The abilities and income of trainees increased
- Social benefit: Establishment of two local organizations by residents (community-based organizations: CBO) and lifestyle improvements of trainees (less anti-social behavior)

3.3.2 Other Impacts

(1) Impacts on the Natural Environment

According to the PPA, the following countermeasures were implemented along with Environmental Compliance Certification (ECC). As a result, environmental impact was limited.

- Appropriate treatment of suspended solids caused by construction
- Land leveling in the bay area necessary for port facility construction
- Considerations for noise, vibrations, and gas emissions during construction

With regard to the flyover above the port access road, the Department of Environment and Natural Resources (DENR) had confirmed that there was no need to issue a new ECC.

The following are the responses to the questionnaire (137 respondents) from the same area residents and store owners mentioned above. No environmental degradation caused by this project was observed.

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[19] While an attempt was made, the External Evaluator was unable to obtain the related statistics. The JICA Philippines office is interested in the traffic congestion in Manila. At the time of ex-post evaluation, they are currently hiring a consultant to conduct a research on the logistical situation for general and container cargo on Luzon as well as how to reduce traffic congestion in Manila including the promotion of the use of Batangas port.

[20] The unemployment rate in the Philippines was 10.0% in 2001 while it was 11.7% in 2004 (Source: CIA World Factbook).

[21] The Technical Education and Skills Development Project conducted by the ADB and several other donors in 2007 resulted in having only 36% of its trainees (students) employed within six months after the project.

Table 5: Environmental Change after Construction (Respondent Ratio)

Unit: %

Items	Air	Noise	Water Quality
Greatly improved	1.5	1.5	1.5
Slightly improved	15.3	12.4	11.7
Unchanged	73.0	72.3	82.5
Slightly worsened	10.2	13.9	4.4
Greatly worsened	0	0	0

Together with the site visit, the External Evaluator conducted interviews in relation to any environmental effects with the implementing agency (air, water quality, noise, and ecological systems, etc.), and no specific problems were identified.

(2) Land Acquisition and Resettlement

Both resettlement and land acquisition were necessary for this project. The results from both events can be summed up as follows: while residents were not satisfied with compensation, the negotiation processes between the PPA and resettled residents received a certain degree of praise, and the vocational training courses were highly appreciated by the resettled residents. (Questionnaire responses from the resettled residents are summarized in Attachment 1.) The PPA response was also in line with the law. Thus it was inevitable that the land acquisition and resettlement became protracted due to the following reasons:

1) Resettlement[22]

(a) Number of Resettlements

Initially at the time of the appraisal, the plan included 114 families. However, according to the record during the project, 222 families[23] eventually had to be resettled. The reasons and causes for the increase of targets remains unknown as there are no records left.

(b) Compensation Details

According to JICA internal documents, resettlement compensation per family was 35,000 PHP (Philippine peso)[24] and a resettled living area of 50 square meters. Responses to the recent questionnaires to the resettled residents showed the actual compensation was the same as the promised compensation.

(c) Resettlement Schedule

The initial plan set forth at the time of the appraisal was to make the appraisal by September 1997 and negotiate, close contracts, finish payments, and remove and transfer unnecessary buildings by December of the same year.

In reality, 77 families resettled in the barangays of Balete in February 1998.

Subsequently, it became difficult to acquire land and resettle residents due to complaints

[22] As stated in "Constraints during the Evaluation Study" at the beginning of this report, main office personnel who participated in the resettlement that took place when the project was underway have retired or are no longer at PPA for other reasons. In tandem with a lack of relevant data written to describe the particulars of the move, this made it exceedingly difficult to confirm the facts. Statements below concerning resettlement without notice are based on JICA internal documents.

[23] Land owners and illegal residents confirmed at the end of May 2002.

[24] As planned at the time of appraisal.

about the compensation package from the residents who had remained at the project site. However, in May 2002, the PPA sent a Notice to Vacate[25] to the residents and they in turn resettled. By June 2002, 206 families out of 222 completed resettlement.

(d) Legal grounds for conducting resident resettlement (starting construction) and for compensation due to resettlement

- Legal grounds concerning resettlement: Construction started based on the access permit issued by the district court in September 2001. This permission was issued based on the Republic ACT 7279[26].
- Legal ground concerning the compensation: According to the PPA, the site acquisition committee was organized by the PPA, the city of Batangas, the Department of Social Welfare and Development, and the affected barangay captains in March 1998. The above stated compensation details were determined by the site acquisition committee and comply with internal PPA guidelines[27], and the contents of these guidelines also comply with the Republic ACT 7279.

2) Land Acquisition[28]

(a) Land Acquired

At the time of the appraisal, 128 ha of fishpond and others was the target for land acquisition. Through an accurate subsequent measurement, a total of 117 ha net area affected by the project and owned by 166 landowners was eventually necessary for land acquisition.

(b) Compensation Details

At the time of the appraisal, compensation was expected to be 336.83 PHP per square meter. However, land owners were actually presented an offer of 500 PHP per square meter by the PPA. Later, some of the land owners filed a lawsuit with complaints about the compensation amount, and finally the Supreme Court ordered for a compensation of 425 PHP per square meter to be paid.

(c) Land Acquisition Schedule

The initial plan at the time of the appraisal for this project was to specify and appraise the land to be acquired by September 1997 and negotiate, close contracts, and finish payments by March 1998. In reality, in 1999, as the PPA decided to proceed with the construction of the Batangas Port Development Project, Phase II, a land acquisition committee was created to determine the reasonable price in the area and negotiate with the landowners affected by the project. The price of 500 PHP per square meter was authorized then. Except for a few, a majority of the landowners refused to voluntarily sell their properties forcing the PPA to eventually file the expropriation case. Negotiation for the voluntary sale continued even when the PPA, through the Office of the Solicitor General, already filed the expropriation

[25] The content was 1. to provide residents who agree with resettlement with proper benefits including 10,000 PHP for any inconvenience, and 2. that the PPA is to start demolishing houses of those who do not agree with resettlement by June 11.

[26] An Act to provide for a comprehensive and continuing urban development and housing program, establish the mechanism for its implementation and for other purposes.

[27] The PPA Memorandum Circular No. 55 - 97, "Guidelines on the relocation and Payment of Financial Assistance to families affected by the Implementation of Batangas project, Phase II".

[28] The following statements are mainly based on the PPA questionnaire responses.

case. A total of 18 landowners accepted the price offered and entered into a voluntary sale with the PPA. The total land area sold voluntarily was 120,050 square meters and the PPA paid a total price of 60,025,000 PHP. In 2009, the expropriation case was finally decided by the Supreme Court at the final compensation price of 425 PHP per square meter with interest reckoned from September 2001. The PPA is trying to finish payment on the balance of advanced payment made by the PPA based on the zonal value which is 290 PHP per square meter at Brgy. Sta. Clara and Bolbok and 400 PHP per square meter at Brgy. Calicanto before the end of CY 2012.

(d) Legal Grounds for Compensation along with Land Acquisition

The 500 PHP per square meter stated above as initially suggested by the PPA complies with the Presidential Administration Order No.50, indicating a price that is at least 10% higher than the official land price fixed by the Bureau of Internal Revenue (zonal value)[29].

3) Other Impacts

None.

In light of the above, this project has achieved its objectives at a limited level. Therefore its effectiveness and impact are low.

3.4 Efficiency (Rating: 2)

3.4.1 Project Outputs

(1) Civil engineering work

Table 6 shows planned project details and actual results.

Table 6: Comparison of the Initial Plan and Actual Output of the Civil Engineering Work

Item	Initial Plan (at time of appraisal)	Actual Result	Causes for Difference
1. Container berth	2 Berths: Total 450 m, Designed water depth -15 m	2 Berths: Total 450 m, Water depth -15 m	
2. Dredging	Water depth -13 m, 4.5 million m^3, other land excavated 200,000 m^3	Water depth -13 m, 4.1 million m^3, land excavated 330,000 m^3	Some were changed reflecting the difference in actual land shape and geology.
3. Reclamation	For Project Phase II 800,000 m^3, Phase IV 2.4 million m^3	Container terminal 2.1 million m^3, general cargo berth 700,000 m^3	Amount of reclamation for container terminal is close to the figure that was fixed by the detailed design (2.3 million m^3). Due to amount of dredging shortage, landfill for Phase IV was shelved.
4. Pavement works	Pavement construction 17 ha, including container yard of 15 ha	Pavement construction 16.7 ha, including container yard of 15 ha	Due to land acquisition limitations, the land area was less than planned.
5. Berth of domestic berth for Phase I	3 Berths	3 Berths	
6. Attaching a boarding bridge with the ferry dock for Phase I	1 Set	1 Set (as planned)	
7. Terminal buildings, electricity, water line, sewerage, and facilities for waste disposal	1 Set	1 Set (as planned)	

[29] Presidential Administration Order No.50, "Guideline for the Acquisition of Certain Parcels of Private Land Intended for Public Use including the Right of Way Easement of Several Infrastructure Projects".

8. Flyover construction work	Extension 650 m Note: Manila and Batangas port were supposed to be connected by the South Luzon highway, roads constructed by the BOT, and access roads constructed by the Department of Public Works and Highways.	Extension 824 m Note: Manila and Batangas port were connected by the South Luzon highway, Lipa- Batangas highway, and access roads constructed by the Department of Public Works and Highways.	It became longer than the initial plan taking into account the actual land shape.
9. Additional Items		Installing cargo handling machinery*1 and total port security system*2 *1 Two Quay Side Gantry Cranes and four Rubber Tired Gantry Cranes *2 This system consists of the following five functions: - Gate Management System, Vessel Traffic Management System, Closed Circuit Television System, RO-RO Inspection System, Patrol Boat	Reasons for additions: 1. Cargo handling machinery: Initially, cargo handling machinery was supposed to be procured by the port operator. However, as there was enough room in the project budget, it was purchased by the project to encourage the operator activity. 2. Total port security system: In 2002, the International Maritime Organization (IMO) adopted a new regulation in the 1974 International Convention for the Safety of Life at Sea (SOLAS). As this new regulation called International Ship and Port Facility Security (ISPS) code called for the system. (There was no such movement at the time of appraisal.)

(2) Consulting services

The following is the content for consulting services, with no changes[30].

1) Bidding support, supervision of construction

2) Monitoring for environmental surroundings, such as water quality, ground pollution, and noise and vibrations around residential areas during construction

(3) Improvement for Lifestyle and Livelihood

Conducted basically as planned.

1) Consulting service

The PPA delegated the following tasks to Madecor Group and had the group implement them. The group worked for 168 man-months (MM), as planned initially (NGOs were hired for 21MM, also as initially planned)[31].

(a) Investigation of the needs for vocational training and coordination with related organizations

The vocational training needs were assessed targeting 3,241 residents in 2002. Additionally, the needs from hiring companies were also investigated, with results reflected in the content of the training program (classes). While conducting the program, the Inter-Agency Committee (IAC) was organized to coordinate the related organizations. As many as 30 meetings were held between the PPA project management office, PPA General Manager, Batangas Port Manager, IAC committee, and JICA to check progress.

(b) Staff education and formulation, implementation and evaluation of vocational training

[30] Terms of Reference (TOR) of the services includes support for resettlement and compensation for land.

[31] Various governmental organizations, universities, and an NGO (LASAC) joined as conductors of training.

programs

A vocational training program was offered to 1,009 individuals, based on a target of 1,000 individuals (through May 2005). The program included 39 training courses and 53 classes. The courses included handicraft, restaurant business, construction, and computer. Only a few courses were related to port work skills.

(c) Support for job hunting activities for trainees

The PPA project management office built a network with various governmental organizations (the Department of Labor and Employment, the Department of Trade and Industry, Batangas province and city governments), private companies, and microfinance organizations in order to help trainees find employment. These organizations provided the trainees with a variety of information as well as employment and microfinance.

As seen already in section "3.2 Effectiveness", vocational training was offered to 1,009 individuals, based on a target of 1,000 individuals. The ex-post evaluation (level of satisfaction) conducted one year after the training was highly praised by trainees. Also, as seen in section "3.3 Impact", 742 out of 1,009 trainees, or 73.5%, reported that they obtained some sort of job, thereby confirming economic and social benefits. The following are believed to be the main factors for a successful lifestyle and livelihood improvement.

i. Vocational training conducted together with community organizational strengthening, such as the establishment of the Relocation Development Committee: Activity of the Relocation Development Committee was reported to be useful in increasing the participation rate and sustainability for training programs.
ii. In addition to the vocational training needs assessment for the trainees, the needs from hiring companies were also investigated and the results were reflected in the contents of training program classes: These actions developed the sorts of human resources that companies require.
iii. The vocational training program office built a network with various governmental organizations (the Department of Labor and Employment, the Department of Trade and Industry, Batangas province and city governments), private companies, and microfinance organizations in order to seek support for the employment of trainees: This helped the trainees find employment.
iv. The program operators always monitored progress and the level of trainees' satisfaction sensitively and continuously: They were able to check in on the effectiveness of training anytime and reflect the results in the training program.

2) Procurement of vocational training devices

Devices were procured based on the training module when necessary.

As stated above, there were no major changes in scope from the initial plan from an aspect of civil engineering work. The two additional scopes (installation of cargo handling machinery and the total port security systems) were both rational and necessary; they are considered appropriate for the purposes of the project.

Although MM of consulting services (related to civil engineering work) have increased due to the extended construction period, including the two additional scopes, the content of consulting service was the same as planned. Consulting service for lifestyle and livelihood improvement was also conducted as initially planned.

3.4.2 Project Inputs

3.4.2.1 Project Cost

The project cost in the initial plan was 12.465 billion yen as foreign currency plus 1.993 billion PHP as domestic currency (6.976 billion yen[32]) for a total of 19.441 billion yen. The project called for yen loans to make up 14.555 billion yen, so the remaining 4.886 billion yen was supposed to be paid out of the Philippines government budget.

The actual project cost was 12.093 billion yen as foreign currency plus 2.356 billion PHP as domestic currency (5.502 billion yen[33]) for a total of 17.595 billion yen, and yen loans made up 14.527 billion yen, so the remaining 3.068 billion yen was paid out of the Philippines government budget.

If viewed entirely in Japanese yen, the actual project cost was 90.5% of the budget.

Table 7: Project Cost: Planned vs. Actual

Items	Initial Plan (time of appraisal)			Actual Cost		
	Foreign currency (1 million yen)	Domestic currency (1 million PHP)	Total (1 million yen)	Foreign currency (1 million yen)	Domestic currency (1 million PHP)	Total (1 million yen)
Civil engineering work and construction	10,417	797	13,207	11,309	853	13,466
Improvement for Lifestyle and Livelihood	-	38	133	40		40
Consulting services	728	30	833	744	121	1,021
Price escalation	761	60	971	-	-	-
Contingency	559	43	710	-	-	-
Administration costs	-	66	231		68	150
Land acquisition	-	959	3,356		692	1,539
Tax					621	1,379
Total	12,465	1,993	19,441	12,093	2,356	17,595

Note: The exchange rate was 3.5 yen per one PHP in the initial plan and 2.24 yen per one PHP (weighted average rate).

Comparing the planned costs and the actual costs for this project, it is clear that the actual cost was lower than the planned cost. However, this is due to the strengthening of the yen; actual spending in PHP was almost the same as the planned costs, excluding the additional scopes. The total expenditure in yen was 13.961 billion yen excluding the unplanned scopes, and the ratio against the planned cost was 71.8%.

[32] The exchange rate (as of September 1997) was 3.5 yen to one PHP.
[33] The exchange rate (weighted average) was 2.24 yen to one PHP.

3.4.2.2 Project Period

This project was supposed to last for three years and seven months from the time loan agreements (L/A) signed in September 1998 until the time civil engineering work completed in March 2002. L/A were actually signed in September 1998, but the civil engineering work was completed in December 2007. As the last two months of the civil engineering work was part of the work period for the unplanned additional scopes, excluding this period, the actual project period was 110 months, while the schedule was 43 months. This largely exceeded the planned period at 255.8%. The main cause for the extended project period was the prolonged land acquisition and resettlement. Among the three construction packages, the construction period for the flyover on the port access road was extended as the final layout was changed due to the problems with land acquisition after bidding. Other civil engineering works finished in close to the scheduled period after starting construction.

3.4.2.3 Consulting Services

The plan and actual results in MM of consulting services (related to civil engineering work) are shown below. Although there was no change in the content of the consulting services, MM increased due to the extension of the project period, which includes the additional scopes.

Table 8: Planned and Actual MM for Consulting Services

Categories	Initial Plan	Actual
Engineers from overseas	196MM	301.5MM
Engineers from the Philippines	294MM	454.5MM
Assistants from the Philippines	225MM	877.5MM

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

Based on documents and information collected at the time of ex-post evaluation, the result for the Economic Internal Rate of Return (EIRR) recalculated with the exactly same method at the time of the appraisal is shown below. (Analysis for the Financial Internal Rate of Return was not possible because critical data needed for re-calculation was not available.)

Table 9: Comparison on EIRR Before and After Project

	Estimation at appraisal	Recalculation result at ex-post evaluation
EIRR	22.9%	-8.1%
Project life	14 years[*1]	14 years
Cost	Cost required for this project (construction fee) Increasing maintenance costs by conducting this project	Cost required for this project (construction fee) Increasing maintenance costs by conducting this project[*2]
Benefits	Reducing demurrage cost at the Port of Manila, conserving cargo logistic time on land	Reducing demurrage cost at the Port of Manila, conserving cargo logistic time on land

*Note 1: According to the main appraisal document, this was 30 years, but the detailed calculation documents attached in the appraisal documentation, which were the base of recalculation, stated 14 years.
*Note 2: As the port operator did not provide actual data on maintenance costs, the calculation method of maintenance costs used at the time of appraisal is applied.

The total cost in PHP exceeded the initial estimated scale, and the volume of container cargo handled was also much less than the initial plan. Therefore, the EIRR was clearly lower than the initial estimate.

In light of the above, although the project cost was within the plan, the project period was significantly exceeded. Therefore efficiency of the project is fair.

3.5 Sustainability (Rating: 2)

3.5.1 Structural Aspects of Operation and Maintenance

There are no specific problems with structural aspects of operation and maintenance.

The operation and maintenance at the container terminal (part of this project) at the Batangas port was delegated to a private company, as initially planned and ATI was selected[34].

The contract is effective for 25 years and was signed in March 2010. The details of the delegated operation are defined in the Terms of Reference (TOR), which is attached to the contract, stating how to operate (cargo handling work, related operations, and other services at port), maintain, promote, and take any other action regarding the facilities. ATI is supposed to pay the PPA a fixed fee and a variable fee linked to the sales amount every year.

At the time of ex-post evaluation, the operation and maintenance organization (ATI) that handles Phase I of the project (berth for ship and boats and general cargo berths, etc.) also handles the container terminal operation and management, as the volume of container cargo is small.

With regard to personnel who actually handle cargo (e.g., crane operators), training is offered to those who meet a few prerequisites[35] and then only those who pass the exam are employed. The division of duties for specialized operation and management personnel is clear. The annual turnover of staff is less than 5%, and the organization is stable.

3.5.2 Technical Aspects of Operation and Maintenance

The core members of the maintenance division for ATI consist of the maintenance supervisor, crane technician, and plant electrician, and each of them holds necessary academic degrees and qualifications.

Operation and maintenance of main devices are conducted as follows based on the operating manual, and the inventory control for necessary parts is also computerized[36].

- Quay Side Gantry Crane: Gantry system, gantry brake, and hydraulic oil are visually inspected as monthly maintenance. In each quarter, they inspect greasing on fitting, wire cable joints and fastening for bolts and nuts.
- Rubber Tired Gantry Crane: Engine oil and various filters are replaced in each after 300 or 600 hours. Every 1,200 hours, air filters are inspected and lubrication is given to wire ropes and the pulley. Engine oil is replaced and the generator system is inspected every 3,600 hours.

[34] ATI is a port operating company based in Manila in the Philippines. Established in 1986, ATI mainly has been operating the Manila south port.
[35] Driver's license and operating experience of heavy machinery.
[36] If parts are out of stock, it is possible to receive support from ATI at the Port of Manila.

When necessary, training for device operators is conducted at the South Harbor of the Port of Manila, which is controlled by ATI.

The port operation quality at Batangas Port is rated highly by an important client (shipping company).

3.5.3 Financial Aspects of Operation and Maintenance

The main organization to pay for the operation and maintenance of this project is the port operator, i.e., ATI. Detailed financial figures regarding the whole ATI port operation, other than financial statements, could not be obtained from ATI. However, operation and maintenance expenses are limited as the facility is quite new, and the budget for operation and maintenance is sufficiently reserved.

According to the received financial statements, the net profit in the past three years until 2010 for the consolidated base of ATI group companies has been increasing every year: 851 million PHP, 1,162 million PHP, and 2,145 million PHP. The return on assets in 2010 was 23.3%.

It is worth noting that the financial situation of the PPA in the past three years until 2011 has been losses of 35.2 million PHP in 2009 and 34.6 million PHP in 2010, and then improving to a profit of 129.4 million PHP in 2011. The return on assets in 2011 was 1.3%.

As explained above, the port operator has been creating profits at a certain level and has reserved necessary financial resources for operation and maintenance at this point. However, the volume of container cargo handled is much lower than expected; a significant deficit is emerging with this project[37]. The volume of container cargo handled is not predicted to rapidly grow, at least at this point. Additionally, according to the contract signed between the implementing agency and the port operator, the fixed fee of the port operator will increase[38]. Considering the entire situation, the financial situation for the project itself will continue to be tight. Therefore, there is a possibility that the port operator might discontinue this project based on the management's judgment in the future. In the long run, it may not be possible to secure the financial resources for operation and maintenance.

3.5.4 Current Status of Operation and Maintenance

As explained already in section "3.2 Effectiveness", all the scheduled machinery is installed, and everything is running smoothly.

There are no specific problems with facility management and maintenance; nor with the organization and technical aspects. As explained above, however, while no detailed information has been provided, there is uncertainty regarding the finance aspect in the long run.

Some problems have been observed in the financial aspect of the maintenance of this project. Therefore sustainability of the project effect is fair.

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[37] According to the interview with ATI

[38] The fixed fee that ATI pays to PPA is 2.26 million US dollars in the first two years, 4.68 million US dollars in the third year, 5.08 million US dollars in and after the fourth year, and 5.33 million US dollars in and after the eighth year according to the contract.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project has been consistent with the Philippines' policy, development needs as well as Japan's ODA policy; therefore its relevance is high. However, the operating ratio of the container terminal constructed by this project remains low, falling far short of the target volume of container cargo to be handled. For this reason, the project has shown only an extremely limited effect on local employment and the economic growth of local businesses; thus its effectiveness and impact is low. Although the project cost was within the plan, the project period significantly exceeded the plan; therefore efficiency of the project is fair. There are no problems with the facility operation and maintenance. Nor are any particular problems observed on an organizational or technical level. Overall, however, with its financial uncertainties, the External Evaluator deems that sustainability of the project is fair.

In light of the above, this project is evaluated to be unsatisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

Although no outstanding effect from this project has been observed at this point, companies in the industrial park at Calabarzon have started using the container terminal in Batangas Port thanks to the sales efforts of the port operator. It is now at an important turning point to judge whether Batangas Port can grow in the future. Under such circumstance it is an effective measure to reduce the port charges against vessels which has been implemented by PPA since October 2012. PPA is recommended to continue implementing this kind of promotional measure in future.

Furthermore, an ongoing JICA research on solutions to alleviate traffic congestion in Manila including the promotion of use of Batangas Port suggests that a key factor in increasing the handled cargoes at the port is the change of the expansion policy of the Port of Manila aiming to increase its cargo handling capacity. Therefore, it is strongly recommended to consider this policy change.

4.2.2 Recommendations to JICA

JICA is recommended to continue watching container terminal operations and to take actions to increase the operating rate such as a promotional seminar for utilizing this terminal that it held together this year with the JCCIPI.

4.3 Lessons Learned

1. During the implementation of this project, the role allotment among ports (differentiating services in Batangas Port from those of the existing large ports in the neighborhood such as the Port of Manila) was rarely considered and the cargo handling capacity at the Port of Manila was increased. These have also led to a low operating rate of the container terminal at Batangas Port. For similar projects in the future, if new ports do not possess areas of strength, the related government offices must give preferential treatment to the new ports through policy, such as restricting the cargo volumes that competitor ports handle or

applying lower usage rate to the new ports, to encourage use of the new ports.

2. The target value for this project is founded on the consideration mainly of the distance between the Port of Manila and Batangas Port and the resulting costs of land transport to distribute cargo volume between these two ports. This is all based on the estimated total volume of cargo handled in Luzon based on GDP estimates. As seen in the analysis on effectiveness, the actual cargo movements are determined by various factors. Therefore, when setting targets for similar port development projects in the future, factors other than macro aspect such as GDP estimates should also be considered as much as possible. Those factors are mid- and long-term outlook of industrial structure (particularly in the hinterland of the port), requirements from potential client companies, and action by the shipping companies who actually deal with cargo.

3. Lifestyle and livelihood improvement policy on this project was successfully conducted. In particular, the following factors can be referred to as good practices that can be applied in other projects.
   1) Investigating the needs of hiring companies together with vocational training needs assessment of the trainees, and reflecting the results in the contents of the training program
   2) Building a network with various governmental organizations (the Department of Labor and Employment, the Department of Trade and Industry, province and city governments), private companies, and microfinance organizations in order to seek support for the employment of trainees
   3) Having program coordinators always pay attention to progress of the program and the level of satisfaction of the trainees, and monitor these factors regularly

4. Resettlement records were not well kept at the PPA, i.e., the implementing agency. Resettlement is always an issue that greatly influences costs and time periods for a project involving large-scale construction. Accordingly, detailed records for each project should be kept to accumulate know-how and lessons for smooth resettlement in future projects.

Comparison of the Planned and Actual Scope of the Project

Item	Planned	Actual
1. Project Outputs		
1) Container berth	2 Berths: Total 450 m, Designed water depth -15 m	As planned
2) Dredging	Water depth -13 m, 4.5 million m^3, other land excavated 200,000 m^3	Water depth -13 m, 4.1 million m^3, land excavated 330,000 m^3
3) Reclamation	For Project Phase II 800,000 m^3, Phase IV 2.4 million m^3	Container terminal 2.1 million m^3, general cargo berth 700,000 m^3
4) Pavement works	Pavement construction 17 ha, including container yard of 15 ha	Pavement construction 16.7 ha, including container yard of 15 ha
5) Berth of domestic berth for Phase I	3 Berths	As planned
6) Attaching a boarding bridge with the ferry dock for Phase I	1 Set	As planned
7) Terminal buildings, electricity, water line, sewerage, and facilities for waste disposal	1 Set	As planned
8) Flyover construction work	Extension 650 m Note: Manila and Batangas port were supposed to be connected by the South Luzon highway, roads constructed by the BOT, and access roads constructed by the Department of Public Works and Highways.	Extension 824 m Note: Manila and Batangas port were connected by the South Luzon highway, Lipa- Batangas highway, and access roads constructed by the Department of Public Works and Highways.
9) Additional items	n.a.	Installing cargo handling machinery and total port security system
2. Project Period	September 1989 – March 2002 (43 months)	September 1989 – December 2007 (112 months)
3. Project Cost		
Amount paid in foreign currency	12,465 million yen	12,093 million yen
Amount paid in local currency	6,976 million yen (1,993 million peso)	5,502 million yen (2,356 million peso)
Total	19,441 million yen	17,595 million yen
Japanese ODA loan portion	14,555 million yen	14,527 million yen
Exchange rate	1 peso = 3.5 yen (As of September 1997)	1 peso = 2.24 yen (Weighted average)

Attachment 1: Summary of Questionnaire Responses from Resettled Residents

A total number of 115 people resettled during this project period from 1998 to 2007[39] responded to the questionnaire. Respondents were randomly selected among those 222 families that lived in Balete.

The results of the satisfaction level of compensation on this project (four levels): "Very satisfied", one person; "Satisfied", one person; "Less satisfied", 27 people (23%); "Not satisfied at all", 84 people (73%). As for the compensation process (explanation and negotiation methods)[40]: "Very satisfied", 18 people (16%); "Satisfied", 29 people (25%); "Less satisfied", 37 people (32%); "Not satisfied at all", 25 people (22%). Costs of housing construction following resettlement were approximately 127,000 PHP per person[41], and the difference between this amount and the compensation fee of 35,000 PHP is considered to be the cause of the unsatisfactory results mentioned above.

37 trainees who joined the vocational training also responded: 29 people answered "Very satisfied" or "Satisfied"[42], which shows a relatively high degree of satisfaction. On this project, the vocational training started later than the resident resettlement, and there were two different groups of opinions on whether before or after resettlement the training should have been conducted.

For the employment situation before and after resettlement, 90.4% of relocated residents had jobs before resettlement while it dropped to 71.3% after that. This is also considered as one of the reasons for dissatisfaction with the compensation.

[39] Accounts for more than half of the resettled residents.
[40] By the time of the appraisal on this project, the Philippines' academic groups and local NGOs had already had conversations with residents and started a lifestyle and livelihood improvement policy based on experience of the Phase I project. This seemed to obtain a certain level of effects for smooth resettlement.
[41] From questionnaire responses. It is the amount based on self-reported figures.
[42] In detail: "Very satisfied", 11 people; "Satisfied", 18 people; "Less satisfied", 7 people; and "Not satisfied at all", 1 person.

The Republic of the Philippines

Ex-Post Evaluation of Japanese ODA Loan
Calaca Coal-Fired Thermal Power Plant No. 1 Unit Environmental Improvement Project

External Evaluator: Ryujiro Sasao, IC Net Limited

0. Summary

This project aimed to improve the environment surrounding the Calaca Coal-Fired Thermal Power Plant on the island of Luzon in the Philippines and to spur the building of the Calaca Power Plant No. 2 Unit by expanding on facilities to prevent coal dust emissions and the spontaneous combustion of coal and by upgrading electrostatic precipitators. Implementation of this project was in line with the policies of the Republic of the Philippines (in the electric power and environmental sectors) and its development needs and with Japan's ODA policy. Therefore its relevance is high. The External Evaluator was able to see evidence that the implementation of this project reduced air pollution and noise roughly as planned and was able to infer that it had a net positive effect on the health of local citizens. While the project stayed within the budget for project cost, the project period significantly exceeded the plan; therefore efficiency of the project is fair. No major problems have been observed in the structural, technical or financial aspects of the operation and maintenance of this project; thus sustainability of the project effect is high.

In light of the above, this project is evaluated to be highly satisfactory.

1. Project Description

Project Site

Windbreak Fence installed in the Project

1.1 Background

According to the six-year Medium-Term Philippine Development Plan (MTPDP) established in 1987, the construction of the Bacon Manito Geothermal Power Plant and the Calaca Coal-Fired Thermal Power Plant No. 2 Unit was supposed to increase the 1986 installed capacity of 6,455 MW by nearly 600 MW to 7,050 MW by 1992. In reality, installed capacity increased only 244 MW because of delays in power plant construction and halted operations at existing power plants[1]. As a result, peak demand on the Luzon Grid (one of three electrical power systems in the Philippines, it includes the Calaca Coal-Fired Thermal Power Plant from this project) often exceeded the available capacity, and the number of blackout days reached 103

[1] In fact, the combined installed capacity of the Calaca Coal-Fired Thermal Power Plant No. 1 and No. 2 Units is 600 MW.

in 1990.

The launch of the Calaca Coal-Fired Thermal Power Plant No. 1 Unit in September 1984 immediately brought about hardships such as air pollution due to coal dust emissions (which were generated in the process of unloading coal from transport vessels and moving it to storage areas, and while in storage), odor due to spontaneous combustion of coal (while in storage) and noise generated when safety valves kicked in. The National Power Corporation (NPC) used its own funds to implement measures to prevent coal dust emissions, spontaneous combustion of coal and other phenomena and was striving to improve conditions, but further measures were required.

1.2 Project Outline

The objective of this project is to improve the environment surrounding the Calaca Coal-Fired Thermal Power Plant and spur the building of the Calaca Power Plant No. 2 Unit by expanding on facilities to prevent coal dust emissions and the spontaneous combustion of coal and by upgrading electrostatic precipitators and, thereby contributing to improving the health of local citizens and the supply-demand balance of electricity on the Luzon Grid.

Loan Approved Amount/ Disbursed Amount	6,112 million yen / 2,987 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	December, 1992 / March, 1993
Terms and Conditions	Interest Rate: 3.0% Repayment Period: 30 years (Grace Period: 10 years) General untied (Same conditions as consultants)
Borrower / Executing Agency[2]	Republic of the Philippines / National Power Corporation (NPC)
Final Disbursement Date	July, 2000
Main Contractor	Consilium CMH Babcock (Sweden) and 17 other companies
Main Consultant	(omitted because less than 100 million yen)
Feasibility Studies, etc.	JICA studied the condition of environmental measures of No. 1 Unit via contractor in 1991
Related Projects (if any)	Calaca Coal-Fired Thermal Power Plant No. 1 Unit Construction Project (export credit from Export-Import Bank), Calaca Coal-Fired Thermal Power Plant No. 2 Unit Expansion Project (yen loan)

2. Outline of the Evaluation Study

2.1 External Evaluator

Ryujiro Sasao (IC Net Limited)

[2] The Calaca Coal-Fired Thermal Power Plant was privatized in July 2009 and is currently being operated by the Sem-Calaca Power Corporation, an affiliate of DMCI Holdings.

2.2 Duration of Evaluation Study

The External Evaluator performed an evaluation study as follows in the course of this ex-post evaluation:

Duration of the Study: November 2011 - September 2012 (from the beginning of the contract through the month in which finished products were delivered)

Duration of the Field Study: February 4 - March 3, 2012 and April 22 - May 7, 2012

2.3 Constraints during the Evaluation Study

More than 12 years have passed since the completion of this project. Moreover, as the Calaca Coal-Fired Thermal Power Plant was privatized in July 2009, information from the period during which this project was implemented was not stored well enough, and some evaluation study agendas did not allow for sufficient confirmation of details.

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

3.1 Relevance (Rating: 3)[3]

3.1.1 Relevance with the Development Plan of the Philippines

The need for the development of domestic power sources to meet demand for electricity that grew an average of 8% per year was stressed in the electric power sector at the time of the appraisal in "Chapter 4: Improving Infrastructure" of the MTPDP (Medium-Term Philippine Development Plan) 1993 - 1998.

By the time of this ex-post evaluation, a chapter in the MTPDP 2011 - 2016 called "Accelrating Infrastructure Development" put forth the need for an increase of power generated to 16,550 MW across the entire country during the plan period of 2009 - 2030 if peak demand for power grew at an average rate of 4.5% per year[4]. The chapter also spoke to the need to develop reliable power sources with a variety of sustainable energies. Furthermore, coal accounted for a top share of 27.4% of power sources in 2009, highlighting the need for sustainability on the environmental aspect.

In the environmental sector, "Chapter 3: Sustainable Agri-Industrial Development" of the MTPDP 1993 - 1998 proposed as policy objectives the introduction of reliable air quality monitoring in urban areas and the development of appropriate technology for controlling air pollution resulting from industrial development.

By the time of this ex-post evaluation, the environmental/natural resources field in the MTPDP 2011 - 2016 has proposed the specific objective of "reducing air pollution in Metro Manila and other major urban areas" based on the recognition that air quality was bad in the country's major urban areas, and one measure put forth toward that end was monitoring major industry for compliance with environmental standards.

In terms of development policy for the electric power sector, a steady push into building the Calaca Coal-Fired Thermal Power Plant No. 2 Unit and launching operations was required to actually develop electric power as called for by plans in place at the time of the project appraisal. The coherence between recent electric power sector policy and this project has not changed, either.

This project played an absolutely vital role in addressing the need to take action on the environmental aspect and ramp up environmental monitoring for the No. 1 Unit as conditions of

[3] This project aimed to improve both the surrounding environment and supply-demand for electricity, so relevance was analyzed in terms of both environment and electric power.

[4] Installed capacity across all of the Philippines in 2010 was 16,359 MW.

project implementation with regard to the Environmental Compliance Certificate (ECC) for the No. 2 Unit. Therefore, in terms of development policy for the environmental sector, this project was in line with the spirit of policy both at the time of appraisal and at the time of this ex-post evaluation.

3.1.2 Relevance with the Development Needs of the Philippines

The current state of development needs in the electric power sector is as follows: the total installed capacity of Philippine power utilities was 16,359 MW in 2010; broken down by grid (network of power distribution lines), the Luzon Grid, the biggest one, accounted for 11,981 MW (73.2% of the total), the Visayas Grid for 2,407 (14.7%) and the Mindanao Grid for 1,971 MW (12.0%)[5]. Next, we consider the relation among installed capacity, available capacity and peak demand in Luzon Grid. The installed capacity of the Luzon Grid was as written above (11,981 MW in 2010), and in September 2011, the available capacity and peak demand were 7,963 MW and 7,048 MW, respectively, leaving a reserve capacity of 915 MW (Based on newspaper reporting). Though not as dire as the time around 1991 when a tight supply-demand balance caused frequent power outages, the above figures indicate more stringent circumstances than those of the mid-1990s, when the supply-demand balance relaxed. The combined installed capacity of the Calaca Coal-Fired Thermal Power Plant No.1 and No. 2 Units is 600 MW, representing 5% of the Luzon Grid's 11,981 MW in 2010. Though not a hearty share, the Calaca Coal-Fired Thermal Power Plant makes a significant contribution to the Luzon Grid considering the aforementioned supply-demand balance.

Next, on the subject of power sources, development of geothermal, hydraulic and coal-fired thermal power progressed based on the 1980s policy calling for a departure from dependence on oil and a move toward using domestic energy. Table 1 shows trends in power source structure:

Table 1: Trends in Philippines Domestic Power Source Structure (%)

Year	1980	1990	2010
Oil	63.7	43.3	19.5
Hydraulic	24.6	35.3	20.8
Geothermal	11.7	14.7	12.0
Coal	0	6.7	29.8
Other	0	0	17.9

Source: Appraisal Document, Department of Energy

Coal-fired thermal power went from nonexistent in 1980 to the top share of nearly 30% by 2010. The fuel cost of coal-fired thermal power is not as low as hydraulic or geothermal power, but it is highly stable, and that is very important in the tight supply-demand environment of the Philippines[6].

Development needs in relation to this project on the environmental aspect are as follows: namely, as expressed in the background section, further action in addition to NPC countermeasures was needed at the time of the appraisal to address the air pollution caused by coal dust emissions, odor due to spontaneous combustion of coal, noise generated when safety

[5] Compared to the figures at the time of the appraisal in 1990, the Luzon Grid did not change much from its 71.7% share, but the Visayas Grid has grown from its 10.9% share to surpass the share provided by the Mindanao Grid.

[6] The El Niño climate pattern caused water levels in dams to drop in 2010 and pushed hydraulic power output down to 80% of its 2009 level. Geothermal power output also dropped 4% from 2009 to 2010 (because of stoppages due to problems with multiple generators at Visayas).

valves kicked in and other problems that appeared directly following the launch of the Calaca Coal-Fired Thermal Power Plant No. 1 Unit. The ECC issued by the Department of Energy and Natural Resources (DENR) for the Calaca Coal-Fired Thermal Power Plant No. 2 Unit in April 1992 required action to be taken on the environmental aspect and improvement of environmental monitoring for the No. 1 Unit as conditions of project implementation. Therefore, comprehensive environmental measures for both units were necessary.

The above clearly shows the development needs in relationship to this project in terms of supply-demand balance in the Luzon Grid, the advantages of coal-fired thermal power for the power source structure and the consideration of environmental aspects.

3.1.3 Relevance with Japan's ODA Policy

Japan's Official Development Assistance Charter formulated in 1992 mentioned its priority on Asia in the regional aspect and also stated "Dealing with global issues such as environment issue and population increase" as one of 5 major thematic issues.

This project aimed to improve the air around power plants and the rest of the environment by introducing facilities to prevent coal dust emissions and the spontaneous combustion of coal and by increasing the number of electrostatic precipitators, and it is in line with the above Charter in terms of both region and theme[7]. Thus, this project is clearly consistent with Japan's ODA policy.

In light of the above, this project has been highly relevant to the Philippines' development plan, development needs as well as Japan's ODA policy. Therefore its relevance is high.

3.2 Effectiveness (Rating: 3)

3.2.1 Quantitative Effects (Operation and Effect Indicators)

Although no quantitative indicators were put in place at the time of the appraisal, the External Evaluator was able to confirm the following environmental improvement issues:

(1) Prevent coal dust emissions
(2) Prevent odor due to spontaneous combustion
(3) Prevent sea water intrusion
(4) Prevent particulate emissions
(5) Prevent noise
(6) Establish an environmental monitoring system

By the time of this ex-post evaluation, approximately 12 years have passed since the completion of this project. First and foremost, the report of evaluation on the "Calaca Coal-Fired Thermal Power Plant No. 2 Unit Expansion Project/Additional Loan Project"

[7] Japanese government's "Country Assistance Program for the Philippines" was formulated in 2000 for the first time. Other policy documents related to Japan's aid for the Philippines at the time of appraisal were not obtained, either. Accordingly, the above Charter was quoted as reference. Although released after the project implementation, the Foreign Economic Cooperation Project Policy (developed in 1999) states as follows and it also shows the project's consistency with the Japan's aid policy. "3. Assistance by Region/Country: V. Philippines, The focus is on assistance toward strengthening the economic structure of the Philippines to provide for sustained growth; mitigating restrictive factors of poverty and regional disparities; providing support that benefits environmental preservation measures that include disaster management; developing human resources and establishing systems."

conducted in 1998, when this project was near completion, indicated that environmental improvement measures were continuing according to plans. Furthermore, the Evaluator did not observe coal dust emissions or spontaneous combustion on power plant property and confirmed that all was well with water quality at drain outlets.

Next, Table 2 is a collection of the results of environmental monitoring implemented as needed in the area surrounding the power plant[8] (the External Evaluator obtained data through 2011) at the time of this ex-post evaluation. The main indicators that correspond to the environmental improvement issues above have been cleared by Philippines environmental standards and in many cases represent an improvement over time after the project implementation. With regard to the environmental monitoring system, Environmental Section of the Power Plant Facilities Division has been established. The section consists of one chief engineer, two environmental monitoring experts and three full-time workers and they monitor various sorts of data.

Table 2: Environmental Monitoring Results

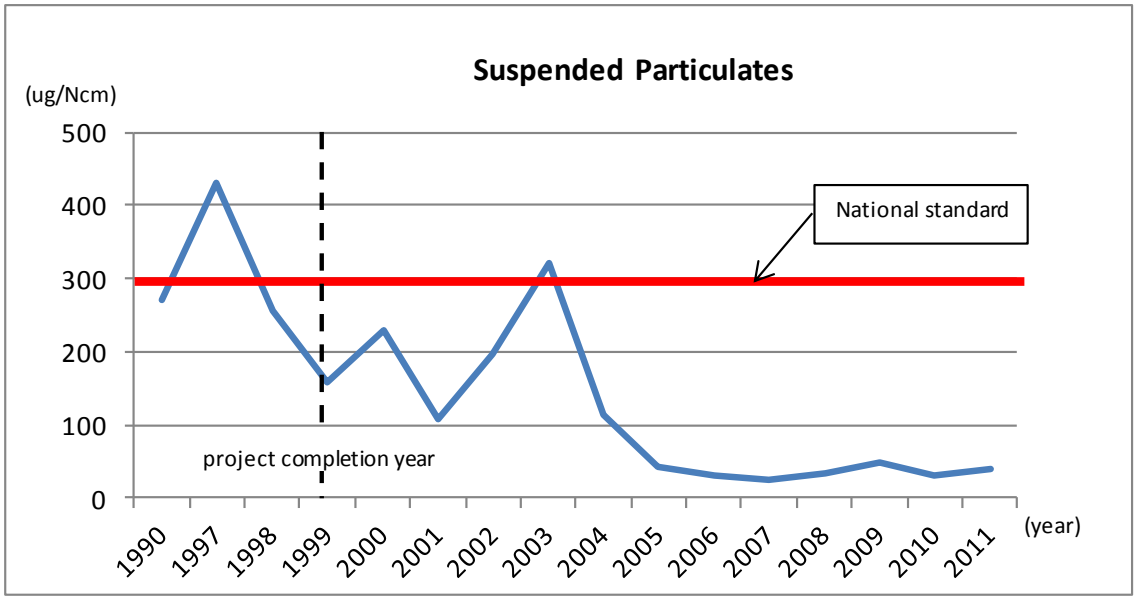
Area	Issue	Compliance with 2011 Domestic Environmental Standards?	Trend Analysis
Air*	1. Ambient Air		
	Suspended Particulates	Yes	Declining annually since 1997.
	Sulfur Dioxide (SO_2)	Yes	Below domestic standard values since 1990 and continuing to fall, particularly since 1999.
	Nitrogen Dioxide ($NO_{2)}$	Yes	Consistently below domestic standard values since 1990 and particularly falling significantly for several years since 1998.
	2. Stack Emission		
	Sulfur Dioxide	Yes	Consistently below domestic standard values since 1999.
	Particulates	Yes	Below domestic standard values since 1999 with some exceptions.
Noise		Yes	Below domestic standard values and declining annually since 1998.
Water Quality	Effluent – Outfall Physico – Chemical Parameters	Yes	Figures have been below domestic standard values in recent years, and there is a clear trend of improvement following the project.
	Effluent – Outfall Heavy Metals	Yes	Figures have been below domestic standard values in recent years, and there are many heavy metals that are not detected at all.
	Groundwater – Outfall Physico – Chemical Parameters	Yes	Figures have been below domestic standard values in recent years, and there is a clear trend of improvement following the project.
	Groundwater – Heavy Metals	Yes	Figures have been below domestic standard values in recent years, and there are many heavy metals that are not detected at all.

*Note: Air monitoring is the so-called ground level pollutant concentration (concentration at the landing point). There are no factories, expressways or facilities that could affect these figures nearby, so the External Evaluator was able to infer that this project is responsible for the trend toward improvement. Since there were no clear standards concerning

[8] Air monitoring is conducted three kilometers away from power plants judged to be the most appropriate for detecting the effects of power plants near the surface of the ground.

discharge concentration in the Philippines at the time of appraisal of this project (1992), discharge concentration monitoring instruments were not used. This power plant began monitoring discharge concentration in 2002 to comply with legislation that went into effect in 1999, but statistics dating back several years are not kept because of trouble with the monitoring instruments. Discharge concentration is now being monitored again, and the latest records show that discharge concentration at this power plant is below domestic standard values. The following are actual measurements of main indicators as of May 2012 (all units mg/Ncm, national standard values in parentheses): Sulfur oxide: 1,071 (1,500) Nitrogen dioxide: 34 (1,500) Nitrogen monoxide: 429 (1,500) Carbon monoxide: 1 (500) Particulates: 52 (200)

Below are graphs expressing the part of aforementioned data.



Note: According to the Environmental Section at the power plant, figures exceeded domestic standard values in 2003 because of high winds that dried the air and led to high airborne particulate matter activity. The section conjectured that it was a temporary phenomenon, and the indicators have improved without any specific treatment.

Figure 1: Target Indicator: Suspended Particulates

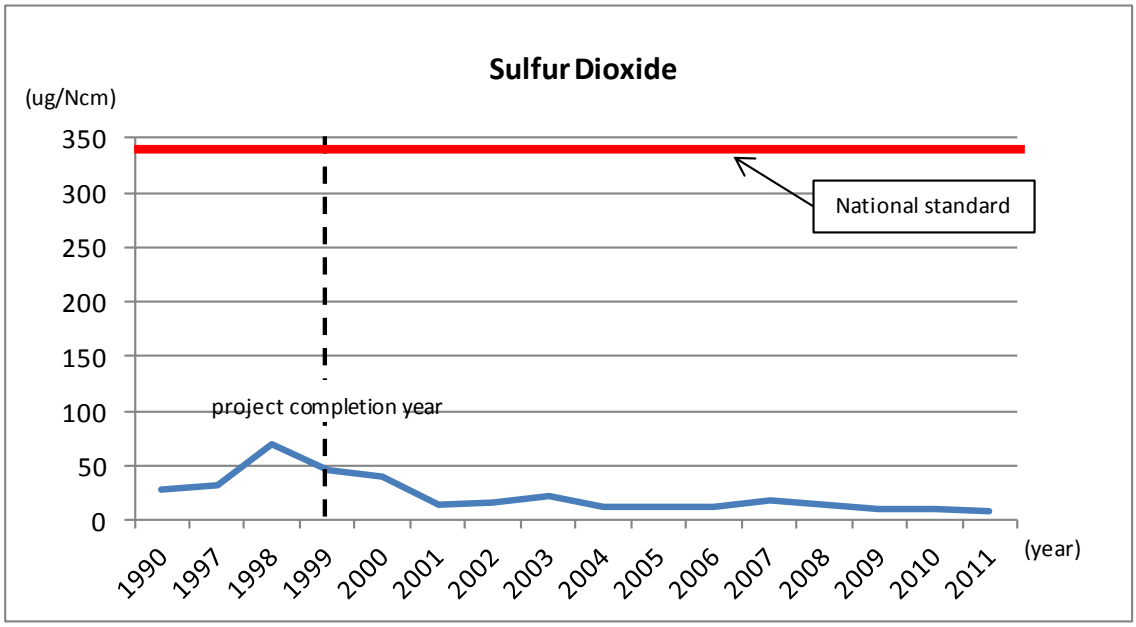


Figure 2: Target Indicator: Sulfur Dioxide

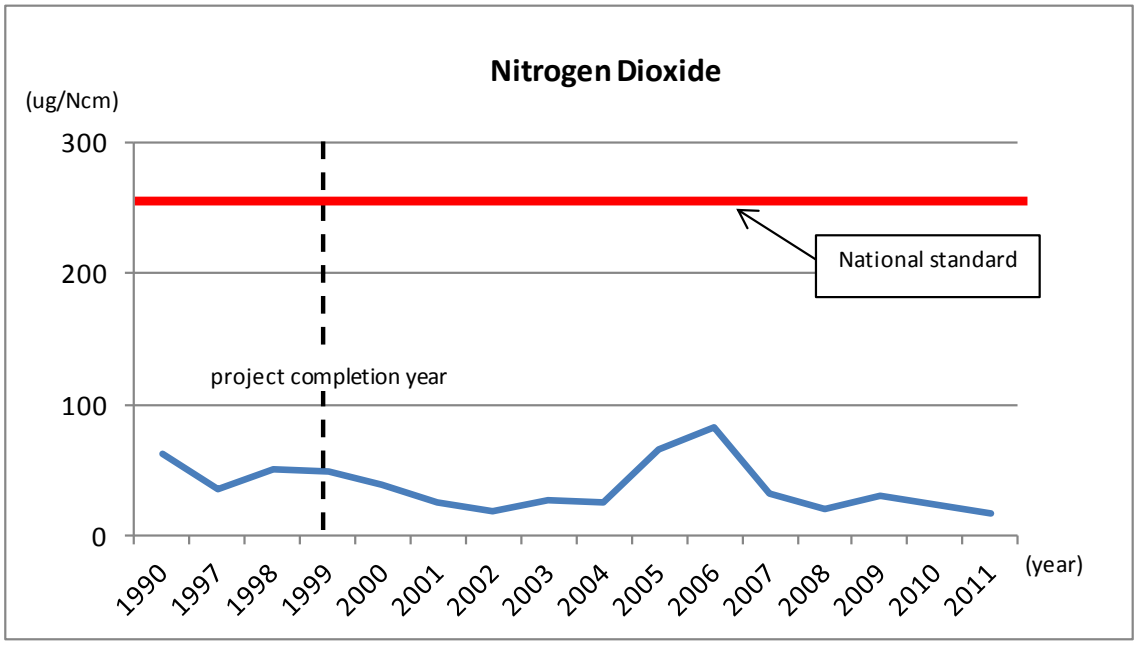


Figure 3: Target Indicator: Nitrogen Dioxide

Annex I shows the plant's general performance as a thermal power plant, and each indicator has reached a roughly appropriate level. However, 27 years have passed since the No. 1 Unit began operations in September 1984, and deteriorating facilities increase the frequency of facility inspections and parts replacement, which has a negative effect on the rate of operation.

3.2.2 Qualitative Effects

During the initial field study, surveyors conducted interviews of a random sample of citizens in all 10 barangays[9] with which the power plant was involved. The target sample for the study was 142 people, and their backgrounds are mainly as follows: average age of 48, 58% women, and among the people from the sample, 50 housewives, 16 agricultural workers and 13 self-employed workers.

The questionnaire asked local citizens to comment on the environment in their neighborhoods at three points in time in particular: before the project (around 1990), just after the project was completed (1999 and on) and at the time of this ex-post evaluation (2012). (Note: Much time had passed since the project was implemented and that it was not always easy for citizens to recall the three times separately. The information below is offered as a reference only.) To be specific, there were five items: coal dust emissions, particulate emissions, noise, odor and sea water intrusion. Interviewees were asked to rate each of the five items on a five-level scale (None/Negligible, Very Slight, Slight, Moderate, Severe) for each of the three times. Below are summarized results from the answers received[10].

The most common reply was "None/Negligible" for every item, regardless of which of the three times, and the ratio of "None/Negligible" increased over time, when we compare "Before project", "Right after project" and "Present". However, the External Evaluator noted "Moderate" and "Severe" answers even for the most recent time, though there were not many of those answers in each item. While the total number of "Moderate" and "Severe" answers for particulate emissions is trending downward, the External Evaluator did not note any change over the years for coal dust emissions, noise or odor. (See Annex II for details)

A breakdown of conditions by barangay clearly shows that the barangays of Baclaran and Carenawan accounted for over 80% of the "Severe" answers for coal dust emissions, noise and odor. This is because these two barangays experience the effects of being directly downwind of the power plant throughout most of the year[11].

Interviews of the Health Sections of the two cities that include the aforementioned 10 barangays showed that there has been improvement to the quality of air and other items.

In addition, an interview with the Batangas Province Office of DENR indicated there were some complaints about environmental problems in the past but lately there have not been any in particular. The office also takes part in multi-party monitoring[12] of this power plant as required by laws and regulations, and it is satisfied with the plant's environmental measures.

3.3 Impact

3.3.1 Intended Impacts

Appraisal documents and such only show outcome levels, and their definition of "impact" is unclear. Given the characteristics of this project, impact can reasonably be viewed as the health

[9] A "barangay" is the smallest administrative unit, managed and operated by the barangay captain, who is appointed in elections within the realms of cities and towns, and functions as a liaison for various government services.

[10] There are no expressways or landfills that could affect the living environment near the citizens' neighborhoods.

[11] It is not possible to confirm particular improvement in these barangays looking only at the total number of "Moderate" and "Severe" answers, but detailed interviews were conducted separately with a barangay counselor (village executive who assists the captain) and a health worker in Baclaran. Those people reported that nearly all items were showing a trend of improvement from year to year and that the extent of the problem recognized was much more minor than indicated on the questionnaires to residents.

[12] According to DENR ordinance, the plant works with outside entities such as DENR and local government units (LGU) to monitor air, noise and water quality each quarter. The results are put together in reports to be shared between the entities that took part in the monitoring.

of local citizens and the stability of the supply-demand balance of electricity on the Luzon Grid. The External Evaluator noted evidence of such impact as follows:

(1) Health of Local Citizens

The External Evaluator was able to confirm that this project had a positive influence on the health of local citizens by combining the following study results of this ex-post evaluation as follows:

① Results of interviews of specific barangay community leaders

Detailed interviews were conducted with a barangay counselor (village executive who assists the captain) and a health worker in Baclaran (Population: 2,329), the barangay that is most susceptible to the effects of being downwind of the power plant. They reported a gradual decrease in the number of people suffering from respiratory ailments from its peak around 1990. It is worth noting two comments about the power plant describing how it sends physicians on a mission once per year to give health checkups and administer medicine and how it sends workers out to answer complaints received from the villagers by listening to them.

② Interviews with health sections of city offices

The aforementioned 10 barangays are a part of the two municipalities of Balayan and Calaca, and interviews were conducted with the Health Section at each city office.

- Balayan (the barangays of Baclaran and Carenawan belong to Balayan):

According to the interviewed physician, problems with coal dust reached their peak in the late 1990s. She also reported a decline of number of people suffering from respiratory ailments from the peak of around 2000 as observed at the clinics[13].

- Calaca:

According to the interviewed nurse, the amount of coal dust visible around their homes before had gone down considerably in recent times, and the number of respiratory ailments had also decreased (though there are no exact statistics).

(2) Stability of the supply-demand balance of electricity on the Luzon Grid

As described previously, the installed capacity of the Luzon Grid was 11,981 MW in 2010. In September 2011, the available capacity and peak demand were 7,963 MW and 7,048 MW, respectively, leaving a reserve capacity of 915 MW. Though not as dire as the time around 1991 when a tight supply-demand balance caused frequent power outages, the above figures indicate more stringent circumstances than those of the mid-1990s, when the supply-demand balance relaxed.

The combined installed capacity of the Calaca Coal-Fired Thermal Power Plant No.1 and No. 2 Units is 600 MW, representing 5% of the Luzon Grid total in 2010. Though not a hearty share, the Calaca Coal-Fired Thermal Power Plant makes a significant contribution to the Luzon Grid considering the aforementioned supply-demand balance and a current status that cannot allow for stoppages. It is worth noting that the External Evaluator noted the same opinions from

[13] However, other factors that may have improved citizens' health include the power plant sending the missions to the barangays to manage their health, the doubling of the local health budget over the previous decade, and the increase in health care staff.

BATELEC, the power distribution association that provides electricity to the Calaca Area, in interviews with related personnel.

3.3.2 Other Impacts

(1) Impacts on the Natural Environment

This project aimed to improve the environment surrounding the power plant, so below are items the External Evaluator was able to study and confirm other than the items written up in the Intended Impacts section.

Action was actually taken on the environmental measures and environmental monitoring for the Calaca Coal-Fired Thermal Power Plant No. 1 Unit was actually ramped up, as conditions of project implementation with regard to the Environmental Compliance Certificate (ECC) for the No. 2 Unit, and the No. 2 Unit was actually built.

It is worth noting that the External Evaluator checked the current status of the land on which the site survey was conducted and did not feel that there were any particular problems with air, odor or noise.

Coal is still being stored outdoors in the coal yard, but the power plant is planning to build a roofed facility to cover the coal this year and further intensify the prevention of coal dust emissions.

(2) Land Acquisition and Resettlement

No land acquisition or resettlement occurred as a result of this project.

(3) Other Impacts

None.

In light of the above, this project has largely achieved its objectives, therefore its effectiveness is high.

3.4 Efficiency (Rating: 2)

3.4.1 Project Outputs

Table 3 shows planned project details and actual results.

Table 3: Planned Project Details and Actual Results

Item	Planned	Actual
1. Prevention of coal dust emissions		
1) Installation of continuous type unloader* 1	2 sets	As planned
2) Installation of water spray system to the coal receiving hoppers	1 set	As planned
3)Repair/reinstallation of dust cover for coal conveyor belts	1 set	None (the cover had been removed from the project scope since it had already been repaired)
4) Tree planting	1 set	Not included in the project scope; the power plant took it upon itself to do this work
5)Installation of windbreak fence around	2 sets	As planned

the coal yard		
2.Prevention of odor due to spontaneous combustion of coal		
1) Restoration of water spray systems	3 sets	As planned
2) Establishment of temperature monitoring system for coal stack piles	1 set	As planned
3. Prevention of sea water contamination: Ramp in the settling pond for easy access of mechanical equipment	1 set	Removed from the project scope because it had already been installed
4. Prevention of particular emissions		
1)Upgrading of electrostatic precipitator	1 set	As planned
2) Retrofit of economizer ash handling system	1 set	As planned
5. Prevention of Noise: Silencer for safety valves	1 set	As planned
6. Environment monitoring: Procurement of environmental monitoring equipment	11 items, 14 sets	6 items, 6 sets*2
7. Other: Training of NPC personnel on coal dealing equipment and ash handling system	On-the-job training (OJT) on the new machinery, overseas training on handling coal and ash, etc.	Details unclear

*Notes:1. A type of machine that unloads coal and other bulk cargo.
2. The main reason for reducing the requirement in the project scope was that, upon a re-examination, the need to introduce some of the machinery had waned.

As described above, a considerable portion of the planned number of machines was installed and introduced. As for the items not introduced as part of this project, some of said machinery and equipment had already been installed, and a re-examination of the project scope revealed that the need to introduce some of it had waned. Thus, changes to the project scope did not have a negative effect on project objectives.

3.4.2 Project Inputs

3.4.2.1 Project Cost (Sub-rating: 3)

The project cost in the initial plan was 6.112 billion yen as foreign currency plus 60.35 million PHP (Philippine Peso) as local currency (290.27 million yen[14]) for a total of 6.402 billion yen. The project called for yen loans to make up the entire amount of foreign currency. Thus the remaining amount of local currency was supposed to be paid out of the Philippines government budget.

The actual project cost was 2.987 billion yen plus 146 million PHP (636.56 million yen[15]) for a total of 3.624 billion yen, and yen loans did indeed make up the entire amount of foreign currency. Accordingly, the remaining amount of local currency was paid out of the Philippines government budget.

If viewed entirely in Japanese yen, the actual project cost was 56.6% of the budget.

[14] The exchange rate (as of January 1992) was 4.81 yen to one PHP.
[15] The exchange rate (as of July 1997) 4.36 yen to one PHP.

Table 4: Project Cost: Planned vs Actual

Units: 1 million yen (foreign); 1000 PHP (local)

Item	Initial Plan (time of appraisal)			Actual Cost		
	Foreign currency (all yen loans)	Domestic currency (all Philippine government funds)	Total (1 million yen)	Foreign currency (all yen loans)	Domestic currency (all Philippine government funds)	Total (1 million yen)
Facilities for environmental measures	4,771	46,000	4,993	2,850	138,300	3,453
Facilities for environmental monitoring	95	500	97	81	7,100	112
Consulting services	96	1,000	101	56	600	58
Price escalation	595	8,074	634	0	0	0
Contingency	555	4,774	578	0	0	0
Total	6,112	60,348	6,402	2,987	146,000	3,624

Note: The exchange rate was 4.81 yen per one PHP in the initial plan and 4.36 yen per one PHP as of July 1997

As demonstrated above, the actual project cost came in far below the initial budget. Below are the main reasons for the disparity:

- Project scope cancellation in certain areas (dust cover for the coal transport conveyor, a portion of environmental monitoring instruments)
- Actual purchase prices were lower than expected (especially the high-priced continuous coal unloader and coal storage yard windbreak fence)
- Reduced costs in Japanese yen because of the strong yen

Even if the initial budget were adjusted to 6.25 billion yen to account for the project scope cancellation in certain areas, the actual cost would still come in at only 58.0% of the budget.

3.4.2.2 Project Period (Sub-rating: 1)

This project was supposed to last for three years and three months from the time of the loan agreement (L/A) signing in April 1993 until the completion[16] of machinery installation in June 1996. L/A was actually signed in March 1993, but the machinery installation was completed in October 1999. In other words, the project period was supposed to be 39 months but lasted for 80, which is 205.1% of the plan, grossly exceeding the planned period.

Overall, each machine was installed roughly according to plans, but it probably took time to procure the machines before they could be installed. The External Evaluator attempted to obtain background information during the field study but was unable to do so because maintenance organizations had left few records of the past. JICA internal documents as at 1998 include the following information:

[16] Generally, the project period begins on the day L/A is concluded, but the place for explaining the project period on the appraisal report made no mention of the L/A conclusion date. However, using only this fact to assign the project period start to the initial activity (activities involving prevention of coal dust emissions and drainage outflow) would mean that this project was handled differently than other projects, so the project period start date is the day on which the L/A was concluded as it would be in general cases.

(1) Procured the second continuous coal unloading equipment after procuring and testing the first because its effectiveness with the coal to be used needed to be confirmed beforehand.
(2) Careful consideration was required on the need for and method of increasing the number of electrostatic precipitators because the quality of domestic coal supplied decreased and the ratio of coal blending with foreign coal changed.
(3) Rebid on ash handling equipment and mufflers three times.

The above procurement issues likely had more of a hand in delaying on-site operations than any external factors, but they were probably unavoidable in the pursuit of proper machinery.

3.4.2.3 Consulting Service: Details Unclear

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

Due to the nature of the project, a quantitative analysis of the internal rate of return was not possible, so there are no planned values. Thus, the External Evaluator has omitted ex-post recalculations.

In light of the above, although the project cost was within the plan, the project period was significantly exceeded. Therefore efficiency of the project is fair.

3.5 Sustainability (Rating: 3)

3.5.1 Structural Aspects of Operation and Maintenance

The Calaca Coal-Fired Thermal Power Plant was sold off to DMCI Holdings, Inc., in July 2009.

DMCI Holdings was established in 1995 and was listed on the Philippine Stock Exchange in the same year. The company has developed its business around construction and engages in projects in construction, real estate, water, mining, electric power and roads. The Calaca Coal-Fired Thermal Power Plant is operated by the Sem-Calaca Power Corporation, an entity within DMCI's Mining Division (it belongs to that division because the division provides coal for fuel). DMCI plans to ramp up its work in power generation in the future.

The Sem-Calaca Power Corporation employs 323 people and is comprised of departments specializing in facilities, general affairs, operations, coal management, maintenance and technical services. There are 165 employees in the Operations and Maintenance Division (98 in the Operations Division, 67 in the Maintenance Division) (employees are generally the same NPC employees as those from before the privatization).

According to interviews with the power plant, employee duties are clearly divided and there are enough of them to handle the work. Annual turnover and retirement rates are low, and the organization is stable.

The organization is stable, employee duties are clearly divided, and there are a sufficient number of employees to carry out operations and maintenance at the power plant. In light of the above, there are no particular structural issues.

3.5.2 Technical Aspects of Operation and Maintenance

There are probably no particular technical issues, either. There are at least four employees working on power plant operations and maintenance who have at least 15 years of experience and degrees in specialized fields that qualify them to be core engineers.

The actual work is done according to manuals[17], and power plant personnel have indicated that they do not face any particular technical problems in terms of operations. Operation and effect indicators are largely adequate and, combined with previous information, show that there are no particular problems with the technical level of employees engaged in operations and maintenance management. Multiple employee training programs are being implemented for employees at several levels in line with annual training plans.

3.5.3 Financial Aspects of Operation and Maintenance

This section will demonstrate that the maintenance budget is sufficient and that the actual business of the power plant is running in the black. There are no particular financial issues; return on sales (net profits) in 2010 and 2011, the two years following the 2009 privatization, were 16.5% and 19.3%, respectively, good marks when compared to management benchmarks for Japanese and foreign electric power providers.

Deteriorating facilities at power plant buildings that had been in service for many years warranted more frequent facility inspections and parts replacement. Thus actual maintenance costs increased from 380 million PHP in 2007 to around 1.023 billion PHP in 2011. The amount required to cover maintenance costs has been secured, and important parts are being replaced as necessary as reported in the next section. The Sem-Calaca Power Corporation, which operates the power plant, posted a net profit of 1.437 billion PHP in 2010.

3.5.4 Current Status of Operation and Maintenance

As Table 5 demonstrates, the main facilities are largely operating well.

Table 5: Main Facilities/Machinery Operational Status

Facility/Machinery Name	Status	How problems are handled
Continuous type unloader of coal	One of the two machines is not running due to its age.	The power plant has procured another unloader and is now running a total of two; this did not interfere with work.
Water spray systems to the coal receiving hoppers	Operating without any particular problems.	
Windbreak fence	Operating without any particular problems.	
Water spray systems for the prevention of odor due to spontaneous combustion of coal	Operating without any particular problems.	
Temperature monitoring system for coal stack piles	Operating without any particular problems.	
Electrostatic precipitator	Operating without any particular problems.	Defective parts[18] are currently being replaced.
Ash handling system	Still operating, but some pumps are under repair.	See “Status” to the left.
Silencer for safety valves	Operating without any particular problems.	

[17] 1. BMH Marine Operation and Maintenance Manual for Screw Type Coal Unloader; 2. ABB Operations and Maintenance Manuals for Electrostatic Precipitator – First Row; and others.

[18] To be specific, collecting plates, emitting wires, EP hopper internal parts, etc., are being replaced.

Environmental monitoring system	Some are in operation and others have become unusable due to age.	Instruments that have become unusable are being replaced as necessary[19].

No major problems have been observed in the structural, technical or financial aspects of the maintenance of this project. Therefore sustainability of the project effect is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

Implementation of this project was in line with the policies of the Republic of the Philippines (in the electric power and environmental sectors) and its development needs and with Japan's ODA policy. Therefore its relevance is high. The External Evaluator was able to see evidence that the implementation of this project reduced air pollution and noise roughly as planned and was able to infer that it had a net positive effect on the health of local citizens. While the project stayed within the budget for project cost, the project period significantly exceeded the plan; therefore efficiency of the project is fair. No major problems have been observed in the structural, technical or financial aspects of the operation and maintenance of this project; thus sustainability of the project effect is high.

In light of the above, this project is evaluated to be highly satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

Facilities are being operated well at present, but it is expected to maintain and update equipment with continued consideration paid to the surrounding environment because some equipment provided on loans is due for updating.

4.2.2 Recommendations to JICA

None.

4.3 Lessons Learned

One noteworthy fact is, after the implementation of this project, that the power plant continually improves the systems themselves and sends physicians and nurses on a mission once per year to surrounding communities (barangays) it affects to give health checkups and administer medicine to citizens. In addition, local citizens offered praise for the way the plant promptly sends workers out to answer any complaints received from the villagers by listening to them. This approach by the power plant likely contributes to the mitigating of the negative effects of power plant operation to the area and can serve as a good example of how power plants, whether public or private, should carry out such operations.

[19] For example, the old Portable SO2 Analyzer has been replaced by an Ambient Air Quality Monitoring System.

Comparison of the Original and Actual Scope of the Project

Item	Original	Actual
1.Project Outputs		
(1) Prevention of coal dust emissions		
1) Installation of continuous type unloader	2 sets	As planned
2) Installation of water spray system to the coal receiving hoppers	1 set	As planned
3)Repair/reinstallation of dust cover for coal conveyor belts	1 set	None (the cover had been removed from the project scope since it had already been repaired)
4) Tree planting	1 set	Not included in the project scope; the power plant took it upon itself to do this work
5)Installation of windbreak fence around the coal yard	2 sets	As planned
(2) Prevention of odor due to spontaneous combustion of coal		
1) Restoration of water spray systems	3 sets	As planned
2) Establishment of temperature monitoring system for coal stack piles	1 set	As planned
(3) Prevention of sea water contamination: Ramp in the settling pond for easy access of mechanical equipment	1 set	Removed from the project scope because it had already been installed
(4) Prevention of particular emissions		
1)Upgrading of electrostatic precipitator	1 set	As planned
2) Retrofit of economizer ash handling system	1 set	As planned
(5) Prevention of Noise: Silencer for safety valves	1 set	As planned
(6) Environment monitoring: Procurement of environmental monitoring equipment	11 items, 14 sets	6 items, 6 sets
(7) Other: Training of NPC personnel on coal dealing equipment and ash handling system	Training in and outside the Philippines	Details unclear
2.Project Period	April 1993 - June 1996 (39 months)	April 1993 - October 1999 (80 months)
3.Project Cost Amount paid in Foreign currency Amount paid in Local currency Total Japanese ODA loan portion Exchange rate	 6,112million yen 290million yen (60 million PHP) 6,402million yen 6,112million yen 1 peso = 4.81 yen (As of January 1992)	 2,987million yen 637million yen (146 million PHP) 3,624million yen 2,987million yen 1 peso = 4.36 yen (As of July 1997)

Annex I. Performance indicators of Calaca coal power plant

Year	1997	2000	2003	2004	2005	2006	2007	2008	2009	2010	2011
Max Outputs (MW) （Upper: No.1 unit, Lower: No.2 unit）	300	288	289	258	207	207	204	183	183	186	187
	300	300	294	277	295	300	298	214	217	251	310
Load Factor (%)*	81.6	69.1	61.5	58.0	69.8	74.2	76.6	87.5	85.3	85.5	82.5
	72.2	73.9	65.8	73.6	64.3	72.5	66.4	83.8	85.1	68.0	67.7
Gross thermal efficiency (%)*	36.6	35.1	33.6	30.9	31.6	31.5	33	33.6	32.8	30.9	30.8
	34.7	32.7	32.0	31.8	32.7	32.2	32.2	31.4	31.9	31.2	31.5
Net Energy Generation (GWh)	1,482	1,202	955	891	1,009	753	988	552	651	840	572
	703	1,192	1,147	1,229	704	1,340	1,056	424	990	668	1,065
Energy Sales, Luzon (MillionKWh=GWh)	27,354	28,473	22,656	23,622	23,458	22,787	23,883	24,003	17,392	n.a.	n.a.

Source: Calaca power plant

*Note: This is a reasonable level as compared to Japanese and other countries' performance.

Annex II. Results of questionnaire survey to local residents living around the plant (Number of repliers)

1. Coal Dust Emissions

	Before	After	Ex-post evaluation*
None/Negligible	40	47	64
Very slight	41	39	27
Slight	33	25	21
Moderate	14	17	13
Severe	11	12	14
Don't Know	3	2	3

*（2012）

2. Particulate Emission

	Before	After	Ex-post evaluation
None/Negligible	51	56	69
Very slight	39	33	27

Slight	17	25	19
Moderate	16	10	7
Severe	2	3	5
Don't Know	17	15	15

3. Noise

	Before	After	Ex-post evaluation
None/Negligible	45	40	52
Very slight	47	48	43
Slight	24	27	25
Moderate	11	16	12
Severe	5	3	1
Don't Know	10	8	9

4. Odor

	Before	After	Ex-post evaluation
None/Negligible	34	38	53
Very slight	34	27	22
Slight	31	33	24
Moderate	21	23	22
Severe	14	18	18
Don't Know	8	3	3

5. Sea Water Intrusion

	Before	After	Ex-post evaluation
None/Negligible	27	27	27
Very slight	4	4	4
Slight	1	1	1
Moderate	0	0	0
Severe	0	0	0
Don't Know	110	110	110

The Republic of the Philippines

Ex-Post Evaluation of Japanese ODA Loan
Central Luzon Irrigation Project

External Evaluator: Haruko Awano, IC Net Limited

0. Summary

This project was conducted to increase agricultural production in the Central Luzon Region of the Philippines, by rehabilitating the existing facilities of the Upper Pampanga River Integrated Irrigation Systems (hereinafter the "UPRIIS") and by revitalizing the Tarlac Groundwater Irrigation System, thereby contributing to the improvement in the livelihoods of the local farmers.

Since this project consists of two components, the Casecnan Multipurpose Irrigation and Power Project-Irrigation Component (hereinafter the "CMIPP-IC") and the Tarlac Groundwater Irrigation System Reactivation Project (hereinafter the "TGISRP"), an evaluation was done first separately for each component and the whole project was then evaluated.

This project is fully consistent with the development policies and development needs of the Philippines and Japan's aid policy to support agriculture and rural development; therefore its relevance is high. The actual planted areas and yield were 103% of the planned ones; hence the overall effects and impacts of the project were high. The project's costs slightly exceeded the plan while the project period significantly exceeded the plan. Therefore the efficiency of the project was low. With regard to sustainability, although no major problems have been observed in the operation and maintenance of the CMIPP-IC component, major problems have been observed in terms of the structural and financial aspects of the operation and maintenance of the TGISRP component. Therefore the sustainability of the effects of the whole project is fair. In light of the above, this project is evaluated to be partially satisfactory.

1. Project Description

Project Location

Super Diversion Canal of CMIPP-IC

Canal of TGISRP

At the time of the appraisal in 1998, agriculture in the Philippines was an important industry, which accounted for 20% of GDP and employed nearly 50% of the labor force. However, demand for rice, the staple food, was higher than the domestic supply due to the high population growth rate, which forced the country to import rice. In addition, two-thirds of the poor were farmers and fishermen in rural areas. Hence an increase in food production and the improvement of the livelihoods of farmers had become an urgent and important task in order to achieve a stable supply of food, the eradication of poverty, and the establishment of social justice. Faced with this situation, the government set priority areas for increased food production and took measures with a focus on constructing and improving irrigation facilities. However, due to frequent natural disasters and improper maintenance, the irrigation facilities were damaged or become obsolete.

The Central Luzon plains are the largest grain basket in the Philippines and are expected to play an important role in supplying food to the surrounding areas, including Metro Manila. The two components of this project are located in the provinces of Nueva Ecija and Tarlac in Central Luzon Plains. (See Figure 1 on the next page.)

The UPRIIS, which is the target system of the CMIPP-IC component, is the largest national irrigation system in the center of the grain basket of the Central Luzon plains. However, there were problems of water shortages in the reservoir of Pantabangan, the major water source, and damaged and obsolete facilities caused by natural disasters and improper maintenance. All this resulted in the irrigation system that was not fully functional. For water resources, it was expected that the government plan of Casegunan power generation would supply additional water to the reservoir of Pantabangan and it was needed to rehabilitate the damaged facilities to maximize the effective use of irrigation water in order to expand rice production.

On the other hand, in Tarlac province and the surrounding areas, many deep wells were built through various forms of assistance such as yen loans in the 1970s. However, since the electricity cost soared due to the oil crisis and the burden of operating costs put pressures on farmers, operation and maintenance had become difficult. Farmers in the region had been craving for irrigation water for many years and it was decided to reactivate the deep wells using diesel-powered pumps.

1.2 Project Outline

This project was conducted to increase agricultural production in the Central Luzon Region of the Philippines, by rehabilitating the existing facilities of the UPRIIS and by revitalizing the Tarlac Groundwater Irrigation System, thereby contributing to the improvement of local farmers' livelihoods.

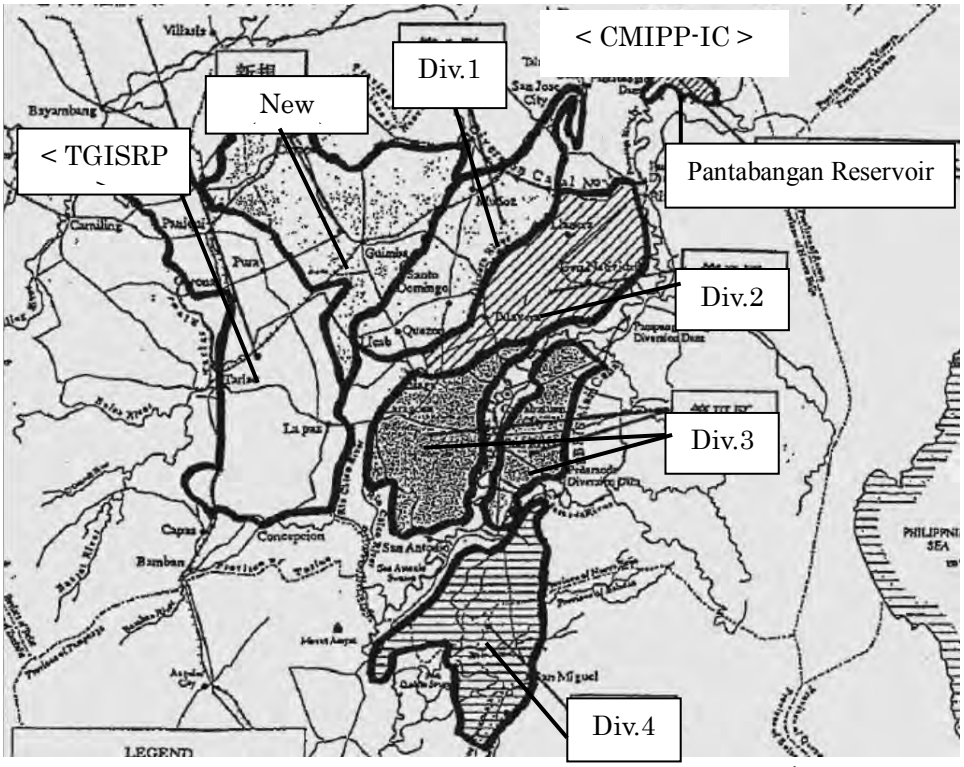


Figure 1: Layout of Central Luzon Irrigation Project [1]

Loan Approved Amount / Disbursed Amount	14,136 million yen / 11,590 million yen
Exchange of Notes Date / Loan Agreement Signing Date	September 1998 / September 1998
Terms and Conditions	(Civil Works) Interest Rate 2.2%, Repayment Period 30 years (Grace Period 10 years), General Untied (Consulting Service) Interest Rate 0.75%、Repayment Period 40 years (Grace Period 10 years), Partially Untied
Borrower / Executing Agency	The Government of the Republic of the Philippines / National Irrigation Administration (NIA)
Final Disbursement Date	January, 2009
Main Contractor	Obayashi Corporation (Japan) / Ube Industries, Ltd.(Japan) / Toyo Construction Co., Ltd. (Japan) (JV), China Geo Engineering Corporation (China), China State Construction Engineering Corporation (China), China International Water & Electric Corporation (China)

[1] The CMIPP-IC Component is composed of five divisions of UPRIIS: Div. 1 to 4 where the facilities were rehabilitated and Div. 5 where the facilities were newly constructed. The TGISRP is located adjacent to the west side of Div. 5 of the CMIPP-IC.

Main Consultant	Nippon Koei Co., Ltd. (Japan) / Sanyu Consultants Inc. (Japan)
Feasibility Studies, etc.	F/S (1984) by Yen Loans, F/S (1996) by Philippine Government, SAPS (1996) by Yen Loans
Related Projects (if any)	"Tarlac Groundwater Irrigation Project" JICA ,1974 "Casecnan Multipurpose Irrigation and Power Project" Philippine Government , 1994 – 2000, "Research and Development Project on High Productivity Rice Technology", JICA, August 1997 – July 2002 "Project on the Development and Promotion of Location - Specific Integrated High - Yielding Rice Technologies", JICA, November 2004 – November 2009

2. Outline of the Evaluation Study

2.1 External Evaluator

Haruko Awano, IC Net Limited

2.2 Duration of Evaluation Study

Duration of the Study: November 2011 – October 2012
Duration of the Field Study: February 3 – 12, 2012, March 3 – 24, 2012, May 20 – 31, 2012, July 17 – 20, 2012

2.3 Constraints during the Evaluation Study

Since there was a significant change of scope in the CMIPP-IC component from the time of the appraisal to the time of the loan agreement, the evaluation of the component was done based on the plan which was agreed upon based on the detailed design conducted after the loan agreement. However, since a certain period of time had passed after the project's completion, information on the scope and project period was insufficient at the time of ex-post evaluation. In addition, the Communal Irrigation System (CIS) and the Small Water Impounding Ponds (SWIPs), which were rehabilitated under the CMIPP-IC, were under the supervision of private organizations and information on the effects and operations and maintenance (O&M) could not be obtained.

3. Evaluation Results (Rating: C[2])

3.1 Relevance (Rating: 3[3])

3.1.1 Relevance with the Development Plan of the Philippines

At the time of the appraisal, the National Mid Term Development Plan of 1993-1998 was aimed at the expansion of irrigated areas by improving irrigation facilities in order to promote food security. The Development Plan of the National Irrigation Authority (NIA) of 1990 – 2000 envisaged an increase in irrigated areas from 1.469 million ha out of a 3.126 million irrigable areas in 1989 to 2 million ha by 2000. In Tarlac Province where TGISRP was conducted, the NIA planned the Balog-Balog Multipurpose Project (BBMP) which will irrigate 4 million ha.

At the time of the ex-post evaluation, the National Mid Term Development Plan in the

[2] A: Highly satisfactory; B: Satisfactory; C: Partially satisfactory; D: Unsatisfactory
[3] 3: High; 2: Fair; 1: Low

Philippines (2011 – 2016), is aiming at inclusive growth and infrastructure development; and the improvement of local irrigation systems was cited as one of the strategies. In the area of agricultural development, improved agricultural productivity and income has become a priority, and measures included the promotion of irrigation systems. The Food Staples Sufficiency Program (2011 – 2016) of the Department of Agriculture aims at increasing planted areas, yields and the production of rice to reduce dependence on imported rice. In order to expand irrigated areas, the program focuses on the rehabilitation of existing irrigation facilities and the construction of new facilities. With regard to the region-wise rice production, since Region 3 is the largest rice producing region, which accounts for 20% of the total rice production in the country, the program set as a target that rice production in the region would increase by 19% per year.

The Six-Year Irrigation Plan of the NIA starting from 2012 plans to construct new irrigation facilities for 166,671 ha and to rehabilitate 284,399 ha in the initial three years. The provinces of Nueva Ecija and Tarlac, where the project is located, state in their development plans from 2011 and 2008, respectively, that agriculture is a key strategic sector.

As above, the project is highly consistent with the policies of the national government and the NIA which have been addressing the expansion of irrigation facilities to increase rice production both at the time of the appraisal and at the ex-post evaluation. In addition, it was confirmed that the project is in line with the current policies of the provincial governments which emphasizes agriculture.

3.1.2 Relevance with the Development Needs of the Republic of the Philippines

At the time of the appraisal, demand for rice was greater than the domestic supply due to the high growth rate of the population which was at 2.3% (average from 1990 to 1995). This lead to an increase in imports from 1995 to 1998 and the reduction of the self-sufficiency rate of rice production to 71%. Therefore, the increase of rice production was an urgent and important issue.

Region 3, where the project was conducted, is adjacent to Metro Manila and the important supplier of rice to it. The Provinces of Nueva Ecija and Tarlac where this project is located produced 10.7% of the rice of the country at the time of the appraisal in 1998. However, the largest national irrigation system of the UPRIIS in Nueva Ecija province had problems with insufficient water in the major source of water, i.e., the reservoir in Pantabangan. Damaged and obsolete irrigation facilities also lead to insufficient rice production in the region, and the rehabilitation of the facilities became an urgent need. Against this background, it was expected that additional irrigation water would be supplied to the major source of the reservoir by the national program of the Casecnan Power Generation Project[4]. On the other hand, in Tarlac province which has abundant groundwater, groundwater irrigation systems were built in the 1970s with support from sources such as yen loans. However, it became difficult to operate and maintain the systems due to the rising cost of electricity, and many facilities became un-operational. The lahar from Mount Pinatubo that erupted in 1991 buried intake facilities of the national irrigation systems in the target area and the water supply to the paddies was suspended. This had a significant impact on the livelihoods of thousands of farmers and restoration of irrigation facilities was needed. Farmers were planting rice and corn using rain water and shallow tube wells (STWs). However, in the dry season when the aquifers were low,

[4] It was expected that the amount of reserve water would increase from 1.3 billion tons to 2.1 billion tons in 2000.

areas irrigated by STWs were reduced. Hence, farmers in the region had been craving for water for irrigation for many years.

The self-sufficiency ratio of rice had increased to an average rate of 90.6% during the period of 1999 – 2003, but decreased to an average of 84.7% during the period of 2004-2010, and the need to increase rice production was high even at the time of the ex-post evaluation. In Region 3, the largest rice producing region in the country, rice production by the provinces of Nueva Ecija and Tarlac accounted for 10.6% of the entire production in the country and played an important role in supplying surplus rice to Metro Manila and other regions[5].

As stated above, at the time of the appraisal and the ex-post evaluation, the need to rehabilitate and restore the irrigation facilities in Central Luzon Region was high.

3.1.3 Review Process of the Project

The Philippine government conducted a Feasibility Study (F/S) in 1996 for the CMIPP-IC. The scope at the time of the appraisal focused only on the rehabilitation of existing facilities, and included detailed designs for the new irrigation areas without the construction of new facilities[6]. However, the NIA requested to add the construction of facilities in new areas, which was included in the Loan Agreement.

For the TGISRP, a study of the Special Assistance for Project Sustainability (SAPS) was conducted in 1996 for the groundwater irrigation systems built in the early 1970s. The study concluded that the reactivation and sustainable operation of the systems would be possible using diesel-powered pumps as a power source[7]. Shallow tube wells (STWs) for irrigation were prevalent in the target area[8] but the SAPS concluded that the STWs were used for the purpose of supplying irrigation water to add to rain water in the wet season and the supply of irrigation water during the dry season was not enough. The SAPS plans to introduce profitable cash crops in the dry season and proposed the establishment of a model farm to promote the cash crops. Finally, it was decided that the CMIPP-IC and TGISRP should be combined and implemented as the Central Luzon Irrigation Project.

However, the review processes of the two components had the following problems.

(1) CMIPP-IC

At the time of appraisal, the rehabilitation of existing facilities was the center of the project scope. Although there was a request from the NIA to construct the facilities and add new irrigated areas, JICA did not include it in the project scope as a detailed study was needed. However, at the time of the conclusion of the Loan Agreement (L/A), new irrigation facilities were added based on the adamant request of the NIA. At that time, the project scope such as the irrigated areas was to be confirmed during the project period and the economic benefit was not re-calculated. It can be said that the process to get consensus before concluding L/A with the

[5] Based on the data of from the Department of Agriculture. The self-sufficiency rates of the provinces are high at 317% and 233% in 2010.

[6] Based on the Minutes of Discussion(M/D) between JICA and the Philippine government in October 1997

[7] Out of the 53 deep wells constructed in the 1970s, three had converted the power source to a diesel engine with the assistance of the NIA. The SAPS found that these wells were available for irrigation and the economic effects of using the diesel engine was recognized, which lead to the proposal to reactivate the deep wells using the diesel engine instead of electricity. For the costs of diesel fuel, the study on the willingness to pay was conducted for the target farmers and it was analyzed that the farmers could afford the diesel fuel price at the time. (For the fluctuation of diesel fuel prices, refer to the Figure 5 on effectiveness.)

[8] The SAPS confirmed that about 900 pumps for STWs had been granted by the Japanese and Philippine governments since 1994 and farmers themselves had purchased 2,724 pumps.

NIA was not enough. The detailed design was carried out after the start of the project but since the budget was significantly increased, it took a longer time to coordinate with JICA and the relevant agencies in deciding the scope. It was the end of 2001 when the project scope was finally agreed upon, about two years behind the plan at the time of the appraisal. This resulted in a significant extension of the implementation period.

(2) TGISRP

The SAPS reviewed the BBMP in which the NIA planned to construct irrigation facilities in Tarlac Province and judged that the BBMP would not duplicate the efforts of this project. However, even at the time of the appraisal, it was confirmed that the BBMP would cover the same areas as this project. According to the NIA, the implementation of the BBMP was not guaranteed. It also seemed that it would take a long time for the BBMP to be implemented, and that it was also necessary to reactivate the ground water irrigation system to meet the urgent needs of farmers after the eruption of Mt. Pinatubo. It was expected that this project would complement the BBMP since deep wells would be utilized to meet the needs for sufficient irrigation water in the downstream area even after the BBMP would be implemented.

At the time of the ex-post evaluation, the BBMP was waiting for approval by the Cabinet. Once the BBMP is carried out, there is a possibility that the utilization rate of the deep wells constructed by this project would be reduced since farmers would use the gravity irrigation system provided by the BBMP where it is available, which may affect the O&M of the deep wells.

3.1.4 Relevance with Japan's ODA Policy

The "Overseas Economic Cooperation Policy" issued by JICA (former JBIC) in 1999 intended to help reduce poverty in the recipient countries. The Country Assistance Program for the Philippines in 2000 aims to reduce poverty and regional disparities, and puts importance on the improvement of rural infrastructure for agricultural and rural development.

From the above, this project is fully consistent with the development policies and needs of the Philippines which are to increase rice production by improving the irrigation facilities, and also Japan's aid policy which focuses on agricultural and rural development. However, the processes to review the two components were not sufficient in terms of consensus building with the NIA (for the CMIPP-IC) and the study of a possibility of duplication with another project (for the TGISRP).

3.2 Effectiveness[9] (Rating: 3)

＜CMIPP-IC Component＞

3.2.1 Quantitative Effects (Operation and Effect Indicators)

(1) Irrigated and planted area

The table below shows the Firmed Up Service Areas (FUSA), the areas that can be provided with irrigation water, and the irrigated and planted areas, the areas which are actually irrigated and planted, at the time of the appraisal, at the time when the scope of the project was agreed on after the detailed design, and the actual performances. The main target of this project is the rehabilitated and new area of the UPRISS which the NIA operates as part of a national irrigation system. However, at the time of the agreement on the scope of the project, the small-scale

[9] The sub-rating for impact is to be taken into consideration in the effectiveness.

rehabilitation of the Community Irrigation Systems (CIS) and the Small Water Impounding Ponds (SWIPs), which would be operated by farmer organizations, were added as new areas[10].

Table 1: FUSA, Irrigated and Planted Areas of the Project Target Area of the CMIPP-IC[11]

(Unit: ha)

Items		Appraisal	Agreement of Scope (Planned Value)	Actual[12] (2011)	Actual / Planned
FUSA	Total	82,000	82,018	N/A	N/A
	Total UPRIIS(Rehabilitated + New areas)	82,000	71,864	75,744	105%
	Rehabilitated area (UPRIIS)	82,000	55,100	58,865	107%
	New area (UPRIIS)	-	16,764	16,879	101%
	New area (CIS/SWIP)	-	10,154	N/A	N/A
Irrigated and planted area of rice (Wet)	Rehabilitated area (UPRIIS)	N/A	55,100	54,936	100%
	New area (UPRIIS)	-	16,764	13,201	79%
	New area (CIS/SWIP)	-	10,154	N/A	N/A
Irrigated and planted area of rice (Dry)	Rehabilitated area (UPRIIS)	N/A	54,100	57,038	105%
	New area (UPRIIS)	-	14,469	14,253	99%
	New area (CIS/SWIP)	-	10,154	N/A	N/A
Irrigated and planted area of rice (Annual)	Total	N/A	160,741	N/A	N/A
	Total UPRIIS(Rehabilitated New areas)	N/A	140,433	139,428	99%
	Rehabilitated area	N/A	109,200	111,974	103%

[10] For CIS/SWIP, only the data for 2008 could be obtained from the NIA. The irrigated and planted areas for rice were 10,041 ha in the wet season and 2,800 ha in the dry season, and the annual irrigated and planted area in total was 12,841 ha. Due to the shortage of irrigation water in the dry season, diversified crops were planted in some areas. The data after 2008 could not be obtained from the project office or the provincial office of the NIA. Therefore, the rate of actual / planned was estimated excluding the data of CIS/SWIP. However, the rating of the effectiveness of this project remains unchanged even if assumed that the same areas the one in 2008 planted in CIS/SWIP, or in the case of excluding CIS/SWIP area from the actual performance against the total areas planned, as explained by the footnote 13.

[11] Since the data on irrigated and planted areas were not available for the areas rehabilitated by this project, the areas were estimated using the cropping efficiency (irrigated and planted area/ FUSA) of Div. 1 to 4 in the dry and wet season, which are 92.3% and 96.4% respectively.

[12] When the scope of the project was agreed upon, it was assumed that the benefits of 100% of the plan would start three years after the completion of the project. Thus the ex-post evaluation used the data of 2011 only when three years passed from the project's completion, and did not use the averages of recent years (same for Table 2). The average annual irrigated and planted areas of rice of the UPRIIS from 2009 and 2011 were 138,119 ha and were slightly less than the actual values of 2011.

	(UPRIIS)				
	New area (UPRIIS)	-	31,233	27,454	88%
	New area (CIS/SWIP)	-	20,308	N/A	N/A
Irrigated and planted area of cash crops (dry)*	Rehabilitated area (UPRIIS)	N/A	2,630	N/A	N/A
	New area (UPRIIS)	-	2,295	152	7%

Source: Appraisal documents, documents on the changes of the scope of the project after the detailed design, JICA internal documents, NIA documents

Note: * It was planned that rice would be planted in all the FUSA and no cash crops would be planned in the wet season.

When the scope of the project was agreed upon, the FUSA of the rehabilitated area was reduced and new areas were added compared to the scope at the appraisal, but the total planned FUSA was 82,018 ha which was almost the same as the one at the time of the appraisal. It was planned to irrigate and plant rice in 160,741 ha (140,433ha for the UPRIIS) during the year because of double cropping. At the time of the ex-post evaluation, the irrigated and planted areas of the UPRIIS were 139,428 ha which accounted for 99% of the plan for UPRIIS[13].

In the rehabilitated areas of the UPRISS, the FUSA at the time of the ex-post evaluation was 58,865 ha which was larger than the planned area of 55,100 ha. The annual irrigated and planted areas of rice exceeded the plan (103% of the plan). On the other hand, the annual irrigated and planted areas of rice for the new UPRIIS areas were 88% of the plan. The data of CIS/SWIPS could not be obtained.

As stated above, the rehabilitated area of the UPRIIS has achieved the target in planted areas of rice. However, in the new areas of the UPRIIS, the irrigated and planted areas for rice in the wet season were 13,201 ha, and 14,405 ha (a total of 14,253 ha of rice planted areas, and 152 ha of cash crop areas) in the dry season; the remaining 3,678 ha in the wet season and 2,474 ha in the dry season were not planted, although the actual FUSA was 16,879 ha. The main reasons for the gaps are as follows.

① In an area, canals were included in the plan but could not be constructed and planted. However, the area was included in the FUSA at the completion of the project[14].

② The areas that the farmers applied to the NIA to get irrigation services were less than the FUSA. The NIA has reason to believe that farmers may be using irrigation in areas other than the areas they claimed, but does not grasp the exact data for the irrigated and planted areas. The Division 5 of the UPRIIS office plans to conduct parcellary mapping

[13] Since the data of CIS/SWIP was not available at the time of the ex-post evaluation, an evaluation on the effects of the overall component could not be made. However, if the same areas as in 2008 were irrigated and planted for CIS/SWIP, the total irrigated and planted areas would be152,269 ha (＝139,428 + 12,841), which is 101% of the plan. When the areas of CIS/SWIP are not included, the achievement ratio of the plan for total irrigated and planted area is 87% (=139,728/160,741).

[14] According to the CMIPP-IC Office of the NIA which was responsible for the implementation of the project, the area where the canals were not constructed was included in the FUSA with the assumption that the area could be irrigated by constructing on-farm facilities by farmers. Upon completion of the project, the UPRIIS office, and the central office of the NIA agreed on the FUSA submitted by the CMIPP-IC office but a detailed check was not carried out in the field. The Division 5 of the UPRIIS Office which is responsible for O&M of the area is of the opinion that the area should not have been included in the FUSA. At the time of ex-post evaluation, the Division 5 plans to construct the necessary facilities in the area and includes them in the action plan.

in order to examine whether there is underreporting by farmers and to identify the exact extent of the FUSA.

③ A part of the downstream area of the Chico River cannot be planted in the wet season due to inadequate drainage[15].

With regard to the FUSA, upon completion of the project, it was necessary to not just verify the documents but to examine and agree in the field with the office of the UPRISS, which is responsible for O&M. In order to expand the planted area, the Division 5 of the UPRISS plans to construct additional canals, conduct parcellary mapping to get the exact extent of the FUSA and planted areas, and conduct the rehabilitation of drainages, which are included in the action plan for the year 2012[16].

It was also planned that cash crops were to be planted in the dry season for 2,630 ha of the rehabilitated area and for 2,295 ha of the new area. While the data of the rehabilitated area at the time of the ex-post evaluation was not available, the planted area of cash crops in the new area was 7% of the plan. According to the beneficiary survey, the reasons not to introduce cash crops were unsuitable weather and soil, the lack of funds and labor, the lack of a market, and that it was more time-consuming and labor intensive than rice. In the target area, research and training for rice production have been actively promoted and the rice yield is high. According to the beneficiary survey, factors such as the high market price of rice and the good post-harvest facilities have contributed to increased rice production. The relatively good environment, which is suitable for rice production, seems to be an incentive for farmers to continue rice production rather than to tap into new cash crops.

(2) Yield of rice (ton/ha)[17]

As shown in the table below, the yield and production of rice in the project areas of the UPRIIS exceed the plan, with an average yield of 113% of the plan throughout the year and an annual production of 111% of the plan. Yields in the wet season are lower than in the dry season due to frequent typhoons and floods in the downstream areas[18].

Table 2: Yield and Production of Rice in the Project Area of CMIPP-IC

Items		At Appraisal	Agreement on Scope (Planned)	Actual (2011)	Actual /Planned
Yield of rice (ton/ha) (Wet)	Rehabilitated area (UPRIIS)	5.0-5.5	4.3	4.3	100%
	New area (UPRIIS)	-		4.1	95%

[15] To address the problem, the Division 5 dredged the drainage facilities downstream, constructed additional drainage facilities, and advised farmers to delay the planting period for the wet season.

[16] The construction of additional canals was partly budgeted for, but the Central Office of NIA has yet to approve the budget for the parcillery study and repair of the drainage.

[17] According to the CMIPP-IC office, the average value of the yield of the CIS/SWIP was 4 tons for the wet season and 4.4 tons for the dry season in 2008. This was lower than the yield of the UPRIIS. However, the data at the time of the ex-post evaluation was not available.

[18] The average yield of the wet season was 4.0 tons per hectare in 2010. The data prior to 2010 could not be obtained but the available data of the Divisions 1 and 2 in 2008 and 2009 were 4.1 tons and 3.0 tons respectively, which are much lower than the average of 6.25 tons in the dry season. The yields of the Division 5 in the wet season increased from 4.2 tons in 2009 to 5 tons in 2010 but decreased to 3.7 tons in 2011 due to typhoons. There were destructive typhoons of Ondoy and Pepeng in 2009, Juan in 2010, and Pedring in 2011 in the target area.

	CIS/SWIP	-		N/A	N/A
Yield of rice (ton/ha) (Dry)	Rehabilitated area (UPRIIS)	5.0-5.5	5.3	6.3	119%
	New area (UPRIIS)	-		6.8	128%
	CIS/SWIP	-		N/A	N/A
Annual average	UPRIIS	5.0-5.5	4.8	5.4	113%
Annual production of rice (estimate ton)	Rehabilitated area (UPRIIS)	-	523,660	595,564	114%
	New area (UPRIIS)	-	148,771	151,045	102%
	Total (UPRIIS)	-	672,431	746,609	111%
	CIS/SWIP	-	97,478	N/A	N/A
	Total	-	769,909	N/A	N/A

Source: Documents of the appraisal, documents on the scope of changes after the detailed design, JICA internal documents, NIA

3.2.2 Qualitative effect

To evaluate the effects and impact of the irrigation projects, a beneficiary survey was conducted for farmers using the irrigation facilities in the target area[19].

(1) Satisfaction with water the supply

The figure below shows the level of beneficiary farmers' satisfaction with the supply of irrigation water. The beneficiary farmers' satisfaction improved significantly compared to before the project. Before the project, 31% of the respondents answered that in the dry season there was no water and 47% responded that it was insufficient, while even in the wet season 42% said the water was insufficient. After the project, 95% in the dry season and the 89% in the wet season responded that water was sufficient.

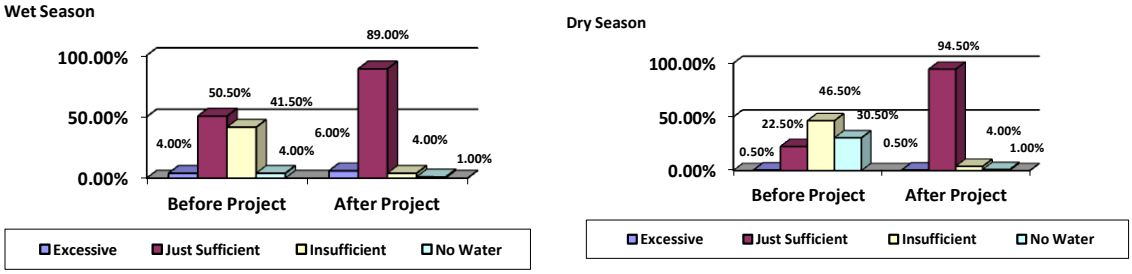


Figure 2: Satisfaction with Water Supply

(2) Planted area and yield of rice

According to the beneficiary survey, 47% of the respondents introduced double cropping of rice because the supply of irrigation water in the dry season became sufficient. Figure 3 shows the average planted areas and irrigated areas before and after the project. Although the average

[19] The beneficiary survey was conducted for 200 samples consisting of 152 farmers of 19 IAs in rehabilitated areas and 48 members of 6 IAs in new areas which were randomly selected from the list of IAs of the UPRIIS. By stream, there are 16 farmers in upstream areas (Div. 5), 96 farmers in mid-stream areas (Div. 1 - 5), and 88 farmers in downstream areas (Div. 2 - 5). This distribution was decided, based on the discussion with local experts and UPRISS, considering the planted area of each target area. Farmers of the CIS/SWIP are not included due to the unavailability of information for those farmers.

planted area have not changed much, irrigated areas increased by about 60% after the project, and the ratio of irrigated areas to planted areas increased from 64% to 99%. Additionally, 63% of the farmers reported an increase in rice yield in the wet season and 36% in the dry season[20].

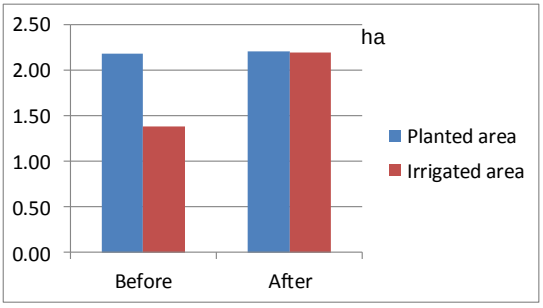


Figure 3: Changes of Ave. Irrigated Areas for Rice (Before and After the Project)

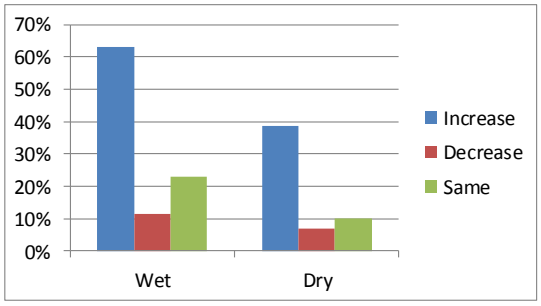


Figure 4: Changes of Average Yield of Rice (Before and After the Project)

44% of those surveyed have received training on the monitoring method for rice production[21] introduced by PhilRice[22] which was supported by JICA, and 73% of those have applied the methodology. It is thus fair to say that the effects of this training have contributed to the increase in yield.

＜TGISRP Component＞

3.2.1 Quantitative Effects (Operation and Effect Indicators)

(1) Irrigated and planted area, yield and production of rice

For the TGISRP, it was planned to construct 52 deep wells and organize 52 Irrigation Service Cooperatives (ISCs) which would cover the FUSA of 2,500 ha. During project implementation, the number of wells and ISCs increased to 72 and the FUSA was expanded to 3,372 ha at the time of the ex-post evaluation. However, due to the high cost of diesel fuel and other problems with the facilities, the number of ISCs utilizing deep wells decreased to 53 in 2007 two years after the completion of the component, and the number was further reduced to 41 at the time of the ex-post evaluation[23]. Hence, the average of the total annual planted area from 2009 to 2011 was 3,145 ha, which was 63% of the planned 5,000 ha. Since the yield is 88% of the plan[24], the rice production is estimated to be at 55% of the plan.

[20] 2.5% of farmers in the wet season and 44.5% of farmers in the dry season, respectively, did not plant rice before the project. Since their yields cannot be compared with the data from before the project, the figures do not include these farmers.

[21] The method is called “palay check” and shows the items and technology to be observed according to the stages of rice production. Farmers are trained to check each item.

[22] PhilRice is the Philippine Rice Research Institute of the Department of Agriculture and the Japanese government assisted them from 1991 to 2009 in various ways such as the construction of a research facility, and technical cooperation projects for research development, and dissemination of technology for small farmers. PhilRice is operated in the province of Nueva Eja where this project is located and is committed to the dissemination of the Palay Check method for monitoring rice production stages in the country.

[23] The data of 2006 could not be obtained.

[24] The yield in the wet season has been lower than the one in the dry season, probably due to typhoons and floods. For example, the yield in 2009 was 4.0 tons for the wet season and 5.0 tons for the dry season, while the yield in 2010 was 4.0 tons for the wet season and 5.5 tons for the dry season.

Table 3: Irrigated and Planted Areas, Yield and Production of Rice of the TGISRP

	Plan at Appraisal	Actual				Actual / Plan
		2009	2010	2011	Average	
FUSA (ha)	2,500	3,500	3,372	3,372	3,415	137%
Irrigated & Planted Area of Rice (ha) (Wet)	2,500	N/A	1,550	1.603	1,577	63%
Irrigated & Planted Area of Rice (ha) (Dry)	2,500	1,015	1,455	1,631	1,367	55%
Irrigated & Planted Area of Rice (ha) (Annual)	5,000	N/A	3,055	3,234	3,145	63%
Irrigated & Planted Area of Cash Crops (ha)	N/A	N/A	N/A	164	164	N/A
Yield of Rice (Wet) Ton/ha	Annual 10.8	N/A	4.0	4.0	4.0	88%
Yield of Rice (Dry) Ton/ha		N/A	5.5	5.5	5.5	
Annual production of rice estimated* (Ton)	27,000	N/A	14,203	15,355	14,779	55%

Source: Documents of the appraisal, NIA

Note: *Estimated by multiplying rice yield with the planted area

There were damages on agriculture caused by the recent typhoon as follows. Ondoy and Pepeng in 2009, Juan in 2010, and Pedring in 2011.

The following table explains the utilization of deep wells at the time of the ex-post evaluation. Even in 2007 when the O&M of this project was transferred to the Tarlac Zambales Irrigation Management Office (TZIMO) of the NIA, 19 deep wells (26% of the total) had not been used. However, that situation has not been reflected in the project completion report produced by the project office of the NIA in 2008. This seems to have delayed an understanding of the issues by the related organizations.

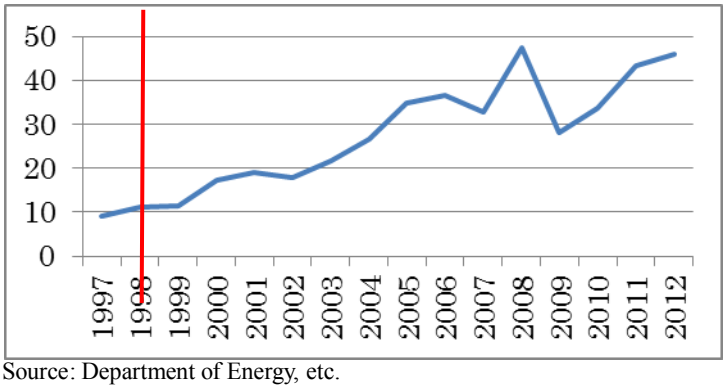
Table 4: Utilization Status of the Deep Wells

Utilization Status	No of ISCs	FUSA	Reasons
Utilized throughout the year	16	772 ha	Many members use the system and costs can be covered; other water sources are limited, which seems to promote the use of deep wells
Utilized partially for such purposes as planting preparation	25	1,179 ha	Partial use to save diesel fuel costs and the use of shallow tube wells for other needs
Not utilized although pumps are operational	9	404 ha	Inadequate canal system; insufficient discharge capacity of pumps; high cost of diesel fuel
Pumps are not operational	12	536 ha	Breakage or stolen parts; engines were withdrawn by the NIA due to non-utilization

Not utilized since the areas were integrated into the UPRIIS	10	481 ha	Use of gravity irrigation by the UPRIIS
Total	72	3,372 ha	

Source: NIA

The major reason that 21 ISCs do not use deep wells or do not repair the facilities which have problems is the rising cost of diesel fuel. From 1998 when this project was planned, to the time of the ex-post evaluation, the diesel fuel price increased by about 350% (about 100% taking the inflation rate into account)[25].



Source: Department of Energy, etc.

Figure 5: Fluctuation of Diesel Fuel Prices (Price in Pesos per Liter)

The prevalence of shallow tube wells (STWs) in the target areas also seems to have affected the utilization of deep wells. Here are a few reasons that farmers in the focus group discussions cited for not using deep wells: it is easier for them to use STWs individually than organizing an ISC to operate a deep well, and it is difficult to bear the operating costs when only some of the members use a deep well. Farmers who do not use a deep well plant rice in the wet season using rain water and STWs, while farming rice or corn which needs less water by also using STWs or water from nearby creeks in the dry season. However, STWs have problems, namely that groundwater sources will decrease when there is a long draught since the sources are shallow. Deep wells have advantages over groundwater sources, such as that they are established in deep aquifers and are dependable, and that they can be operated at a lower cost than STWs when they are used by many farmers. However, nine ISCs opted to not use deep wells and 25 ISCs used deep wells only partially due to the high cost of diesel fuel and other operational problems, even if the irrigation water supply by STWs is insufficient.

The TGISRP component constructed two model farms to promote profitable cash crops in order to reduce the cost burden of farmers operating deep wells. However, the planted areas of cash crops at the time of the ex-post evaluation were only 164 ha. Although training courses for several cash crops were provided to farmers at the model farms, cash crops were not introduced extensively. In the beneficiary study, farmers cited inappropriate soil and weather, and lack of capital and markets as the primary reasons for not introducing cash crops. It is also likely that the high and stable market price for rice may have discouraged the introduction of cash crops.

[25] The average inflation rate from 1998 to 2011 was 5.4%. Even if the rate of inflation is taken into account (by adjusting the diesel fuel price in 2011 to the 1998 price), the price in 2011 is about double the one in1994.

The component also planned to establish a Groundwater Irrigation Development Fund that would provide credit to farmers for agricultural inputs such as fuel costs and seeds, and carried out training programs for farmers for this purpose. However, since the government enacted a law that prohibits financial services by non-financial institutions, and the Department of Finance did not approve the loan program by the NIA, the Fund has subsequently not been set up. This seems to be affecting the outcome of the component[26]. The beneficiary study showed that 58% of the respondents borrowed money for agriculture, but 45% did so from friends, relatives, money lenders and traders while only 13% got loans from financial institutions such as the Land Bank.

3.2.2 Qualitative effect

In order to measure the impact and effect of the component, a beneficiary survey was conducted for ISC members who use a deep well in the target areas[27].

(1) Utilization of deep wells

The following table shows how farmers use deep wells constructed by this project and the STWs which are prevalent in the target area. In the dry season, 93% use deep wells but 51% also use STWs in order to save on diesel fuel costs. In the wet season, over 40% do not use deep wells nor STWs since they can use rain water.

Table 5: Utilization of Deep Wells and STWs

Season	Use of Deep Wells			Use of STWs		
	Use	Partially Use	Do Not Use	Use	Partially Use	Do Not Use
Wet	32%	25%	43%	14%	21%	65%
Dry	78%	15%	7%	24%	27%	49%

Note: "Use" means the utilization throughout the cropping season. "Partially Use" means utilization during a limited period such as for planting preparation.

(2) Satisfaction with the Water Supply

Many reported that irrigation water was sufficient after the project both in the wet and dry seasons, while 22% responded that water was excessive in the wet season. There are cases that farmers cannot plant during the wet season because excess water remained for about one month due to flooding but the NIA advised them to delay the planting period so that they would be able to crop in that season.

[26] Source: Interviews with the NIA and ISCs, internal documents of JICA and documents of NIA

[27] For the beneficiary survey, 100 samples from 12 ISCs were randomly selected from the 41 ISCs which are utilizing the facilities.

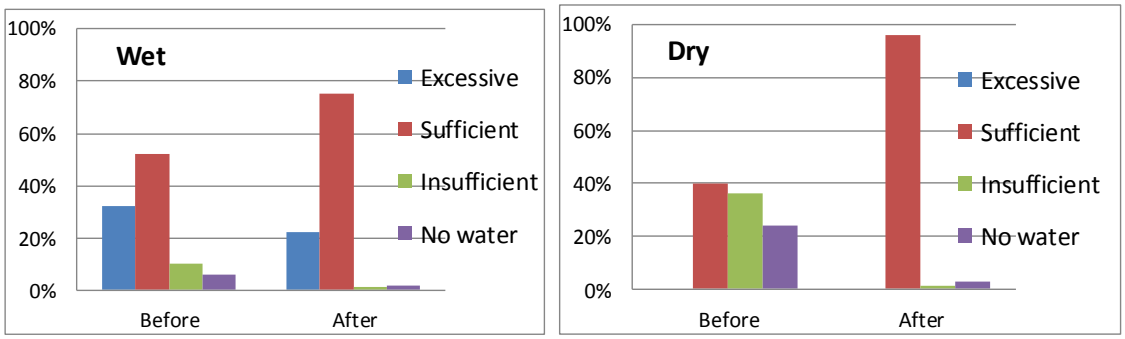


Figure 6: Satisfaction with Water Supply by Beneficiaries of the TGISRP Component

(3) Cropping Patterns, planted areas and yield

44% of the farmers have introduced double cropping of rice after the project, but only 1% has introduced cash crops. Although the average planted area for rice is almost the same as before the project, the irrigated area has increased by about 50% and the percentage of irrigated areas to the total planted area increased from 57% before the project to 86% after the project. 34% of the farmers reported an increase in the yield of rice in the wet season, and 33% an increase in the dry season[28]. In the target areas, about half the respondents had planted rice in the dry season using STWs before the project. However, many of them have increased their yields by using deep wells. 39% of the farmers were trained on the monitoring method of PhilRice for planting rice and 21% had adopted the method, which seems to have contributed to the increase in yields.

3.3 Impact

＜CMIPP-IC Component＞

3.3.1 Intended Impacts

(1) Improved living standards for the local beneficiaries

During the beneficiary survey, all the farmers in the rehabilitated and new areas of the UPRIIS replied that they experienced an increase in income compared to before the project. Their net agriculture income became more than four times on average. In addition to the introduction of double cropping and increased yields, several issues were cited as contributing factors; the high and stable market price for rice, the lower transport costs thanks to the construction of rural roads and the improved post-harvest facilities of rice such as paddy dryers and warehouses which are leading to better quality of rice. As shown in the figure below, 93% of the respondents reported that the standard of living has improved due to improved income. Examples are securing food, better education for children, improved housings and acquiring electric appliances.

[28] Farmers who did not plant rice before the project (23% in the wet season, 45% in the dry season) were not included in this answer.

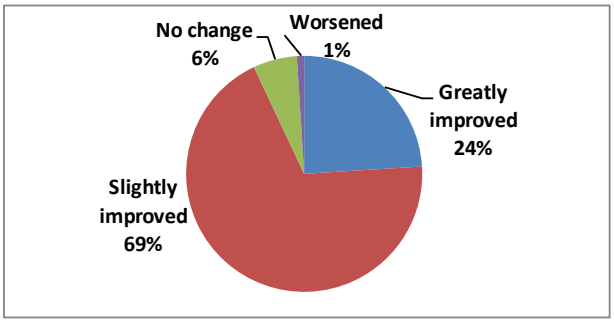


Figure 7: Changes in the Standard of Living (CMIPP-IC Component)

3.3.2 Other Impacts

(1) Impact on the natural environment

For the CMIPP-IC, an Environment Compliance Certificate (ECC) was issued in 1998 and ten conditions towards project implementation were presented, such as the stabilization of soil and waste treatment. The project office took appropriate actions on all of the ten items. For example, the conditions included addressing the problems cited by the community, and the project office improved community roads used by the construction vehicles and constructed temporary drainages to prevent floods during civil works. This was done in order to address the issues raised by IAs and local governments. The project office conducted environmental monitoring during the civil works period and checked the status of soil erosion and stabilization, waste management, and soil and air pollution. In addition, the NIA implemented controls on illegal logging, and planted trees in 900 ha, resulting in the reforestation of the target area. The NIA has reported no major negative impacts on the environment during and after the construction works. The site visit at the time of the ex-post evaluation revealed a decrease in the water level of the downstream part of the Talavera River Irrigation Dam. With regard to the environmental impact of the decrease in the water level of the river, the Department of Energy and Natural Resources (DENR) inspects and analyzes water quality every quarter and has analyzed that there are no negative impacts. In the beneficiary survey, 6% of the respondents reported negative effects such as the deterioration of water quality, but no serious problems were reported. It is thus fair to say that the project in the CMIPP-IC component has had no major negative impact of on the natural environment.

(2) Land Acquisition and Resettlement

No resettlements were planned for the CMIPP-IC, but the plan included acquiring 272 ha of land to construct canals for the UPRIIS. During project implementation, the land acquired increased to 501 ha due to changes in the scope of the project, and compensation was paid to land owners based on the national policy and the standards of the NIA. The project office worked with IAs and the local government and assigned officers for this purpose. However, in some lands, the NIA was unable to gain approval of land owners, and changed the arrangement of canals or filed a suit. The trial lasted for 24 months in court but the owners finally entered into an amicable settlement and accepted the proposed compensation from the NIA.

(3) Unintended Positive/Negative Impacts

No other impacts were observed.

＜TGISRP Component＞

3.3.1 Intended Impacts

(1) Improved living standards of local beneficiaries

In the beneficiary survey of the TGISRP, the respondents reported that their average net income from agriculture became 2.5 times compared to before the project. Just as in the CMIPP-IC the high market price for rice, reduced transportation costs thanks to rural roads constructed, were contributing factors in addition to the introduction of double cropping and increased yield. As shown in the following figure, 89% responded that the standard of living had improved compared to before the project due to increased income. Examples of improved living standards are better food security, better access to education for children, improved housing, and the procurement of electric appliances.

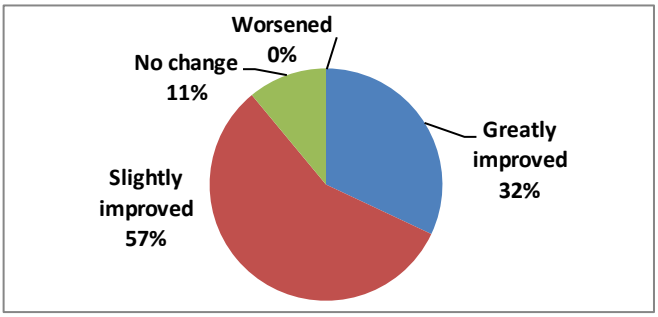


Figure 8: Changes in the Standard of Living (TGISRP)

The TGISRP constructed a domestic water supply system for three ISCs in addition to the irrigation water supply using deep wells. However, at the time of the ex-post evaluation, two ISCs did not operate because of floods in the wet season and difficulties in operation and management. One ISC provided domestic water only to its members. On the other hand, one ISC constructed a domestic water system, which was not part of this project, but did so with the support of the local government and is currently providing water services to more than 1,000 residents. Based on this success, the NIA has approached several local governments inquiring about the possibility of utilizing a deep well constructed by this project for use in the domestic water supply.

3.3.2 Other Impacts

(1) Impact on the natural environment

For the TGISRP, an ECC was issued in 1996. No conditions were attached, but the project office and consultants conducted monthly environmental monitoring, such as checking the status of fuel utilization and disposal, operational safety and work standards, noise, and water and air pollution. The NIA reported no negative impact on the environment during or after the construction. During the site visit at the ex-post evaluation, no problems were observed. In the beneficiary survey, 7% of the respondents cited negative impacts on the environment, but there have been no serious problems. It is thus fair to say that the project in the TGISRP component has had no major negative impact on the natural environment.

(2) Land Acquisition and Resettlement

Land for the construction of wells and canals for the TGISRP was to be donated by farmers. Thus, land acquisition and resettlement has not been performed. However, the construction site of a deep well had to be changed when the consent of the landowners could not be obtained[29].

(3) Unintended Positive/Negative Impacts

According to the beneficiary survey, the ISC members in the area where domestic water services are provided have reported that safe drinking water has been secured.

＜Overall evaluation of the effectiveness and impact of the project＞

For the CMIPP-IC, effectiveness is evaluated using the data from the UPRIIS, which are the major facilities of this project, since the data from the CIS/SWIP is not available. The irrigated and planted areas are at 99% of the target, the annual yield is at 113% of the target, rice production is estimated at 111% of the target, and the overall achievement rate is calculated at 106% which is the average of the achievement rates for irrigated and planted areas and yield. On the other hand, the irrigated and planted areas of the TGISRP is 65% of the target, the yield is 88%, the estimated production is 57%, and the overall achievement rate is calculated to be 76.5%. The overall rate of achievement of the project is calculated to 103%, by using the average of the achievement rates of the two components and weighting by project costs[30].

On the other hand, the beneficiary survey on farmers revealed the effects of their satisfaction with the water supply, the introduction of double cropping of rice, and increased irrigated area and yield. Net agriculture income was increased by 300% for the CMIPP-IC and 150% for the TGISRP compared to before the project, which lead to the desired impact of improved living standards such as improvements in food, children's education, and housing.

Based on the above, it is evaluated that this project has largely achieved its objectives. Therefore its effectiveness and impact are high.

3.4 Efficiency (Rating: 1)

＜CMIPP-IC Component＞

3.4.1 Output

For the CMIPP-IC component, a new area was added to the scope during the period between the project appraisal and the conclusion of L/A. Then, when the scope was agreed upon, the rehabilitated area was reduced and the construction of water intake facilities and canals in the new area was added. This change was appropriate in terms of effective use of additional supply of irrigation water and project funds to provide irrigation services in the irrigation potential area. There was no significant change from the agreed scope to the actual one.

(1) Civil Works

The following table shows the major outputs at the time of the appraisal, at the time when the scope was agreed upon, and actual.

[29] In the target area, the design of the canals has been changed. However, since the arrangement of the canals does not meet the needs of the target farmers, the deep well constructed has not been used.

[30] The ratios of the project costs (excluding CIS/SWIPS) are 89.4% for the CMIPP-IC and 10.6% for the TGISRP. The average of the two components weighted by the cost is calculated as follows: 106 % x 0.894 +76.5% x 0.106 = 94.8% + 8%=102.8%。

Table 6: Major Planned and Actual Outputs of CMIPP-IC Component

Outputs	At Appraisal	At Scope Agreement (Planned)	Actual
FUSA	82,000 ha	82,018 ha	85,780 ha
Rehabilitated Area (UPRIIS)	82,000 ha	55,100 ha	58,865 ha
Rework on intake facilities	3 places	3 places	3 places
Main canals concrete lining[31]	42 km	21.1 km	27.6 km
Drainage improvement	98 km	Deleted	Deleted
River improvement (Taravera River)	44 km	Deleted	Deleted
Rework on main canals/ laterals/ sub-laterals	836 km	N/A	992 km
Related canal and drainage structures	1,608 units	N/A	80 units
New Area (UPRIIS)	-	16,764 ha	16,879 ha
Addition and rework on intake facilities	-	N/A	8 new places; reworking on 10 places; 22 movable gates; 1 scouring sluice; 1 emergency power supply
Main canals expansion and rework	-	2.8 km	3.27 km
Head gates	-	N/A	7 (new), 4 (replacement)
Super Diversion Canals (SDC)	-	29.2 km	20 km (Concrete lining), 19.2 km (Earth canal), related structures
SDC laterals & sub-laterals	-	N/A	241 km
On-farm facilities and related structures	-	N/A	481 km、602 turn outs
Drainage systems	-	N/A	260 km
Project facilities	N/A	N/A	1 Project Office, 12 IA Offices
New Areas (CIS/SWIP)	-	10,154 ha	10,036 ha
Repair of CIS (Communal Irrigation System)	-	N/A	8
Improvement of SWIPs (Small Water Impounding Ponds)	-	N/A	51

Source: Appraisal documents, documents at the agreement on the scope, JICA internal documents, NIA documents

The following significant changes were made to the scope during the period between the appraisal and the agreement on the scope.

[31] Concrete lining is to cover the sides and bottom of canals with a fixed lining of concrete.

① Addition of new irrigated areas: The detailed design (D/D) planned a new UPRIIS area of 37,200 ha, but the target area was reduced to 16,764 ha due to budget constraints. Meanwhile, the rehabilitation of CIS/SWIP of 10,154 ha was added as a new area. The remaining 20,436 ha is scheduled to be constructed in Phase 2[32].

② Addition and rehabilitation of water intake facilities and construction of the Super Diversion Canal (SDC)[33]: For the additional UPRIIS area, necessary water intake facilities and the SDC were constructed.

③ Reduction of rehabilitated area: Rehabilitation focused on the reworks of major facilities such as water intake facilities and the total rehabilitated area was reduced. Some of other reworks were implemented by the NIA budget and the remaining works will be done in Phase 2.

④ Deletion of improvement of Talavera River and construction of drainage facilities in the rehabilitated area: In order to improve Taravera River, substantial flood control measures in the downstream area by other organizations were a prerequisite[34]. Therefore, the improvement of the river was deleted because the flood control measures were not implemented. Major drainage facilities were constructed with the NIA budget and the remaining works will be done in Phase 2.

These changes were appropriate in terms of effective use of additional supply of water for irrigation services and project funds. On the other hand, it is difficult to measure the differences in the scope between the one at the agreement after D/D and the one actually implemented, because the detailed scope at the time of the agreement is not available. However, major facilities were constructed as planned as at the agreement and it is considered that there is no significant change.

(2) Procurement

Since the documents on the agreed scope do not show details of the procurement of machines and equipment, it is difficult to compare the planned and actual procurement. However, the budget for procurement was cut in half when the scope was agreed compared to the time of the appraisal. As well, the number of actually procured machines and equipment was reduced from 105 at the appraisal to 66. At the appraisal, it had been planned to procure the equipment for O&M but the project focused on the necessary equipment for civil works and the number of equipment was reduced. The equipment items that were significantly reduced in number include backhoes which the UPRIIS office currently needs for dredging works.

3.4.2 Input

3.4.2.1 Project cost

The table below shows the project cost of the CMIPP-IC component. When the scope was agreed, a new area was added, and the cost of civil works was increased from 10,069 million yen to 10,490 million yen (percentage of the new regions is 68%). However, the other costs

[32] The NIA plans to implement Phase 2 of CMIPP-IC with the assistance of China.

[33] In the new UPRIIS area, the irrigation water is drawn from the existing PRIS Dam through a new intake and provided by the diversion canal. This diversion canal runs parallel to the existing main canals upstream but is divided at some point to provide water to the new area. This diversion canal is called the Super Diversion Canal (SDC).

[34] Dredging works by the Department of Public Works and Highways (DPWH) and reforestation works by the Department of Energy and Natural Resources (DENR).

decreased due to yen appreciation, and the total cost of the CMIPP-IC component decreased from 17,370 million yen to 15,232 million yen. The actual total cost is 16,180 million yen, which is 106% of the planned cost of 15,232 million yen. Here are the major reasons for the cost increase: (1) a 13% increase in the cost for civil works (increase in the construction cost for water intake facilities and SDCs in the new area which consists of 72% of the total civil works cost); (2) increase in the cost of consulting services due to the extension of the project period; (3) a 101% increase in the institutional development cost; and (4) a 110% increase in the administrative costs due to the extension of the project period. The actual project cost in peso is 6,862 million pesos which is 115% of the planned cost of 5,950 million pesos. Due to the yen appreciation, the increase rate against the plan in peso is larger than the one in yen.

Table 7: Planned and Actual Project Cost of CMIPP-IC Component

Items	At Appraisal		At Scope Agreement		Actual		Actual / Plan	
	Mil Yen	Mil Peso	Mil Yen	Mil Peso	Mil Yen	Mil Peso	Mil Yen	Mil Peso
Total Cost	17,370	4,373	15,232	5,950	16,180	6,862	106%	115%
Loan Portion	12,249	3,062	12,249	4,785	11,590	4,915	95%	103%
<Breakdown>								
Civil Works	10,069	2,517	10,409	4,066	11,771	4,992	113%	123%
Procurement	566	142	207	80.8	156	66	75%	82%
Consul Services	2,022	506	960	375	1,181	501	123%	134%
Institution Dev.	-	-	128	50	257	109	201%	218%
Land acquisition	68	17	325	127	323	137	99%	108%
Administration	1,024	256	896	350	1,884	799	210%	228%
Env. Monitor	-	-	138	54	-	-	-	-
Contingency	1,159	290	1,306	510	21	9	2%	2%
Price increase	982	246	868	339	-	-	-	-
Tax	1,480	370	-	-	-	-	-	-
Preparaory works	-	-	-	-	387	164	-	-
Others	-	-	-	-	203	86	-	-

Source: Appraisal documents, documents on the agreement on the scope, JICA internal documents, NIA documents
Note: Since the documents on the agreement on the scope show the cost only in peso, the value in yen is calculated using the exchange rate as of December 2001, which is when the agreement was made.

3.4.2.2 Project period[35]

The table below shows the planned and actual project period of the CMIPP-IC component.

Table 8: Planned and Actual Project Period of CMIPP-IC Component

At Appraisal	At Scope Agreement (Planned)	Actual	Actual / Planned
July 1997 - June 2004 (84 months)	July 1997 - Dec. 2004 (90 months)*	July 1997 - Dec. 2008 (138 months)	153%

Source: Appraisal documents, documents on the agreement on the scope, JICA internal documents, NIA documents
Note: *Documents when the scope was agreed upon do not show the target completion time and no information on

[35] Prior to the signing of L/A, the Philippine government used its own funds to formulate a detailed design for the CMIPP-IC and establish a demonstration farm for the TGISRP; Minutes of Discussions sets the start of these initiatives as the start of the project period. Therefore, in the ex-post evaluation, the project period is the one from the start of the works by the Philippine government to the completion of the civil works.

the project period was available. Therefore, December 2004, which is when the final project cost was set in EIRR calculation in the scope agreement as well as the target completion date set found in the JICA internal documents, is used as the end of the project period.

At the time of the appraisal, the detailed design was scheduled to be completed by October 1999. However, the scope was changed substantially and the final scope was agreed upon in December 2001, two years behind schedule, through a consensus building processes with the National Economic Development Agency and JICA.

However, even when the scope was agreed upon, it seemed that the component was to be implemented within 90 months, which was essentially the same duration as the one at the time of the appraisal. In reality, it took 138 months, which was 153% of the plan. Here are the reasons for the longer period: (1) delays in procurement due to changes in the scope such as the addition of irrigated areas (12-month delay in the pre-construction process, six-month delay in civil works); (2) six-month delay in civil works due to flush floods; (3) 12-month suspension of civil works in the rainy season due to clay-rich soil; (4) four-month delay of execution of the government budget; (5) 20-month extension of the process to clarify bidding qualification; (6) prolonged negotiation on land acquisition (24 months for the court trial); and (7) four-month delay in quarry permit by local government.

3.4.3 Results of calculations of the Economic Internal Rates of Return (EIRR)

The table below shows the results of re-calculation of the EIRR of the CMIPP-IC component using the same pre-conditions and method as those at the time of the appraisal. The recalculated EIRR is 13.5%, which is slightly lower than the one at the time of the scope agreement. The main reason for the lower EIRR is the increased cost in peso, while there is no significant change in benefits from the agreement.

Table 9: EIRR of CMIPP-IC[36]

At Appraisal	At Agreement of Scope	Ex-Post Evaluation
16.2%	15.2%	13.6%[37]

＜TGISRP component＞

3.4.1 Output

In the TGISRP component, the number of deep wells was increased from 52 to 72 to meet the needs of local farmers and to take advantage of surplus funds in peso due to the yen appreciation. However, when the deep wells were added, six out of the 18 wells constructed at that time were not utilized. The wells should be added after reviewing the status of these facilities.

[36] Here are the preconditions: project life of 50 years; benefits are an increase in net agriculture income and income from the NIA's sales of electricity to an electricity company; and costs are project costs and an increase of the O&M cost by this project, and the fees of water and electricity to be paid to the BOT company. The NIA purchases irrigation water and power from the BOT company operating the power project, and sells the power to the electricity company. .

[37] Since the data of CIS/SWIPs targeting 10,041 ha is not available, the cost of civil works of CIS/SWIPs (1.4% of the total project cost of CMIPP-IC) and its benefits are deleted in EIRR re-calculation.

(1) Civil works

At the time of the appraisal, 52 deep wells planned to be constructed[38]. During the implementation, 20 wells were added in order to meet the needs of local farmers by utilizing surplus funds in pesos due to the strong yen. Three domestic water supply systems utilizing pumps of deep wells were also added.

However, in 2002 when additional wells were applied, six deep wells out of the 18 wells constructed so far were not used because of availability of other water sources such as creeks and shallow tube wells (STWs) and lack of discharge capacity of pumps. Out of the 20 pumps added, two were not used also for lack of discharge capacity of pumps and ten were used only partially while STWs and creeks were used. Application and approval processes should be made after fully reviewing the reasons of the deep wells that were not used at that time and possible countermeasures[39].

It is appropriate that the domestic water supply systems were added, because the systems were based on the local needs such as securing safe drinking water, facilitated the efficient use of deep wells, and improved sustainability of the deep wells. However, in two places, the water systems were not utilized due to floods in the wet season and difficulties in management, while one ISC was providing the water service only to its members at the time of the ex-post evaluation. During project implementation, confirmation on the flood status of the target area in the wet season and advice on management of the system should have been made.

Table 10: Planned and Actual Output of TGISRP Component

Output	At Appraisal	Actual
Construction and rehabilitation of deep wells	52	72
(Details) Drilling works of deep wells (180 m)	40	53
Construction of exploratory/production wells	10	10
Demonstration farms including deep wells (50 ha)	2	2
Rehabilitation of deep wells	(1)*	7
Establishment of groundwater table monitoring system (Drilling of shallow wells)	10 units	0
Establishment of groundwater table monitoring system (Installation of automatic water level recorders)	10 units	10 units
On-farm irrigation system development	50 sites (2,500 ha)	70 sites (3,500 ha)
Access roads	—	9 units
Rural water supply system	—	3 systems

Source: Appraisal documents and internal documents of JICA

Note: *The rehabilitated deep well is one of the two wells in the demonstration farms.

[38] Include the deep wells for demonstration farms at two sites.

[39] At that time, the NIA project office knew that these wells were not utilized. However, the NIA decided to add wells to meet the demand from different places in the hope that the wells would improve agriculture productivity. The NIA did not study the reasons for non-use of the wells or reflect them into the revised plan. At the time of the ex-post evaluation, six wells that had not been used in 2002 and four out of the 20 wells added were not utilized. Here are the reasons of non-use of the four wells: low discharge capacity of pumps (two wells) and a component failure (one well), etc.

(2) Procurement

At the time of the appraisal, the purchase of 50 pumps and engines was planned, but 46 pumps and 65 engines were actually procured. 20 deep wells were added and necessary numbers of pumps and engines also increased. However, the project utilized the existing pumps and engines and the numbers of additional pumps and engines to procure were decreased.

3.4.2 Input

3.4.2.1 Project cost

The table below shows the project cost of the TGISRP. The actual cost in yen is 1,913 million yen, or 77% of the plan. However, the cost in peso is 802 million pesos, which is 129% of the planned 624 million pesos. The major reasons for the increase in pesos are addition of deep well facilities and higher costs of consulting services and administration due to the extension of the project period. The difference of ratios of the actual cost to the planned one between yen and peso is attributed to the yen appreciation during the period.(average rate of 2.39 pesos/yen during the project period as opposed to 4 pesos/yen at the time of the appraisal)

Table 11: Planned and Actual Project Cost of TGISRP

Items	At Appraisal		Actual		Actual / Plan	
	Mil Yen	Mil Peso	Mil Yen	Mil Peso	Mil Yen	Mil Peso
Total Cost	2,496	624	1,913	802	77%	129%
Loan Portion	1,887	472	1,306	550	69%	117%
<Breakdown>						
Civil Works	1,153	288	1,236	572	107%	155%
Procurement	325	81	154		47%	
Consulting Services	373	93	311	140	83%	151%
Administration	148	37	206	86	139%	232%
Contingencies	161	40	-	-	-	-
Price Increase	124	31	-	-	-	-
Tax	212	53	0	0	-	-
Others	-	-	7	3	-	-

Source: Appraisal documents, JICA internal documents, NIA documents

3.4.4.2 Project period[40]

The table below shows the project period of the TGISRP. Although the planned period was 64 months at the time of the appraisal, the actual one was 76 months excluding 24 months to add deep wells; the percentage of the actual period to the planned one is 119%. The main reason is a one-year extension of the civil works, which were meant to last 35 months.

Table 12: Planned and Actual Project Period of TGISRP Component

At Appraisal	Actual	Actual / Plan
Sept.1997 - Dec. 2002 (64 months)	Sept. 1997 - Dec. 2005 (76 months)*	119%

Source: Appraisal documents, JICA internal documents, NIA documents

Note: *Exclude 24 months of the extended period to expand the scope.

[40] As explained in the footnote 35, the project period is calculated from the start of the works by the Philippine government prior to signing of L/A to the completion of the civil works.

3.4.4.3 Results of calculations of the EIRR

The table below shows the results of re-calculation of the EIRR of TGISRP using the same pre-conditions and method as in the time of the appraisal. The re-calculated EIRR is 5.7%, which is less than the one at the time of the appraisal. The main reason for the lower EIRR is the decreased benefit due to planted area reduced to 65% of the plan, and the increased cost in peso.

Table 13: EIRR of CMIPP-IC[41]

At Appraisal	Ex-Post Evaluation
18.7%	5.7%

<Evaluation of the efficiency of the project as a whole>

The following table shows the total project cost. At the time of the appraisal, it was 19,866 million yen including the yen loan portion of 14,136 million yen. Since the scope of the CMIPP-IC was changed substantially and the total cost of the CMIPP-IC in yen decreased, the total cost became 17,728 million yen, which is the planned value for evaluation. The actual total cost is 18,093 million yen, which is 102% of the plan and slightly higher than the plan.

Table 14: Total Project Cost of Central Luzon Irrigation Project

	Plan	Actual	Actual / Plan
Total cost (million yen)	17,728	18,093	102%

Source: Appraisal documents, documents on the scope agreement of the CMIPP-IC, JICA internal documents, NIA documents

The table below shows the total project period. The project actually lasted 138 months[42], which is 153% of the plan and much longer than the planned 90 months.

Table 15: Total Project Period of Central Luzon Irrigation Project

Plan	Actual	Actual / Plan
July 1997 - Dec. 2004 (90 months)	July 1997 - Dec. 2008 (138 months)	153%

Source: Appraisal documents, documents on the scope agreement of the CMIPP-IC, JICA internal documents, NIA documents

As shown above, the project cost slightly exceeded the plan while the project period exceeded the plan significantly. Therefore the efficiency of the project is low.

3.5 Sustainability (Rating: 2)

< CMIPP-IC component>

3.5.1 Structural aspects of operation and maintenance (O&M)

The table below shows the operation and maintenance system of the UPRIIS.

[41] The preconditions are as follows: 30 years of the project life; benefit is an increase in net agriculture income; and cost is the total project cost as well as an increase in the O&M cost by the project.

[42] The planned and actual start dates of the CMIPP-IC component are earlier than the ones for TGISRP, and the component's planned and actual completion dates are later than those of the TGISRP. Thus the project period of the CMIPP-IC component is used for evaluation of the project as a whole.

Table 16: O&M System of UPRISS Facilities at Ex-Post Evaluation

Irrigation facilities	Organization in charge and contents of major O&M activities
Diversion dam & intake facilities	UPRIIS office: Supply of irrigation water and regular check of equipment
Main canals, drains, laterals	UPRIIS office: Major dredging works Irrigation Associations (IAs): Small-scale dredging works and cleaning, overall O&M activities of laterals when registered as Model 2 of IMT
Sub-laterals, on-farm facilities	IAs: Dredging and cleaning of sub-laterals, O&M activities of on-farm facilities

Source: NIA

The UPRIIS facilities built under this project were transferred to the UPRIIS office in December 2008. The office has been conducting O&M with Irrigation Associations (IAs) since then. It is comprised of five departments that are in charge of O&M of five districts and the O&M department that oversees the entire O&M of the system. The office had more than 1000 staff members in the 1990s but reduced the number to 550 by 1999 under the policy of the Philippine government. The number of the full-time staff members was further reduced to 386 under the subsequent rationalization policy of the NIA. However, to make up for the smaller staff size, the office has hired contract personnel. The current total number of staff members in the UPRIIS office including the contract ones is 868.

To improve the performance of the national irrigation systems, the NIA started the Irrigation Management Transfer Program (IMT) in 2008 to transfer O&M activities of irrigation systems to IAs. The IMT classifies IAs into model 1 to 4 (4 is the highest-capacity model) and transfers the O&M of facilities and water fee collection to IAs in phases.[43]

The UPRIIS has 386 IAs in which 59 are model 1, 12 are model 2, and 290 have signed the contract on O&M with the NIA under the old system[44]. In the Division 5 of the new area, all the IAs has become model 2[45]. The Divisions 1 to 4 plan to transfer all the IAs to the IMT by 2013.

For the CIS and SWIP, which were rehabilitated by this project, 56 IAs which were formed by the project are responsible for the O&M of the facilities. Since most of the IAs use the system originally constructed by private owners, the NIA is not responsible for monitoring them.

[43] Here are the responsibilities of the models. (Source: IMT Manual of NIA 2009)
Model 1: The NIA is responsible for O&M of the entire irrigation system, while some O&M activities for sub-laterals and on-farm ditches, monitoring of irrigation water, production of the list of irrigated and planted area, and promotion of water fee payments are commissioned to IAs. The NIA pays the corresponding remuneration to IAs.
Model 2: IAs are responsible for O&M of facilities under laterals, collection of irrigation fees from members, and financial management of the fees. The NIA pays the IA a certain percentage of the water fees collected, depending on the collection rate.
Model 3: In addition to the responsibilities of model 2, IAs conduct partial O&M of main canals except those main canals from dams to the first lateral.
Model 4: IAs are responsible for O&M of all the facilities, collection and management of water fees, and management of funds for O&M and construction of facilities. The NIA conducts monitoring and evaluation of the system and provide technical support to IAs when necessary.
As of November 2011, there were 2,446 IAs in the country. Among them 463 IAs, or 19% of all the IAs, are registered as model 1, 270 (11%) as model 2, 30 as model 3, and two as model 4. Other IAs are in the process to be registered in the IMT. In Region 3, no IAs are registered as model 1, but 26% are registered as model 2, and 8% as model 3. (Source: NIA documents)

[44] The remaining 21 IAs have not concluded a contract with the UPRIIS even under the old system.

[45] Under IMT, when the collection rate of water fees is more than 50%, a part of the fees is paid to IAs, which is an incentive for IAs to collect the fees. It is likely that the collection rate of the Division 5 is higher than the other divisions because of this factor.

Thus the information on all the IAs could not be obtained. However, two out of the three IAs visited did not operate as an association because the irrigation facilities were not operational due to breakages.

As for the CMIPP-IC component, the UPRIIS office which is responsible for O&M employs necessary personnel including contract staff and the transfer of O&M to IAs has been promoted steadily. Therefore, no major problems have been observed in the structural aspect of O&M.

3.5.2 Technical aspects of operation and maintenance

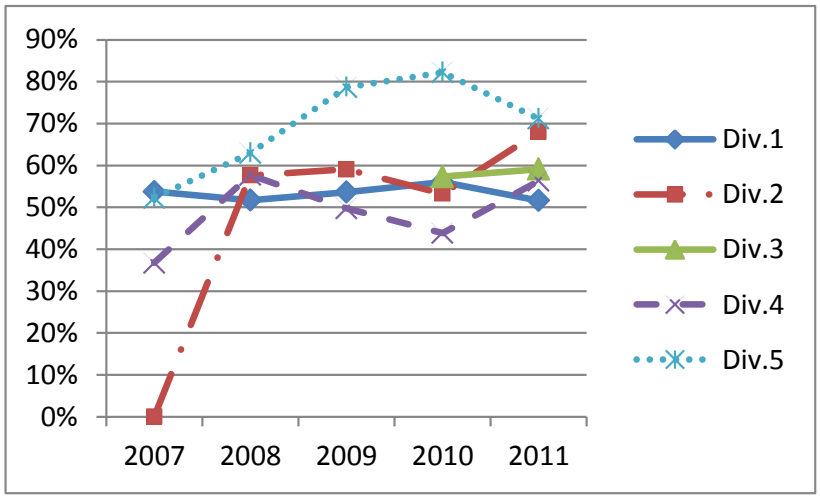
The NIA reported that the guidance and training by the consultants for this project have improved the capacity of the NIA staff on study, design, construction and management for the development of irrigation. The UPRIIS office has deployed technical staff members with expertise on civil engineering and agriculture engineering: 19 in the UPRIIS office itself and 22 to 38 in each division. They use the O&M Manual which has been used by the office since the time before the project, and the methodology and frequency of O&M activities are clearly defined and conducted accordingly in the diversion dam[46]. The staff in charge of O&M has been trained and no technical problems have been observed. However, due to lack of maintenance equipment such as backhoes, dredging work of major canals has been delayed.

As for IAs, the project conducted capacity building on O&M to 32 IAs including 12 in the new area. After the project, all the 12 IAs were transferred to the IMT as model 2; the capacity building by the project seems to have contributed to this outcome. One of the IAs in the new area was awarded as the most outstanding IA in the country. In order for all the IAs to be transferred to the IMT by 2013 as model 2, the UPRIIS office plans to conduct intensive training to its staff and IAs in 2012. According to the beneficiary survey, 31% of the respondents evaluated the capacity of IAs on water management and coordination as very high and 66% as slightly high.

3.5.3 Financial aspects of operation and maintenance

The figure below shows the collection rates of water fees by the five UPRIIS divisions. Although the rates as a whole tend to improve, the average was 57% in 2011. In the Division 5 of the new area, the collection rate decreased in 2011 due to lower rice yield caused by typhoons but remained above 70%.

[46] As for the O&M Manual produced by this project, the management members of the UPRIIS Office including the five divisions do not know of its existence and do not use it.



Source: NIA

Figure 9: Water Collection Rate of UPRIIS

Meanwhile, as shown in the table below, the ratio of income versus O&M cost[47] of the UPRIIS has been high at 157% in 2010 and 148% in 2011. Although the water fee collection rate has not been high, the divisions attained a high ratio of income versus O&M cost because they have controlled the O&M cost[48].

Table 17: Ratio of Income Versus O&M Cost of UPRIIS

	Div.1	Div.2	Div.3	Div.4	Div.5	Total
2010	157%	187%	228%	140%	138%	157%
2011	128%	161%	221%	165%	118%	148%

Source: NIA documents

As shown above, the water fee collection rate by the UPRIIS office has improved, the ratio of income versus O&M cost has also been high, and no major problems are observed in the financial aspect of O&M of the UPRIIS office.

3.5.4 Current status of operation and maintenance

The following problems were observed for the CMIPP-IC component. Many of them are to be addressed by the divisions of the UPRIIS office under their action plans. The main canal of the SCD (earth canal) will be concrete-lined under Phase 2 of the CMIPP-IC. However, the delay in dredging works due to lack of equipment has to be reviewed urgently, including such aspects as outsourcing the works. As a whole, the impact of these problems is small, and the overall status of O&M of the facilities constructed by the project is generally good.

(1) PRIS Dam: Silting at intake outlets (1.5 m) because of the delay in dredging affected by the lack of equipment

[47] JICA uses the Sufficiency Rate of Operation and Maintenance Cost (Actual O&M cost divided by planned O&M cost) as the Operation and Effect Indicator. However, since the data for the indicator was not available, alternative indicators were used to show how much of the O&M cost was covered by the income from the project and by the collected water fees. This was done because the NIA adopted a policy to cover the O&M cost by the income from water fee collection.

[48] Based on the interviews with each of the UPRIIS divisions

(2) TRIS Dam: Requires continuous dredging; Water shortage in the dry season due to decreased water flow of Talavera River[49]
(3) Some sections of the main canal of PBRIS: Collapsed concrete lining due to slope erosion
(4) Part of the main canal of SDC (earth canal): Intermittent erosion along canal slopes
(5) Gate and outlets of DC1: Breakages of lifting structures of the gate

As stated above, no major problems have been observed in the structural, technical and financial aspects of O&M of the CMIPP-IC component.

< TGISRP component >

3.5.1 Structural aspects of O&M

The deep wells constructed by the TGISRP were to be operated and maintained by 72 Irrigation Service Cooperatives (ISCs). The supervision of ISCs was transferred from the NIA project office to the NIA Tarlac Zanmbales Irrigation Management Office (TZIM Office) in 2007. However, three staff members in charge of the project are contract ones and work mainly on other assignments. Thus it is difficult for them to monitor and supervise the ISCs. In addition, out of the 72 ISCs, ten will be transferred to the UPRIIS in 2013 and 21 out of the remaining 62 do not use deep wells due to the high diesel fuel cost and deficiencies in equipment and do not operate as cooperatives. Hence, 41 ISCs are managing the deep well facilities at the time of the ex-post evaluation. Under the project, ISCs are required to pay 30% of the construction cost of the facilities over a five-year period in a contract with the NIA in order that the ownership of the facilities would be subsequently transferred from the NIA to ISCs. However, as explained later, only three ISCs have paid the equity. The delayed transfer of the ownership of the facilities to ISCs seems to have led to a weak O&M system by ISCs in such aspects as lack of capacity to bear the cost to repair deficient facilities.

As discussed above, the TGISRP faces shortage of staff at the local office that monitors and supervises the ISCs and delayed transfer of the facilities to ISCs.

In addition, as mentioned in the section on relevance, gravity irrigation by the NIA's Balog-Balog Multipurpose Project (BBMP) will be implemented for most of the target areas of the TGISRP. According to the NIA, even after the BBMP has been introduced, it is expected that the deep wells constructed by this project would be utilized to complement the BBMP because the target areas are located in the downstream areas and the supply of irrigation water by the BBMP may be insufficient in the dry season. However, the implementation of the BBMP may further decrease the utilization rate of the deep wells as well as the incentives for ISCs to maintain the deep well systems.

3.5.2 Technical aspects of operation and maintenance

The TZIM Office uses a maintenance manual produced by this project in 2005 to advise ISCs. The TZIM staff members in charge of this project have the expertise in agriculture and receive support from an in-house mechanic to advise ISCs in repairing their facilities. In the beneficiary survey, 26% of the respondents said that the capacity of ISCs to supply irrigation water and coordinate ISC members was very high and 64% said slightly high.

[49] To address the shortage of irrigation water, the project office provides water from the other main canal of DC1.

3.5.3 Financial aspects of operation and maintenance

ISCs and the NIA have concluded a contract that requires the ISCs to pay 30% of the construction cost of the deep wells in five years. However, only three ISCs have paid all the cost so far. The recovery rate of the cost is only 19.6%, and about 37 million pesos (69 million yen) have not been paid. Since part of the payment would be used for supervision activities of ISCs by the TZIM Office, it is fair to say that the low repayment rate has affected these activities[50].

As explained before, 25 out of the 42 ISCs use the facilities partially and there are many ISCs in which only some of the members use the facilities. Since the members' utilization rate of the facilities is low, it is difficult for ISCs to collect the payment for the construction cost from the members. Most of the ISCs do not save the O&M cost and many cannot pay for repair when there are deficient parts[51]. It is also difficult for them to secure the cost for future replacement of pumps and engines.

3.5.4 Current status of operation and maintenance

15 out of 72 deep wells are not operational due to damaged facilities or removal of the engine. Three out of 15 have problems of discharge capacity of pumps and three had problems of canals. The TZIM Office worked out the action plan to grasp the utilization status of pumps and engines as well as to carry out reworking and construction of necessary canals[52].

As discussed above, for the TGISRP, only 41 ISCs, or 57% of the 72 ISCs established, use the facilities and operate as cooperatives. The TZIM Office, which is responsible for supervising ISCs, faces shortage of staff as well as delayed transfer of the facilities to ISCs. In addition, ISCs cannot save the funds for the O&M cost. When the BBMP is implemented, the utilization rate of deep wells may decrease even further and affect O&M of the facilities. Thus major problems have been observed in terms of structural and financial aspects of O&M of the TGISRP component, which poses concerns on the future O&M of the facilities.

< Evaluation of the sustainability of the project as a whole>

As discussed above, although no major problems have been observed in the operation and maintenance of the CMIPP-IC component, there are major problems in structural and financial aspects of O&M in the TGISRP component. In the project as a whole, some problems have been observed in terms of structural and financial aspects of O&M. Therefore the sustainability of the project effect is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project is fully consistent with the development policies and development needs of the Philippines and Japan's aid policy to support agriculture and rural development; therefore its relevance is high. The actual irrigated and planted areas and yields were 103% of the planned

[50] Budget for activitiess by the TZIM Office for the project in 2012 is 1 million pesos, which is about 1.88 million yen.

[51] When major repair is necessary, the TZIM Office takes necessary parts from the engines and pumps that are not being used and provide them to the ISCs. When such parts are not available from the engines and pumps at the office, the office instructs ISCs to collect the necessary cost from their members because the office has no such funds. However, as the diesel fuel is expensive and many ISCs use the facilities at a limited level, it is difficult for ISC members to pay for repair.

[52] Pumps and engines that are not being used but are operational are to be removed and used as spare parts for other ISCs. A mechanic of the TZIM Office repairs damaged equipment if at all possible.

ones; hence the overall effects and impact of the project are high. The project cost was slightly above the plan, while the project period exceeded the plan significantly; thus the efficiency of the project is low. With regard to sustainability, although no major problems have been observed in the operation and maintenance of the CMIPP-IC component, major problems have been observed in terms of structural and financial aspects of operation and maintenance of the TGISRP component. Therefore the sustainability of the project effects as a whole is fair. In light of the above, this project is evaluated to be partially satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the executing agency

(1) CMIPP-IC component

① There are gaps between FUSA and irrigated and planted areas in the new area of the UPRIIS: the gaps are 3,678 ha in the wet season and 2,474 ha in the dry season. To expand the planted area, the Division 5 of the UPRIIS should promote its action plan including necessary reworking of the facilities and parcellary mapping to define FUSA.

② With regard to the issue of delayed dredging works at water intake outlets and canals, which is explained in the sustainability, each UPRIIS division should consider outsourcing dredging works and taking measures to secure minimum equipment for such works.

(2) TGISRP component

Only 41 out of the 72 deep wells constructed by this project are being used, and the sustainability of the deep wells is highly questionable. It is recommended for the NIA to carry out the following for effective use of the deep wells and improving sustainability.

① Strengthen the capacity of the TZIM Office to monitor, advice, and support ISCs.

② Secure subsidies on diesel fuel cost to ISCs that use the deep wells.

③ The TZIM Office should implement its action plan on construction and repair of the facilities.

④ The TZIM Office will formulate and implement a plan to collect the construction cost to be paid by ISCs in consultation with the central office of NIA. The TZIM office will consider the possibility of payment collection from the ISCs whose facilities are not operational or who have not used the facilities. Then the office will review if they can transfer the major facilities which are not used but operational to other areas and collect the cost of those facilities from those who would receive the facilities.

⑤ Introducing a domestic water supply system utilizing deep wells has a merit of promoting the use of deep wells and using the income from the water supply system for maintenance of the facilities. The TZIM Office has already consulted with several local governments to introduce such water supply system and it is expected that the system to be promoted. However, it is necessary to review possible impacts on such system by the natural environment such as flood as well as the management capacity of ISCs. It should also be noted that the supply of irrigation water will not be affected by the introduction of the domestic water supply system.

Many of the target areas of this component are to be covered by the BBMP which is in the

approval process. It is recommended that the TZIM Office consult the BBMP office and the central office of NIA to review how to provide irrigation services in the target areas and implement the recommendations above. In the review process, the NIA does not have to delete the target areas from the BBMP but explore measures for the deep wells and the BBMP to complement each other. Then, the NIA should review the recommendations above for the target areas including those that will not be covered by the BBMP. Among the factors that should be taken into account are as follows: years of operation and service life of pumps and engines; number of members who use the deep wells and the frequency of use; planned completion date of the BBMP; and the BBMP's capacity for irrigation water supply as compared to the demand.

4.2.2 Recommendations to JICA

(1) As for the TGISRP component, JICA should keep monitoring the approval process of the BBMP and consult with the NIA on measures for effective use of the deep wells. Then, JICA should continue to monitor the implementation status of the action plan of the TZIM Office.

4.3 Lessons Learned

(1) Thorough consultation and review at the stage of project formulation

For the CMIPP-IC component, the original scope was substantially changed after the project appraisal based on the strong request from the Philippine side and L/A was signed without a definite scope, which became a major cause of the extension of the project period. It is important to conduct sufficient consultation with the implementing agencies at the appraisal and agree on the scope.

For the TGISRP component, higher diesel fuel cost and the prevalence of shallow tube wells were major factors that reduced the utilization of the deep wells. In addition, as the target area is overlapped with another irrigation project, the utilization of the deep wells may decrease even further if that project is implemented. In the project formation stage, it is necessary to examine the possibility of overlapping with other projects or facilities in the target area. When multiple irrigation methods are expected such as deep wells and shallow tube wells, it is necessary to analyze operational aspects such as ease of O&M and management by farmers, in addition to the methods' functions and costs.

(2) Consideration for risks of fluctuations in fuel costs

The TGISRP component was formulated to activate the deep wells which had not been used due to the high electricity cost by utilizing diesel fuel which was much cheaper than electricity. To cover the diesel fuel cost, water fees were estimated, and economic analysis was done utilizing the diesel fuel price at the time of the SAPI. However, the risk of changes in the diesel fuel cost has not been studied. For deep wells, it is necessary to carefully examine the risk that facilities will not be utilized because of the rising fuel cost for pumps.

(3) Securing O&M equipment

In the CMIPP-IC component, if the planned O&M equipment had been procured, the situation of delayed dredging works could have been avoided. For a large-scale project, it is important to procure necessary equipment for O&M after project completion, through sufficient coordination with agencies that are responsible for O&M.

(4) Agreement on the completion status of facilities with agencies that are responsible for O&M and improvement of the quality of project completion reports

In the CMIPP-IC component, the project office and the office in charge of O&M had different understanding on the completion status on some facilities and FUSA. For the TGISRP component, the project completion report has not reflected the actual status of the constructed deep wells and their utilization, which seems to have affected O&M and monitoring activities after project completion. When facilities are transferred to an organization responsible for O&M, the facilities should be inspected and verified with the organization on the project site based on documents that describe the facilities in detail.

(5) Promotion of coordination with financial institutions to meet farmers' demands for funds

In the TGISRP component, it was planned to establish a fund to provide loans for payment of the construction cost and for agriculture input, and training to farmers was conducted. However, due to the policy of the Philippine government which prohibits non-financial organizations such as the NIA from providing financial services, it was not possible to set up the fund. When the policy became clear, it should have been reviewed to promote loan services by financial institutions such as the Land Bank of the Philippines to target farmers, in addition to the suspension of setting up the fund.

Since financial activities by non-financial institutions such as the Ministry of Agriculture met many failures and such activities are often restricted by government in other countries, projects are recommended to facilitate financial services by financial institutions for farmers and not have irrigation agencies provide such services

Comparison of the Original and Actual Scope of the Project

< CMIPP-IC Component >

Item		Plan (Agreement after D/D)	Actual
1.Outputs			
(1) Civil Works	FUSA	82,018 ha	85,780 ha
	Rework on intake facilities	3 places	3 places
	Main canals concrete lining (km)	21.1	27.6
Rehabilitated Area	Rework on main canals/ laterals/ sub-laterals	N/A	992 km
	Related canal and drainage structures	N/A	80 unites
New Area	Addition and rework on intake facilities	N/A	41 places, 1 emergency power supply
	Main canals expansion and rework	2.8km	3.27 km
	Head gates	N/A	11
	Super Diversion Canals (SDC)	29.2 km	39.2km & related structures
	SDC laterals & sub-laterals	N/A	241 km
	On-farm facilities & related structures	N/A	481km, 602 turn outs
	Drainage systems	N/A	260 km
	Project facilities	N/A	13
	Repair of Communal Irrigation System	N/A	8
	Improvement of Small Water Impounding Ponds	N/A	51
2) Procurement	Construction Equipment	N/A	30
	Trucks, Jeeps, Motorbikes	N/A	37
3) Consulting Service	International (MM)	185 (Estimate)	227
	National (MM)	355 (Estimate)	453
2. Project Period		July 1997～ December 2004 (90 months)	July 1997～December 2008 (138 months)
3. Project Cost	Amount paid in Foreign currency	8,973 million yen	10,538 million yen
	Amount paid in Local currency	6,259 million yen (2,445 million pesos)	5,642 million yen (2,393 million pesos)
	Total	15,232 million yen	16,180 million yen
	Japanese ODA loan portion	12,249 million yen	11,590 million yen
	Exchange rate	1peso＝2.56 yen (As of Dec. 2001)	1 peso＝2.36 yen (Weighted average)

< TGISRP Component >

Item		Plan	Actual
1.Outputs			
(1) Civil Works	Drilling works of deep wells (180 m)	40	53
	Construction of exploratory/production wells	10	10
	Demonstration farms including deep wells (50 ha)	2	2
	Rehabilitation of deep wells	1 (included in the model farms)	7
	Establishment of groundwater table monitoring system (Drilling of shallow wells)	10	0
	Establishment of groundwater table monitoring system (Installation of automatic water level recorders)	10	10
	On-farm irrigation system development	50 (2,500ha)	70 (3,500ha)
	Access roads	—	9
	Rural water supply system	—	3 systems
2) Procurement	Pumps	50	46
	Engines	50	65
3) Consulting Service	International (MM)	55	58
	National (MM)	174	205
2. Project Period		September 1997～December 2002 （64 months）	September 1997～ December 2005（100 months）
3. Project Cost	Amount paid in Foreign	1,500 million yen	1,307 million yen
	Amount paid in Local currency	996 million yen (249 million pesos)	606 million yen (252 million pesos)
	Total	2,496 million yen	1,913 million yen
	Japanese ODA loan portion	1,887 million yen	1,306 million yen
	Exchange rate	1 peso＝4 yen （As of October 1997）	1peso＝2.39 yen（Weighted average）

The Republic of the Philippines

Ex-Post Evaluation of Japanese ODA Loan
Pampanga Delta Development Project (Irrigation Component)

External Evaluator: Haruko Awano, IC Net Limited

0. Summary

This project was conducted to increase agricultural production in the Pampanga Delta Area in Central Luzon, Philippines, by constructing irrigation facilities, thereby contributing to the improvement of living standards and income of local residents.

This project is fully consistent with the development policies and development needs of the Philippines for the improvement of productivity and self-sufficiency rate of rice as well as Japan's aid policy to support agricultural development; therefore its relevance is high. Households of the beneficiary farmers reported effects and impacts of the project, such as an improved agricultural income due to the increase in rice production and improved living standards. However, the extent of these effects and impacts is very limited as the actual irrigated and planted areas were about 30% of the planned ones; hence the overall effects and impacts of this project are low. Efficiency of the project is fair because its cost and period exceeded the plan. Some problems have been observed in staff shortages of the local offices responsible for maintenance and financial sustainability; therefore sustainability of the project is fair. In light of the above, this project is evaluated to be unsatisfactory.

1. Project Description

Project Location

Pampanga Diversion Dam

Pumping Station

1.1 Background

In the Philippines, only half of the potential irrigable areas of 3.1 million ha were irrigated as of 1989 and establishment of irrigation facilities was an important investment for stable food production. The Central Luzon region, where this project was implemented, is adjacent to Metro

Manila and has played an important role in supplying rice. The project site of the Pampanga Delta, which had been affected by floods every year, had great potential in agricultural development. However, due to inadequate irrigation and drainage facilities in the region, irrigation water was insufficient in the dry season while water management was difficult in the rainy season. As a result, the growth of annual rice production had been sluggish, which affected the improvement of farm income and stable supply of rice. Therefore, the development of irrigation facilities in the region to increase rice production was an urgent task for the government of the Philippines.

1.2 Project Outline

The objective of this project is to increase agricultural production in the Pampanga Delta Area by providing irrigation facilities, thereby contributing to the increase of income and the enhancement of the living standards of residents in the project area.

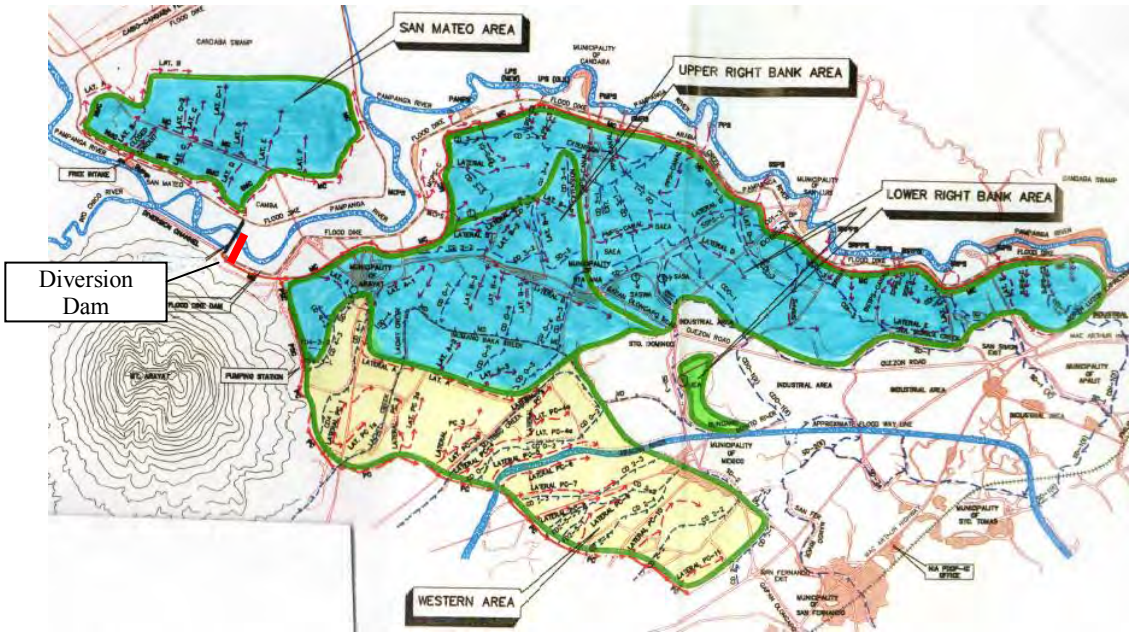


Figure 1: Layout of Pampanga Delta Development Project (Irrigation Component)

(The project area is surrounded by the green line. The blue area shows the gravity irrigation area; the light yellow one, the West Bank pump irrigation area; and the green one, the small-scale pump area[1].)

[1] Gravity irrigation is a method that applies irrigation water to fields by letting it flow from a higher-level supply canal through ditches or furrows to fields at a lower level. Pump irrigation is to pump up irrigation water from the water source by pump equipment to be supplied to the ground. In this project, a large-scale pump irrigation system was introduced in the West Bank to pump up the water in the diversion dam by large pumps; in the Mexico area in the downstream of the Right Bank, small equipment was introduced to pump up the water in the river.

Loan Approved Amount / Disbursed Amount	9,427 million yen / 9,303 million yen
Exchange of Notes Date / Loan Agreement Signing Date	March, 1991 / July, 1991
Terms and Conditions	Interest Rate: 2.7% Repayment Period: 30 years (Grace Period: 10 years), Conditions for Procurement: General Untied
Borrower / Executing Agency	The Government of the Republic of the Philippines / National Irrigation Administration (NIA)
Final Disbursement Date	October, 2002
Main Contractor	Taisei Corporation (Japan) / Kurimoto Ltd. (Japan) (JV), Kubota Corporation (Japan) / C. M. Pancho Construction Inc. (Philippines) / L.P. Engineering Services (Philippines)(JV)
Main Consultant	Nippon Koei Co., Ltd. (Japan)
Feasibility Studies (F/S), etc.	F/S (1980), E/S (1986), SAPI (1995) by Yen Loans
Related Projects (if any)	UNDP (Pampanga Delta and Candaba Swamp Integrated Development Plan, 1975); JICA (Project on the Development and Promotion of Location - Specific Integrated High - Yielding Rice Technologies, Nov. 2004 – Nov. 2009); JICA (Irrigators Association Strengthening Support Technical Cooperation Project, Oct. 2007 – Sep. 2011); JICA (Pinatubo Hazard Urgent Mitigation Project III, Dec. 2007 – present)

2. Outline of the Evaluation Study

2.1 External Evaluator[2]

Haruko Awano, IC Net Limited

2.2 Duration of Evaluation Study

Duration of the Study: November 2011 - October 2012
Duration of the Field Study: February 3 - 12, 2012, March 3 - 24, 2012,
May 20 - 31, 2012, July 17 - 20, 2012

2.3 Constraints during the Evaluation Study

In this project, the unexpected eruption of Mount Pinatubo occurred in the target area which necessitated the suspension of the project and significant changes in the project's scope. Therefore, the evaluation was done based on the plan that was adopted from the results of the Special Assistance for Project Implementation (SAPI), which was conducted after the eruption, not the plan at the time of the appraisal. Due to the reassignment of the staff responsible for the implementing agency, it was difficult to obtain information such as review processes of the project plan for the criteria of relevance, reasons for the decrease in the irrigated and planted areas for effectiveness, and the monitoring situation of the Environment Compliance Certificate (ECC) and land acquisition for impact.

[2] This project was jointly evaluated with the National Economic Development Authority of the Philippine government.

3. Results of the Evaluation (Overall Rating: D[3])

3.1 Relevance (Rating: 3[4])

3.1.1 Relevance with the Development Plan of the Philippines

During the project appraisal period, the Mid-Term Philippine Development Plan (1987 - 1992) emphasized the food self-sufficiency through increasing agriculture production. Low productivity was raised as one of the reasons for insufficient supply of rice, and the plan gave irrigation related projects a high priority, which accounted for about 8% of the plan's total investment. The provincial government of Pampanga put importance on the production of agricultural products with high added value and aimed to improve the quality of agriculture. The Development Plan (1990 - 2000) of the National Irrigation Administration (NIA) stated that irrigated area would be expanded from 1,469,000 ha in 1989 out of the potential irrigation area of 3,126,000 ha to 2,000,000 ha by 2000.

At the time of the ex-post evaluation, the Philippines' Mid-Term Development Plan (2011 - 2016) aims for inclusive economic growth and considers infrastructure development including irrigation improvement as one of the country's development strategies. In agriculture development, the top priority is the improvement of agriculture productivity and income through such measures as improved irrigation facilities. The Food Staples Sufficiency Program (2011 - 2016) by the Department of Agriculture points out that self-sufficiency in rice has not been achieved with the increase of rice consumption[5]. In order to reduce the import of rice, the Mid-Term Development Plan aims to expand the planted areas of rice and increase yield and production. It also puts emphasis on the rehabilitation of existing irrigation facilities and the construction of new facilities to expand irrigated areas. The Development Plan of Pampanga Province (2011 - 2016) stipulates that agriculture development is one of the major economic clusters as source of growth. The plan specifies support to agriculture by such means as small-scale irrigation facilities, and the province is rehabilitating existing irrigation facilities and providing shallow tube wells for upland areas. Moreover, the NIA aims to construct new irrigation facilities of 166,671 ha and rehabilitate or restore the facilities of 284,399 ha in the first three years in its six-year irrigation plan from 2012.

3.1.2 Relevance with the Development Needs of the Republic of the Philippines

At the time of the appraisal, the agriculture sector employed about half of the total labor force in the Philippines. However, the country was not self-sufficient in rice, its staple food, from 1988 and 1990, and imported it to make up for the shortage. Due to the increased population, the demand for rice was expected to grow by 31% in 1998 compared to 1988. Although the rice production was estimated to increase by 23% during the period, there would still be supply shortage of 170,000 tons and the shortage was expected to continue.

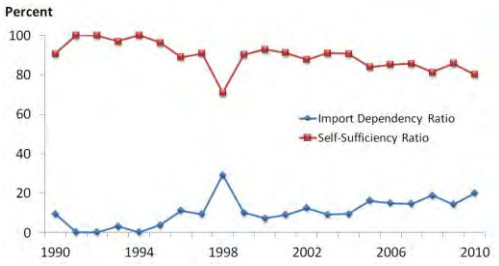
At the time of the ex-post evaluation, rice production has been increasing but does not meet the increasing demand. The average self-sufficiency rate of rice from 2004 to 2010 remained at 84.7%. In 2009, the Philippines' rice yield was 3.6 ton/ha, behind Indonesia and Vietnam. Thus

[3] A: Highly satisfactory; B: Satisfactory; C: Partially satisfactory; D: Unsatisfactory

[4] 3: High; 2: Fair; 1: Low

[5] Annual consumption of rice per capita increased from 105.77 kg in 1999/2000 to 119.08 kg in 2008/2009. However, the amount of rice that can be domestically supplied per capita was estimated at 114.64 kg in 2009. Therefore, there is a gap of 4.4 kg per capita between supply and demand in the year. The rate of population growth during the 2000s is 1.9% per year, which is less than 3% of the annual growth rate of rice production during the same period. However, the amount of rice consumption per capita has increased together with income increase, which is considered to be a cause of the demand-supply gap of rice.

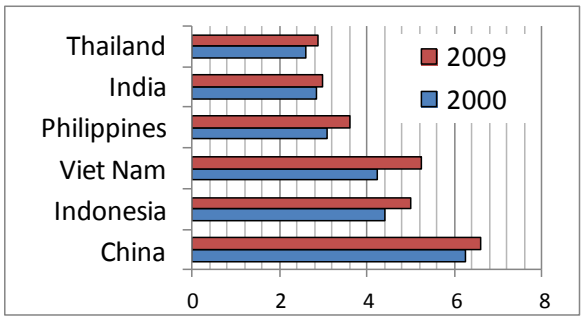
the improvement of rice productivity is still urgent.



Source: Department of Agriculture

Fig. 2: Self-Sufficiency and Import Dependency Rate of Rice

(Unit: Tons/ha)

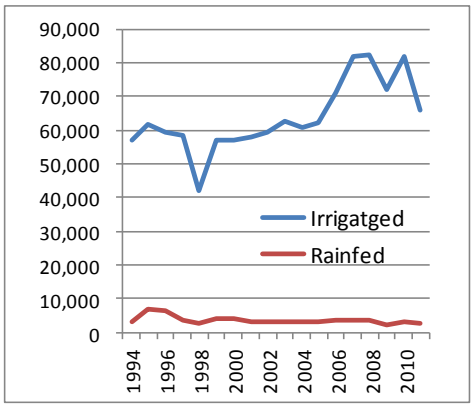


Source: Department of Agriculture

Fig. 3: Comparison of Rice Yield

Central Luzon, where Pampanga Province is situated, has been the largest producer of rice in the country and a major supplier of rice to Metro Manila. Pampanga Province is one of the major grain production areas in the Region. However, the province's production did not meet its own demand in 1990, and the province's rice self-sufficiency rate was 82%. Therefore the increase in rice production in the province was imminent. In 2010, the rice planted area increased to 84,746 ha, and rice production increased, but the self-sufficiency rate remained at 89%[6]。

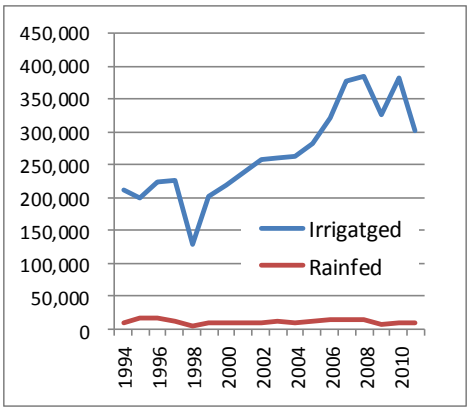
(Unit: ha)



Source: BAS

Fig. 4: Rice Planted Area in Pampanga Province

(Unit: ton)



Source: BAS

Fig. 5: Rice Production in Pampanga Province

3.1.3 Review Process of the Project

The concept of this project originated from the "Survey of Comprehensive Development Plan and Candaba Pampanga Delta Swamp" (1975 - 1978) by the United Nations Development Programme (UNDP). Based on the survey results, the Feasibility Study (F/S) for flood control and irrigation, both of which were considered urgent, was conducted by JICA in 1980 and the Engineering Study (E/S) was carried out in 1986 - 1989 by JICA's yen loan projects. Then, the Flood Control project started in 1990 and the Irrigation Project in 1991 by JICA's yen loans.

[6] Data from the Department of Agriculture

After the appraisal of this project was conducted in 1990, Mount Pinatubo erupted in June 1991. Since the impact by the eruption could not be anticipated at that time and the Philippine side's preparation of the project, such as establishment of the project office, was proceeding, the loan agreement was signed in July 1991 as scheduled. However, a large amount of lahar flow occurred a few months after the volcanic eruption, the target area sustained a major negative impact, and the project was suspended in March 1993. After the situation stabilized, a study on the SAPI was conducted in 1994. The SAPI proposed ten alternative plans, and the plan 7 to add a pump irrigation scheme in the West Bank area was adopted[7]. The plan cited the disadvantage of high irrigation fees in the West Bank area. However, the cost analysis of water fees including pump operation was presented as average cost per hectare of the whole project, which was less than 2% of the estimated net agriculture income. It was analyzed that beneficiary farmers would be able to bear the cost. Since the operation cost of pumps would be paid by the farmers in West Bank, water fees including the pump operation cost should have been analyzed targeting West Bank and explained in the SAPI report; but no such analysis was done[8]. Cash crops in the West Bank area were also planned in consideration of higher economic effects and sustainability of this project through facilitating the payment of water fees by farmers[9]. The needs for agriculture extension services and loans were pointed out, but only the collaboration with relevant agencies such as the Department of Agriculture was suggested.

3.1.4 Relevance with Japan's ODA Policy

The White Paper on Japan's ODA in 1990 cited the agriculture sector as an important assistance area. It also made promotion of agricultural development as one of its priorities to increase food production and stabilize food production. Moreover, it suggested comprehensive support to agricultural development by (1) equipment and facilities as well as (2) human resources and institutions. The former included the expansion of irrigation facilities.

From the above, this project is highly relevant with the development policies and development needs of the Philippines which aimed to improve the productivity and self-sufficiency rate of rice, as well as Japan's ODA policy to support agriculture development. Therefore its relevance is high. However, in the process to add pump irrigation in the West Bank area after the eruption of Mount Pinatubo, the examination was insufficient on the cost of operating pump irrigation to be borne by farmers, the introduction of cash crops, and their possible impacts and effects on the project.

3.2 Effectiveness[10] (Rating: 1)

3.2.1 Quantitative Effects (Operation and Effect Indicators)

(1) Irrigated and planted area

The table below shows Firmed Up Service Area (FUSA, the area that can be provided with irrigation water) and irrigated and planted area (the area which is actually irrigated and planted) at the time of the appraisal, at the time of the SAPI, and actual values from 2009 to 2011. At the

[7] In addition to the 8,100 ha which will be irrigated by the gravity system, 2,400 ha which will be irrigated by pumps was added. The plan was adopted because it included the introduction of highly profitable cash crops in the dry season and the estimated net income of farmers was the highest.

[8] The disadvantages of the plan 7 are taken from the comparison table of proposed plans in Table 4-9-12 on page T-68 of the SAPI. The study on the farmers' willingness to pay the irrigation water fees was not conducted.

[9] Based on the interviews with the former manager and staff of the PMO (Project Management Office) of the NIA.

[10] The impact is to be taken into consideration in sub-rating for effectiveness.

time of the appraisal, a FUSA of 11,540 ha was planned but the SAPI excluded several areas and the FUSA was reduced to 10,500 ha. As a result, it was planned to irrigate and plant rice for a total of 17,290 ha for both the dry and rainy seasons. However, at the time of the ex-post evaluation, FUSA decreased to 7,836 ha and the irrigated and planted area of rice registered at the NIA in a year was only 5,166 ha, or about 30% of the plan at the SAPI. However, the actual area may be more than the area registered at the NIA because many farmers reportedly tend to declare their planted area in a way that is less than the actual value.

It was assumed that cash crops would be planted in 3,710 ha in the dry season but the NIA reported only the planted area of corn as 28 ha and the actual area of cash crops is considered small[11]. Even in a sum of the irrigated and planted area of rice and the area used for cash crops and fish ponds in the dry season when the utilized area in the FUSA is higher than in the rainy season, only 4,505 ha is irrigated in 2011[12] and it is considered that 3,331 ha of FUSA is not used. Table 1 and Figure 6 below show these situations.

Table 1: FUSA, Irrigated and Planted Area of the Project Target Area (Unit: ha)

Items	Apprai -sal	SAPI (Planned)	Actual				Actual / Planned
			2009	2010	2011	Average	
FUSA	11,540	10,500	7,836	7,836	7,836	7,836	74.6 %
Irrigated & planted area of rice (Dry)*1	9,540	6,790	4,103	3,866	4,041	4,003	59.0%
Irrigated & planted area of rice (Rainy)*2	11,540	10,500	1,344	1,048	1,096	1,163	11.1 %
Irrigated & planted area of rice (Annual: Dry + Rainy)	21,080	17,290	5,447	4,914	5,137	5,166	29.9 %
Irrigated & planted area of cash crops (Dry)	2,000	3,710	N/A	540	28	28	0.8%
Fish Pond Area using irrigation (Dry)*3	N/A	N/A	N/A		436	436	N/A

Source: Appraisal documents, SAPI Report, NIA documents

*Note 1: Since the data of cash crops and fishponds of the dry season in 2009 is not available, the planted area of rice may include such data.

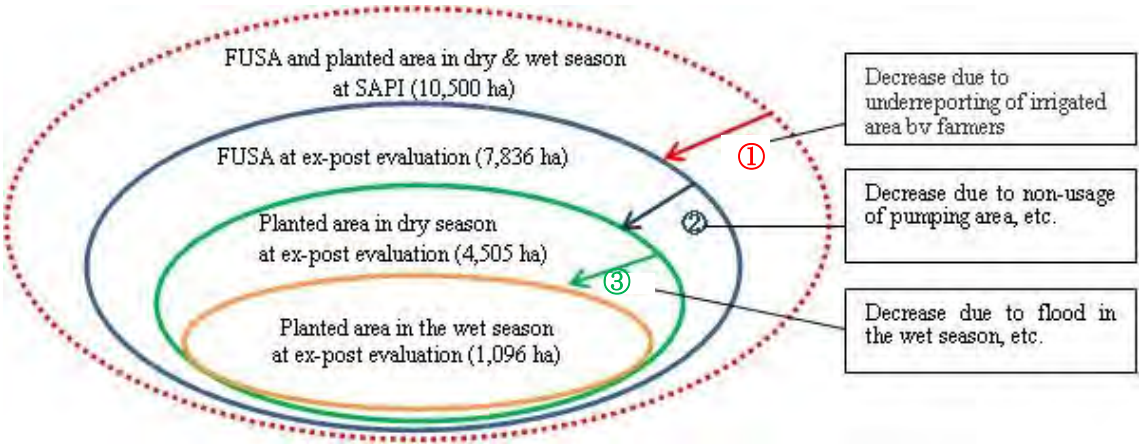
*Note 2: The data of the area of cash crops and aquaculture ponds in the rainy season in 2009 and 2011 could not be obtained. Therefore, there is a possibility that the data of planted area of rice for these two years contains the area of cash crops and fish ponds. The area of cash crops and fish ponds during the rainy season of 2010 was 114.8 ha.

*Note 3: Fish ponds in the target area are not planned in SAPI. However, tilapia fish ponds increased from 2005 to 2008 and improved the income of farmers. Irrigation fees set for a fish pond are higher than those for rice and contributed to the increase in the NIA's income from irrigation fees. However, since around 2011, the pond area has been reduced due to cost increase in such items as feed, crop failure due to rising temperature, and decreased market prices. At the time of the ex-post evaluation, a number of ponds are being converted to rice paddy.

[11] The PDRIS Office of the NIA, which is in charge of O&M (Operation and Maintenance)of the project, collects only the cash crop data of corn. Therefore, the data of "Actual" in the table is limited to corn. The data of corn is available only for 2011 and the data for other years is the total of cash crops and fish ponds. Therefore, the data of corn cannot be compared with other years.

[12] The figure is calculated from Table 1 as follows. Irrigated and planted area of rice 4,041 ha + cash crops 28 ha + fish ponds 436 ha = 4,505 ha.

Figure 6: FUSA and Irrigated and Planted Area (Including Cash Crops and Fish Ponds) in 2011



Source: SAPI Documents, NIA

The table below summarizes the reasons for decrease of irrigated and planted area. Repair of laterals and other facilities with problems indicated in Item 2. in the table are included in the Action Plan by the NIA and it is expected to restore about 1,000 ha in 2012.

Table 2: Reasons for Reduction of FUSA and Irrigated and Planted Area[*1] (Unit: ha)

Items	SAPI	Actual	Gap	Reasons
1. FUSA	10,500	7,836	2,664 (① in Figure 6	1,420 ha was added by the project after SAPI, then decreased by 4,084 ha. Reasons are **underreporting of irrigated area by farmers** (-2,000, estimated by NIA), lack of canals in pump area (-952, estimated by NIA)[*2], and conversion of land (-905, estimated by NIA)[*3]
2. Irrigated & planted area (Dry season)	10,500	4,505	5,995 (Gap from actual FUSA: 3,331, ② in Figure 6)	In addition to the reduction of FUSA above, **non-utilization of pump irrigation (-1,956),** withdrawal of small pumps in the Right Bank area (-260), malfunction of Lateral A (-320), necessary repair for several facilities (-785)
3. Irrigated & planted area (Rainy season)	10,500	1,096	9,404 (Gap from planted area in dry season: 3,409, ③ in Figure 6)	In addition to the above reduction of FUSA and planted area in dry season, it is estimated that **farmers do not plant due to flood in the downstream area and/or use rain water for planting.**

4. Planted area of cash crops (Dry season)	3,710	28	3,682	Lack of canals in pumping area (-952); non-use of irrigation in pumping area (-1,956); farmers do not introduce cash crops; lack of data of NIA

Source: SAPI Report, NIA

Note: Irrigated and planted area includes cash crops and fish ponds.

*Note 1: Data in the table is based on the O&M data, the Action Plan including repairs, and information from the PDRIS Office of the NIA. However, much of the data is estimates by the PDRIS Office since precise data was unavailable.

*Note 2: The Project Completion Report (PCR) reported 2,920 ha of FUSA was constructed in the West Bank where pumping irrigation was introduced. According to the NIA, however, after the completion of the project, it was found that FUSA decreased by 952 ha because a few parts of the canals were not constructed. The reduction of FUSA by the incomplete construction of the canals should have been reflected in FUSA, but the reduced area was included in the PCR by mistake.

*Note 3: Parts of FUSA were converted to other purposes such as residence and industrial use.

The major reasons for the decrease in the irrigated and planted area are as follows.

1) Reductions of FUSA due to underreporting of areas by farmers

The NIA estimates that the area declared by farmers for irrigation services is less than the plan by more than 2,000 ha and believes that the farmers may be utilizing irrigation services in more areas than their report[13]. The NIA cannot determine the correct FUSA. Therefore, it is expected that FUSA and the planted area will increase when the NIA conducts parcillary mapping[14].

2) Reductions of irrigated and planted area due to non-utilization of pumping facilities

Most farmers in the pump irrigation area in the West Bank do not use the irrigation services due to the high price of diesel fuel and availability of shallow tube wells. The SAPI in 1994 estimated the price of diesel fuel per liter at 7.1 pesos, but it increased to 21.6 pesos in 2003 when this project was completed and 43.3 pesos in 2011[15]. Thus the pumping facilities were not used for about four years after the completion of the project. In 2008 and 2009, when a subsidy was provided, three Irrigation Associations (IAs) in the upstream used the pumping facilities. However, only one IA has been using the facilities for about 30 ha[16] since then. At the time of the ex-post evaluation, farmers in the upstream area planted rice

[13] Based on the interviews with the NIA and the vice president of the Federation of Irrigation Associations. An IA conducted parcillary mapping that almost doubled FUSA. Therefore, the NIA believes that it is highly likely that farmers are underreporting the irrigated area.

[14] If the planted area is increased, the NIA can increase the income from water fees. Out of the planted area of 4,505 ha including cash crops and fish ponds in the dry season in 2011, 4,384 ha was irrigated by gravity.

[15] Based on the data from the Department of Energy of the United States and the Department of Energy of the Philippines. Even when adjusted by the average CPI rate of 6% from 1994 to 2011, the diesel fuel price in 2011 is 2.4 times the price in 1994.

[16] After the completion of the project, the NIA held several discussions with the farmers in the area on the use of pump irrigation facilities, but the farmers declined to use them due to the high diesel fuel cost. The NIA estimated that the water fee including diesel fuel and other operation costs of the pumping facilities would be 700 kg of rice per ha. (Water fees applied to other areas by the project at the ex-post evaluation are 150 kg of rice for the dry season and 100 kg for the rainy season.) The three IAs tried pumping irrigation for 165 ha in 2008 and 80 ha in 2009 but the two IAs decided not to use the pumping facilities because of the high cost and difficulties in arrangements among IA members. At the ex-post evaluation, only one IA near the pumping station was using the pumping facilities for 30 ha out of 123 ha of its FUSA. However, it did not use the pumps in the dry season in 2012. (Based on FGD with farmers in the area and interview with the NIA.)

and corn using the existing shallow tube wells. It is assumed that most farmers in the downstream area do not plant using irrigation during the dry season[17].

3) Significant decrease in irrigated and planted area in the rainy season due to inundation and use of rain water

The target area is a region that has suffered frequently from flooding and the SAPI excluded the flood prone areas from the project. Therefore, the SAPI assumed that, even without the project, 96% of the target area will be planted by irrigation or rain fed in the rainy season. The SAPI pointed out the possibility of an increase in floods caused by lahar but planned that the same level of areas will be irrigated and planted in the dry and rainy seasons. However, the actual irrigated and planted areas in the rainy season after the completion of the project in 2004 were very small in the range of 893 to 1,343 ha. The main reason is that the crop cannot be planted as many areas are flooded in the rainy season[18]. In the project area, floods increased after the eruption of Mount Pinatubo due to an accumulated lahar in the river. In addition, the improvement of the river Bungang Guinto, which was the cause of flood and drainage facilities, was carried out during the civil works, and the other flood prone areas were added as target areas. However, these works were insufficient to solve the problems of flooding in the area. Furthermore, drainage of some fishponds is inadequate and causing the expansion of the inundation area.

For the reasons above, crops cannot be planted during the rainy season in many areas. While lahar affected the area, the target area should have been determined after a thorough study and review of the other project plans on flood control measures to improve drainage, when a project is implemented in flood prone areas. Currently, JICA is requesting the DPWH to carry out the dredging of the Bungang Guinto river in the ongoing project of Emergency Disaster Relief of Mount Pinatubo. When completed, the dredging is expected to reduce the impact of flooding.

In addition, it is estimated that many farmers use rain water for planting and do not use irrigation services in the rainy season[19]. The SAPI assumes that, even if this project is not implemented, 2,868 ha will be planted using rain water in the rainy season, and farmers in the area will use irrigation services after the completion of the project. However, it is considered that farmers in the area is still using rain water and not using irrigation services. According to the NIA, even if farmers are in rain-fed farming, the NIA should include them

[17] Based on the field study for the upstream area and information from the NIA for the downstream area. The SAPI reported that a few areas were using small-scale facilities to use groundwater but estimated that they were short of groundwater in the dry season after the eruption of Mt. Pinatubo.

[18] The program areas of the NIA PDRIS Office exclude the flooded area in the rainy season and the area of the rainy season in 2011 was only 1,826 ha and out of which only 1,096 ha was actually planted. The program areas in the previous rainy seasons were 1,410 ha in 2010, 1,647 ha in 2009, 1,356 ha in 2008, 1,485 ha in 2007, 1,586 ha in 2006 and 1,788 ha in 2005. Data on the program area of the rainy season in 2004 was not available but the irrigated and planted area was 1,071 ha. Therefore, it is fair to say that, immediately after the completion of the project in May 2003, the NIA judged many of the target areas could not be planted in the rainy season. On the other hand, the SAPI in 1994 does not show the data of the planting situation in the rainy season of the target area but estimated the planted area without the project as 10,120 ha consisting of 5,920 ha of irrigated area and 4,200 ha of rain fed area. It assumed that, when the project is implemented, all the rain fed area will be irrigated and planted with rice and the total irrigated and planted area will be 10,500 ha. The SAPI pointed out the risk of flooding due to lahar accumulated in the rivers, but the risk was not reflected in the plan of irrigated and planted area in the rainy season and the SAPI assumes that 100% of FUSA can be planted in the rainy season. Later, there was an increase in the area which cannot be planted due to the influence of accumulated lahar.

[19] Reason: Only about 30% of the respondents in the beneficiary study reported excessive water in the rainy season due to flood and an insufficient drainage system.

in the irrigated and planted area and require water fees from them. However, due to a lack of information, the NIA finds it difficult to collect the water fees.

4) Reduction of planted area of cash crops during the dry season

The SAPI planned that cash crops such as eggplant and tomato were to be planted for 3,710 ha mostly in the West Bank area. However, most of farmers in the area in the West Bank (planned area of 2,400 ha) is not using the irrigation facilities for planting due to the increased cost of diesel fuel in the dry season[20]. As for the remaining 1,310 ha, the NIA reported that corn is planted for 28 ha at the time of the ex-post evaluation. Although the Pampanga Provincial Agriculturists are conducting the training courses on cash crops in collaboration with the NIA, only 4% of the respondents of the beneficiary study reported the introduction of the cash crops after the project. Reasons for not introducing the cash crops are the preference of farmers to continue rice cropping which farmers are accustomed to, unsuitable soil and weather, and lack of funds.

As stated in the section on relevance, the introduction of cash crops was planned in order to facilitate payment of water fees by farmers in the West Bank and increase the economic benefit by the project. However, the project should have considered the preference of farmers and farming patterns and measures to secure necessary funds. With regard to the introduction of new crops, it is necessary to conduct a pilot project and confirm the achievement in planting, sales, and revenue, or review and confirm the cropping achievement in neighboring areas, before including the new crops in the planned beneficiary areas.

On the other hand, in the upstream portion of the dam outside the project area, rice is planted in an area of 550 ha during the dry season using dam backwater after the project completion. At the time of the ex-post evaluation, the NIA is conducting the necessary operation of dam intakes to benefit the farmers in the upstream area and initiated negotiations with the farmers to collect water fees. The NIA estimates that about 3,000 ha in this area could be planted with rice in the dry season using the dam backwater. If the area is included, many farmers can benefit and contribute to effective utilization of the project facilities. In order to include the area in the FUSA, it is necessary to construct necessary canals and form IAs. In addition, the NIA must provide guidance on and manage the planting periods for the irrigation water to be supplied properly to each of the upstream and downstream portions of the dam[21]. It should also be noted that the upstream area of the dam is in the lowland and inundated in the rainy season and cannot be planted in the rainy season.

(2) Yield and Annual Production of Rice

As shown in the table below, yields of rice did not meet the target of the SAPI. Since the irrigated and planted area is about 30% of the plan and the yield falls below the target, the annual production of rice is estimated at 23% of the plan.

[20] In the West Bank area, corn was planted in some places in the dry season, but egg plant and tomato were not.

[21] Although it is reported that the necessary facilities in the area such as canals are not large ones, the costs and benefits must be reviewed. As for the management of the planting period, the NIA must close the intake gate of the dam for the upstream area to avail the backwater in the dry season and open the gates to supply water to the downstream area only after confirming that the upstream farmers finished planting rice.

Table 3: Yield and Annual Production of Rice in the Project Area

Item	Before Project	SAPI (Planned)	Actual*	Actual / Planned
Rice Yield (ton/ha) (Dry season)	3.8	5.48	4.23	77.2%
Rice Yield (ton/ha) (Rainy season)	3.7	5.35	3.89	72.7%
Estimated annual production of rice (ton)	-	93,384	21,457	23.0%

Source: Appraisal documents, SAPI Report, NIA documents
*Note : Actual value is the average of the data from 2009 to 2011

The lower yield of the rainy season than the dry season is caused by floods and typhoons. It is hard to control natural disasters, but problems they cause may be mitigated to some extent by improving drainage. The NIA plans to dredge drainage and JICA is to conduct river improvement works as explained previously.

In the beneficiary survey, crop diseases, rat infestation, and lack of funds to purchase agriculture inputs were cited as major constraints to improving rice production. The SAPI assumed that the rice yield would be increased by the construction of irrigation facilities and agriculture inputs such as fertilizer. However, in the beneficiary survey, 31% of the respondents cited high cost of agriculture inputs, lack of funds, and unavailability of quality seeds as the major obstacles to improving productivity and achieving higher yield.

3.2.2 Qualitative Effects

To evaluate the effects and impact of irrigation projects, a beneficiary survey was conducted for 200 farmers using the irrigation facilities in the target area[22]. As mentioned in the section on the quantitative effects, the project's effects as a whole are limited due to decreased irrigated and planted area. However, among the beneficiary farmers who utilize the irrigation services, effects such as satisfaction with water supply and increase in yield were reported.

(1) Satisfaction with water supply

As shown in the following figure, the beneficiary farmers' satisfaction with irrigation water improved significantly compared with the one before the project.

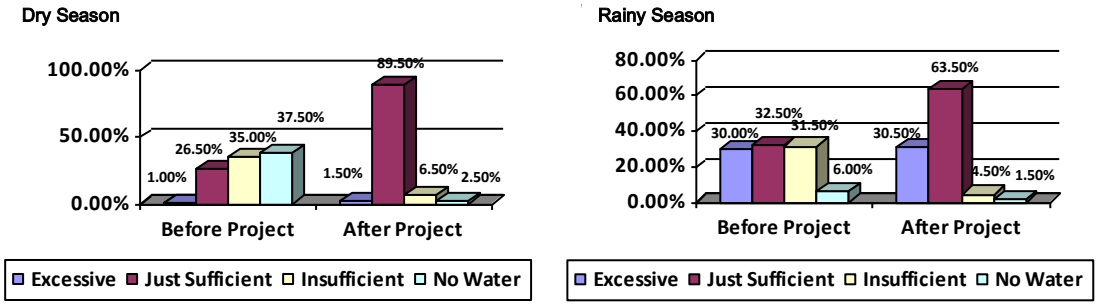


Figure 7: Extent of Satisfaction with Water Supply

[22] The beneficiary survey was conducted for 200 samples consisting of 72 farmers in nine IAs in the upstream area, 64 farmers in eight IAs in each of the middle and downstream areas, which were selected randomly from the list of IAs of the NIA. One of the IAs in the upstream area was the one using pumping irrigation in the West Bank. The IAs that were not utilizing the irrigation services were excluded from the sample.

Before the project, 38% of the respondents said that there is no water in the dry season, and 32% cited insufficient water in the rainy season. However, the situation changed significantly after the completion of the project. After the project, 90% reported that there is sufficient water in the dry season, and 64% said the same in the rainy season. On the other hand, more than 30% of the respondents said that water supply in the rainy season is excessive. The reasons are flood in the lower basin (20%) and insufficient drainage (10%). Inadequate fishpond drainage facilities were also pointed out as one of the causes.

(2) Changes of cropping pattern, planted area, and yield of rice

The figures below show a comparison of cropping pattern and planted area of rice before and after the project. 42% of the respondents said that they introduced double cropping of rice after the irrigation facilities were constructed. Many farmers irrigated their paddies by utilizing shallow tube wells or small pumps before the project. However, as shown in Figure 9, the irrigated area increased by about 60% after the project and the ratio of the irrigated area against the total planted area increased from 58% to 96%.

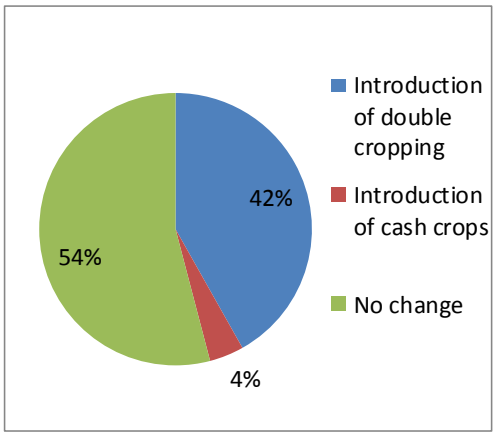


Figure 8: Changes of Cropping Patterns Before and After the Project

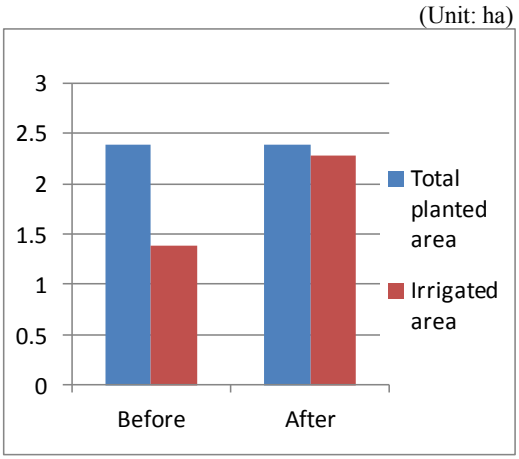


Figure 9: Changes of Irrigated Area of Rice Before and After the Project

Figure 10 shows a comparison of rice yield before and after the project. Out of the farmers surveyed, 45% responded that the yield increased in the rainy season, and 35% in the dry season after the project. In addition to the supply of irrigation water, the use of fertilizers, agricultural chemicals, and high-quality seeds, and the introduction of new agricultural technologies are mentioned as reasons for the increase in yield. 18% of the surveyed farmers received the training by the Philippine Rice Research Institute (PhilRice)[23] with the assistance by a JICA technical cooperation project. As a result, 12% adopted the palay check method introduced by PhilRice to monitor the rice production process and reported effects such as increased yield.

[23] The Philippine Rice Research Institute (PhilRice) of the Department of Agriculture of the Philippines is located in Central Luzon. Japan has been assisting PhilRice through such means as the construction of research facilities and technical cooperation of research capacity building since the 1980s. The Project on the Development and Promotion of Location-Specific Integrated High-Yielding Rice Technologies, a JICA technical cooperation project from 2004, promoted the method of "palay check" to monitor the necessary points and technologies to be followed in the rice production process.

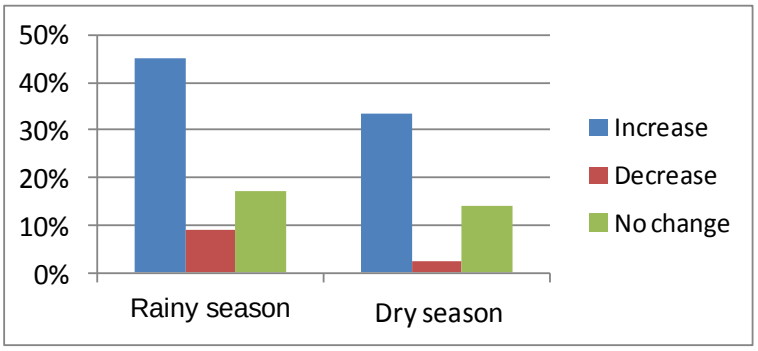


Figure 10: Yield of Rice[24] Compared with the One Before the Project

(3) Capacity building of NIA staff by technical support of this project and other related projects

This project supported the NIA staff in project implementation and supervision as well as formulation of a maintenance manual. The manual was in use at the ex-post evaluation. The long-term Japanese expert dispatched to the NIA Central Office also provided technical guidance. Moreover, after the completion of the project, NIA introduced a training module to strengthen IAs under the Irrigators Association Strengthening Support Technical Cooperation Project, another technical cooperation project of JICA. As a result, the capacity of NIA staff in charge of this project to train IAs has been enhanced. This module is currently used in the training of IAs.

3.3 Impact

3.3.1 Intended Impacts

(1) Improved living standards of local beneficiaries

According to the aforementioned beneficiary survey, farmer households who are using irrigation facilities reported that their net agriculture income increased by 90% on average after the project because of the introduction of double cropping of rice and the increase in yield. Other contributing factors are high market prices of rice due to stable demand and lower transportation costs after the construction of rural roads.

As shown in the figure below, 24% of the surveyed farmers answered that their standard of living improved significantly due to the increased income from agriculture, and 63% said that it slightly improved. Specifically, about half of the survey respondents reported improvement in food sufficiency and access to education for their children, 25% cited improvement of their residences, and 16% said that their savings increased.

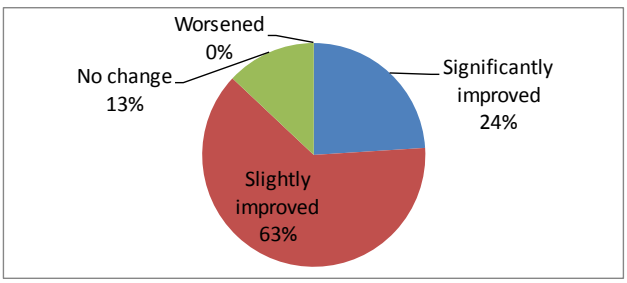


Figure 11: Changes in Living Standards

[24] This figure does not include the farmers (29% in the rainy season and 50% in the dry season) who did not plant rice before the project. It is not possible to compare their rice yield after the project with the one before the project, as the latter does not exist.

3.3.2 Other Impacts

(1) Impact on the natural environment

For this project, ECC was issued in February 1996 for the irrigation of 10,500 ha based on the plan revised by the SAPI[25].

In the beneficiary survey, 87% answered that there is no change in the natural environment by the project. 13% responded that there were changes in the environment including 7% citing negative impacts such as river pollution by dumping of garbage as responded by 3% of the respondents. However, no serious problems were reported. During the site visit, the environmental situation in various areas, including the one where dumping of garbage was reported, was checked, but no contamination of water in canals and rivers and other negative impacts were observed. It is thus fair to say that the project had no major negative impact on the natural environment.

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(2) Land Acquisition and Resettlement

In this project, the relocation of residents did not take place, but the land required for the construction work was acquired and compensation in accordance with the standards of the NIA was made to the land owners. However, in some parts of the downstream section of the pump irrigated areas, the site for the planned construction could not be secured because the NIA was unable to gain approval from the land owner and some canals were not constructed. Such factors may have resulted in the reduction of FUSA by 952 ha in the area.

(3) Unintended Positive/Negative Impact

In the beneficiary survey, 45% of the farmers reported positive impacts such as improved access to education of children due to increased income. No negative impact was observed.

As mentioned in the section on effectiveness, the irrigated and planted area of this project is 30% of the planned value of the SAPI and the yield is less than 80% of the target. Therefore, the annual production of rice by the project as a whole is estimated to be only 23% of the plan. However, in the beneficiary survey, farmers who use irrigation facilities (in the limited area because of the decrease in the beneficiary area) showed significant improvement in water supply, and increased planted area and yield due to the introduction of double cropping of rice. The impact of improved living standards due to increased agricultural income has also been reported. From the above, this project has achieved its objectives at a limited level, therefore its effectiveness and impact is low.

3.4 Efficiency (Rating: 2)

3.4.1 Project Outputs

(1) Civil Works

Table 4 shows the planned and actual major outputs of the project.

[25] In the ECC, conditions such as the prevention of soil erosion, noise and dust caused by construction work were required. However, the information on measures to deal with these conditions could not be obtained from the NIA staff in charge of project implementation.

Table 4: Planned and Actual Major Outputs of the Project

Item	At Appraisal	SAPI (Planned)	Actual
FUSA	11,540 ha	10,500 ha	11,920 ha (PCR, Project Completion Report)
Diversion dam		No change	No change
Fixed weir	Length: 850 m Height: 1.3 m Crest elevation: 8.6 m	Length: 850 m Height 1.3 m Crest elevation: 8.6 m	Length: 850 m Height: 1.3 m Crest elevation: 8.6 m
Movable weir	Length: 150 m Spillway gates: 3 Flushing sluice gate: 1	Length: 150 m Spillway gates: 3 Flushing sluice gate: 1	Length: 150 m Spillway gates: 3 Flushing sluice gate: 1
Water intake gates	5	5	5
Diversion channel	—	Width: 160 m Depth: 8 m Length: 3.3 km	Width: 160 m Depth: 8 m Length: 3.3 km
Pumping station	None	Added	Added
Pumps	—	3	3
Rehabilitation of pumps in Right Bank area	—	—	3 places (addition)
Canals	Total: 162.13 km	Total: 141.77 km	Total: 116.876 km
Main canals	36.96 km	29.35 km	31.828 km
Pump supply canal	—	(Addition) 2.66 km	2.66 km
Pump canals	—	(Addition) 17.44 km	14.136 km
Laterals	75.77 km	92.32 km	68.252 km
Sub-laterals	49.4 km		
O&M roads	Same as canals	N/A	Same as canals
Drains	Total: 116.06 km	Total: 100.80 km	Total: 192.08 km
Main drain	27.95 km	—	43.98 km
Secondary drain	33.17 km	—	55.35 km
Collector drain	54.94 km	100.80 km	80.85 km
Farm drain	—	—	11.90 km
On-farm facilities	1,208 km	Included in the drains	Included in the drains
Project facilities	7 buildings	N/A	7 buildings

Source: Appraisal documents, SAPI Report, JICA internal documents, NIA

Due to the impact of the eruption of Mount Pinatubo and changes in land use, the following changes were made to the scope in the SAPI in 1995. However, there is no change for the diversion dam.

1) Changes in the target area: Deletion of residential and industrial areas, flood-prone areas and lahar affected areas, addition of pump irrigation areas in the West Bank
2) Introduction of pumping irrigation facilities in the West Bank
3) Significant changes in the arrangement of the canals and drainage

There were also the following changes from the plan of the SAPI.

1) Adding the San Mateo area in the upstream region, rehabilitation of small pumps on the Right Bank, and increase of FUSA:

These changes were based on the needs of the areas and considered appropriate. By these changes, FUSA was increased from 10,500 ha planned by the SAPI to 11,920 ha.

2) River improvement works and increased drainage system:

The SAPI expected the accumulation of lahar and pointed out that, unless another responsible agency improved drainage of the Bungang Guinto river, it would be difficult to prevent flooding. Therefore, the SAPI excluded the construction of major drainage systems. However, the actual construction work added the improvement works of the river and construction of drainage system within the service area and included the down-stream areas which were affected by flood. These works were done based on the assumption that the river drainage improvement in the downstream area would be continued by the Pintatubo Commission, a government agency.

Nevertheless, the river improvement work was not continued by the Pinatubo Commission. Since the flood control measures to be done in collaboration with related projects were not implemented as planned, the inundation problem in the target area was not solved. As explained in the section on effectiveness, this has become one of the causes of the reduction in planted area in the rainy season.

3) Decrease of pump canals and sub-laterals

In the West Bank where pumping irrigation was introduced, some pump irrigation canals were not constructed due to land acquisition problems, and a few sub-laterals were not constructed due to soil problems. These changes were unavoidable but they led to the reduction of FUSA in the area by 952 ha[26].

(2) Procurement

At the time of the appraisal, procurement of equipment for maintenance was planned as shown in the table below. The SAPI does not explain details on the equipment to be procured, but it is assumed that the same equipment was to be procured since the same budget at the appraisal was planned. However, according to a NIA staff in charge of the project, the procurement was narrowed down to the necessary equipment in civil works and number of construction equipment and hydro-meteorological equipment was reduced during the project implementation, since the contractors already had these equipment items. On the other hand, data analysis and communication equipment was increased to facilitate the implementation of the project. In the face of the increased procurement cost, it may be inevitable to reduce the number of equipment items for procurement and purchase only the necessary ones for civil works[27]. It should be noted that the problems on operation and maintenance due to lack of equipment has not been reported.

[26] Please refer to *Note 2 in Table 2 on page 9.
[27] Reasons for the increased procurement cost could not be obtained.

Table 5: Planned and Actual Procurement of Equipment

Item	Appraisal	Actual	Item	Appraisal	Actual
Construction equipment	42	28	Hydro-meteo station equipment	22	8
Vehicles and motorbikes	27	24	Data analysis and communication equipment	17	22

Source: Appraisal documents, JICA internal documents

3.4.2 Project Inputs

3.4.2.1 Project Cost

As shown in the table below, the total project cost was 12.569 billion yen at the time of the appraisal but was reduced to 9.839 billion yen due to a change of the plan at the SAPI[28]. However, the actual cost increased to 12.443 billion yen, which is 126% of the planned value of the SAPI. In peso, the cost increase is larger with the actual value of 4.603 billion pesos against 2.674 billion pesos of the plan, amounting to 172% of the planned value. The difference in increase in the cost of the yen and peso is attributed to the yen appreciation during the project period. At the SAPI, the rate was 3.68 yen per pesos but the weighted average rate during the project period is 2.70 yen per pesos. Therefore, the total cost in yen increased differently from the cost increase in peso. The following are the major reasons for the increased costs.

1) Increase in the cost of civil works: Construction costs of additional canals and drainage systems, and the extension in the period for using equipment for constructing the diversion dam as well as reworking the facilities in downstream area in the Right Bank
2) Cost increase in consulting services: Extension of the construction period due to additional work and the increased ratio of man-months (M/M) of international consultants
3) Increase in administrative costs: Extension of the project period including the time for suspension of the project
4) Increased cost of land acquisition: Increase in the target area for land acquisition due to the design changes, increase in land value, compensation to farmers for crops affected by construction, etc.

Table 6: Planned and Actual Project Cost

Items	Appraisal		SAPI (Planned)		Actual		Actual/Plan	
	Mil. yen	Mil. peso	Mil. yen	Mil. peso	Mil. yen	Mil. peso	Mil. yen	Mil. peso
Total cost	12,569	1,848	9,839	2,674	12,443	4,603	126%	172%
Loan	9,427	1,386	9,427		9,303			
<Breakdown>								
Civil works	9,118	1,340.9	7,058	1,918	9,768	3,527	138%	184%
Procurement	216	31.8	217	59	266	84	123%	142%
Contingencies	466	68.5	1,549	421			0%	0%
Consulting service	489	71.9	596	162	769	379	129%	234%

[28] The possible reasons for the reduction of the total cost in yen from the appraisal to the SAPI are the appreciation of yen and that the SAPI does not include tax in the cost.

Land acquisition	265	39.0	105	28.4	581	239	556%	842%
Administration	580	85.3	313	85	914	331	292%	389%
Tax	1,435	211.0	N/A	-		0		
Agriculture/ institutional development	-	-		-	145	44		
Exchange rate (Yen/Peso)	6.8 yen (1990)		3.68 yen (1995)		4.15 yen (1996) - 2.11 yen (2003)			

Source: Appraisal documents, SAPI Report, JICA internal documents, NIA

3.4.2.2 Project Period[29]

The table below shows the planned and actual project period. At the time of the appraisal, the project was to be completed in 86 months. However, it was suspended for 38 months due to the Mount Pinatubo eruption. Therefore, the evaluation was done excluding the suspension period and based on the SAPI. In the SAPI, the implementation period after the resumption of the project was planned for 84 months and the total project period is calculated as 104 months including 20 months before the suspension of the project. The actual project period was 106 months, which was slightly longer than the SAPI plan. The main reason for the extension is the delay in approval of the changed project scope from the National Economic Development Authority (NEDA).

Table 7: Planned and Actual Project Period

Appraisal	SAPI (Planned)	Actual*	Actual/ Plan
September 1990 – October 1997 (86 months)	July 1991 - February 1993 + 84 months (20 + 84 = 104 months)	July 1991 - February 1993, April 1996 - May 2003 (20 + 86 = 106 months)	102%

Source: Appraisal documents, SAPI Report, JICA internal documents

*Note: Actual period shows the total months from the conclusion of the contract to the month when the project suspended due to the eruption of Mount Pinatubo and the period from the month when the project resumed till the completion of the civil works.

3.4.3 Results of Calculations of Economic Internal Rates of Return (EIRR)

The table below shows the results of the recalculation of the economic internal rate of return (EIRR) of this project using the almost same calculation method and the pre-conditions at the time of the appraisal[30]. There was no big change in the EIRR of 15.8% at the SAPI from 16.2% at the time of the appraisal. However, the re-calculated EIRR at the ex-post evaluation based on the actual irrigated and planted area is only 1.5%. The significant decrease from the EIRR of the SAPI was due to the reduction of planted area and the cost increase. It is assumed that substantial areas are actually irrigated and planted but not reported to the NIA; the EIRR may increase if these areas are included in calculation.

[29] The project period is from the conclusion of the loan contract to the completion of civil works.

[30] In re-calculating the EIRR at the ex-post evaluation, the economic benefits from fish ponds were taken into account.

Table 8: Results of Calculations of Economic Internal Rates of Return

Appraisal	SAPI (Planned)	Recalculation at Ex-Post Evaluation
16.2%	15.8%	1.5%
(Pre-conditions) Project life: 50 years Benefit: Increased production of rice and cash crops Cost: Project cost, O&M cost, replacement cost of dam facilities	(Pre-conditions) Project life: 50 years Benefit: Increased production of rice and cash crops Cost: Project cost, O&M cost, replacement cost of dam and pumping facilities	(Pre-conditions) Project life: 50 years Benefit: Increased production of rice, cash crops and fish ponds Cost: Project cost, O&M cost, replacement cost of dam and pumping facilities

Source: Appraisal document, SAPI Report, documents of NIA

From the above, the project cost and the project period slightly exceeded the plan. Therefore efficiency of the project is fair.

3.5 Sustainability (Rating: 2)

3.5.1 Structural Aspects of Operation and Maintenance (O&M)

Irrigation facilities constructed by the project were transferred to Regional Office of Region III of the NIA after the completion of the project and the Pampanga Delta River Irrigation System (PDRIS) office is in charge of O&M of the project facilities. The PDRIS is categorized as a national irrigation system and the O&M system of the facilities are as shown in the table below.

Table 9: O&M System of the Project Facilities at Ex-Post Evaluation

Organization	O&M activities in charge
Irrigation Associations (IAs)	O&M of sub-laterals and on-farm facilities (Some IAs are responsible for O&M of laterals and collection of water fees[31]; these functions will also be transferred to other IAs)
NIA PDRIS Office	O&M of diversion dam, pumping stations, main canals, and laterals; collection of water fees
NIA Region III Office	Supervision of NIA PDRIS Office
NIA Central Office	Provision of necessary cost for rework and construction of facilities based on the report of PDRIS

Source: NIA

The PDRIS office employed 34 staff members when the facilities were transferred. However, due to the NIA's rationalization plan, the number of staff was reduced to 27[32]. This is a significant decrease from 73 who were to be employed for the office responsible for O&M planned by the SAPI, and the shortage of staff is affecting O&M of the project facilities in such ways as delayed dredging of canals. In 2012, as part of the rationalization plan, the office with most of the staff was transferred to the NIA provincial office in Florida which is far from the

[31] IAs which are registered as Model 2 in the IMT.
[32] Seven staff members out of the 27 are in charge of water fee collection.

project site. Although several staff members including the project manager are to be stationed at the dam site office, the transfer must be done without affecting activities such as monitoring and guidance to IAs since most of the staff members are far from the project site[33].

The NIA introduced the Irrigation Management Transfer Program (IMT) in 2008 to transfer the maintenance activities of irrigation systems to IAs and improve the performance of the national irrigation systems. In the IMT, IAs sign a contract with the NIA with classification from model 1 to 4 depending on their O&M capabilities and the NIA will gradually transfer the O&M activities and collection of water fees to IAs[34]. The higher the model number, the higher maintenance capacity is required for the IA and the NIA trains IAs to strengthen their capacity.

In this project, 62 IAs were organized but only 45 IAs are functioning. 17 IAs including 12 IAs in the West Bank are not utilizing the irrigation services and thus are not functioning[35]. The NIA is promoting the IMT to the functioning 45 IAs. At the time of the ex-post evaluation, 15 IAs, i.e., one-third of the functioning ones, are registered as model 2 and conducting O&M of facilities such as sub-laterals and collecting water fees. The ratio of model 2 IAs in the project is much higher than the national ratio of 11%.

As for the entire structural aspect of maintenance, staff shortage in the PDRIS office is a concern. To address this concern, the PDRIS office plans to reduce the staff's burden by delegating O&M of sub-laterals and water fee collection to IAs. It is needed to transfer O&M to IAs in a smooth fashion and give guidance to them.

3.5.2 Technical Aspects of Operation and Maintenance

The staff members of the PDRIS office include three engineers with expertise and the office has implemented the necessary training for the staff using the maintenance manual that this project produced. No major problems are observed in the technical aspects of operation and maintenance by the PDRIS Office.

As for the IAs, according to the beneficiary survey, 89% of the respondents are satisfied with the services by IAs such as water management and 70% with their O&M activities[36]. 93%

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[33] The vice president of the IA Federation expressed the concern in an interview.

[34] Responsibilities of each model are as follows. (Source: IMT Manual of NIA 2009)

Model 1: The NIA is responsible for O&M of the entire irrigation system, while some O&M activities for sub-laterals and on-farm ditches, monitoring of irrigation water, production of the list of irrigated and planted area, and promotion of water fee payments are commissioned to IAs and the NIA pays the corresponding remuneration to IAs.

Model 2: IAs are responsible for O&M of facilities under laterals, collection of irrigation fees from members, and financial management of the fees. The NIA will pay the IA a certain percentage of the water fees collected, depending on the collection rate.

Model 3: In addition to the responsibilities of model 2, IAs will conduct O&M of the part of main canals excluding the main canals from dams to the first lateral.

Model 4: IAs are responsible for O&M of all the facilities, collection and management of water fees, and management of funds for O&M and construction of facilities. The NIA will conduct monitoring and evaluation of the system and provide technical support to IAs when necessary.

As of November 2011, 463 IAs, or 19% of all the IAs in the country, are registered as model 1, 270 (11%) as model 2, 30 as model 3, and 2 as model 4, and others are in the process to be registered at IMT. In Region 3, no IAs are registered as model 1, but 26% are registered as model 2, and 8% as model 3. (Based on NIA documents)

[35] Reasons for the non-functioning status of these IAs include the following: non-utilization of pumping irrigation facilities by 12 IAs; some areas needing construction and repair of irrigation facilities; and withdrawal of small pumps in the Right Bank areas due to the high cost of diesel fuel.

[36] Most of the responses indicating that they are not satisfied are due to deficiencies of drainage and delays in repair of the small pumps (often due to delays in funding) and not about the maintenance capacity of IAs.

responded that the organizational capacity of IAs is high. However, in the focus group discussions with IAs utilizing the irrigation services, it became clear that some IAs had not received training on O&M yet. The PDRIS office planned to conduct training courses on the IMT including ones on O&M for all the IAs in 2012. As described in the box below, an IA is engaged in various activities such as parcillary mapping, credit services to members, and joint marketing of rice in collaboration with related organizations.

Box 1: IA Which Is Engaged in Various Activities[37]

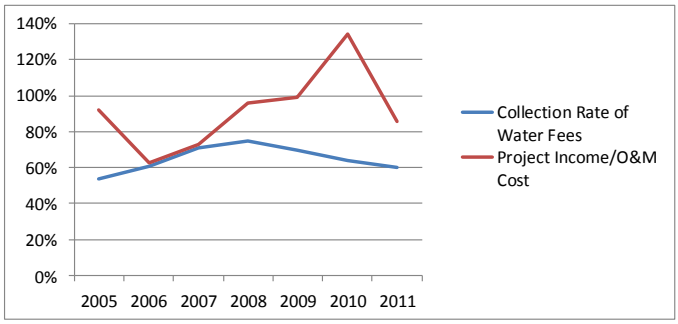
TA. RITA RICAP IA with 98 members is registered as a model-2 IA in the IMT and is engaged in the O&M of sub-laterals and water fee collection. The collection rate of water fees has been as high as 93 - 95%, with the exception of the years significantly affected by typhoons. Under the strong leadership of its president, the IA has also carried out the following activities.

- Parcillary mapping of FUSA: The mapping resulted in an increase of FUSA from about 80 ha to about 160 ha, and the IA can receive a larger share of the collected water fee from the NIA.
- Credit services to members utilizing a loan from the Land Bank of the Philippines: The IA got a loan of 2 million pesos at an annual interest rate of 8.5% from the Land Bank and on-lend it to its members by charging an additional interest of 4.5% as management fee. The members use the loan to purchase agriculture inputs.
- The IA has secured a high income for its members by selling rice produced by the members directly to the National Food Authority (NFA).

No major problems were observed in technical aspects of O&M of the project, although further training for IAs is needed.

3.5.3 Financial Aspects of Operation and Maintenance

The figure below shows the collection rate of water fees and the ratio of project income versus O&M cost[38].



Source: NIA

Figure 12: Collection Rate of Water Fees and Rate of Project Income/O&M CostThe PDRIS

[37] The president of the IA also serves as the vice president of the Federation of IAs.

[38] JICA uses the Sufficiency Rate of Operation and Maintenance Cost (Actual O&M cost divided by Planned O&M cost) as the Operation and Effect Indicator. However, since the data for the indicator was not available, alternative indicators were used to show how much of the O&M cost was covered by the income from the project and by the collected water fees. This was done because the NIA adopted a policy to cover the O&M cost by the income from water fee collection.

office has estimated that the water fee collection rate must be at least 80% for the collected fees to cover the regular O&M cost of the project facilities and set it as the target[39]. Until 2008, the water fee collection rate increased to nearly 80%, but decreased from 2009 because rice production decreased due to typhoons and floods.

The ratio of project income/O&M cost increased to nearly 100% or above from 2008 until 2010. However, this increase was due to the subsidy for diesel fuel cost and additional rental income of equipment; it was a temporary improvement and not sustainable[40]. The rate dropped to 86% in 2011.

To continue pumping irrigation, a subsidy is necessary. Thus the PDRIS office is seeking assistance from local governments, but there is no guarantee that a subsidy will be provided continuously. A deficit in the maintenance of each irrigation system is covered by regional offices of the NIA. However, since the NIA emphasizes the importance of keeping each system financially self-sufficient[41], the PDRIS Office must improve the financial status of the irrigation systems including increased collection rates of water fees.

3.5.4 Current Status of Operation and Maintenance

With regard to the maintenance situation of project facilities, the following issues have been observed at the time of the ex-post evaluation. However, the maintenance status of the diversion dam is good and has no major problems.

Here is a summary of problems in the O&M status of the facilities.

1) Main canal: Siltation on the part of the canal
2) Laterals: Erosion and accumulation of silt are seen in some parts of laterals
3) Drainage: Many drainage systems are clogged with water lilies and debris.
4) Mexico area: The major problems are the old small pumps and the lack of spare parts.

The necessary parts are likely to be secured. In addition, a check gate to raise the river water level was broken due to a typhoon[42].

The O&M situation is expected to improve, as the PDRIS office plans to rework facilities such as the laterals to address the erosion problem and dredge canals and drainage systems.

The project has no problem in the technical aspects of O&M, but faces the shortage of staff in the PDRIS office which is responsible for O&M and an unstable financial situation. Thus it has some problems in terms of the structure and financial aspects of O&M, and sustainability of the project is fair.

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[39] For the national irrigation systems, collected water fees are sent to the NIA central office which provides the O&M costs to the field offices that are engaged in maintenance. When IAs conduct O&M of the facilities, the PDRIS office pays them commissions from a share of the collected water fees. However, IAs that use small pumps are to pay for the repair cost of pumps.

[40] Major repair costs of facilities are paid by the NIA central office to the PDRIS office including the rental costs of necessary equipment. When the PDRIS office uses its own equipment, the rental fees become income of the PDRIS office. Therefore, in the years when the PDRIS office was engaged in many major reworking tasks, its income increased.

[41] The NIA regional offices cover the deficit of a non-self-sufficient system. However, when the deficit becomes large, it is difficult for regional offices to cover it. Thus the NIA provides incentive-based remuneration to project staff to promote self-sufficiency of each system.

[42] The check gate was not constructed by the project. However, breakages in the gate reduced the water level of the river and made it difficult for the small pump to draw the river water.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project is fully consistent with the development policies and development needs of the Philippines for the improvement of productivity and self-sufficiency rate of rice as well as Japan's aid policy to support agricultural development; therefore its relevance is high. Households of the beneficiary farmers reported effects and impacts of the project, such as an improved agricultural income due to the increase in rice production and improved living standards. However, the extent of these effects and impacts is very limited as the actual irrigated and planted areas were about 30% of the planned ones; hence the overall effects and impacts of this project are low. Efficiency of the project is fair because its cost and period exceeded the plan. Some problems have been observed in staff shortages of the local offices responsible for maintenance and financial sustainability; therefore sustainability of the project is fair. In light of the above, this project is evaluated to be unsatisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

The NIA is recommended to grasp the situation of the project area and to implement the following for the purpose of increasing the irrigated and planted area whose achievement rate of the target is low, and improving effective use and sustainability of the project facilities. It is also necessary that the NIA central office secures the budget for this purpose.

1) The PDRIS office will proceed with the rework and construction of necessary facilities based on their action plan. These works can expand the planted area by 1,000 ha.

2) The farmers may be using the irrigation facilities in the areas that are larger than what they have declared to the NIA. Therefore, it is recommended that the PDRIS Office conduct the parciliary mapping based on its action plan and identify the correct FUSA. Then, the information on revised FUSA should be shared among the PDRIS Office, IAs and IA members to increase transparency of the data, and water management should be jointly done by them. The NIA is required to continue to provide guidance to the farmers in order to increase their awareness on proactive management of FUSA. As for the application of planted area by farmers in the rainy season, the PDRIS will examine the areas which cannot be planted due to flood and the areas which are planted using rain water and not reported to NIA, and study how to collect water fees even when farmers use rain water for planting. It is also recommended that for the future projects, the NIA identify the irrigated area by conducting parcillary mapping in an early stage after the completion of the projects. The necessary budget for this purpose should be secured in the project cost.

3) Pump irrigation facilities were used only for 30 ha, or 1.25% of the planned area, at the time of the ex-post evaluation due to high diesel fuel cost and it cannot be said that the facilities have been effectively utilized. The low utilization rate of the facilities has caused lower collection of water fee, which has become a burden on the PDRIS office that bears the maintenance cost. Therefore, it is recommended to explore the effective use of irrigation pumps. For example, it may be worthwhile to create a system that can provide a subsidy for diesel fuel costs in a stable manner to promote the use of the facilities by the target farmers. The NIA will consult with IAs and farmers in the target area and study a possible revolving

subsidy mechanism in which the subsidy is provided before the planting season and collected at the harvest as an addition to the water fee so that the collected fee can be used for the next season[43].

4) It is estimated that about 3,000 ha can be irrigated by the project in the upstream part of the diversion dam. The PDRIS office has begun to identify the area which can be irrigated by the project, and study the cost to construct the necessary facilities and to organize IAs. The PDRIS office should fully review the costs and benefits of the expansion of FUSA and the system to provide advice for planting as well as for proper water management and take necessary measures to expand the FUSA.

5) To transfer the maintenance and management of the facilities below laterals to IAs, the PDRIS will continue to strengthen the capacity of the IAs and promote their registration under the IMT. Such undertaking will help reduce the PDRIS office's burden on maintenance.

4.2.2 Recommendations to JICA

1) Keep monitoring the status of addition of new FUSA and the action plan of the PDRIS office including parcillary mapping and repair of facilities, and provide advice.
2) For effective use of pumps, consult with the NIA and provide necessary advice.
3) Follow the implementation of dredging of the Bungang Guinto river, which has been proposed to the ongoing Pinatubo Hazard Urgent Mitigation Project III by JICA.

4.3 Lessons Learned

1) In this project, the utilization rate of irrigation pumps was greatly reduced due to the rising cost of fuel. For pumping irrigation, it is necessary to carefully review the beneficiaries' ability to pay water fees in the target area and consider the risk that facilities may not be utilized due to the rising fuel cost. For project planning, economic cost and benefit, financial sustainability, and necessary subsidies should be analyzed with the above factors taken into consideration.

2) The project planned to introduce cash crops but did not succeed. Even if cash crops are expected to have a high economic effect, such introduction has to be carefully considered in advance since many factors affect the outcome. The factors include not only climate, soil, profitability, and market, but also cropping patterns, willingness of farmers to introduce cash crops, and their financial capacity. The introduction of new crops should be included in the planned cropping areas after conducting a pilot project and confirming the results in planting, sales, and revenue, or after confirming the performances of cropping in neighboring areas.

3) The project faced problems of increased flooding caused by lahar accumulated in the river and an insufficient drainage system, which resulted in many areas that could not be planted in the rainy season. Increased risks of flooding due to lahar had been expected but were not

[43] This undertaking was proposed by the vice president of the federation of IAs. However, when the farmers are requested to make payment, it is necessary to carefully review their ability to pay in comparison with their revenue in the target area. It will be important to fully explain to the farmers the cost and benefit of pumping irrigation compared with shallow wells and engage in negotiations with them.

reflected in the target setting of planted area and yield in the rainy season. In the areas affected by flooding, it is necessary to analyze conceivable risks more carefully and set realistic goals and targets for planting in the rainy season.

Comparison of the Planned and Actual Scope of the Project

Item		Plan (SAPI)	Actual
1.Output			
(1) Civil Works	FUSA (ha)	10,500	11,920 (in PCR)
	Diversion Dam (Fixed weir)	Lenghth 850m、Height 1.3m、Crest Elevation 8.6m	Lenghth 850m、Height 1.3m、Crest Elevation 8.6m
	(Movable weir)	Length 150m, Spillway gates 3, Flushing sluice gate 1	Length 150m, Spillway gates 3, Flushing sluice gate 1
	(Water Intake Gates)	5	5
	(Diversion Channel)	Width 160m、Depth 8m, Length 3.3km	Width 160m、Depth 8m, Length 3.3km
	Pumping station	Pumps 3	Pumps 3
	Rehabilitation of pumps in Right Bank area	-	3 places
	Main Canals(km)	29.35	31.828
	Pump Supply/Pump Canals (km)	20.1	16.796
	Laterals・Sub-laterals (km)	92.32	68.252
	Drains (km)	100.8	192.08
	Project Facilities	N/A	7
2) Procurement	Construction equipment	42	28
	Vehicles・Motorbikes	27	24
	Hydro-meteo station equipment	22	8
	Data analysis & communication equipment	17	22
3) Consulting Service	Foreign (M/M)	N/A	172.6
	Local (M/M)	N/A	129.6
2. Project Period		July 1991 - February 1993 + 84 months (104months)	July 1991 - February 1993, April 1996 - May 2003 (20＋86＝106 months)
3. Project Cost	Amount paid in Foreign Currency	6,918 million yen	9,293 million yen
	Amount paid in local currency	2,921million yen (793 million Peso)	3,150 million yen (1,167 million peso)
	Total	9,839 million yen	12,443 million yen
	Japanese ODA loan portion	9,427 million yen	9,303 million yen
	Exhange rate	1 peso = 3.68 yen (As of 1995)	1 peso = 2.70 yen (Weighted average)