Ex-Post Project Evaluation 2014:

Package III-4

(Benin, Mauritania, the Philippines)

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JAPAN INTERNATIONAL COOPERATION AGENCY

Ernst & Young Sustainability Co., Ltd.

Japan Economic Research Institute Inc.

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Republic of the Philippines

Ex-Post Evaluation of Technical Cooperation Project

"Small Water District Improvement Project"

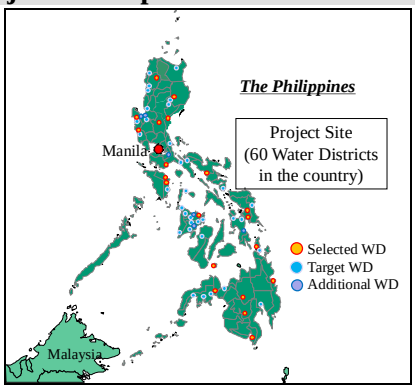
External Evaluator: Keisuke Nishikawa, Japan Economic Research Institute Inc.

0. Summary

This project was implemented to provide financial and technical assistance to small water districts (hereinafter referred to as 'WD') with an aim to improve the services and management of these WDs. The objective of this project was consistent with the development plan and needs of the Philippines both at the time of planning and ex-post evaluation, as well as the priority areas of Japan's ODA policy at the time of planning. Therefore, the relevance of this project is high. The effectiveness at the time of project completion is also high with general achievement of the five outputs expected, leading to the achievement of the project purpose through the implementation of this project. Operational and financial indicators of the WDs have continued to improve on average after the completion of the project meaning that the overall goal has generally been achieved. In addition, this project has not caused any negative environmental or social impacts, and an impact is considered to have been generated. Therefore, the effectiveness and impact of this project can be said to be high. With regard to project implementation, the efficiency was judged to be fair as the project cost exceeded the planned amount due to an extension of the cooperation period. Regarding sustainability, while the operational and financial statuses of the WDs have improved as a whole, it was observed that difficulties to receive low-interest loans from the Local Water Utilities Administration (hereinafter referred to as 'LWUA'), which is required to be financially independent, had become a bottleneck in further management improvement. Another issue was that some WDs have an excessive number of staff. Based on these findings, the sustainability of the effects produced in this project is fair.

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

1. Project Description



Project Locations

Elevated Water Tank constructed in this Project
(San Marcelino Water District)

1.1 Background

In the Philippines, until the 1960s, water supply services were provided mainly by Local Government Units (hereinafter referred to as 'LGUs') but, in 1973, Presidential Decree 198 authorized the formation of WDs. The decree also established LWUA, a government-owned and controlled corporation, to provide WDs with technical and financial assistance and to serve as their regulator.

In 2004, Executive Order (hereinafter referred to as 'EO') 279 was approved to provide for comprehensive reform of the financing policies of the water supply sector and to streamline LWUA's organization structure. The EO 279 mandates that LWUA focus its lending operation and assistance on less creditworthy water districts with the aim of raising them to creditworthy status and become independent.

However, a number of small WDs were still facing various problems such as a shortfall of financial resources, weaknesses in technical, institutional and managerial capabilities, insufficient supply, poor water quality, a high level of non-revenue water and so on. These WDs were also suffering from excessive debt incurred through initial investment, an inadequate capability in operation, and inadequacies in maintenance and rehabilitation of facilities, resulting in a decrease in the number of beneficiaries.

Under this circumstance, the Government of the Philippines requested the Government of Japan to implement the "Small Water Districts Improvement Project" to provide financial and technical assistance to small WDs and to improve the services and management of these WDs. This project was eventually implemented.

While this project was initially planned to be implemented for five years, the Terminal Evaluation, which was conducted toward the end of the project period, recommended an extension of the project by pointing out that although the WDs were applying the skills and knowledge acquired through the project, they needed to improve their method of practical application. Following this recommendation, JICA and LWUA agreed to extend the project, leading to an extension of one year and eight months.

1.2 Project Outline

Overall Goal	Water supply services and management of target water districts are improved.
Project Purpose	1. Water supply services and management of selected water districts are improved. 2. Guidelines for improvement of water supply services and financial viability of the target water districts (excluding 20 selected water districts)

Outputs[1]	Output 1	Profiles of target water districts are prepared and the water districts to be improved by the Project are selected.
	Output 2	Improvement Plans for services and financial viability of selected water districts are prepared, updated and implemented as scheduled.
	Output 3	Water supply facilities of selected water districts are improved.
	Output 4	Overall management capacity of target water district personnel is strengthened.
	Output 5	LWUA's technical support for target water districts is enhanced and this experience is disseminated to other water districts.
Total cost (Japanese Side)		1,028 million yen
Period of Cooperation		August, 2005 – March, 2012 (of which the extension period: August, 2010 – March, 2012)
Implementing Agency		Local Water Utilities Administration (LWUA)
Other Relevant Agencies / Organizations		Department of Public Works and Highways (August, 2005 – June, 2008 and October, 2011 – March, 2012) Department of Health (July, 2008 – September, 2011)
Supporting Agency / Organization in Japan		NJS Consultants Co., Ltd.
Related Projects		[ODA Loan] Provincial Cities Water Supply Project (1988 – 2007, implemented over five phases) Rural Water Supply Project (1977 – 2015, implemented over five phases until 2015 with a change of project name during this period) [Grant Aid] The Project for Improvement of Water Quality in Local Areas (2002 – 2005) and its Follow-Up Project (2010 – 2013) [Other Donors] The following and other donors have cooperated in various projects. World Bank: LGU Urban Water & Sanitation Project (1999 – 2006), etc. Asian Development Bank: Small Towns Water Supply Sector Project (1996 – 2005), etc. Germany: Provincial Towns Water Supply Project (2003 – 2006), etc.

[1] In analyzing Output – Project Purpose – Overall Goal, a PDM as of the Terminal Evaluation of the extended phase conducted in February 2012 was used. While it was revised from time to time to include the indicators from the originally-planned PDM, it basically remained as the change of expressions.

1.3 Outline of the Terminal Evaluation[2]

1.3.1 Achievement Status of Project Purpose at the time of the Terminal Evaluation

There were three indicators set to measure the achievement levels of the Project Purpose. Regarding the first indicator, to improve operation and financial indicators of the selected WDs, improvements were seen as a whole and the project effects were confirmed, while the data for some indicators were not sufficiently developed. Two other indicators were both judged to have been achieved.

1.3.2 Achievement Status of Overall Goal at the time of the Terminal Evaluation

In the Terminal Evaluation, it was anticipated that the staff of the WDs supported by this project would continue the skills fostered through seminars, workshops, OJT training etc. to obtain loans from financial institutions while applying the skills to further improve operational status. In this way, operational and financial indicators would be improved and the overall goal would be achieved.

1.3.3 Recommendations at the time of the Terminal Evaluation

The following four recommendations were made in the Terminal Evaluation of the extended phase of this project (based on the 'Summary of Evaluation Result' in the Terminal Evaluation).

1) In order to enhance project sustainability, LWUA was recommended to strengthen the existing consultation mechanism between WDs and LWUA through management advisors. Through this mechanism, the technology transfer process would be continued through the service of the management advisors free of charge.
2) LWUA was recommended to make efforts to establish cooperative relationships among small WDs.
3) To disseminate good practices, it was recommended that LWUA invite 'improved' WD managers and staff as lecturers to LWUA seminars, etc.
4) In line with LWUA's social responsibility, it was recommended that LWUA study the possibility of providing loans with lower interest rates and longer periods of repayment to small WDs.

In addition to these four recommendations above, the following 'lesson learned' was proposed to LWUA according to the material provided by JICA[3].

- ✓ To measure the project outputs objectively not only during the project but also after

[2] Terminal Evaluation studies were conducted before the end of the original period and the extended period. In this section, the outline of the Terminal Evaluation for the extended phase is described as it was conducted at the end of the entire project.

[3] This 'lesson learned' was stated here as it could be regarded as a 'recommendation'.

the project, it would be necessary to introduce a system to continuously monitor the operational and financial indicators of the target WDs.

2. Outline of the Evaluation Study

2.1 External Evaluator

Keisuke Nishikawa (Japan Economic Research Institute Inc.)

2.2 Duration of Evaluation Study

This ex-post evaluation study was conducted with the following schedule.

Duration of the Study: October, 2014 – September, 2015

Duration of the Field Study: January 8 – February 6, 2015 and April 5 – 18, 2015

2.3 Constraints during the Evaluation Study

The following constraints were experienced in making the evaluation judgment in this ex-post evaluation study.

- While a total of 60 WDs were assisted in this project, it was difficult to visit all the WDs scattered around the country due to time constraints in this ex-post evaluation study. A total of 14 WDs in the Central Luzon Region and Panay Island were visited. While this number is judged to have been sufficient in capturing the overall picture of the project, Mindanao Island could not be visited due to unstable security. In Mindanao, 12 WDs benefited from assistance in this project, but their operation and maintenance status could not be grasped apart from the operational and financial indicators submitted from WDs to LWUA.
- In examining operational and financial indicators, an attempt was made to collect data from 54 WDs which were supported during the initial project period (hereinafter referred to as 'original period'). However, there were some WDs that stopped operations, whose water supply services were transferred to LGUs, and that had not submitted data to LWUA. Therefore, in analyzing operational and financial indicators, the figures of the WDs without submission of data to LWUA were estimated by using the average rate of increase or by assuming that there were no improvements. Consequently, it is necessary to regard them as rough indications rather than accurate figures.

3. Results of the Evaluation (Overall Rating: B[4])

3.1 Relevance (Rating:③[5])

3.1.1 Relevance to the Development Plan of the Philippines

[4] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

[5] ③: High, ②: Fair, ①: Low

In the 'Medium-Term Philippine Development Plan 2004-2010', the national development plan of the Philippines at the time of planning, a supply of safe potable water to 633 waterless towns[6] outside Metro Manila was positioned as a priority. Also, in the Executive Order issued in 2004, the development of independent and sustainable WDs was an urgent task.

In the 'Philippine Development Plan 2011-2016', the national development plan at the time of project completion, water was seen as a basic need, the right of the people, and a component supporting economic growth. In relation to the water supply, there were priority strategies such as the implementation of priority programs in waterless areas, the development of a water source to meet the demand, and an expansion of the supply area.

At the water sector level, 'The Philippine Water Supply Sector Roadmap (2nd Edition)' was formulated in 2010 with one of the medium-term outputs being the development of adequate infrastructure particularly in the water supply areas with less than 50% service coverage.

In the Philippine water sector, LWUA is in charge of technical and financial assistance to WDs, while a number of organizations are involved as to be stated later. LWUA, as a corporation under the Department of Public Works and Highways (hereinafter referred to as 'DPWH'), was transferred to the Department of Health by EO 738 issued in July 2008 and was again transferred back to DPWH by EO 62 in October 2011. Despite these changes in the supervising governmental department, their mission to provide financial, technical and organizational support and to set regulations on regional water suppliers nationwide has remained unchanged.

Based on the above, this project can be said to have been consistent with the development plans at the national and sector levels at the time of project planning and completion (2012) particularly in terms of the expansion of the water supply.

3.1.2 Relevance to the Development Needs of the Philippines

At the time of planning of this project, there was a gap between the objectives listed in the water sector policy and the reality under harsh fiscal situations in the Philippines. One of the reasons was that there were a number of water suppliers[7] (WDs, LGUs and

[6] Towns with less than 50 percent potable water supply coverage

[7] Water District: Although shown as 'district', it is not an area but an entity. It is established in a town with a population of over 20,000 and is basically a water supplier based on an independent financial system. According to LWUA, there were 514 WDs supplying water to approximately 19 million people as of the end of 2013 (The Water Districts Directory 2003-2004 is the latest published data, and according to this, there were 447 WDs in the country supplying to approximately 15 million people.)
Local Government Unit: As of 2005, approximately 350 LGUs were supplying water to approximately 7 million people. (Source: Ex-ante Evaluation Report)
Community-Based Organizations: Local residents (communities) operate and manage point-water sources (wells) and communal water tap systems. In 2005, approximately 35 million people accessed this system. (Source: Ex-ante

Community-Based Organizations) under poor financial conditions, who were unable to contribute to the development of a water source and the expansion of supply areas and whose independence of water supply management was questioned. Out of these water suppliers, small WDs with less management independence generally had problems such as budget shortages, shortcomings in technical, organizational and management capabilities, insufficient water supply, poor water quality, and high non-revenue water rates. Due to these problems, this project focused particularly on support to small WDs experiencing more issues among all water suppliers, and selected 54 WDs as 'Target WDs', while the WDs with some improvements expected, out of which the WDs expected to become more financially independent through relatively small-scale additional financial inputs and capacity strengthening on water supply management, were selected as 'Selected WDs' to which some improvements of facilities were supported and for which improvements in management and service provision were planned. Therefore, this project can be said to have responded to the needs of small-scale WDs at the time of planning.

By implementing this project, many of the targeted WDs generally improved financial statuses and water supply services as will be stated later. However, they cannot be said to have reached a sufficient level and many of them need further improvements. Moreover, their funding sources were limited and it was difficult for them to obtain cues toward management improvement such as expansion of customer base through facility development.

At the national level and according to the estimate in a monitoring program jointly undertaken by WHO and UNICEF, households with an individual water supply comprised 43% of those in the Philippines in 2012 (61% in urban areas and 26% in rural areas), showing steady increases from 33% in 2000 and 38% in 2005[8]. In the progress report of the Millennium Development Goals (hereinafter referred to as 'MDGs'), it was additionally confirmed that a proportion of people with access to safe water[9] increased to 84.4% in 2011 from 77.4% in 2004 (before the commencement of this project). However, as the proportion of all households connected to a water supply network is still less than half, and as approximately 15% of the nationals have no access to safe water, it can be said that there existed a need to improve the water supply services at the time of project completion.

3.1.3 Relevance to Japan's ODA Policy

This project was consistent with the ODA Charter and 'Poverty Reduction', a priority area

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Evaluation Report)

[8] Including a water supply to individual households by the WDs supported in this project

[9] In the Philippines, access to potable water by households is defined as whether they are able to access improved potable water sources, which includes not only water connections to houses, but also communal taps, boreholes, protected wells and springs. Consequently, there is a gap in the rate between the WHO/UNICEF data and the report on MDGs.

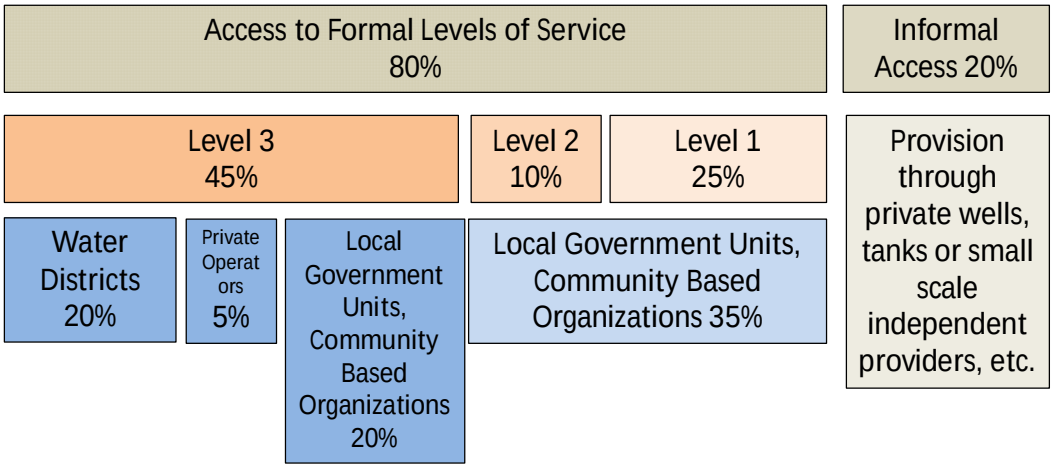
in the Medium-Term Policy on ODA as well as the priority area, 'Correction of Disparities – Improvements in Basic Living Conditions (Improvement in Water Supply)', specified in the Country Assistance Policy and the Country Program toward the Philippines. Therefore, the relevance to Japan's ODA policy at the time of planning can be said to have been high.

This project was consistent with the development plan and needs of the Philippines both at the time of planning and completion, as well as Japan's ODA policy at the time of planning. Therefore, the relevance of this project is high.

[Current Institutional Arrangement of the Philippine Water Sector and Its Challenges]

In the Philippines, a number of organizations are involved in water supply and its structure is said to be complicated. Therefore, this column describes LWUA's position and the overview of the water sector (current situation and challenges) as follows.

According to 'The Philippine Water Supply Sector Roadmap (2nd Edition)' (2010), in the Philippines, while approximately 80% of households have formal access to water, the remaining 20% have only informal access and are unable to enjoy water supply services. Among the households with formal access, the ones with individual access to water remain at 45% of the total, and the proportion of WDs, supported by LWUA, is 20%, which is less than half of it (refer to the figure below).



Source: Prepared from 'The Philippine Water Supply Sector Roadmap, 2nd Edition', p.10
Note: Level 1 – Water is supplied through wells or springs in the community
Level 2 – Water is supplied through communal water taps
Level 3 – Water is supplied to individual households through water supply pipelines.

Figure: Access to Water

As shown in the figure, it can be observed that there are private operators, LGUs, community based organizations, and WDs as the organizations to provide water supply services, as well as houses with private supplies through wells, tanks, or purchases from small scale independent providers with informal access. In terms of institutional aspects, there are a number of governmental organizations in addition to LWUA and LGUs in the Philippine water sector which have the following roles.

Department of Environment and Natural Resources (DENR)

DENR promulgates regulations for the control of water and standards for water.

Department of the Interior and Local Government (DILG)

DILG provides capacity building support to LGUs (provision of training, coordination of master plan preparation, provision of information on financing, etc.).

Department of Finance (DOF) / Government Financing Institution (GFI)

DOF/GFI provides financing support for the water supply sector.

Department of Publics Works and Highways (DPWH)

DPWH provides technical support to LGUs, LWUA's supervising department.

National Economic and Development Authority (NEDA)

NEDA coordinates the preparation of the national development plan and investment programs.

National Water Resources Board (NWRB)

NWRB plans and coordinates the water sector policies of the Philippines. It also regulates and supervises water service providers.

Metropolitan Waterworks and Sewerage System (MWSS)

In charge of water supply and sewerage services in Metro Manila; It also serves as the regulatory agency in the capital region.

While a number of organizations are related to the water sector in this way, many institutional issues have been pointed out in that the activities are duplicated and the implementation of the policy is not well coordinated. Major problems stated in the Roadmap are summarized in the table below.

Table: Institutional Issues in the Water Supply Sector

Issue Area	Details
Institutional fragmentation	・ Weak and fragmented institutional framework ・ Uncoordinated sector planning and lack of monitoring
Inadequate support to rural water supplies	・ Inadequate support in technical design criteria, project financing, management, operation and maintenance ・ Limited capacity of LWUA or DILG, etc. to provide support services to water supply providers
Low tariff and cost-recovery level	・ Water utilities being unable to sustain operations and expand coverage ・ Different tariff levels, structures and setting methodologies across individual service providers
Low performance of water utilities	・ Unsatisfactory performance of water service providers
Weak and fragmented regulatory framework	・ Lack of transparency ・ Impedance of effective regulation due to the lack of sector information at the service provider
Sector investment and financing	・ Low public and private sector investment in the water supply sector ・ Limited access to financing for service expansion of small utilities

Lack of water supply and sanitation sector information	・ General lack of sector information and continuous updating ・ Lack of reliable data and the absence of a systematic monitoring

Source: Prepared from 'The Philippine Water Supply Sector Roadmap, 2nd Edition'

In response to these issues, the Roadmap sets goals to improve the institutional environment through an improvement of regulations and integrated sector planning, development of capacities of related parties, and strengthening of collaboration between various organizations. This project was designed to relieve 'inadequate support to rural water supplies', 'low performance of water utilities', and the 'lack of water supply and sanitation sector information' among the issues listed above. However, as stated in '3.4.1 Related Policy and Institutional Aspects for the Sustainability of Project Effects', an institutional fragmentation, where it is not clear which organization should take the leading role among various organizations involved and a possibility of continuation of LWUA's financial assistance to WDs are still regarded as issues.

3.2 Effectiveness and Impact[10] (Rating:③)

3.2.1 Effectiveness

In this project, a team of experts was routinely involved with selected WDs, including areas from facility improvement to promoting management improvement. In other target WDs, this project mainly provided seminars, etc. and instructed on the preparation of improvement plans. Their effectiveness was evaluated by comprehensively examining the achievement levels of the indicators for Outputs 1 to 5 and Project Purpose at the time of project completion[11].

The indicators of the project were revised several times, particularly when the mid-term evaluation of the original period was conducted. However, all of them remained as slight word changes and no changes of indicators that would have affected the evaluation judgment were observed.

3.2.1.1 Project Output

1) Output 1: Profiles of target water districts are prepared and the water districts to be improved by the Project are selected.

Indicator 1: Profiles of target WDs prepared by January 2006.

Indicator 2: Selection criteria of WDs to be improved prepared by February 2006.

[10] Sub-rating for Effectiveness is to be put together with consideration of Impact.

[11] Outputs 1 to 3 were related to the selection of WDs, preparation of improvement plans and improvement of water supply facilities which were not the contents concerning capacity development often used as outputs in technical cooperation projects though they had an aspect related to work procedures of facilities development, etc.

Indicator 3: Final list of selected WDs agreed upon by LWUA by March 2006.

After 60 small WDs with characteristics described in '3.1.2 Relevance to the Development Needs of the Philippines' were selected from all over the country in August 2005, profiles of each WD were prepared and completed in February 2006. Out of these 60 WDs, 6 WDs which eventually did not express their intentions to participate, were excluded, while the other 54 WDs became the final target WDs. Out of these 54 WDs, 20 WDs were designated for improvement of facilities and were selected in accordance with the following absolute and relative criteria.

<Absolute Criteria>
- Small-scale and less creditworthy WDs
- WDs without experience or future plans of ODA assistance
- WDs without plans to split or merge

<Relative Criteria>
- Geographical weighting: Focus on the Visayas and Mindanao regions
- WDs with limited debt from LWUA, large population with a water supply, and a low debt level per served population

The WDs selected under these criteria were approved at the Joint Coordinating Committee for the project in May, 2006. In this project, an additional 10 WDs were also selected during the extended period with similar criteria and assistance being extended. 8 of these WDs were selected from the target WDs that had not been selected as WDs during the original period, and the remaining 2 WDs were selected from those of the Follow-Up Cooperation of the Grant Aid project, 'The Project for Improvement of Water Quality in Local Areas', being implemented at the same time in August 2010 with approval from LWUA.

The period allotted for achievement of the above indicators was delayed by one month respectively from to original plan. According to the team of experts and LWUA, this project commenced with the arrival of the expert team, which actually took place in August 2005 contrary to the expected date of July 2005, and no negative influences were seen in terms of generating the project effects. In this ex-post evaluation study, no influences from this slight delay were actually observed, and it can be judged that Output 1 was achieved as a result.

2) Output 2: Improvement Plans for services and financial viability of selected water districts are prepared, updated and implemented as scheduled.

Indicator 1: Improvement plans of the first 10 WDs agreed upon with WDs by July 2006 and of the second 10 WDs by July 2007.

The improvement plans for water supply management / services for selected WDs were prepared so that each WD received assistance from the expert team including meetings and follow-ups. As for the schedule, 20 WDs were divided into 2 groups and the improvement plans of the first 10 WDs were prepared by July 2006. The preparation of the improvement plans of the remaining 10 WDs was completed by July 2007. Also during the extended period, improvement plans were formulated for the additional 10 WDs (8 WDs in 2010, and 2 WDs in 2011).

Based on the above, it was heard that improvement plans were formulated for all selected WDs with a planned schedule during the original and extended periods.

In light of the above and regarding the achievement level of this project, Output 2 can be said to have been achieved as improvement plans were formulated and implemented as scheduled at the time of project completion.

3) Output 3: Water supply facilities of selected water districts are improved.

Indicator 1: Detailed design and tender documents for the facility improvement of the first 10 WDs prepared by March 2007 and the second 10 WDs prepared by March 2008.

Indicator 2: Facility improvement works of the first 10 WDs completed by March 2008 and of the second 10 WDs completed by March 2009.

For this output, 2-step indicators; detailed design and tender document preparation for facility improvement of selected WDs and the actual improvement works, had been set. The detailed design and the preparation of tender documents were prepared in May 2007 for the first 10 WDs and in May 2008 for the next 10 WDs. During the extended period, the tender documents and a detailed design of the rehabilitation works were prepared for Abuyog WD (a WD for the Follow-Up of the Grant Aid Project), one of the 10 WDs. With respect to facility improvement works, the improvement works of the water supply facilities were carried out as originally planned for the 20 selected WDs of the original period and Abuyog WD in the extended period[12]. The design details were based on the

[12] Regarding the 20 selected WDs during the original period, works were completed in May 2008 for the first 10 WDs and in March 2009 for the next 10 WDs. Rehabilitation works of the existing pump station at Abuyog WD in the extended period commenced in November 2011 and completed in December 2011.

discussions among the parties concerned (LWUA, WDs, expert team, etc.) including community meetings. According to the Implementing Agency, they reflected the needs of the WDs. Also, project counterparts worked on the formulation of improvement plans under the instruction of the project experts and learned the procedures and knowledge. While some WDs had slight delays in schedule, it was heard that there were no major negative influences on the actual generating of project effects. Consequently, it can be judged that there were no problems.

Therefore, Output 3 can be said to have been achieved as expected.

4) Output 4: Overall management capacity of target water district personnel is strengthened.

Indicator 1: Knowledge on management and O/M of the personnel of target WDs are strengthened.

Indicator 2: Knowledge and skills on management and O/M of the personnel of selected WDs are strengthened.

Since the Indicators 1 and 2 for Output 4 are similar and there are many common activities, it was considered that no major differences between the outputs achieved in selected WDs and target WDs. The achievement levels of the generated outputs, 'securing of funds by utilizing the experiences of this project' and 'strengthening of management capacities', were jointly analyzed for both types of WDs.

[Securing of funds by utilizing the experiences of this project]

In this project, 12 training courses and 9 workshops/seminars were held during the original and extended periods.

The staff members from WDs who participated in them said that they could learn the formulation of improvement plans and the basics of financial management, facility operation, and maintenance and technical management. Consequently, 6 of the target WDs were able to obtain funds for water supply facility development through a special budget (Non-LWUA Initiated Fund, hereinafter referred to as 'NLIF') outside LWUA's recurrent budget by the end of the project. Moreover, 6 WDs were approved to borrow LWUA's ordinary loans (recurrent budget). In this way, there were cases observed where proposals were prepared based on what they had learned in this project. As for the selected WDs, 14 out of 20 WDs submitted proposals to NLIF and obtained funds by the end of the project which demonstrates that the effects of this project were generated at a high rate.

According to the Implementing Agency, the number of WDs that could receive financial assistance from government organizations including other funding sources between 2009 and 2012, during the cooperation period, was 41 out of 60 WDs supported in this project.

[Strengthening of management capacities]

As can be seen as actual effects in the above-mentioned improvement of fund securing, opinions of the participants of training programs, etc were heard that they could gain long-term perspective by learning the method and concepts of improvement plan formulation, which was very useful in proposing new requests. It was also heard that the training sessions in this project were held by the expert team and LWUA counterparts who vigorously visited each WD to implement OJT activities, and additionally held training, workshops, and seminars in the Visayas and Mindanao regions. The ingenuity to make it easier for neighboring WDs to participate in this way was a major factor and made it possible to cover a number of WDs.

Through the implementation of this project, staff members from selected WDs particularly commented that they could acquire the knowledge and skills toward further improvement of their operation and management capacities. Throughout the project period, the selected WDs not only became able to attend seminars but also regularly receive direct assistance from the expert team and apply what they learned through the seminars as their water supply facilities were improved in the project. In addition, it is worthwhile to note that this project introduced community meetings in selected WDs as a measure to improve marketing strategies.

Training on financial management, facility operation and maintenance, and technical management were conducted in both selected and target WDs, and the target WDs gradually improved their facilities through other funding sources. It was commented that there were no remarkable differences observed between selected and target WDs in terms of the knowledge and skills acquired, and it was inferred that there were no major gaps in the influences on operation.

Based on the above, Output 4 can be said to have been generally achieved as the improvement of capacities were observed in many WDs by the time of project completion.

5) Output 5: LWUA's technical support for target water districts is enhanced and this experience is disseminated to other water districts.

Indicator 1: Knowledge of LWUA counterpart personnel on the financial and technical condition and on water supply system improvement of target WDs are strengthened.

Indicator 2: Knowledge of LWUA on the effective improvement methodology for target WDs is enhanced.

With regard to the capacity development of LWUA counterparts working with the expert team in this project, it was planned that the expert team would transfer the technology and methodology needed for management improvement of WDs through activities such as the preparation of an improvement plan and facility improvement works. As a result of project implementation, the following effects were observed.

- This project provided an opportunity to obtain knowledge on hydraulic analysis and a practical approach on the formulation of comprehensive plans etc.
- Understandings of the current status of WDs were expanded as they visited target WDs frequently to have consultations and were involved in workshops and community meetings.
- They recognized that community meetings, preparation of comprehensive improvement plans, and the implementation of a participatory approach were effective for the improvement of the WDs' current statuses.

LWUA counterparts also commented that by attending project seminars and workshops, they could have more profound knowledge on the methodologies for the improvement of WDs (survey and profiling of WDs, formulation of selection criteria for WDs to be supported, provision of lectures and advice to WDs, support on the preparation of improvement plans, management of procurement work, inspection of construction works, financial analysis, etc.). Therefore, it was assumed that the planned items were implemented and the counterparts were able to gain a deeper knowledge.

LWUA has assigned one management advisor for every 10 – 15 WDs to provide them with management and technical advice routinely. The activities of this project were supported as a whole by the expert team and the counterparts of this project who frequently visited each WD in addition to these management advisors.

In light of the above, Output 5 is considered to have been generally achieved as the knowledge described as indicators had been improved as planned.

3.2.1.2 Achievement of Project Purpose

In this project, it was seen that the indicators of each Output had been improved as a

whole by the completion of the project. Coupled with LWUA's routine advice, the Project Purpose would be achieved with the implementation of project activities and the above Outputs achieved through them. Therefore, it is considered that there is a sufficient causal relationship between the Outputs and the Project Purpose.

Although the purpose of this project was initially 'Water supply services and management of selected water districts are improved, and the guidelines for improvement of water supply services and financial viability of the target water districts (in 40 water districts excluding selected water districts) are prepared'. However, it was eventually organized into two purposes as follows.

1. Water supply services and management of selected water districts are improved.
2. Guidelines for improvement of water supply services and financial viability of the target water districts (excluding 20 selected water districts) are prepared.

The levels of achievement (at the time of project completion) of these indicators, which were set to measure the achievement level of the Project Purpose, were as shown in Table 1. Regarding the first purpose, it was confirmed that the facility improvement in selected WDs played an extremely vital role in increasing the number of connections leading to an improvement in their financial conditions. The satisfaction level of water users with water supply services was also confirmed to have been generally high in the satisfaction survey conducted during the Terminal Evaluation of the extended period. Consequently, the first purpose can be said to have been achieved as a whole. Concerning the second purpose, the 'formulation of improvement plans' in target WDs, which was set as an indicator, it was confirmed to have been implemented in all target WDs[13]. During the extended period, the plans were also formulated for the 6 WDs covered in the Follow-Up of the Grant Aid Project. Therefore, the second purpose can also be said to have been achieved.

[13] During the field survey, it was confirmed that the plan meant the formulation of financial improvement plan, differencing from the improvement plan in selected WDs.

Table 1: Achievement Level of Project Purpose

Purpose	Indicator	Actual Performance
Project Purpose	Indicator 1-1: Operation and financial indicators of all the selected WDs are improved by 2010.	number of active connections, number of connection per staff, collection efficiency rate, non-revenue water rate, operating cost rate, current ratio, principal-interest repayment ratio, earning ratio, etc. have been improved as a whole, and this project clearly contributed to the management and financial improvement of selected WDs.
	Indicator 1-2: Satisfaction of the selected WDs' water users is elevated by 2010.	A result was drawn that the water users in 19 out of 20 selected WDs, except Balatan WD, which stopped operations in 2010[14], were satisfied with the quality of water supply services.
	Indicator 2-1: Improvement plans of the target WDs (34 WDs) are prepared by March 2009.	All 34 WDs whose facilities were not improved, prepared respective improvement plans (financial section only). Moreover, support on the preparation of improvement plans was extended to 6 WDs assisted in the Follow-Up Cooperation of the Grant Aid Project.

Source: Prepared from the Terminal Evaluation Report of the extended period of this project and the responses from LWUA

In light of the above, as all the indicators were achieved, it can be judged that the Project Purpose was generally achieved.

It can be said that 5 Outputs of this project were seen to have been generally achieved, and the achievement of the Outputs realized the achievement of the Project Purpose. Therefore, the effectiveness of this project at the time of project completion is judged to be high.

3.2.2 Impact

3.2.2.1 Achievement of Overall Goal

Overall Goal: Water supply services and management of target water districts are improved.

As the Overall Goal of this project, it was expected in 34 target WDs which did not receive any facility improvement support that the indicated services and measures for management improvement would be put into concrete action by the completion of the project and the indicators would actually improve by 2015.

A design of this project was structured with a link in which improvement plans were

[14] While Balatan WD resumed operation in October 2012 after halting water supply services from March 2010 till September 2012, the volume of water from the drilled well was not sufficient (especially during the summer) and the water supply has been very unstable. Their financial conditions are not sound. In 2014, a plan to take water in from the Balatan River to supply water was approved, but LWUA was looking for a funding source at the time of ex-post evaluation.

formulated, and operational and financial indicators would then improve leading to the improvement of management in the WDs supported in this project. As this flow can be judged to have rationality and coherence in the actual implementation of the project, there is logical consistency between the Project Purpose and the Overall Goal.

Table 2: Achievement Level of Overall Goal

Goal	Indicator	Actual Performance
Overall Goal	Operation and financial indicators of all target WDs are improved by 2015.	As of 2013, operational and financial indicators of target WDs were improving as a whole. The creditworthiness of those WDs was also generally improving, but creditworthiness of many WDs was still low.

Source: Analyzed and Judged Based on the Information Provided by LWUA

In the ex-post evaluation study, operational and financial indicator figures for 2005 and 2011-2013 of 54 WDs, which were supported from 2005 in this project, were obtained. The operational and financial indicators of 6 WDs assisted in the Follow-Up Cooperation of the Grant Aid Project could be collected for 2011 – 2013 only. Therefore, the data from 54 WDs, supported from the original period, were used in making comparisons to the planning stage.

The change rates of major indicators are shown in Table 3.

Table 3: Changes in Operational and Financial Indicators

		Operational Indicator							Financial Indicator
		No. of active connection	Served population	Service coverage	Collection efficiency	No. of connection per staff	Production volume	Non-revenue water rate	Total Revenue
Selected WDs	2005→2011	147%	145%	129%	106%	124%	92%	97%	203%
	2005→2013	164%	168%	144%	107%	127%	123%	119%	252%
	2011→2013	112%	116%	112%	100%	102%	134%	123%	124%
Target WDs	2005→2011	134%	151%	121%	103%	110%	120%	86%	227%
	2005→2013	153%	169%	130%	101%	126%	125%	78%	274%
	2011→2013	114%	112%	108%	99%	114%	105%	91%	121%

Source: Calculated from the Information Provided by LWUA

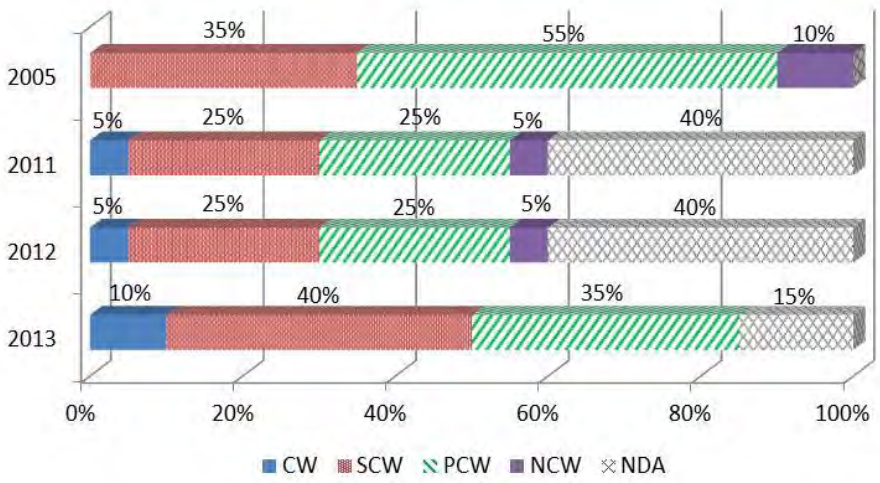
Note 1: Served population: Number of active connection x Household size

Service coverage: WD served population / Total population of the area covered by WD

Note 2: The WDs without submission of some data to LWUA were calculated as 'no improvement' or by using 'average values of the adjacent 2 years'. Therefore, the rate of changes is not necessarily accurate and indicative. 2 WDs out of target WDs were excluded from calculation as they stopped operations or were merged with an LGU after this project commenced.

Regarding the changes in operational and financial indicators, a substantial improvement can be observed from the above table regardless of selected or target WDs. The number of active connections, for example increased by an average of 47% in selected WDs from 2005 (at the time of planning) to 2011 (at the time of completion) and by 64% from 2005 to 2013 (at the time of ex-post evaluation). The data shows that the number of connections increased by 12% after project completion. The same applies to target WDs showing an increase of 34% from 2005 to 2011 and 53% from 2005 to 2013. LWUA has set the target number of connections per staff member at more than 120 in small WDs, with the selected WDs currently having 105 and the target WDs with current number of 112 in 2013. Although they have not reached the target, it was observed that they have both improved.

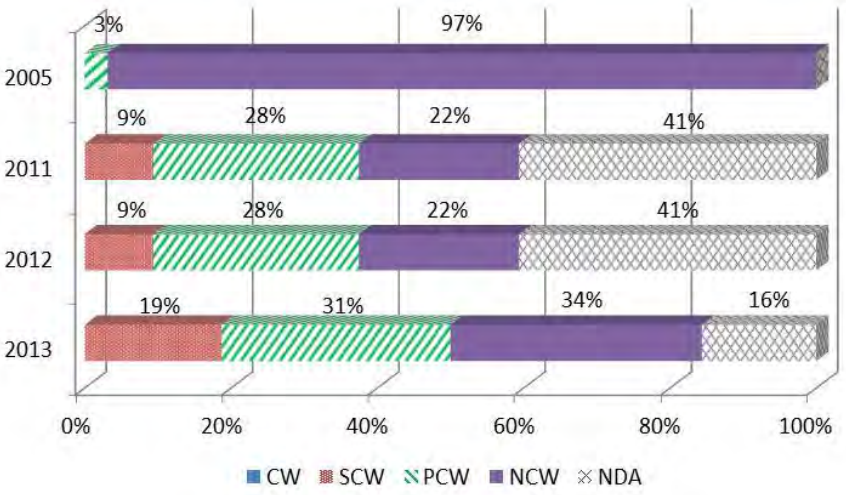
The only indicator with a concern is the Non-revenue water rate of selected WDs. While it decreased (=improved) slightly from 2005 to 2011, it increased (=worsened) by 23% from 2011 to 2013. However, the cause was not clear as it was not captured by LWUA[15]. Also, while the service coverage rate has been improving as a whole, there are a number of WDs with one-digit actual rates, with the highest WD being 56% (in 2013), which shows a lot of room yet for improvement .



Source: Prepared Based on the Information Provided by LWUA
Note: CW (Creditworthy), SCW (Semi-creditworthy), PCW (Pre-creditworthy), NCW (Non-creditworthy), NDA (No data (unable to analyze))

Figure 1: Credit Rating of Selected Water Districts

[15] According to the Implementing Agency, there were WDs with problems of having no water meters installed so that accurate non-revenue water rates could not be calculated in any way.



Source: Prepared Based on the Information Provided by LWUA
Note: CW (Creditworthy), SCW (Semi-creditworthy), PCW (Pre-creditworthy), NCW (Non-creditworthy), NDA (No data (unable to analyze))

Figure 2: Credit Rating of Target Water Districts

The financial indicator, as seen in Table 3, has significantly improved on average in both selected and target WDs, and the revenue has continued to increase even after project completion. LWUA analyzes each WD's financial condition and classifies whether WDs have sufficient creditworthiness for LWUA loans into 4 categories, from a higher category to a lower one as 'CW (Creditworthy)', 'SCW (Semi-Creditworthy)', 'PCW (Pre-Creditworthy)', and 'NCW (Non-Creditworthy)'. Figures 1 and 2 indicate the creditworthiness of selected and target WDs of this project, and among selected WDs in 2005, the WDs classified as SCW comprised 35% of the total, PCW 55%, and NCW 10%. While it is difficult to interpret a subsequent tendency because of years when up to 40% of WDs recorded 'No Data (NDA)', WDs with a CW rating started to emerge with the implementation of this project, and WDs with a creditworthiness of CW or SCW reached half of all selected WDs in 2013. The same tendency is true with target WDs; while 97% of them were NCW in 2005, 19% of them were classified as SCW, and 31% as PCW in 2013, demonstrating that the overall financial conditions have improved.

In this way, the Overall Goal was generally achieved with a number of WDs improving their operational and financial indicators not only during the project implementation but also after the implementation.

However, while general improvement can be seen, it can be said that further development and management improvement efforts are necessary since, for example, there were a number of WDs stagnant at a one-digit service coverage rate, as mentioned

above, and more than half of the WDs were still at a rating lower than PCW without sufficient ability to borrow. It was occasionally observed during the site visit of the ex-post evaluation that, among the WDs without improvements in operational and financial situations, some had their management affected by external factors other than their water supply services, such as damages to distribution networks and transmission pipes by a typhoon and the collapse of a bridge where main transmission pipes were placed. There were also some cases where LWUA's management advisors were involved in the actual management of some WDs not showing any improvement due to poor management functions.

The operational and financial data of the WDs covered in this project were collected and sorted by LWUA[16], but LWUA was not capturing the situation on whether the improvement plans formulated during the project were utilized and revised after project completion and the overall picture was not clear. As far as the site survey was conducted, there were various selected WDs, from those not utilizing and revising the plan at all to those reviewing and utilizing it.

[16] It was confirmed that they were holding regular meetings with the JICA Philippine Office and keeping operational and financial indicators of the targeted 60 WDs on a spreadsheet.

[Beneficiary Survey Results on Water Supply Services]

In the ex-post evaluation study, interview surveys on water supply services were conducted with a total of 242 residents in 9 WDs in the Central Luzon Region and Panay Island (in the Visayas), where site surveys were carried out, out of a total of 60 WDs supported in this project[17]. The main results were as shown below.

Q. Do you think that the stability of the water supply has improved as a result of the project?

Yes	No
83.8%	16.2%

Q. Do you think that the quality of service has improved as a result of the project?

Improved	Same	Worse
53.3%	40.5%	6.2%

Q. Do you think that the water pressure has improved as a result of the project?

Improved	Same	Worse
64.5%	31.0%	4.5%

Q. Do you see any changes to your lifestyle as a result of the project?

Improved	Same	Worse
64.6%	30.8%	4.6%

Q. Are you generally satisfied with the water supply services?

Satisfied	Not satisfied
84.6%	15.4%

As shown above, favorable evaluation was observed regarding the improvement of water supply services by implementing this project. Three quarters of the respondents who chose 'Same' regarding the improvement of water quality and pressure commented that there had been no problems with the water quality or pressure already before the implementation of the project. Including such respondents, it is considered that a number of beneficiaries are satisfied with the water supply services as shown in their responses on the satisfaction level. Common responses provided as examples of a change in lifestyle were that they no longer needed to fetch water or that cooking and washing became easier.

[17] 242 respondents from a total of 45,303 beneficiaries. 7 WDs in Central Luzon (142 in total) and 2 WDs in Panay Island (100 in total). The average number of members in one family was 4.90 and 3.3% of household expenditures were directed to water charges.

3.2.2.2 Other Impacts

(1) Impact on the Natural Environment

According to the Implementing Agency, noise and traffic congestion associated with the works occurred during the implementation of facility improvement works, but there were no cases in which they became major problems. In fact, no negative effects or complaints, etc. due to the works were seen during or after the project implementation. Therefore, it is assumed that there were no problems.

With regard to water supply, the contribution to the increase in the proportion of the population receiving safe water with the realization of stable supply[18] is considered a positive impact.

(2) Resettlement and Land Acquisition

According to the Implementing Agency, facilities such as water reservoirs and pump stations were constructed for selected WDs. According to the Implementing Agency, no cases of land acquisition and resident resettlement associated with them occurred. Therefore, there seems to have been no problems. In the beneficiary survey, no respondents commented that resettlement or land acquisition cases took place.

As stated above, the logic of this project is considered to have been coherent as it was structured in a way that the improvement of services and management in selected WDs would improve and the measures toward the improvement of target WDs would be indicated, (Project Purpose: at the time of completion), leading to the improvement of services and management of target WDs (Overall Goal). While the achievement of the Project Purpose was judged at the time of completion, further potential improvements through the period of the ex-post evaluation were checked mainly with its operational and financial indicators. Although there were variations among the WDs, it was judged that they were moving toward the achievement of the Overall Goal as a whole.

However, there is no roadmap drawn on how WDs lacking positive improvement of indicators and borrowing capacity will be able to become independent, and this is an area to be improved. It was thought important to strengthen efforts in enhancing the operational and financial indicators of the WDs lacking the aforementioned improvement. In addition, improvement plans need to be revised regularly, and it is essential to ensure that the WDs not submitting data, do so, so that their management situations will be adequately understood.

No particular negative impact on the natural environment, resettlement, or land acquisition

[18] While no quantitative data could be obtained, treatment of discharged water (wastewater), outside of this project scope, was not implemented properly with just ground penetration in some areas. It is therefore necessary to develop such facilities in the future.

has occurred and it is considered that there are no problems.

As for the effectiveness and impact as a whole, the achievement of the Outputs leads to the achievement of the Project Purpose. Also, improvements of various operational and financial indicators in many WDs are expected to lead to the achievement of the Overall Goal in a desirable manner. Therefore, the effectiveness and impact of this project is high.

3.3 Efficiency (Rating:②)

3.3.1 Inputs

In this project, the following components were applied to carry out various activities.

Table 4: Inputs into the Project

Inputs	**Plan**	**Actual** (at completion)
(1) Dispatch of Experts	6 long-term experts	4 long-term experts (2 in the original period, 2 in the extended period) 9 short-term experts (7 in the original period, 2 in the extended period)
(2) Training in Japan	Not specified	5 (4 in the original period, 1 in the extended period) * Not specific to this project. JICA's group training program was utilized.
(3) Provision of Equipment	Simplified water quality analyzer, Billing and collection-related equipment, office equipment for project management, etc.	Simplified water quality analyzer, Billing and collection-related equipment, office equipment for project management, etc.
(4) Local Consultants[19]	Not specified	12 (10 in the original period, 2 in the extended period)
(5) Local Contractors[20]	Not specified	4 (3 in the original period, 1 in the extended period)
(6) Facilities Improvement Support	Facilities improvement support: 200 million yen	Facilities improvement cost: approximately 234 million yen (93.691 million Pesos) (Approx. 230 million yen (91.4 million Pesos) in the original period and approx. 4 million yen (2.291 million Pesos) in the extended period)
(7) Others	Training and workshop costs in the Philippines	Training and workshop costs in the Philippines

[19] Contracted out to effect a detailed design and manage construction of the facilities of selected water districts
[20] Contracted out to construct water supply facilities in selected water districts

		(The cost could not be obtained)
Total Cooperation Cost from Japan	Approximately 700 million yen	1,028 million yen
Input from the Philippine Government	Counterpart personnel cost, Travel expenses, Water quality test equipment, Project office, Land necessary for facility improvement of selected water districts	Original period: 4.5 million Pesos Extended period: 1.8 million Pesos Utilities and communications expenses at the Project office, Travel expenses, Purchase of billing and collection system, training (personnel cost not included)

3.3.1.1 Elements of Inputs

The inputs of this project are as shown in Table 4. Since the project period was extended as to be stated later, actual inputs exceeded the original plan. It was judged at the end of the original period that there were some WDs with room to improve on the method of utilizing the skills and knowledge acquired, as to be stated later. Therefore, some support such as for the formulation of improvement plans were added for some WDs. During the extended period, 6 WDs without sufficient effectiveness generated in the Grant Aid Project, implemented in the past, were also added and supported in terms of operation and management as well as the maintenance of treatment plants. These inputs are considered to have been adequate for the improvement of operation and maintenance in those WDs.

According to LWUA and at the time of ex-post evaluation, comments were obtained on the inputs from the Philippine side for the generation of project effects stating that the number of counterparts assigned to cover all 20 WDs during the original period was adequate.

3.3.1.2 Project Cost

The actual project cost including the extended period was 1,028 million yen, exceeding the planned project cost of approximately 700 million yen (146%). The actual expenses at the completion of the original period were not available as the original period ended in July 2010 of the financial year and the expenses were not divided and sorted out.

The significant increase in the project cost was mainly due to the support for the 10 WDs by extending the project period, as to be stated later, during which the cooperation with some target WDs from the original period and WDs supported in the Grant Aid Project was added.

3.3.1.3 Period of Cooperation

The cooperation period of this project was planned to be for 5 years from July 2005 to June 2010, and the original period was 5 years from August 2005 to July 2010. As described in 'Effectiveness Output 1', there were no negative influences due to the change of period.

In the Terminal Evaluation of the original period (March 2010), it was judged that while the Project Purpose was achieved as a whole, there were some WDs with some issues in terms of sustainability, that is, there were some WDs with room to improve or the method of utilizing the skills and knowledge acquired through the project. Therefore, the project period was extended by 1 year and 8 months. As a result, this project was extended until March 2012. As this extension has an aspect of making additional inputs to enhance the sustainability of the effects generated in the project, the actual project period exceeded the originally expected plan (133% of the planned period).

In consideration of LWUA's resources, the size and inputs of the project seem to have been adequate. However, as it was judged at the end of the original period that there was room to improve on the method of utilizing the skills and knowledge acquired, the project was decided to be extended. As a consequence, the project cost was 146% of the original plan and the project period was 133% of the original plan. As both of them exceeded the plan (less than 150%), the efficiency is judged to be fair.

3.4 Sustainability (Rating:②)

3.4.1 Related Policy and Institutional Aspects for the Sustainability of Project Effects

The Government of the Philippines was giving a priority to the water sector, particularly the access to potable water for rural households in the 'Philippine Development Plan 2011-2016', with a target to supply potable water to 86% of the households by 2016. At the sector level, 'The Philippine Water Supply Sector Roadmap (2nd Edition)' was formulated in 2010 with one of the medium-term outcomes set to develop adequate infrastructure particularly in the water supply areas where the service coverage rate is less than 50%. In this way, it can be observed that the importance of water supply has remained high in national and sector level policies during the ex-post evaluation or thereupon.

As already stated, a number of government organizations are involved in the water sector; however, it is supposed that no integrated water supply services are provided as there is an issue of which organization should take a leading role not being clear enough. This project, with a framework in which LWUA supports WDs, does not seem to offer LWUA, which is supposed to be self-financed while prohibited from operating a deficit, any incentive to lend

to small WDs with management concerns and take risks by itself except when subsidies, etc. for financing to WDs can be obtained from the government. At the time of ex-post evaluation, LWUA was dependent on the budget from the central government as well as donors for funds to be financed to WDs for investment in facility expansion. On the other hand, while it was indicated in this study that the rehabilitation and expansion of facilities as well as the improvement of management capacities in WDs were an effective measure for management improvement, many WDs are in circumstances where borrowing of funds through LWUA is not an easy task. In this way, continuation of financial assistance from LWUA to WDs is considered to have certain institutional challenges.

3.4.2 Organizational Aspects of the Implementing Agency for the Sustainability of Project Effects

Although LWUA was transferred from DPWH to the Department of Health by EO 738 issued on July 23, 2008, it became an organization under DPWH again by EO 62 issued on October 26, 2011. However, a mission to provide financial, technical and organizational assistance to WDs throughout the country in addition to setting regulations has not changed. LWUA had 393 staff members as of the end of 2014, and the Deputy Administrator (in charge of area operations) is responsible for the monitoring of LWUA-funded projects in WDs. The WDs Development Unit (a total of 3 units in Luzon, Bicol & Visayas and Mindanao) is in charge of the organizational development of WDs, and management advisors belong to this unit.

It is perceived that small WDs have extremely fragile organizational structures, especially in terms of human resources, and LWUA's management advisors are playing an important role in looking after 10 to 15 WDs to provide advice on their management. A certain level of structure to support WDs has been developed and management advisors visit each WD once every one to several months with the cost borne by LWUA and depending on the seriousness of the issues such WDs may have. However, many of the WDs visited during the ex-post evaluation study revealed that management advisors' visits were not frequent enough.

The organizational structures of each WD varied depending on the organizational size, but they have a General Manager under the Board of Directors and staff members such as accountants and water technicians are allocated. An organization consisting of at least several posts will be necessary to operate WDs. As seen in '3.2.2.1 Achievement of Overall Goal', while the number of service connections per staff is approaching 120, set as a target by LWUA, it was 105 in selected WDs and 112 in target WDs, and the number of staff tended to be excessive in the case of very small WDs. Out of the WDs supported in this project, the WDs with less than 90 connections per staff (three quarters of the target) were

25% of selected WDs and 29% of target WDs (in 2013).

Based on the above, while there were no major problems in terms of implementation structure as a whole, some issues were observed in that more frequent visits by LWUA's management advisors are desirable and some WDs need to increase the number of connections per staff.

3.4.3 Technical Aspects of the Implementing Agency for the Sustainability of Project Effects

LWUA has a section in charge of training and has been implementing various training sessions for technical staff members in the fields of planning, design, construction, operation and maintenance. Also, manuals on feasibility studies, detailed design procedures, and water supply construction, etc. were developed and utilized. When a project funded by LWUA is implemented, WDs are able to receive technical assistance from LWUA during various design and construction supervision stages on a chargeable basis.

In terms of the relationship between the effectiveness and sustainability of this project, the Terminal Evaluation of this project during its extension phase considered that the technical skills and knowledge transferred from Japanese experts to LWUA counterparts would be entrenched as the counterparts had high motivation to strengthen skills and knowledge even after the completion of this project.

When checked with LWUA during the ex-post evaluation, there were opportunities for some counterparts particularly in the water quality area to become lecturers for training, etc. though there were no such records documented. The management advisors who took part in the seminars of this project were also providing advice in their routines by utilizing the knowledge acquired through this project[21]. However, no programs were established at LWUA by directly or systematically utilizing the skills and knowledge obtained in this project, and it could not be confirmed that an overall improvement had been achieved by sharing the outcomes of the project within the organization. Moreover, no efforts were seen in particular to compile individual information of WDs, including the WDs covered under this project, for conducting a comprehensive analysis and information sharing with an intention to resolve their issues.

The facilities improved under the support of this project were confirmed to have been managed and utilized generally in good condition. Out of 5 selected WDs visited in the ex-post evaluation, 4 of them had no problems in operation and maintenance, but one of them had a pump damaged when a typhoon hit the WD making it unusable. However, a substitute pump was installed to continue the water supply.

[21] As an example, they were instructing each WD how to construct and operate the tariff collection database introduced in this project.

Based on the above, an organization-wide effort is expected as a system to share the direct outcomes of this project was not established though LWUA had a certain level of techniques needed to instruct WDs.

3.4.4 Financial Aspects of the Implementing Agency for the Sustainability of Project Effects

Since LWUA's technical assistance described in '3.4.3 Technical Aspects of the Implementing Agency for the Sustainability of Project Effects' has to be paid by each WD, the financial situation on LWUA's lending is analyzed here as the financial analysis necessary to sustain the effects generated in this project[22].

As shown in Table 5, most of LWUA's revenue comes from the interest earned through lending to WDs[23], and the overall balance is often in surplus. A deficit was recorded in 2011 due to a temporary increase in operational expenses, but it came back to a surplus from the following year. However, the interest income is gradually decreasing and the amount of loans has been decreasing in recent years as shown in Table 6. The provision of NLIF contributed largely to the higher amount of loans to WDs in 2009 and 2010, and it has become difficult to lend stably to WDs after the lending through NLIF came to an end. LWUA is meeting various expenses with the interest income from the loans repaid by WDs, and the principal is used to relend to WDs.

Table 5: LWUA's Actual Income and Expenses

(Unit: thousand Pesos)

	2010	2011	2012	2013
Interest Income	1,487,000	1,148,204	1,032,733	873,845
Service Income	202,463	30,895	29,988	45,410
Fines and Penalties	14,676	20,998	26,838	47,083
Miscellaneous	16,088	35,569	17,368	21,816
Gross Income	1,720,227	1,235,665	1,106,927	988,154
Total Expenses	1,388,486	2,467,602	807,092	899,842
Net Income from Operations	331,742	-1,231,937	299,835	88,313
Other Income	3,423972	-129,520	645,005	66,439
Net Income before tax	335,166	-1,361,457	944,840	154,752
Income Tax	98,946	-409,321	77,103	27,393
Net Profit	236,220	-952,135	867,737	127,359

Source: Data Provided by LWUA

[22] LWUA needs a transport budget for management advisors to visit WDs. While no detailed information was obtained regarding the securing of a training budget for each WD, it is estimated that the WDs with increasing revenue are able to secure a budget as seen in the analysis of financial status in '3.2.2.1 Achievement of Overall Goal', whereas comments were heard from indebted WDs that it was difficult to secure budget.

[23] When LWUA provides technical assistance, LWUA charges 9% of the basic construction cost plus contingencies in the case of feasibility studies or designing and 4% in the case of construction supervision to WDs, as technical fees.

Table 6: Amount of Loans from LWUA to Water Districts

(Unit: million Pesos)

	2009	2010	2011	2012
Loan to Water Districts	1,109	1,434	708	595

Source: Data Provided by LWUA

Lending is conducted based on the aforementioned creditworthiness category of WDs (4 ranks), set by LWUA and the proposed project details, and the focus of LWUA is to lend to WDs classified as SCW, PCW and NCW as creditworthy WDs can access other financial institutions for their loan needs . The lending criteria are based on a judgement of whether the project is feasible (repayable), and the tariff ceiling is set within 5% of the average income of households belonging to the low-income group in that area. A restriction is also imposed that no tariff hikes of over 60% can be made from the previous tariff structure (normally up to once a year) [24].

With respect to the financial situations of the WDs targeted in this project, revenues are increasing as seen in '3.2.2.1 Achievement of Overall Goal' and their creditworthiness is also improving as a whole. However, while sufficient analysis could not be done due to a lack of data, there were many WDs with a substantial amount of debt from past borrowings from LWUA, with many cases of past due repayment. In addition, as LWUA is required to be ensured of profitability in lending, it is not easy for small WDs applying for loans to pass the loan assessment and some WDs among those visited in the site survey were not approved for loans though they wanted them. Therefore, some WDs will be required under the current situation to improve operational indicators by rehabilitating and expanding facilities using other funding sources so that their financial status will improve and an adequate financial standing to receive loans will be established.

Although water supply is positioned as an important priority in the policy, a variety of related organizations and water suppliers exist in the sector, and integrated water supply services do not seem to be deployed. In terms of organizational aspect, LWUA has the role of providing WDs with financial and technical assistance, and management advisors are assigned to instruct WDs; but, an issue was seen in that the number of staff members against the number of service connections in small WDs tends to be excessive. Financially, while small WDs still need additional loans, LWUA has a dilemma of not to being able to lend easily to the small WDs with a large amount of outstanding loans and low credit ratings as it is required to ensure profitability.

[24] Water tariffs differed from one WD to another, but the authority to set them is practically with LWUA as it has receivables and WDs cannot decide them freely.

The small WDs supported in this project were in various conditions; while some WDs were steadily increasing their revenues and had higher credit ratings, other WDs were not improving and in a state of inability to receive loans.

In light of the above, some minor problems have been observed in terms of the policy background, organizational and financial aspects in this project. Therefore, the sustainability of the project effects is fair.

4. Conclusion, Lesson Learned and Recommendations

4.1 Conclusion

This project was implemented to provide financial and technical assistance to small water districts (hereinafter referred to as 'WD') with an aim to improve the services and management of these WDs. The objective of this project was consistent with the development plan and needs of the Philippines both at the time of planning and ex-post evaluation, as well as the priority areas of Japan's ODA policy at the time of planning. Therefore, the relevance of this project is high. The effectiveness at the time of project completion is also high with general achievement of the five outputs expected, leading to the achievement of the project purpose through the implementation of this project. Operational and financial indicators of the WDs have continued to improve on average after the completion of the project meaning that the overall goal has generally been achieved. In addition, this project has not caused any negative environmental or social impacts, and an impact is considered to have been generated. Therefore, the effectiveness and impact of this project can be said to be high. With regard to project implementation, the efficiency was judged to be fair as the project cost exceeded the planned amount due to an extension of the cooperation period. Regarding sustainability, while the operational and financial statuses of the WDs have improved as a whole, it was observed that difficulties to receive low-interest loans from the Local Water Utilities Administration (hereinafter referred to as 'LWUA'), which is required to be financially independent, had become a bottleneck in further management improvement. Another issue was that some WDs have an excessive number of staff. Based on these findings, the sustainability of the effects produced in this project is fair.

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

4.2 Recommendations

4.2.1 Recommendation to the Implementing Agency

<u>Further Management Improvement of WDs through Facilities Improvement Support and Private Sector Entry</u>

A number of WDs without freedom to set their water tariffs were facing the challenge of not being able to expand their customer base as they could not develop water sources and

distribution networks, all of which was caused by a lack of borrowing capacity. Some of the selected WDs improved their management due to the facilities improvement support becoming a big cue for them. Therefore, it is considered to be a beneficial viewpoint to create a cue for improvement of the WDs with a high possibility of improvement by special lending at low interest rates using a governmental special budget or the donors' integrated fund so that the facilities will be developed. In addition, it would be a strategy to develop facilities by promoting the entry of the private sector into operations. By doing so, it will become possible to gradually increase the WDs to a higher creditworthiness, in other words, encouraging their independence.

Monitoring of Management / Organizing and Accumulation of Information as Best Practice

While LWUA's management advisors are providing advice on management and maintenance of each WD, LWUA as a whole was not compiling individual information of each WD to conduct a comprehensive analysis to resolve issues. Accumulation of information of the WDs with good management as best practices will be useful for information sharing among management advisors and resolution of issues in poorly managed WDs. Therefore, it is considered to be desirable to implement these measures.

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

Implementation by Groups of Water Supply Facilities Improvement

The 20 selected WDs where water supply facilities were developed in this project were divided into 10 WDs each, and improvement works were carried out at different times. This measure was taken by confirming the limitation of human resources in the number of experts and the counterpart organization, and the works were supported in sequence at a feasible size, which consequently made it possible to give sufficient instruction to all the WDs, from design through completion. Therefore, when similar works are implemented, it will be important from the perspective of generating project effects that a feasible schedule be secured by dividing the whole schedule into phases.

Making a Cue to Better Management by Facilities Improvement

Many of the WDs needed to increase revenues to improve borrowing capacity, but as shown in '4.2.1 Recommendation to the Implementing Agency', facilities of selected WDs were developed through the Grant Aid in this project which enabled many WDs to expand their

customer bases and improve financial conditions. Among the target WDs which did not receive facilities improvement, some were finding it difficult to expand their facilities through new loans due to the large amount of past debt though the revenues were gradually increasing. Such WDs have not been able to expand their water supply service areas. In this project, as facilities improvement support paved the way to WDs' self-reliance, it is considered to be an effective strategy to examine the possibility of using external funds and to implement facilities development as well.

Monitoring of Project Effects through Regular Discussions

It is essential for LWUA to keep providing appropriate instructions and take necessary measures each time so that the WDs supported in this project practically apply the knowledge acquired. For this purpose, it is thought to have been effective that JICA and LWUA held regular discussions on the operational and financial conditions of the WDs supported and that they monitored the project's effects at least until the time of ex-post evaluation to understand the situations. It is desirable to implement and continue similar monitoring activities in similar projects.

(End)

Republic of the Philippines

Ex-Post Evaluation of Japanese ODA Grant Aid Project

"The Project for Improvement of Aurora Memorial Hospital"

External Evaluator: Yumi Ito, Japan Economic Research Institute Inc.

0. Summary

In this project, a hospital facility such as an outpatient department building was constructed and medical equipment was furnished to improve the medical services of Aurora Memorial Hospital (hereinafter referred to as AMH). The relevance of this project is high, as it was consistent with the development policy and needs of the Philippines as well as the ODA policy of Japan. The efficiency is also high, as the contents of the project were implemented mostly as planned and the project cost and period were within the scope of the plan. With regard to the effectiveness of the project, it is considered that the effects have been realized in terms of the increase in the number of inpatients, deliveries, bed days[1] and major operations including caesarian sections, improvement of medical services provided by AMH and the reduction of the patients' physical and economic burden. In addition, it was inferred that this project contributed to reinforcement of medical service provision capacity in Aurora province, securement of quality health workers and reinforcement of medical service systems of the entire province through strengthening Aurora province's capacity to train health workers. Therefore the effectiveness and impact of this project are high. The sustainability of the effects of this project is fair. Although there is less concern with the financial aspects, there are some minor problems observed in terms of organisational and technical aspects, as well as the current status of operation and maintenance, such as the need to strengthen personnel organization and difficulties in the repair of equipment and procurement of spare parts.

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

[1] A bed-day is a day during which a person is confined to a bed and in which the patient stays overnight in a hospital (OECD Glossary of Statistical Terms)

1. Project Description

Project Location

Aurora Memorial Hospital

1.1 Background

AMH, the target of this project, is a provincial general hospital located in Baler, the capital of Aurora province. Although it is officially positioned as the top referral hospital of the province, AMH had hardly been able to perform its expected role due to factors such as the absence of specialist doctors, deterioration of hospital facilities and medical equipment. AMH's hospital license was downgraded from Level 2 to Level 1, as it became unable to perform proper surgical procedures since the Department of Health (hereinafter referred to as DOH) put restrictions on operations conducted at a hospital without a surgeon and an anesthesiologist. Patients needed to be transferred to the national hospital in the neighboring Nueva Ecija province in order to have surgery or receive intensive care, but it takes about four hours to travel to that hospital, and there were cases where the road leading to the neighboring province was blocked during the typhoon seasons.

Furthermore, development and placement of community-rooted health workers were also problems in Aurora province, in addition to development of infrastructure such as buildings and equipment. Having experience in fostering community-based health workers, the School of Health Sciences of University of the Philippines Manila (hereinafter referred to as UPM-SHS) established its extension campus in Baler, Aurora, in 2008, and it was necessary to satisfy the UPM-SHS's needs to secure a training hospital where its students could have practical working experience.

Under these circumstances, the provincial government of Aurora decided to relocate the existing AMH and upgrade it to a Level 4 hospital with 100 beds[2] and requested Japan's Grant Aid Assistance for establishment of a new AMH. This project was implemented, based on the result of the preparatory survey conducted in response to this assistance request, which

[2] According to the information provided by JICA. At the time of the project planning, it was planned to upgrade AMH to a Level 3 hospital in "Province-wide Investment Plan for Health (2009-2013)."

concluded that upgrading to a Level 2 hospital with 50 beds would be more appropriate in terms of function and size.

1.2 Project Outline

The objective of the project was to improve the medical services of the Aurora Memorial Hospital in Aurora province by constructing a new facility for the AMH and furnishing it with medical equipment.

Grant Limit / Actual Grant Amount	1,089 million yen / 1,028 million yen
Exchange of Notes Date / Grant Agreement Date	March, 2010 / March, 2010
Implementing Agency	Provincial Government of Aurora, the Philippines
Project Completion Date	December, 2011
Main Contractors	Construction: Toyo Construction Co., Ltd. Procurement: Nissei Trading Co., Ltd.
Main Consultants	The Consortium of Azusa Sekkei Co., Ltd and Intem Consulting, Inc.
Basic Design	February, 2010

2. Outline of the Evaluation Study

2.1 External Evaluator

Yumi Ito (Japan Economic Research Institute Inc.)

2.2 Duration of Evaluation Study

This ex-post evaluation study was conducted with the following schedule:

Duration of the Study: October, 2014 – September, 2015

Duration of the Field Study: January 11 – February 4, 2015 and April 5 – 18, 2015

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

3.1 Relevance (Rating: ③[4])

3.1.1 Relevance to the Development Plan of Republic of the Philippines

At the time of project planning, health was included as one of the essential services to be provided in the "Medium-term Philippine Development Plan (2001-2010)", and six health priorities were to be pursued, especially to reach the poor. These were: (1) Reducing the cost of medicines commonly bought by the poor, (2) Expanding health insurance particularly for

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

[4] ③: High, ②: Fair, ①: Low

indigents through premium subsidy, (3) Strengthening national and local health systems through the implementation of the Health Sector Reform Agenda, (4) Improving the Health Care Management System, (5) Improving health and productivity through R&D, and (6) Establishing/expanding drug treatment and rehabilitation centers.

As a policy of the health sector, "FOURmula One (F1) for Health" launched by the DOH stated that important reforms were supposed to be carried out in Health Service Delivery, Good Governance in Health, Health Financing and Health Regulation, and Aurora Province was included as one of the target provinces. In Aurora Province, the health sector was considered as one of the priority sectors and its "Province-wide Investment Plan for Health (2009-2013)" included improvement of health facilities as one of its strategies and planned to apply for re-classification for the hospital license of AMH and another provincial hospital and to upgrade AMH from Level 1 to Level 3.

At the time of ex-post project evaluation, the "Philippine Development Plan (2011-2016) (Midterm Update)" aims at inclusive growth and lists "Human capabilities improved" as one of the sector outcomes of social development sector and "Health and nutrition status improved" as one of the subsector outcomes, and states "Provide health care to all" as the main strategy for improving the health status of the people. The "Aquino Health Agenda", the Philippines' health sector policy, aims at achievement of a responsive health care system, etc. by ensuring that all Filipinos have equitable access to affordable health care through implementation of Universal Health Care. It lists improved access to quality hospitals and health care facilities by doing things such as upgrading government–owned/operated hospitals and health facilities. The "Province-wide Investment Plan for Health (2014-2016)" of Aurora Province aims at ensuring that every resident of Aurora province receives quality health care services as the overall goal and lists access to quality health facilities as one of its major programs. In order to achieve this, it includes items such as improvement of health facilities, provision of necessary equipment and establishment of a functional service delivery system.

In this way, this project is consistent with the Philippines development plan, its national health sector policy and Aurora province's health sector policy, both at the time of project planning and ex-post evaluation, in improving a health facility in order to strengthen the capacity of local health service provision.

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

AMH was officially positioned as the top referral hospital of the province, but it had hardly been able to perform its expected role due to factors such as the absence of specialist doctors, deterioration of hospital facilities and medical equipment. Patients needed to be transferred to a hospital outside the province in order to receive intensive care or have

surgery, but it took about four hours to travel and there were cases where the road leading to the neighboring province was blocked during the typhoon seasons. At the time of the project planning, development of health workers and facilities in Aurora province was behind; its population per doctor was 11,800 (as compared to 1,100 for the whole country) and its population per hospital bed was 2,800 (1,000 for the whole country). In addition, in order to address the problems of the outflow of health professionals to foreign countries as well as their concentration in urban districts within the country, the University of the Philippines established the School of Health Sciences (hereinafter referred to as UPM-SHS) to foster community-based health workers. UPM-SHS established its first extension campus in Baler, Aurora in July, 2008, and needed to secure a training hospital which could serve that purpose on a permanent basis[5].

At the time of ex-post evaluation, AMH is positioned as the top referral hospital of Aurora province. Being the only provincial hospital with surgery functions in the province, AMH is expected to provide medical services which could not be provided by other public health facilities within the province, such as surgery and caesarian operations, especially for populations such as the indigent. According to the provincial health office, Aurora province's population per doctor was 8,216 and its population per hospital bed was 1,643 (as of 2014). Although these indicators have improved, they have not yet reached the national level as of the time of project planning. Regarding the needs of securing health workers in Aurora province, according to an interview with UPS-SHS's extension campus in Baler, AMH has been serving as training hospital for UPM-SHS and nurses and midwives to work at Rural Health Units (hereinafter referred to as RHU) etc. have been fostered and supplied enough by the UPS-SHS; however, it is still difficult to secure doctors in Aurora province.

Based on the above, this project can be considered as consistent with the development needs of the Philippines, as medical service provision by AMH is still highly important in the province because AMH is positioned as the top referral hospital also at the time of the ex-post evaluation, and this project is contributing to securing health workers within the province.

3.1.3 Relevance to Japan's ODA Policy

At the time of project planning, the Country Assistance Program for the Republic of the Philippines prepared by the Japanese government (2008) listed "expansion of basic social services (improving the living conditions of the poor)" such as health care services as one of the guidelines to address one of the priority development issues set in the program, which is "empowerment of the poor and improvement of the living conditions of the poor." Therefore, this project is highly consistent with Japan's assistance policy, as it corresponds to Japan's

[5] Information provided by JICA

priority cooperation areas set in the country assistance program at the time of project planning.

3.1.4 Appropriateness of Project Planning and Approach

This project was planned to construct a new facility for AMH as a Level 2 hospital with 50 beds. The Bed Occupancy rate of AMH (Table 1) dropped to 66% in 2012, right after the project completion, but has been gradually increasing and reached more than 100% in 2014, three years after the project completion. Furthermore, at the time of ex-post evaluation, it was reported that the provincial government of Aurora/AMH had a plan to construct another ward (with 25 beds) within 2015 in order to accommodate the increasing number of patients. Therefore it is considered that the project planning to construct a hospital with 50 beds was appropriate, as it took into consideration AMH's capacity before project implementation and estimation of hospitalization needs.

Table 1 Bed Occupancy Rate of AMH

	2009	2010	2011	2012	2013	2014
Authorized bed capacity	25	25	25	49	49	49
Actual implementing bed capacity	58	58	58	61	68	73
Bed Occupancy Rate (%)	101.8	129.39	123.44	66.14	89	105

Source: Answer to the questionnaire

Note: Bed Occupancy Rate = (total inpatient service days for the period/(total number of authorized beds x total days in the period)) x 100

As described above, this project was and is consistent with the Philippines' development plan and development needs as well as Japan's ODA policy, both at the time of project planning and at the ex-post evaluation. The project planning and approach were also considered to be appropriate. Therefore the relevance of this project is high.

3.2 Efficiency (Rating: ③)

3.2.1 Project Outputs

The planned project components are as shown in Table 2.

Original

Table 2: Planned Components of This Project

	Facilities (Floor Area)	Details
Facility ($3,969.6m^2$)	Administration, ER & OPD Building ($1,503.0m^2$)	Administration Dept., ER, OPD, Laboratory, X-ray Room, Pharmacy, etc.
	Operation & Delivery Building ($765.0m^2$)	Operation Theater, Delivery Room, Central Sterilizing & Supply Room, etc.

	Ward Buildings (2 blocks) (Per block 432.0m^{2,} Total 864.0m^2)	4 beds room, 2 beds room, 1 bed room, HCU, Shower Room, etc.
	Service Building (432.0m^2)	Kitchen, Laundry, Maintenance Room, Pump Room, Water Tank Storage, etc.
	Ancillary Buildings (405.6m^2)	, Guardhouse, Driver's Waiting Room, Elevated Water Tank, Septic Tank, etc.
Medical Equipment	Equipment for Dental, Physical Therapy, Radiology, ER/Operation Theater, Obstetrics/Gynecology, EENT (Eye, Ear, Nose and Throat), etc.	

Source: prepared based on the information provided by JICA

Actual output

The hospital facilities (3,969.6 m^2) and equipment were implemented mostly as planned, with 18 changes with the facilities and 2 changes with the equipment. Major changes among these are shown in Table 3.

Table 3: Major Changes from the Original Plan

(Major changes after the detailed design survey)

1) Change in the location and size of the door and cancellation of a pass box between the Laboratory and Blood Collection Room
2) Addition of a sink in the Pharmacy
3) Change in the size and location of the door to the Generator Room and addition of a louver
4) Change of windows, from three sliding windows to two-connected windows and from double sliding windows to single windows, as well as a change in the width of a single window from 840mm to 1,000mm
5) Change of the frame of the interior doors from wooden to one made of steel

Source: Information provided by JICA

According to the AMH, no inconveniences were reported as a result of these changes. Instead it was reported that improvements were brought about by these changes, such as the provision of better air circulation and convenience for users.

Regarding the major equipment procured, it was confirmed that most of the major equipment was being used. However, the hematology analyzer was not used due to the unavailability of reagents to be used for the equipment locally[6]. Also, among other pieces of equipment that were not listed as major ones, there was certain equipment that was not being used due to the difficulty in procuring parts or consumables domestically.

6 Among the major pieces of equipment, the autopsy table was not being used because situations that require an autopsy had not occurred after implementation of this project.

OPD Reception

OPD Waiting Area

In addition to the above, at the time of the project planning, clearing of existing facilities etc. and leveling and reclaiming the land at the construction site, installing a surrounding fence, bringing electricity to the site, relocating existing furniture and procuring furniture, tree planting, securing a budget for VAT refunds and bank commission payments were planned to be implemented by the Philippine side. All of these items were implemented, although a part of the surrounding fence remained as a temporary construction.

3.2.2 Project Inputs

3.2.2.1 Project Cost

The cost of this project to be borne by Japan was planned to be 1,089 million yen, while the cost to be borne by the Philippine side was planned to be 167 million yen. The actual project cost of the Japanese side was 1,028 million yen. This was because the bidding price was lower than the estimated price. The cost borne by the Philippine side was 171 million yen, influenced by the exchange rate fluctuation. Thus, compared to the planned cost of 1,256 million yen, the total project cost was 1,199 million yen, which was lower than the planned amount (95.5 % of the plan).

3.2.2.2 Project Period

At the time of project planning, the period of this project was expected to be 21 months including implementation of detailed design and bidding. This project was implemented as planned, as the actual project period was also 21 months from March 2010 (Signing date of the Exchange of Notes) until December 2011.

As described above, the outputs of this project were mostly as planned, the project cost was within the plan (95.5% of the plan) and the project period was as planned (100% of the plan). Therefore, the efficiency of the project is high.

3.3 Effectiveness[7] (Rating: ③)

3.3.1 Quantitative Effects (Operation Indicators)

As quantitative effects to be achieved by implementing this project, the targets for the number of inpatients at AMH, major operations including caesarian sections[8], deliveries, bed days at AMH and the number of patients that could receive medical care at AMH without being transferred to other hospitals outside the province were set respectively as shown in the table below.

Table 4: Operation Indicators of This Project

	Baseline	Target	Actual	Actual	Actual	Actual
	2008	2014	2011	2012	2013	2014
	Baseline Year	3 Years After Completion	Completion Year	1 Year After Completion	2 Years After Completion	3 Years After Completion
Number of AMH inpatients	3,960	increase	4,612	4,764	5,599	6,005
Major operations including caesarian sections	16	270	124	155	240	251
Deliveries	371	780	620	703	886	1,245
Bed days of AMH	7,700	14,600	11,922	11,958	15,497	18,738
Number of patients who could receive medical care at AMH without being transferred to other hospitals outside the province (per year)	0	800	No data			

Source: Information provided by JICA and AMH

Notes: As to the indicator "Bed days of AMH," "Cumulative number of inpatients acceptable at AMH" was listed in the ex-ante evaluation table of this project, but during ex-post evaluation, it was confirmed that "bed days of AMH" was the indicator that had originally been intended. Thus "bed days of AMH" was used as a basis for ex-post evaluation. In addition, the target of this indicator was set as "13,000 persons/day" in the ex-ante evaluation table. It was confirmed that "14,600 persons/day" was the target intended in the Preparatory Survey Report of this project, according to the project consultant. Therefore the evaluator amended the target figure as originally intended one and conducted an evaluation based on it.

The number of inpatients at AMH, deliveries and bed days achieved their respective target figures as of 2013. Major operations including caesarian sections achieved 93% of the targeted figure as of 2014 with an increasing trend. Expansion of the facility capacity (increase in number of beds) and increase in numbers of operations and deliveries by securement of specialized doctors (obstetrician and gynecologist, anesthetist and surgeon) are considered as factors that help to explain that the above mentioned indicators have

[7] Sub-rating for Effectiveness is to be put with consideration of Impact.

[8] "Major operation" means surgical procedures requiring anesthesia/spinal anesthesia to be performed in the operating theater.

achieved their respective target figures. However, as to the number of deliveries, prohibition of non-facility deliveries issued by the DOH is also considered as a factor to explain its increase.

There is no aggregated data on the number of patients who could receive medical care at AMH without being transferred to other hospitals outside the province. However, it could be considered that major effects expected at the time of project planning have been achieved as the number of major operations including caesarian sections, which had to be transferred to other province at the time of project planning, has been increasing since completion of the project. Besides, the number of inpatient referrals from AMH to other health facilities (Table 5) decreased right after the project completion, but increased sharply in 2014. According to the implementing agency, it was inferred that there were many patients who hoped to be transferred to other health facilities in 2014.

Table 5 Number of Inpatient Referrals from AMH to Other Health Facilities

2010	2011	2012	2013	2014
230	195	145	138	242

Source: AMH Hospital Statistical Report for the respective years

Table 6 shows the number of patients from Aurora province who were admitted in the Paulino J. Garcia Memorial Research & Medical Center (hereinafter referred to as PJG Memorial Research & Medical Center). This Center is considered to have accepted the largest number of patients from Aurora province among public hospitals in other provinces. The numbers of referrals in obstetrics and gynecology, internal medicine and ear, nose and throat departments are slightly decreasing, but a trend of drastic decrease was not observed.

Table 6 Number of Patients from Aurora Province
Admitted in PJG Memorial Research & Medical Center

	2008	2009	2010	2011	2012	2013	2014
Obstetrics and Gynecology	208	238	183	185	178	148	178
Pediatrics	109	115	87	91	88	62	109
Internal medicine	216	252	209	189	191	180	167
Surgery	146	138	137	150	174	141	171
Appendectomy	49	38	27	24	24	25	42
Orthopedics	23	25	10	41	35	48	39
Ear, nose and throat	24	5	8	4	5	4	1
Ophthalmology	13	3	6	3	14	12	8

Source: Information provided by Paulino J. Garcia Memorial Research & Medical Center

According to the interview with RHUs, a lack of specialist doctors at AMH is being considered as a problem. An interviewee at RHU commented that they refer their patients to PJG Memorial Research & Medical Center because there were many patients who had been referred to AMH and were later transferred to PJG Memorial Research & Medical Center. An interviewee at a RHU also explained an example case where a patient had to be transferred to PJG Memorial Research & Medical Center because there was no available surgeon at AMH at that time. Therefore, it was inferred that AMH's capacity is limited due to personnel organization where there was only one doctor per specialization, in addition to the lack of specialized doctors.

In addition, the beneficiary survey result[9] shows that there were many respondents who expressed their expectation for AMH to strengthen their personnel organization structure, such as an increase in the number of doctors, as their comments on further improvement to be expected to AMH. More concretely, the comments included not only an increase in the number of doctors, but also comments for having specialized doctors in a certain specialization area or in various specialization areas. Therefore, it is inferred that their desire to have a hospital like PJG Memorial Research & Medical Center in Aurora province might be partly reflected in their expectations. This is because PJG Memorial Research & Medical Center is a national general hospital with a Level 3 hospital license that accepted many patients from Aurora province.

In addition, in interviews with RHUs, there was such comment that the RHUs do not have a good understanding of medical services available at AMH as well as equipment used there. It is considered as important to make medical services provided by AMH, etc. known to health units within the province.

3.3.2 Qualitative Effects

At the time of project planning, the following qualitative effects were expected by implementing this project.

(1) Improvement in the quality of medical services provided by AMH

(2) Reduction of the physical and economic burden of patients who could receive medical care at AMH without being transferred to other hospitals outside the province by the long drive

With regard to (1), hospitals are categorized according to medical services provided etc., by

[9] A questionnaire survey with 322 interviewees, a total of 126 healthcare professionals working in Arora Province and 196 outpatients/inpatients of AMH was conducted. The survey concerned the improvement of medical facilities and equipment, improvement of medical services as a result of this project, satisfaction with medical services provided by AMH, reduction of the physical and economic burden of patients, hygienic conditions of AMH, maintenance conditions etc.

the hospital licensing system in the Philippines. AMH could obtain and continue renewing its hospital license by the category that was intended at the time of project planning[10]. Therefore, AMH, also furnished with new equipment, is capable of providing medical services that were not available at the old AMH, such as major operations including caesarian sections, that needed to be referred to other hospitals in other provinces at the time of the project planning.

The result of the beneficiary survey also shows that about 80% of the healthcare professionals and patients considered that medical services at AMH had improved as a result of this project, as 30% responded "Improved a lot" and 49% responded "Improved" to the question "Do you think that the quality of medical services provided by AMH has improved as a result of the Project?" Furthermore, regarding satisfaction with medical services provided by AMH, about 80% of the patients showed their satisfaction, with 14% responding "Highly satisfied" and 65% responding "Satisfied."

Regarding (2), the reduction of the physical and economic burden of patients, the beneficiary survey result shows that 47% responded "the physical burden of patients and his/her family members was/has been reduced", while 46% responded as "the economic burden of patients and his/her family members was/has been reduced." In both questions, about half of the participants responded that the burden was/has been reduced[11], so it is inferred that this project contributed to the reduction of the physical and economic burden of patients.

3.4 Impacts

3.4.1 Intended Impacts

At the time of project planning, the following two impacts were expected by the implementation of this project.

(1) The capacity of medical service provision in Aurora province will be reinforced

(2) Aurora province's capacity to train health workers will be strengthened, leading to securement of quality health workers and reinforcement of medical service systems of the entire province.

Regarding (1), number of inpatient referrals from other health facilities to AMH

[10] At the time of the project planning, the hospital licensing system in the Philippines classified general hospitals into 4 levels. At the time of the project planning, AMH was classified as Level 1, an emergency hospital to provide initial clinical care and primary care, due to the absence of a surgeon and an anesthesiologist, according to the DOH's rules. It was assumed to construct a Level 2 hospital with the function of conducting major surgery, including caesarian sections, by implementation of this project. In 2012, DOH introduced a new classification for hospital license system, by which general hospitals are to be classified into 3 levels. Hospitals that were classified as Level 1 under the old licensing system are to be classified as "infirmary" under the new system, and not positioned as a general hospital. AMH is classified as a Level 1 hospital under the new licensing system, but this is a category for a general hospital with surgery functions, and thus there is no change in its position from what was expected at the time of the project planning.

[11] Among the remaining half of the respondents, 30% and 35% did not provide any response regarding the reduction of physical and economic burdens, respectively.

increased largely in 2014, compared to that in 2009, as the table 7 shows.

Table 7 Number of Referrals from Other Health Facilities to AMH (inpatients)

	2009	2014
From RHUs	18	200
From other hospitals	169	228

Source: AMH Hospital Statistical Report for the Year CY 2009 and answer to the questionnaire

According to interview with other provincial hospital in Aurora province, the interviewee answered that they could refer their patients to AMH with more confidence compared to before because a surgeon is stationed and caesarian sections could be implemented at AMH. In addition, the interviewee noted that more patients prefer to be transferred to AMH for financial reasons and improvement in the quality of the hospital's medical service. As written above, there have been cases where patients were transferred from RHU to a hospital in other province due to reasons like the absence of doctors. However, it is considered that this project is contributing to strengthening the capacity of medical service provision within Aurora province, because it is inferred that the reliability of AMH as the top referral hospital in the province has increased in part compared to the time of the project planning.

Regarding (2), AMH has been receiving trainees every year from UPS-SHS (midwifery, nursing) as well as other schools within the province (caregivers, etc.), as the table below shows.

Table 8 Practical Trainees Accepted at AMH

	2009	2010	2011	2012	2013	2014
UPM-SHS (midwifery)	58	70	59	47	47	95
UPM-SHS (Nursing)			12	10	10	11
Other school in the province	15	7	11	7		
Other school in the province		18	14	10	12	20

Source: Answer to the questionnaire

It was reported that the old AMH had received trainees before this project was implemented. However, at the new AMH, students can use new pieces of equipment and have more practical training opportunities with an increase in the number of beds. According to an interview with UPM-SHS, many graduates have been employed at RHUs, etc. within Aurora province. Therefore, it is considered that this project is contributing to strengthening the capacity to train health workers with the introduction of new equipment and an increase in practical training opportunities at AMH, which accepts students from schools like UPM-SHS. Furthermore, it is also considered that this project is contributing to

reinforcement of the medical service system of the entire province through contributing to securing health workers, as many graduates from UPM-SHS are employed within the province.

3.4.2 Other Impacts

3.4.2.1 Impacts on the Natural Environment

At the time of the project planning, as a consideration to the natural environment, it was planned to decrease the BOD by discharged water treatment through installing a septic tank according to the effluent standard in the Philippines.

At the time of ex-post evaluation, it was reported that there was no BOD data of discharged water, however, the pollution control officer had been recently appointed and AMH was just conducting examination of items such as discharged water in order to report on their compliance to the environmental standard to the Department of Environment and Natural Resources (hereinafter referred to as DENR) for the first time since completion of this project. According to the result of examination on the quality of the discharged water, two items including BOD exceeded the standards. However, according to AMH, they took measures for improvement such as cleaning the septic tank right after they had the test results, and they are planning to conduct the next examination in the next quarter. From now on, AMH has to report quarterly to DENR, so it is considered that adequate measures will be taken.

As for medical waste, AMH secured a disposal area within its premises where medical waste was separately disposed, with the assistance of the Japan Overseas Cooperation Volunteer (hereinafter referred to as JOCV) that was dispatched to AMH, because incineration of waste is prohibited by law in the Philippines. According to the implementing agency, there were no environmental impacts observed, except for water discharge, by construction of the project facility and medical waste disposal.

3.4.2.2 Land Acquisition and Resettlement

There was no land acquisition and resettlement for this project, as it was implemented on the land owned by the provincial government.

With regard to the effectiveness of the project, it is considered that the intended effects have been realized because the number of inpatients, major operations including caesarian sections, deliveries and bed days at AMH have almost reached their respective targets set at the time of project planning. Although there was no data available on the number of patients who could receive medical care at AMH without being transferred to other hospitals outside the province, it is considered that major effects have been realized because the number of major operations,

including caesarian sections, that were transferred to other provinces at the time of project planning, has been increasing together with an increase in the number of inpatients and deliveries. As to the qualitative effects, improvement in the quality of medical services provided by AMH and the reduction of the physical and economic burden of patients, are considered as being realized.

Regarding impacts, it was inferred that this project has been contributing to reinforcement of the capacity of medical service provision in Aurora province because it was inferred that the reliability of AMH by other health facilities in the province has increased in part compared to the time of the project planning. It was also inferred that this project has also contributed to securement of quality health workers and reinforcement of medical service systems of the entire province through strengthening Aurora province's capacity to train health workers. There was no land acquisition and resettlement for this project, but it is necessary to take adequate measures for discharged water as it exceeded the standard. Overall, however, it is considered that the sufficient impact of the project has been realized.

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

3.5 Sustainability (Rating: ②)

3.5.1 Institutional Aspects of Operation and Maintenance

The implementing agency of this project is the Provincial Health Office of the provincial government of Aurora. AMH is a provincial hospital with 164 staff working under the chief of the hospital, and the hospital is operated with the organizational structure shown below. Also, as of the time of the ex-post evaluation, the head of the administration section has been already assigned, although this person was not yet assigned at the time of the project planning.

Source: Prepared from information provided by AMH

Figure 1 AMH Organizational Structure

Table 9 Number of Staff at AMH (2014)

Section	Permanent	Contractual	Casual	Job order
Administrative & Financial	22		8	25
Medical	6	8	1	
Nursing	5		8	46
Ancillary	13		8	14
Total	46	8	25	85

Source: Prepared from the Hospital Statistical Report for 2014

According to the Provincial Health Office/AMH, AMH has to secure a certain number of staff number, which is required to renew its hospital license. It is considered that AMH could maintain the organizational structure necessary to operate as a Level 1 hospital because it could renew its hospital license and that the level of service provided has been checked as the DOH conducts on-site investigation for license renewal every year. However, the staff composition of AMH shows that short-term contracted workers, called "casual" or "job order"[12], constitute a majority in terms of the number of employees. Although this is due to a limitation on budgets set by a law[13], there is a concern about sustainability due to a composition of staff with a majority of short-term contracted workers whose contract renewal is not guaranteed. In addition, according to AMH, there are not enough cleaning workers due to a limitation on the number of short-term contracted workers.

[12] Contract periods are 6 months for "casual" workers and less than 3 months for "job order" workers.
[13] In the Philippines, there is a law on the upper limit to the percentage of the personnel budget of the provincial budget.

Table 10 Doctors at AMH (as of the end of December 2014)

		Permanent	Affiliate	MOA
Specialization	Internal Medicine		1	
	Surgeon			1
	Obstetrician		1	
	Pediatrician			1
	Anaesthesiologist			1
	Radiologist			1
	Pathologist			1
	ENTT specialist			1
	Psychiatrist*			
	Neurologist*			
General Physicians		5		
Dentist		1		
Ophthalmologist				1

Source: Answer to the questionnaire
*Psychiatrist and neurologist visit AMH every two months.

Table 10 shows the number of doctors at AMH. According to AMH, most of the doctors are renewing their contracts with AMH after implementation of this project.

Maintenance personnel under AMH's general service unit are in charge of maintenance of AMH's facility, and engineering office or general service office of the provincial government provides support with work such as repairs when necessary. As for equipment, each section is in charge of daily maintenance. In addition, technicians dispatched from the Hospital Service Management attached to the DOH conduct checks and repairs of the equipment at the time of the hospital license renewal every year. Although the provincial government had a plan to establish a section in charge of the equipment maintenance of all provincial hospitals (Health Facilities Development and Maintenance Unit), this was not realized due to the upper limit on personnel budget allocation described above.

3.5.2 Technical Aspects of Operation and Maintenance

Regarding the medical technical level of AMH, it is considered that AMH has staff equipped with the technical level necessary to renew its Level 1 hospital license, as it has been able to renew its hospital license every year according to the DOH hospital licensing system.

As for technical aspects of maintenance of the hospital facility and equipment, AMH depends on external resources; for example, the provincial government in case of facility maintenance and suppliers or engineers of the DOH in case of equipment. AMH could receive support from the provincial government for maintenance of the hospital facility, but it is expected that AMH would establish and strengthen its own system or capacity to be able to conduct repairs of the equipment in a more stable way.

AMH sends its personnel to training programs, seminars and workshops conducted by the DOH or private organizations as an effort to improve the capacity of their employees. However, there has been no particular training conducted for maintenance staff since they received maintenance training at the time of the hand-over of this project. More efforts for personnel capacity building are expected in the future, as AMH's expenditure on capacity building has not reached 1% of its total expenditure, the level recommended at the time of project planning.

3.5.3 Financial Aspects of Operation and Maintenance

According to the Provincial Health Office/AMH, AMH's budget is a part of the provincial government's budget, and in case AMH incurs more expense than its originally-planned budget, the provincial government allocates supplementary budget. As Table 11 shows, the budget of the Aurora provincial government has been on an increasing trend. Budgets of the Provincial Health Office and AMH have also been on an increasing trend due to an increase in the provincial governments' awareness of the importance of the health sector.

Table11 Budgets of Aurora Province and the Provincial Health Office

(unit: thousand pesos)

Fiscal Year	Provincial Government (a)	Provincial Health Office (b)	b/a (%)	Budget for AMH
2009	397,616	63,382	15.9	24,499
2010	501,154	77,497	15.5	32,271
2011	513,579	78,244	15.2	32,969
2012	476,588	79,672	16.7	31,470
2013	636,883	87,492	13.7	32,786
2014	684,161	97,823	14.3	41,436
2015	665,480	108,787	16.3	45,184

Source: Answer to the questionnaire

Table 12 shows the income and expenditure of AMH. The income of AMH has been increasing, especially by the contribution of an increase in Philhealth reimbursement. With the exception of 2013, its expenditure is also increasing, but the cost recovery ratio (Table 13) has been at the same level or increasing, compared to that at the time of project planning[14]. Looking at the income level of AMH from its income-maintenance & other operation expenses (hereinafter referred to as MOOEs) ratio (Table 14), the income has been at the same level as before or at a higher level than before to cover the MOOEs

[14] However, it is necessary to take notice of the inappropriateness of comparing AMH's cost recovery ratios between 2014 and previous years, because the personnel expense of 2014 was smaller than previous years due to the exclusion of the personnel expenses of casual workers from AMH's expenditures starting from 2014.

except for personnel expenses, although this has been increasing with the exception of 2013. With regards to 2013, the cost recovery ratio is very high in that year compared to those of other years, because the income in that year was more than that of its previous year while its expenditure was smaller. Regarding 2014, although the rate of the MOOEs increase was large, exceeding that of the income increase, the year's cost recovery ratio shows that the income is still at a level covering more than 70% of the MOOEs.

Therefore, it is considered that there are less concerns for the financial aspects of operation and maintenance of this project. This is because the AMH's budget is a part of the provincial government's budget, the expenditure exceeding the budget was made in 2012, and that AMH's budget and own revenue increased in 2014.

Table12 Income and Expenditure of AMH

(unit: million pesos)

	2009	2010	2011	2012	2013	2014
Service Income	5.5	7.4	6.3	8.6	13.3	15.8
Philhealth portion	0.1	0.3	2.7	n/a	6.9	9.5

Source: Answer to the questionnaire

(unit: million pesos)

		2009	2010	2011	2012	2013	2014
Hospital Expenditure	Budget	30.4	37.3	33.0	31.5	32.8	41.4
	Actual	30.1	31.5	32.8	36.6	29.9	40.8
Personnel expense portion	Budget	20.0	24.2	25.2	22.3	25.0	19.0*
	Actual	21.0	22.3	25.0	27.4	24.8	19.0*
Maintenance & other operation expenses (MOOEs) portion	Budget	10.4	13.1	7.8	9.2	7.8	21.9
	Actual	9.2	9.2	7.8	9.1	5.1	21.4
Electricity Charges	Actual	0.6	0.9	1.0	0.7	0.8	0.6

Source: Answer to the questionnaire

* Personnel expense of "casual" workers is not included in AMH's 2014 expenditure

Table 13 Cost Recovery Ratio of AMH (Income/ (hospital expenditure + electricity charges)

2009	2010	2011	2012	2013	2014
18%	23%	19%	23%	43%	38%*

Source: Calculated by the evaluator based on answer to the questionnaire

*It is necessary to take notice of the inappropriateness of comparing AMH's cost recovery ratios between 2014 and previous years, due to exclusion of the personnel expenses of casual workers from AMH's 2014 expenditure.

Notes: Electricity charges are borne by the provincial government, and therefore not included in the operation expense. However, the evaluator included electricity charges in AMH's operation expense for calculation of this ratio.

Table 14 AMH Income-MOOEs Ratio

2009	2010	2011	2012	2013	2014
56%	73%	72%	88%	225%	72%

Source: Calculated by the evaluator based on answer to the questionnaire
Notes: MOOEs includes electricity charges for this calculation.

3.5.4 Current Status of Operation and Maintenance

At the time of the ex-post evaluation, no written maintenance plan has been formulated and maintenance activities are basically conducted by the respective section where equipment is placed.

Maintenance of the hospital facility is conducted with support of the provincial government. However, the timing of maintenance depends on prioritization by the provincial government. For example, there are cases where a certain maintenance activity is set as lower priority due to budget limitations.

As for maintenance of equipment, in many cases the technicians dispatched by the DOH have difficulty with repairs, and in such cases AMH looks for and contacts a supplier by itself. However, according to AMH, it is difficult to find local suppliers/agents to order repairs or spare parts, and some equipment was not being used because of this reason. For this project, it was confirmed that equipment was procured after confirming the availability of local agents and a list of contacts of such agents were handed over to AMH. However, the list has not been effectively utilized because the list was missing as a result of events like the change of personnel. It is considered to be necessary for AMH to establish a system to easily make orders for repairs or spare parts[15]. In addition, AMH's procurement of consumables or spare parts might take a long time or could be conducted only when the necessity arises, in cases where the provincial government's procurement rule applies. Therefore, it is necessary to think out some measures for appropriate stock management.

With regards to cleaning of the facility, AMH considers that an insufficient number of cleaning staff is a concern in terms of maintaining cleanliness in the hospital, although there were no problems observed in particular during the site survey of this ex-post evaluation study. Although it is difficult for AMH to increase the number of cleaning staff due to the upper limitation of the number of its staff, it is considered necessary to strengthen its personnel organization, taking into consideration its plan of ward expansion during 2015.

5S activities have been conducted at AMH, with support by a JOCV that was dispatched to AMH and the Aurora provincial government. More concretely, it is reported that a 5S committee was created within AMH, and that they hold bi-monthly meetings to monitor

[15] It is reported that AMH took the initiative to seek assistance from the Hospital Services Management Luzon for preventive maintenance, repair and calibration of the equipment.

and evaluate 5S activities conducted in the hospital. In addition, AMH is making efforts to improve the quality of its service, by putting suggestion boxes in the hospital to carry out tasks like to gather patients' complaints and take measures to solve complaints.

With regard to the organizational structure for operation and maintenance, AMH has been able to renew DOH's hospital licence, but there is a concern partly regarding the stability of the personnel organization because the majority of AMH staff are short-term contract workers. In addition, it is considered necessary to strengthen personnel organization, including cleaning staff, in anticipation of future facility expansion. While there are no particular issues regarding technical aspects to maintain the facilities as support is provided by the provincial government, equipment maintenance is unstable because AMH has to rely on external resources when technicians dispatched by the DOH have difficulty with repairs. There is less concern for financial aspects, because the income and budget of AMH have been increasing and the AMH budget is a part of the provincial government's budget, and according to the provincial government this is planned to continue. The maintenance status needs improvement because repair orders or procurement of consumables and spare parts were not conducted at the appropriate timing.

In light of the above, some minor problems have been observed in terms of organisational and technical aspects as well as the current status of operation and maintenance. Therefore, the sustainability of the project effects is fair.

4. Conclusion, Recommendations and Lessons Learned

4.1 Conclusion

In this project, a hospital facility such as an outpatient department building was constructed and medical equipment was furnished to improve the medical services of AMH. The relevance of this project is high, as it was consistent with the development policy and needs of the Philippines as well as the ODA policy of Japan. The efficiency is also high, as the contents of the project were implemented mostly as planned and the project cost and period were within the scope of the plan. With regard to the effectiveness of the project, it is considered that the effects have been realized in terms of the increase in the number of inpatients, deliveries, bed days and major operations including caesarian sections, improvement of medical services provided by AMH and the reduction of the patients' physical and economic burden. In addition, it was inferred that this project contributed to reinforcement of medical service provision capacity in Aurora province, securement of quality health workers and reinforcement of medical service systems of the entire province through strengthening Aurora province's capacity to train health workers. Therefore the effectiveness and impact of this project are high. The sustainability of

the effects of this project is fair. Although there is less concern with the financial aspects, there are some minor problems observed in terms of organisational and technical aspects, as well as the current status of operation and maintenance, such as the need to strengthen personnel organization and difficulties in the repair of equipment and procurement of spare parts.

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

4.2 Recommendations

4.2.1 Recommendations to the Implementing Agency

Reinforcement of Personnel Organization for Maintenance

With regard to personnel organization, it is not easy for AMH to increase its number of staff because of the upper limitation set for budget allocation to personnel expenses. Therefore it needs to rely on many short-term contract workers. In addition, there is a concern about the insufficient number of cleaning staff. In view of planned ward expansion during 2015, it is desirable to reinforce personnel organization for operation and maintenance, for example, through consignment of cleaning work to an external service provider.

Smooth Implementation of Repairs and Spare Parts Procurement

It is necessary for AMH to establish a system which enables AMH to do repairs or procure spare parts easily. For example, it is reported that the AMH supply officer became able to directly contact the supply officer at Benguet General Hospital and to obtain supplier information. This was made possible through implementation of a study trip to the Benguet General Hospital which was also supported by the Japanese government for the improvement of facilities and equipment. It is desirable to conduct repairs and to do parts procurement promptly through active collection and utilization of information on domestic suppliers, etc., through doing things such as utilizing this network effectively.

4.2.2 Recommendations to JICA

Continuation of Support for Repairs and Parts Ordering

It was observed that AMH did not have information on domestic suppliers and agents and some equipment could not be repaired or parts could not be procured at an appropriate timing. It is reported that the JICA Philippine office has been supporting AMH so far in this respect. This is considered to contribute to effective utilization of the equipment if such support in obtaining contact information of domestic agents, etc. could be continued when necessary, until the time when AMH accumulates and puts in order such contact information[16].

16 A list of local agents was re-sent by the JICA Philippine Office to AMH in June 2015.

4.3 Lessons Learned

Introduction of a System for Stable Equipment Repair and Parts Procurement

In this project, the procurement of equipment was conducted based on confirmation of the availability of domestic agents. However, at the time of the ex-post evaluation, it was difficult for AMH to find a local supplier or agents and there were pieces of equipment that could not be repaired or parts that could not be procured at an appropriate timing. It was confirmed that a list of local agents for all equipment had been provided to AMH at the time of hand-over of the equipment, but the information was not used effectively as the list was missing due to issues such as personnel changes. As such personnel changes could be expected to happen after the project completion because a staff member might quit or be replaced, it is considered important to have measures that enable anyone to access contact information easily. For example, a sticker with contact information for a repair order was put on equipment procured at AMH, but it contained only a telephone number and an e-mail address in Japan. There might be a possibility that it is not easy to make an international call to Japan for smooth parts procurement, that an e-mail communication system is not well established, and communication in English is not easily conducted. Therefore, it is considered that introduction of a system which enables anyone to contact domestic agents, etc. easily by measures such as putting a sticker with the contact information of local agents on equipment would contribute to continuous and effective utilization of the equipment.

(End)

Republic of the Philippines

Ex-Post Evaluation of Japanese ODA Grant Aid Project

"The Project for Flood Disaster Mitigation in Camiguin Island"

External Evaluator: Keisuke Nishikawa, Japan Economic Research Institute Inc.

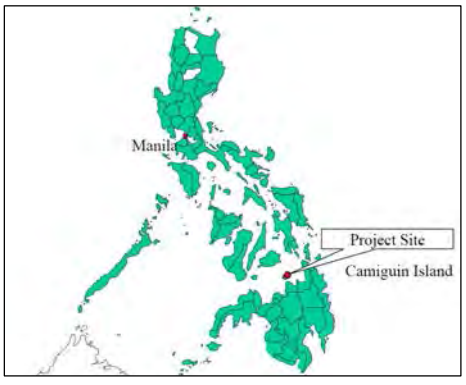
Yumi Ito, Japan Economic Research Institute Inc.

0. Summary

In this project, the Sabo dams were constructed and a bridge was reconstructed in Camiguin Island to prevent the disaster by debris flow along river basins and to improve the traffic condition over the bridge. The relevance of this project is high, as it was consistent with the development plan and needs of the Philippines as well as the ODA policy of Japan. The efficiency is also high, as the contents of the project were implemented mostly as planned and the project cost and period were within the scope of the plan. With regard to the effectiveness of the project, it was confirmed that the effects have been realized in terms of improvement in vehicle speed passing over the bridge, prevention of debris flood disasters, and securing of a safe and smooth traffic flow on the bridge. In addition, as impacts of the project, it was inferred that this project contributed to the establishment of a comprehensive disaster prevention system with a combination of structural and non-structural measures, an increase in traffic volume near the Hubangon Bridge, the improvement in access to markets, a stable transport of goods, and the enhancement of the Camiguin's image as a tourist spot. Therefore, the effectiveness and impact of this project are high. The sustainability of the effects of this project is considered high. There were no problems observed in terms of institutional or technical aspects as well as the current status of operation and maintenance. Although sufficient quantitative information was not obtained to assess financial aspects of the sustainability, there were no particular problems observed in terms of the contents of maintenance activities and implementation status of daily maintenance activities.

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

1. Project Description



Project Location

Sabo Dam (Upper Dam)

1.1 Background

Camiguin Island is a volcanic island located about 70km north of Mindanao Island, with a population of 81 thousand (as of the time of project planning). In November 2001, Typhoon Nanang caused a mudslide resulting in 250 dead or missing persons (among whom 224 were in the Municipality of Mahinog) on the Island. A wide range of areas including infrastructural facilities such as water veins and roads as well as houses and paddy fields were damaged with the amount of damage estimated at about 500 million yen.

After the disaster, Region X Office of the Department of Public Works and Highways (hereinafter referred to as DPWH) and the Provincial Government of Camiguin requested technical assistance from JICA, and JICA conducted "Basic Survey of Disaster Prevention and Rehabilitation Activities in Camiguin" (a basic survey of the overseas office) in 2003 and "Basic Survey of Disaster Prevention for Soft Measures" (a basic survey of the overseas office 2) in 2004. In the basic survey conducted in 2003, a hazard map covering major rivers in Camiguin Island was prepared, and it was recommended to introduce non-structural (soft) measures in addition to structural (hard) measures. Based on this recommendation, the drawing of a line between dangerous areas and other areas, the installation of a rainfall gauge and the instructions on observation, the establishment of an alarm standard, the preparation of a disaster prevention manual, and the execution of emergency drills were conducted in 2004.

However, there was a risk that similar damages might happen because no structural measures for disaster prevention had been introduced to the river basins of the Hubangon and the Pontod rivers where serious damage was caused at the time of the disaster in 2001 and the damaged Hubangon Bridge had not yet been rehabilitated.

Under these circumstances, the Philippine Government requested grant aid from the Japanese Government in 2006, and the project to construct two Sabo dams and reconstruct the Hubangon Bridge was implemented.

1.2 Project Outline

The objective of the project was to mitigate the damage caused by debris flow along river basins by constructing the Sabo dams and to improve the traffic condition by reconstructing Hubangon Bridge in Camiguin Island, thereby contributing to the maintenance/improvement of the residents' living conditions and sustainable economic development.

Grant Limit / Actual Grant Amount	1,013 million yen / 868 million yen
Exchange of Notes Date / Grant Agreement Date	June, 2009 / June, 2009
Implementing Agency	Department of Public Works and Highways

Project Completion Date	July, 2011
Main Contractor	Construction: Toyo Construction Co., Ltd.
Main Consultant	CTI Engineering International Co., Ltd.
Basic Design	April, 2009
Detailed Design	December, 2009
Related Projects	"A Basic Survey of Disaster Prevention and Rehabilitation Activities in Camiguin (a basic survey in the overseas office)" (2003) "The Basic Survey of Disaster Prevention for Soft Measures (a basic survey in the overseas office 2)" (2004)

2. Outline of the Evaluation Study

2.1 External Evaluator

Keisuke Nishikawa, Japan Economic Research Institute Inc.

Yumi Ito, Japan Economic Research Institute Inc.

2.2 Duration of Evaluation Study

This ex-post evaluation study was conducted with the following schedule:

Duration of the Study: October, 2014 – September, 2015

Duration of the Field Study: January 8 – February 6, 2015 and April 5 – 18, 2015

3. Results of the Evaluation (Overall Rating: A[1])

3.1 Relevance (Rating: ③[2])

3.1.1 Relevance to the Development Plan of Republic of the Philippines

At the time of project planning, the "Medium-term Philippine Development Plan (2001-2010)" aimed at poverty reduction and placed high priority on disaster prevention and transportation that would lead to social stabilization. More concretely, the Plan listed improvement of safety against disaster, rehabilitation/reconstruction of roads and bridges connecting to sightseeing areas, between rural areas and markets, and the completion of a nautical highway system linking the entire country, positioning this project as an important project in the Plan.

At the time of ex-post evaluation, the "Philippine Development Plan (2011-2016) (Midterm Update)" aimed at inclusive growth and poverty reduction. In order to attain these objectives, the Plan listed infrastructure development as one of its key strategies that would

[1] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

[2] ③: High, ②: Fair, ①: Low

contribute to enhancing resilience to increasing climate change risks and natural disasters.

In this way, this project was consistent with the Philippines development plans both at the time of project planning and ex-post evaluation in terms of improving safety against disaster to achieve poverty reduction.

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

The Philippines was considered the most disaster prone country in the world in the final report of the United Nations "International Decade of Natural Disaster Reduction" (1990-1999)[3]. At the time of project planning, there was a risk that similar disasters might happen because no structural measures for disaster prevention had been introduced to the river basins of the Hubangon nor the Pontod rivers where serious damage was caused by Tyhpoon Nanang in 2001 and the river channels were still covered with sediment deposits. In addition, the damaged Hubangon Bridge had not yet been rehabilitated and a traffic restriction had to be implemented to limit the use to only one lane of the bridge.

As Table 1 shows, flood events have continued to happen in Camiguin after project completion. This project introduced structural measures for disaster prevention in the areas seriously damaged by the Typhoon Nanang, but the demand for disaster prevention measures is still high because flood events caused by typhoons, etc. have continued to occur in Camiguin Island after project completion.

Table 1 Flood Events that Caused Damages in Camiguin Island

	Year/month occurred	Number of affected municipalities	Number of affected people	Estimated damage cost (million Pesos)
Typhoon Seniyang	2014/12	5	3,277	1.25
Typhoon Ruby	2014/12	5	3,341	No report
Tropical Storm Agaton	2014/1	2	34,500	15.0
Typhoon Pablo	2012/12	5	1,807	11.26
Typhoon Gener	2012/7	4	4,898	60.5

Source: Provincial Disaster Risk Reduction & Management Council of Camiguin Province

3.1.3 Relevance to Japan's ODA Policy

At the time of project planning, the Country Assistance Program for the Republic of the Philippines, prepared by the Japanese Government (2008), listed "expansion of basic social services" (improving the living conditions of the poor) as one of the priority sectors for addressing one of the priority development issues set in the program known as "empowerment of the poor and improvement of the living conditions of the poor." As one of the guidelines for the above-mentioned priority sector, "protecting life from natural

[3] According to the information provided by JICA

disasters" was included, including support for maintenance and management of flood control and the Sabo infrastructure in high priority sites as well as emergency assistance and support for rehabilitation and reconstruction in the regions which have suffered enormous damages from sudden natural disasters. In addition, JICA prepared "Disaster Prevention Program" as its cooperation policy on disaster prevention in the Philippines and planned to implement a comprehensive program in this sector[4].

Therefore, this project is highly consistent with Japan's assistance policy as it corresponds to Japan's priority cooperation areas set in Country Assistance Program at the time of project planning.

As described above, this project was and is consistent with the Philippines' Development Plan and development needs as well as Japan's ODA policy at the time of project planning. Therefore, the relevance of this project is high.

3.2 Efficiency (Rating: ③)

3.2.1 Project Outputs

The planned components and actual output of this project are as shown in Table 2.

Table 2: Planned Components and Actual Output of This Project

Original	Reconstruction of the Hubangon Bridge and its access road (Bridge length:40.9m, Access road length: Left side 10.75m, Right side 10.15m) Construction of Upper Sabo Dam and its access road (Dam height: 10m, Length: 115m, access road length: 525m) Construction of Lower Sabo Dam and its access road (Dam height: 12m, Length: 70m, access road length: 657m)
Actual output	Reconstruction of the Hubangon Bridge and its access road (Bridge length:40.9m, Access road length: Left side 10.75m, Right side 10.15m) Construction of Upper Sabo Dam and its access road (Dam height: 10m, Length: 115m, access road length: 520m) Construction of Lower Sabo Dam and its access road (Dam height: 12m, Length: 70m, access road length: 660m)

Source: Prepared based on the information provided by JICA

The Hubangon Bridge as well as the Upper and Lower Sabo Dams were implemented mostly as planned and are shown in Table 2 with five changes made to the Detailed Design.

[4] JICA prepared a comprehensive program that would utilize various cooperation schemes in order to extend cooperation with a combination of structural and non-structural measures focusing on disaster prevention capacity building of communities in addition to conventional support for capacity building of the central government mainly focusing on structural measures. As a result, eight cooperation projects were proposed in order to enhance disaster prevention capacity of the Philippines through strengthening support for measures against flood & sediment disasters and volcanic & seismic disasters.

The major changes among them are shown in Table 3[5].

Table 3: Major Changes from the Original Plan (Detailed Design)

Changes in transverse pre-stressing (tightening PC steel wires) of the cross beam in superstructure of the Hubangon Bridge, etc.	This change was made for the purpose of avoiding extension or shortening of the construction period by using materials that were readily available.
Change in the foundation excavation lines of the Sabo Dams	The design was prepared with an assumption of the condition of the foundation. Thus the foundation excavation lines were adjusted according to the actual condition of the dam foundation which became apparent during the progress of excavating the foundation. However, there were no changes in the dam height as a result of this adjustment.
Changes in the line shapes of the Sabo Dams' access roads	The line shapes of the access roads were adjusted to the asperity of the terrain which could not be grasped by the survey conducted at the time of designing. As a result, the lengths of the access roads were changed to 520.3m for the road to the upper dam and 660.4m for the lower dam.

Source: Prepared based on the information provided by JICA

Hubangon Bridge

Sabo Dam (Lower Dam)

According to the DPWH and the Provincial Government of Camiguin, no inconveniences were caused as a result of these changes. Instead, according to the project consultant, these changes were made according to the actual site condition or for the purpose of avoiding an extension or shortening of the construction period by procuring readily available materials. Therefore, these changes are considered as minor and adequate. In addition, no negative influences that might hinder the realization of the project effects were observed during the site survey of ex-post evaluation.

[5] There were two minor changes to cast-in-place piles in the foundation of the abutment of the Hubangon Bridge.

In addition to the above, at the time of project planning, securing land for construction of the project facilities, securing a temporary area necessary for the construction works, developing/improving the connecting roads necessary for the construction works, relocating electric poles and water pipes which could become obstacles for the construction works, and constructing gates were planned and to be implemented by the Philippine side. All of these items were implemented and no particular problems were observed.

Source: Information provided by JICA

Figure 1 Project Sites in Camiguin Island

3.2.2 Project Inputs

3.2.2.1 Project Cost

The cost of this project to be borne by Japan was planned at 1,013 million yen, while the cost to be borne by the Philippine side was planned at 5 million yen. The actual project cost of the Japanese side was 868 million yen. This was due to the result of competition bidding and exchange rate fluctuation. The cost borne by the Philippine side was 3.9 million yen for implementation of the contents of the original plan. Thus, compared to the planned cost of 1,018 million yen, the total project cost was 872 million yen (86 % of the plan) which was lower than the planned amount.

3.2.2.2 Project Period

At the time of project planning, the period of this project was expected to be 25.5

months, from June 2009 (signing date of the Exchange of Notes) until August 2011, including implementation of the detailed design and the carrying out of bidding. This project was implemented in a shorter period than planned (98% of the plan) as the actual project period was 25.1 months, from June 2009 until July 2011.This is because construction progressed smoothly according to the project consultant.

As described above, the outputs of this project were achieved mostly as planned, and the project cost and the project period were within the plan. Therefore, the efficiency of the project is high.

3.3 Effectiveness[6] (Rating: ③)

3.3.1 Quantitative Effects (Operation and Effect Indicators)

3.3.1.1 Operation Indicator

At the time of project planning, a traffic restriction had to be implemented to limit the use to only one lane of the Hubangon Bridge and the vehicle speed limit on the bridge was 5-10 km/h. The achievement of the target shown in Table 4 was expected by implementing this project.

Table 4: Operation Indicator of This Project

	Baseline	Target	Actual	Actual	Actual
	2008	2014	2012	2013	2014
	Baseline Year	3 Years After Completion	1 Year After Completion	2 Years After Completion	3 Years After Completion
Vehicle speed on the Hubangon Bridge	5～10 km/h	60km/h	50km/h	60km/h	60km/h

Source: Documents provided by JICA, answer to the questionnaire
Note: At the time of basic design, the bridge was designed with the designed speed of 50km/h, but the actual speed limit was set at 60km/h at the project site, therefore the latter was used as a basis for the evaluation. It was confirmed by the project consultant that there would be no problem with the bridge's strength by crossing the bridge at 60km/h.

As the above table shows, it became possible to cross the Hubangon Bridge at a speed of 60km/h by the target year (3 years after completion). Therefore, the target set at the time of the project planning has been achieved.

3.3.1.2 Effect Indicator

At the time of project planning, it was expected that the number of debris flood disasters (in case of intense rainfalls with the interval of more than 100 years) would become zero by implementing this project.

[6] Sub-rating for Effectiveness is to be put with consideration of Impact.

The implementing agency reported that such debris flood disasters have not occurred as shown in Table 5. Therefore, the project target set at the time of project planning has been achieved.

Table 5: Effect Indicator of This Project

	Baseline	Target	Actual	Actual	Actual
	2008	2014	2012	2013	2014
	Baseline Year	3 Years After Completion	1 Year After Completion	2 Years After Completion	3 Years After Completion
Number of debris flood disasters (in case of intense rainfalls with the interval of more than 100 years)	Debris flood disasters were happening	none	none	none	none

Source: Basic Design Study Report, Information provided by the Implementing Agency

3.3.2 Qualitative Effects (other effects)

At the time of project planning, securing of a safe and smooth traffic flow on the Hubangon Bridge was expected by implementing this project.

Table 1 shows the situation of flood event occurrences and their damages in Camiguin Island after project implementation. Typhoon Gener in July 2012 caused flooding in four municipalities including Mahinog where the project facilities are located, but there were no deaths or missing persons caused by this typhoon. Furthermore, there was no report of deaths or missing persons caused by other typhoons except one which was a death by electrocution when a flash flood occurred during tropical storm Agaton in January 2014. It could be considered to a certain extent that this project is contributing to the situation that there have been no deaths or missing persons after project implementation, by taking into account that this project mitigated damages caused by debris flow through constructing the Sabo dams in addition to the technical cooperation conducted prior to the implementation of this project on non-structural disaster prevention measures such as evacuation planning or drills.

In addition, the result of the beneficiary survey[7] shows that 98.8% of the respondents answered that they thought the traffic flow on the Hubangon Bridge had become safer and smoother. From this, it could be considered that a safe and smooth traffic flow on the bridge is secured.

[7] A questionnaire survey with a total of 163 users of the Hubangon Bridge and residents living in the vicinity of the bridge or Sabo dams was conducted. The survey concerned securing a safe and smooth traffic flow and improvement of access by reconstruction of the bridge, securing a stable transport of goods, changes in economic conditions by reconstruction/construction of the bridge and Sabo dams, awareness of safety against disasters, occurrence of disasters and their damages after the project completion etc.

3.4 Impacts

3.4.1 Intended Impacts

At the time of project planning, the following impacts were expected from the implementation of this project.

(1) Realization of a comprehensive disaster prevention system, with a combination of structural measures undertaken by this project and non-structural measures performed prior to this project's implementation

(2) Increase in traffic volume near the Hubangon Bridge

(3) Stable access from neighboring farms to the markets and securing of reliable transport of goods

(4) Enhancement of Camiguin's image as a tourist destination with disaster prevention measures by prevention/reduction of damages caused by sediment disasters

With regard to (1), utilizing the experience of JICA support, non-structural measures (preparation and introduction of hazard maps, a warning evacuation standard, a disaster prevention manual, etc.) have continued to be taken in the project sites, the Municipality of Mahinog and Barangay[8] Hubangon. For example, the Municipality of Mahinog revised its warning and evacuation plan by itself in 2013. Therefore, a comprehensive disaster prevention system has been established together with the structural measures undertaken in this project.

More concretely, when a large typhoon approaches, the provincial government sends an early warning to municipalities based on the weather forecast. Actions to be taken by the provincial government, by municipalities, and by barangays have been determined respectively according to the warning level. Ultimately, each barangay will order the residents to evacuate. Furthermore, the damage situation is to be reported from barangays to municipalities and from municipalities to the provincial government.

[8] Barangay is the smallest local government unit in the Philippines. A municipality or city is composed of barangays.

Table 6: Standard Operating Procedures of Each Local Government Unit at the Time of Disaster

Warning Level	PDRRMC	MDRRMC	BDRRMC
1 Standby	1. PDRRMC sends emergency advisory to MDRRMC based on rainfall situation. 2. PDRRMC convenes and activates PDRRMC - Committees. 3. PDRRMC activates PDRRMC / Operations Centers. 4. Networking of all PDRRMC levels will be done.	1. Convene and activate MDRRMC. 2. Activate Operations Center. 3. Ready all warning devices 4. Check network of warning system. 5. Issue advisory to BDRRMC. 6. Put up #1 sign on warning board. 7. Instruct MAO to collect rainfall data, instruct BDRRMC to observe river condition and transmit datato MDRRMC 8. Transmit rainfall data to BDRRMC. 9. Inventory vehicle for evacuation. 10. Check the availability of health workers and volunteers. 11. Dep-Ed disseminate information to teachers and pupils. 12. Decision-making on whether to upgrade warning to #2.	1. Convene BDRRMC upon receipt of adviaory from MDRRMC. 2. Activate disaster operation center. 3. Mobilize community volunteers. 4. Ready all warning devices. 5. Instruct river observer to observe river condition and transmit river condition data to MDRRMC. 6. Inventory vehicles for evacuation. 7. Check the network of warning system. 8. Inventory food stock pile. 9. Locate the bucket near BDRRMC.
2	1. Check the network of warning system. 2. Inventory vehicle for evacuation. 3. Check the medicine stock pile. 4. Check the availability of health workers and volunteers if worst case senario occurs. 5. Invenroty food stock piles.	1. Update warning level from 1 to 2. 2. MAO continues to collect hourly rainfall data. 3. Transmit reainfall and river conditions to BDRRMC. 4. Transmit rainfall data to BDRRMC. 5. Meet to decide whether the situation warrants an order to prepare for evacuation. 6. Evacuation committee secures keys to evacuation centers from school principals and/or security guards. 7. Prepare materials for evacuation. 8. Contact private individuals for	1. Transmit information/data on river conditions to MDRRMC. 2. Prepare materials and stock piles for evacuation. 3. Meet to decide whether the situation warrants an order to prepare for evacuation. 4. Recommend to MDRRMC to prepare the evacuation.
3 Alert / Preparatory	1. Provide suppor to MDRRMC in terms of supplies requirements. 2. Link the RDRRMC on other requirements that PDRRMC cannot provide. 3. Continue monitoring of weather updates and disseminate to lower levels of PDRRMCs. 4. Deployment of PDRRMC operatives to disaster area / incident area.	1. Upgrade warning level from 2 to 3. 2. Order preparation to evacuate all BDRRMCs concerned. 3. Review master list of potential evacuees. 4. Open evacuation centers in preparation for possible evacuation. 5. Dispatch support for evacuation, including medical staff and health volunteers and evacuation committee, to BDRRMC to pre-position augumentation support to BDRRMC. 6. PNP sends police to evacuation centers and areas to evacuate for security purposes. 7. Meet to decide whether to order evacuation.	1. Meet to decide whether the sitation warrants an order to evacuate and recommend to MDRRMC order to evacuate. 2. Announce preparation to evacuate to affected families. 3. Dispatch evacuation team, barabgay health workers to pick-up points. 4. Review master list of evacuees.
4 Evacuation	1. Link with MDRRMC on ready support for evacuation. 2. Deployment all PDRRMC and support operatives for evacuation.	1. Upgrade warning from 3 to 4. 2. Order BDRRMC and operatives to evacuate.	1. Order the community to undertake evacuation.

Source: Prepared based on the information provided by Provincial Disaster Risk Reduction & Management Council of Camiguin Province

Structural disaster prevention measures undertaken in this project are contributing to the realization of an adequate evacuation by the residents in an environment where risk of sediment disaster is mitigated.

With regard to (2), the average daily traffic volume of the two-way lane near the Hubangon Bridge was 1,193 vehicles as of 2008, before project implementation. As shown in Table 7, it has been increasing greatly since the completion of the project.

Table 7: Average Daily Traffic Volume of Two-way Lanes near the Hubangon Bridge

2009	2010	2011 (Completion Year)	2012 (1 Year After Completion)	2013 (2 Years After Completion)
2,037	2,151	3,353	3,743	4,330

Source: Data provided by DPWH Camiguin Office

Regarding (3), the result of the beneficiary survey shows that 95.1% of respondents answered that access to the markets had been improved and 93.9% answered that transport of goods had become more stable. Furthermore, according to an interview with a freight forwarder, it took about 2.5 times more distance and time as well as a higher fuel cost before implementing the project. This was because trucks could not cross the Hubangon Bridge due to weight limits and had to make a detour taking them around to the opposite side of the island. After the project implementation, however, trucks can take the shortest route now that they can cross the Hubangon Bridge. Therefore, based on the result of the beneficiary survey and the interview with the freight forwarder, it could be considered that access to the markets had improved and transport of goods had become more stable compared to the time of project planning.

Besides, the Hubangon Bridge is located on the route of the Central Nautical Highway, one of the highways to be developed as “Nautical Highways to Link the Entire Country” in the “Medium-term Philippine Development Plan (2004-2010).” Decelerating traffic or making a detour due to weight limit was necessary before project implementation; however, they are not necessary anymore owing to the reconstruction of the Hubangon Bridge. Therefore, it could be considered that this project is contributing to the fulfillment of the function of the Central Nautical Highway through realizing smooth and stable transportation of goods at a relay point between the Visayas and Mindanao.

With regard to (4), the number of tourists to Camiguin was 193,012 in 2007, before project implementation. As Table 8 shows, tourists to Camiguin have been increasing yearly. The Sabo dams constructed by this project have been utilized as one of the tourist spots or study tour destinations for university students, local government units, etc. The Provincial Government of Camiguin is making efforts to actively utilize the Sabo dams and the neighboring area as tourist spots, for example, by installing railings at the Sabo dams or paving the unpaved parts of the access roads.

Table 8: Number of Tourists to Camiguin Island

(Unit: persons)

Year	Foreigners	OFW	Domestic	Panaad	Total
2008	9,815	751	242,042	29,563	282,171
2009	9,259	491	260,355	31,177	301,282
2010	7,342	552	283,142	28,132	319,168
2011	8,678	613	326,306	33,215	368,812
2012	9,104	647	350,490	40,412	400,653
2013	10,204	873	388,729	42,412	442,218

Source: Information provided by JICA and by Tourism office of the Camiguin province
Notes: OFW stands for Overseas Filipino Workers, and Panaad is an annual celebration of Roman Catholics to commemorate the Holy Week and it shows the number of visitors to Camiguin Island during the Panaad.

3.4.2 Other Impacts

3.4.2.1 Impacts on the Natural Environment

At the time of project planning, this project was considered as not having a severe negative impact on the environment by the Environmental Management Bureau of the Department of Environment and Natural Resources.

According to the relevant agencies, no negative environmental impacts of this project were observed during and after project implementation and there had been no complaints made by the residents. Therefore, it is considered that there are no particular problems in terms of impacts on the natural environment.

Instead, as a result of implementation of this project, it is considered that there has been a positive impact on the natural environment in mitigating damages in the target area by preventing occurrences of heavy floods.

3.4.2.2 Land Acquisition and Resettlement

At the time of project planning, it was assumed that the negative social impact would be minimized by selecting a site for access road construction with the smallest number of resettlements (one settlement).

There was one case of resident resettlement in the project site (where the access road was constructed) caused by the implementation of this project; however, it was reported that the resident was properly compensated according to domestic law. At the time of ex-post evaluation, it was confirmed that this resident constructed a new house in a different location and was living there. Regarding land acquisition, the affected land owners were also compensated according to domestic law.

As described above, it is considered that land acquisition and resettlement were

conducted without problems because they were both implemented based on the domestic law and no consequent dispute had arisen.

With regard to the effectiveness of the project, it is considered that the intended effects have been realized because the vehicle speed crossing the Hubangon Bridge has achieved the target set at the time of project planning, debris flood disasters (in case of intense rainfalls with the interval of more than 100 years) have not occurred, and the project's qualitative effect, "securing of a safe and smooth traffic flow on the Hubangon Bridge", is considered to have been realized based on the result of the beneficiary survey, etc.

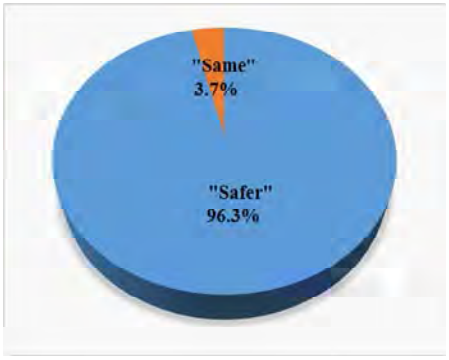
Regarding the impacts, it was confirmed that a comprehensive disaster prevention system has been established with the combination of structural and non-structural measures in the Municipality of Mahinog and Barangay Hubangon. In addition, traffic volume near the Hubangon Bridge has been increasing after project completion, improvement in access to the markets and securing of a stable transport of goods were observed according to the results of the beneficiary survey, and contribution has been made to the fulfillment of the function of the Central Nautical Highway. Furthermore, it was observed that tourists to Camiguin have been increasing yearly and the Sabo dams constructed in this project have been utilized as one of its tourist spots, etc. Therefore, it is considered that the impact of the project has been realized sufficiently.

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

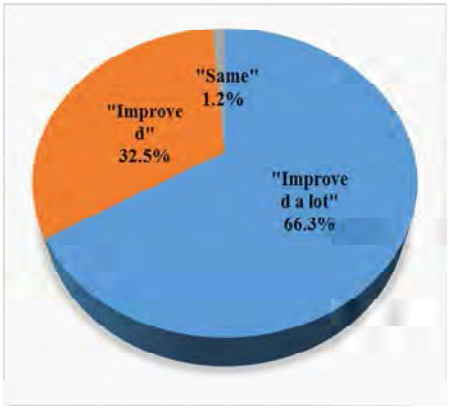
【Reference】Selected results of the Beneficiary Survey

Selected results of the beneficiary survey conducted at ex-post evaluation, except those described in the text, are as follows.

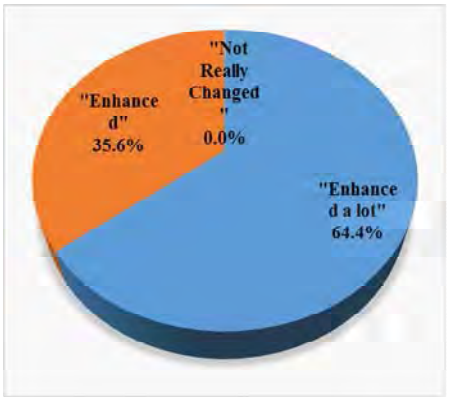
1. Do you feel that your life is much safer with the Sabo Dams constructed up in the mountain?



2. How do you see the changes in economic conditions of Camiguin Island as a result of the project?



3. How do you see the changes in the residents' awareness of safety against disasters after the project?

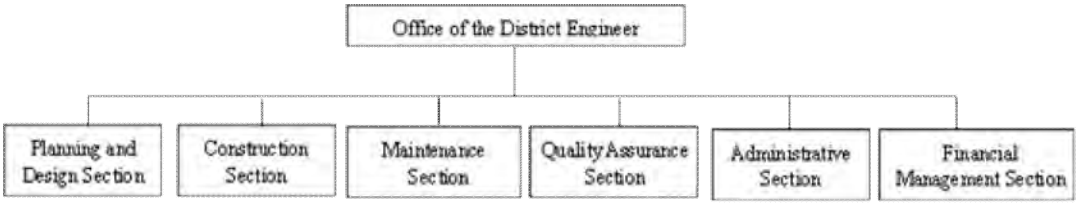


3.5 Sustainability (Rating: ③)

3.5.1 Institutional Aspects of Operation and Maintenance

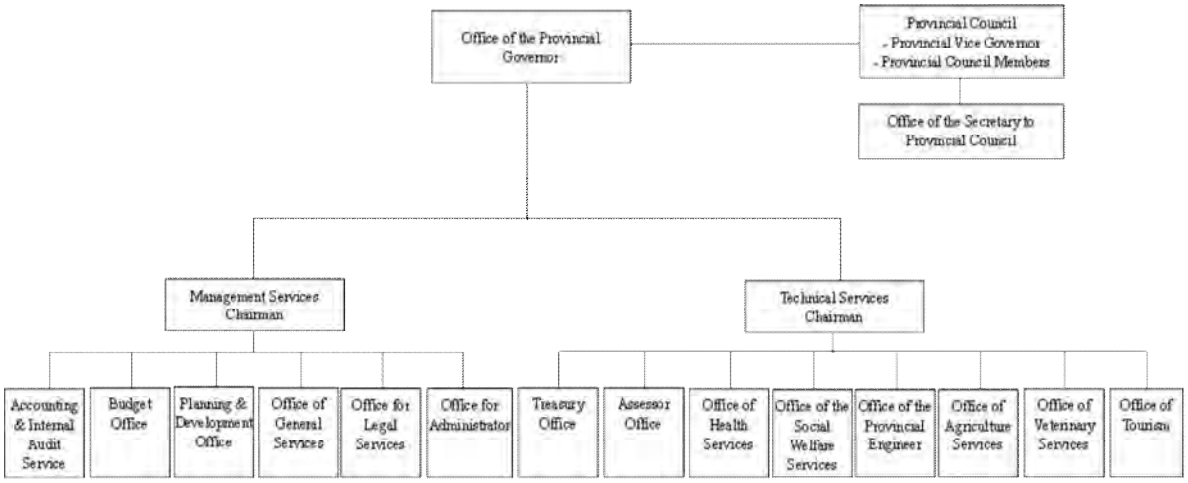
The implementing agency of this project is the DPWH. DPWH Camiguin District Engineering Office is in charge of daily maintenance of the Hubangon Bridge and the access road, while DPWH Regional Office (Region X) is in charge of major repairs. With regard to maintenance of the Sabo dams and access roads, the Provincial Government of Camiguin is in charge of daily maintenance and DPWH Camiguin District Engineering Office is in charge of major repairs. At the time of ex-post evaluation, the Memorandum of Agreement was not signed yet between the DPWH and the provincial government to confirm the respective responsibilities on the maintenance of the project facilities[9].However, it was informed that both sides are in agreement about respective responsibilities in operation and maintenance of the project facilities, and there is a clear structural demarcation between them.

Figure 2 and 3 show the organizational structures of DPWH Camiguin District Engineering Office and the Provincial Government of Camiguin respectively.



Source: Prepared from information provided by DPWH Camiguin District Engineering Office

Figure 2: Organizational Structure of DPWH Camiguin District Engineering Office



Source: Prepared from information provided by the Provincial Government of Camiguin

Figure 3: Organizational Structure of the Provincial Government of Camiguin

[9] As of April 2015, it was being prepared for signing at DPWH.

DPWH Camiguin District Engineering Office, in charge of daily maintenance of the Hubangon Bridge, has 51 staff members (including 19 engineers). The engineering office of the Provincial Government of Camiguin, in charge of daily maintenance of the Sabo dams and access roads, has 45 staff members (including 9 engineers). Table 9 shows the staff numbers in charge of maintenance of the project facilities by function at the respective agencies. It is considered that both agencies are securing a sufficient number of staff.

Table 9: Number of Staff in Charge of Maintenance

	DPWH Camiguin District Engineering Office Maintenance Section	Provincial Government of Camiguin Engineering Office O&M section
Chief Engineer	1	1
Engineer	2	1
Supervisor	2	1
Equipment Operator	3	2
Driver	-	2

Source: Information provided by DPWH Camiguin District Engineering Office and the Provincial Government of Camiguin

3.5.2 Technical Aspects of Operation and Maintenance

Regarding operation and maintenance of the Hubangon Bridge and access road, two engineers from the DPWH Camiguin District Engineering Office were trained by DPWH or its regional office and accredited as Bridge Engineers. In addition, all staff in the maintenance section of DPWH Camiguin District Engineering Office has been working at the section for more than 10 years. Therefore it is considered that they have sufficient experience. Furthermore, regular inspection is conducted on the bridge according to the manual prepared by DPWH and the inspection results are reported to DPWH as well as the DPWH Regional Office. Engineers of the engineering office of the Provincial Government of Camiguin are in charge of operation and maintenance of the Sabo dams and access roads, and there are no problems in technical capacities to maintain the Sabo dams according to an interview with the Flood Control and Sabo Engineering Center (hereinafter referred to as FCSEC)[10].

Besides, training for bridge inspection is conducted every year by DPWH and its regional office, while training for engineers for the Sabo dams is conducted occasionally by FCSEC.

Therefore, there were no particular problems observed with the technical level of the staff

[10] FCSEC is a center under the DPWH and aims to plan, design, construct and maintain flood control and Sabo facilities. Japan has provided technical cooperation to enhance FCSEC's technical skills since its establishment, by dispatching experts, implementing pilot projects, holding seminars, etc.

in charge of operation and maintenance of the project facilities as they have enough experience and skills.

3.5.3 Financial Aspects of Operation and Maintenance

Table 10 shows the total budget, total O&M budget, and O&M budget for bridges (only the budget based on the General Appropriation Act) of DPWH Camiguin District Engineering Office which is in charge of operation and maintenance of the Hubangon Bridge and access road.

Table 10: Total Budget and O&M Budget of DPWH Camiguin District Office

(Unit: thousand pesos)

	2010	2011	2012	2013	2014
Total Budget	281,518	115,641	279,289	193,930	270,687
O&M budget	2,813	7,665	27,315	11,600	10,742
O&M budget for bridges	No data	391	386	386	630

Source: Prepared from information provided by DPWH Camiguin District Engineering Office

It was impossible to specify the O&M budget allocated only for the Hubangon Bridge out of the O&M budget for bridges given by DPWH Camiguin District Engineering Office. However, according to this office, as the Hubangon Bridge is new, O&M cost for this bridge was minimal as of the time of ex-post evaluation. In addition, large-scale maintenance had not yet been considered necessary at the time of ex-post evaluation. In the case there is a need for repair, additional budget is to be allocated by the DPWH following DPWH's approval of a budget request made by Camiguin District Engineering Office based on the findings of a bridge inspection. Therefore, there were no concerns observed with the financial aspect of maintenance of the Hubangon Bridge and access road including the budget allocation process.

Regarding O&M budget of the Provincial Government of Camiguin, the information shown in table 11 was provided by the provincial government at the time of ex-post evaluation. The maintenance cost of the Sabo dams was estimated to be 340,000 pesos/year at the time of project planning. While sufficient financial information was not provided during the ex-post evaluation study, the information in Table 11 which was provided during the study period shows that the amount of O&M budget for the Sabo dams was below the estimated amount. However, there were no particular problems observed with the O&M budget at the time of ex-post evaluation, as the removal of accumulated sediment was conducted[11] and there were no comments made by the provincial government about a

[11] At the time when the first site survey was conducted (January 2015), no problem was observed with the river flow although a typhoon hit the Island in the previous month. According to the provincial government of Camiguin, the

shortage in the O&M budget. Therefore, regarding the financial sustainability of operation and maintenance of Sabo dams, it is considered that the budget for daily operation and maintenance of the Sabo dams has been secured at the time of ex-post evaluation. Besides, there was no plan for large-scale maintenance of the Sabo dams which had been designed not to require large-scale maintenance for decades according to the project consultant.

Table 11: O&M Budget of the Provincial Government of Camiguin

(unit: thousand pesos)

	2010	2011	2012	2013	2014
Total Amount	No data	No data	No data	5,839	6,424
O&M cost	No data	No data	No data	2,223	2,446
O&M cost for Sabo dams	―	No data	No data	223	245

Source: Prepared from information provided by the Provincial Government of Camiguin

3.5.4 Current Status of Operation and Maintenance

During the site survey of this ex-post evaluation study, there were no particular problems observed with the current status of operation and maintenance of the Sabo dams and the Hubangon Bridge. As for daily maintenance activities at the Sabo dams, it was reported that visual inspection is conducted nearly every week and removal of sediment is conducted when the accumulation of sediment reaches a certain level. At the time of the site survey, sediment had not accumulated and no problem was observed with the river flow. Regarding the Hubangon Bridge, inspections on structures, etc. are being conducted based on the above mentioned manual and it was confirmed that a necessity for repair had not been reported until then.

With regard to institutional aspect of operation and maintenance, a sufficient number of staff was secured both at DPWH Camiguin District Engineering Office and the engineering office of the Provincial Government of Camiguin. There were no particular problems observed in terms of technical aspect as the staff in charge of maintenance of the project facilities had skills appropriate for the job. At both agencies, there were no particular problems observed in financial aspects. Furthermore, it was confirmed that the project facilities had been operated and maintained in good condition.

In light of the above, no major problems have been observed in institutional, technical, or financial aspects of the operation nor in the maintenance system or with the current status of operation and maintenance. Therefore, the sustainability of the project effects is high.

rocks removed from the deposits of the Sabo dams are transported to and used as valuable materials on another island. Therefore it was considered that there was a good incentive for the government to conduct removal of the sediment.

4. Conclusion, Recommendations and Lessons Learned

4.1 Conclusion

In this project, the Sabo dams were constructed and a bridge was reconstructed in Camiguin Island to prevent the disaster by debris flow along river basins and to improve the traffic condition over the bridge. The relevance of this project is high, as it was consistent with the development plan and needs of the Philippines as well as the ODA policy of Japan. The efficiency is also high, as the contents of the project were implemented mostly as planned and the project cost and period were within the scope of the plan. With regard to the effectiveness of the project, it was confirmed that the effects have been realized in terms of improvement in vehicle speed passing over the bridge, prevention of debris flood disasters, and securing of a safe and smooth traffic flow on the bridge. In addition, as impacts of the project, it was inferred that this project contributed to the establishment of a comprehensive disaster prevention system with a combination of structural and non-structural measures, an increase in traffic volume near the Hubangon Bridge, the improvement in access to markets, a stable transport of goods, and the enhancement of the Camiguin's image as a tourist spot. Therefore, the effectiveness and impact of this project are high. The sustainability of the effects of this project is considered high. There were no problems observed in terms of institutional or technical aspects as well as the current status of operation and maintenance. Although sufficient quantitative information was not obtained to assess financial aspects of the sustainability, there were no particular problems observed in terms of the contents of maintenance activities and implementation status of daily maintenance activities.

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

4.2 Recommendations

4.2.1 Recommendations to the Implementing Agency

Utilization of Camiguin experience in disaster prevention efforts (structural and non-structural measures)

DPWH is considering the application of Sabo dam technology in other areas. In the case DPWH constructs Sabo dams in other areas, it is desirable to promote the sharing of the experience in Camiguin Island, including not only the structural measures of Sabo technology but also the non-structural measures such as preparation of an evacuation plan. This could be conducted through introducing efforts to establish a comprehensive disaster prevention system with a combination of structural and non-structural measures conducted through the support of JICA in the Municipality in Mahinog or Barangay Hubangon in Camiguin Island with the DPWH regional offices or local government units in areas where Sabo dams would be constructed. For this purpose, it would be useful for stakeholders in

Camiguin province to collect and compile the information pertaining to how this project has been contributing to the reduction of damage caused by natural disasters.

4.2.2 Recommendations to JICA

None.

4.3 Lessons Learned

Effective combination of supports in introducing structural and non-structural measures for disaster prevention

This project is positioned as a part of the disaster prevention program being conducted in the Philippines with the support of the Japanese Government. Prior to project implementation, technical assistance for introducing non-structural disaster prevention measures was provided at the time of ex-post evaluation, and it was confirmed that the benefit of the assistance had been maintained and utilized, as seen in the independent revision of the warning and evacuation plan. For disaster prevention, the establishment of a comprehensive system (combination of structural and non-structural measures) is considered to be effective. Therefore, when a similar project is to be implemented, it would be important to consider technical assistance for non-structural measures concurrently in order to enhance the effectiveness of the project. In addition, it would be considered useful to organize the experience of establishing a comprehensive disaster prevention system and disseminate it to other areas.

(End)

Republic of Benin

Ex-Post Evaluation of Japanese Grant Aid Project

" The Project for Rural Water Supply (Phase VI)"

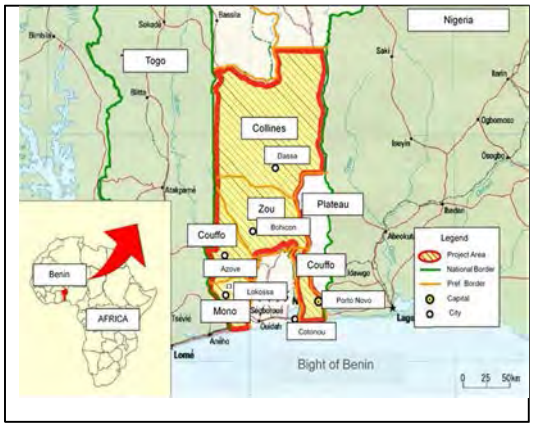
External Evaluator: Chiaki Yamada, Japan Economic Research Institute Inc.

0. Summary

The objective of this project is to increase the number of people with reliable access to safe water in the five targeted departments in rural Benin (Collines, Zou, Couffo, Mono and Ouémé) by constructing water facilities, and thereby improve the standard of living in these departments. This project has been highly relevant to the Benin's development plan and development needs, as well as Japan's ODA policy, so its relevance is high. The efficiency of both the project cost and project period were within the plan and the efficiency of the Project is high. The ex-post evaluation confirmed that the operational rate of deep wells with hand pumps (hereafter Level 1) and small-scale water supply facilities (hereafter Level 2) developed by the Project has exceeded the 80% target value. Furthermore, it is confirmed the number of people who had access to safe and stable water increased by approximately 89,000. Improvement of hygienic conditions due to the provision of safe water and reductions in water-borne diseases and water-fetching labor were confirmed as positive impacts, resulting in improved school enrollment rates and an improved standard of living amongst women. Accordingly, the effectiveness and impacts are high. The operational rate for water facilities is very high (83.1% for Level 1 and 100% for Level 2), and it is summarized that almost all of these facilities are properly maintained. However, small problems were observed in operation and maintenance (hereafter O&M) with regard to the institutional, technical, and financial aspects for Level 1, and to the financial aspect for Level 2. There is clearly still room for the Government of Benin to improve the capacity to manage the facilities, and thus the sustainability of the effect is rated as fair.

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

1. Project Description



Project Locations

Level 2 Facilities (left) and Level 1(right) Facilities Developed by the Project

1.1 Background

According to World Bank in 2003, in rural areas of Benin (where about 70 % of the population is living), the rate of access to safe and reliable water remained at approximately 36 % and the levels of coverage for water supply and sanitary services remained low. As a result, the population was more prone to water-borne diseases, and children were obliged to drop out of school to fetch water. Overall, negative impacts upon their health, education, and economies were observed. In order to tackle the negative impacts, the “Millennium Development Goals (MDGs)” (2000-2015) formulated by the Government of Benin in 2000 stated that the water supply rate in rural areas should be raised to 85% by 2015. Since then, donors such as the Government of Japan, the United Nations Children's Fund (UNICEF), and the German Agency for International Cooperation (GIZ) have been promoting the development of water supply facilities in these areas. However, as the water supply rate still remained low in 2005, the target rate by 2015 unavoidably had to be revised downward to 67.3%. In order to boost the water supply rate, the further development of water facilities was required.

Under the above circumstances, the Government of Benin requested the Government of Japan to implement the Project entitled“ The Project for Rural Water Supply (Phase VI)” in June 2005, with funding from grant aid focused on the poorest rural areas in Southern Benin.

1.2 Project outline

The objective of this project is to increase the number of people with reliable access to safe water in the five targeted departments in rural Benin (Collines, Zou, Couffo, Mono and Ouémé) by constructing water facilities, and thereby improve the standard of living in these departments.

Grant Limit[1] / Actual Grant Amount[2]	1,041 million yen / 762 million yen
Exchange of Notes Date (/Grant Agreement Date)	July, 2009 / July, 2009
Implementing Agency	Directorate General of Water, Ministry of Energy, Petroleum and Mineral Research, Water and Renewable Energy Development（Direction Générale de l'Eau du Ministère de l'Energie, des Recherches Pétrolières et Minières, de l'Eau et du Développement des Energies Renouvelables）(hereafter DG Eau）
Project Completion Date	May, 2011
Main Contractor	Water & Geo-tech Engineers Nissaku
Main Consultant	Sanyu Consultants Inc.
Basic Design (B/D)	September, 2007-November, 2008
Detailed Design (D/D)	March, 2009-November,2009
Related Projects	<Grant Aid Project> The Project for Rural Water Supply (Phase I-V) (1984-2007) <Other International Organization and donors> UNICEF "Projet d'Approvisionnement en Eau Potable et Assainissement de Base dans 200 Localites Vulnerables" (2006-2011), GIZ "Programme d'Assistance au Developpement du Secteur de l'Approvisionnement en Eau Potable et de l'Assainissement en Milieu Rural"(2009-2011), Government of the Netherlands "Programme pluriannuel d'appui au secteur Eau et Assainissement II (PPEA-II)" (2012-2015)

2. Outline of the Evaluation Study

2.1 External Evaluator

Chiaki Yamada, Japan Economic Research Institute Inc.[3]

2.2 Duration of Evaluation Study

Duration of the Study: October, 2014 - September, 2015

Duration of the Field Study: January 7 - 26, 2015 and April 6 - 10, 2015

[1] In other words, Exchange of Notes Limit
[2] The amounts of Detailed Design (60 million yen/58 million yen) are included.
[3] The evaluator is a subcontractor from INGÉROSEC Corporation.

2.3 Constraints during the Evaluation Study

One hundred and twenty-four Level 1 and ten Level 2 facilities (including 80 common faucets) were developed by the Project in the five target departments. The Level 1 and Level 2 facilities are spread out within the five departments (about 25,000km^2). Due to limitations in budget and time, the current functioning and O&M status were not thoroughly monitored for all of the Level 1 and Level 2 facilities through the field study of the ex-post evaluation. Accordingly, a beneficiary survey[4] and telephone interviews with the communes[5] responsible for O&M of the facilities were conducted to collect information on the Level 1 and Level 2 facilities that were not observed through the field study.

3. Results of the Evaluation (Overall Rating: A[6])

3.1 Relevance (Rating: ③[7])

3.1.1 Relevance to the Development Plan of Benin

3.1.1.1 Relevance to Higher Development Plan

During the project planning stage, three goals were designated as priority targets in the "Poverty Reduction Strategy Paper II (PRSP II) 2007-2009" formulated as the development plan for Benin: "Promoting sustainable economic development," "Improvement of basic services," and "Promotion of good governance." Through activities for the improvement of basic services, the development plan targeted an increase in the rural water supply from 46 % (2006) to 51 % (2010). At the same time, the Millennium Development Goals (MDGs) targeted an increase of the rural water supply rate to 85 % by 2015. However, the World Bank's study conducted in 2003 revealed that the access rate to safe water remained at approximately 36 % in the rural areas of Benin, where 70 % of the population lives. As a result of the review, the targeted rural water supply rate in December 2015 was revised downward to 67.3%.

During the ex-project evaluation, the following five sectors were designated as priority issues in the "Poverty Reduction Strategy Paper III (PRSP III) 2011 - 2015" revised and formulated in 2011: 1) Sustainable Acceleration of Growth and Transformation of the Economy, 2) Infrastructure Development, 3) Strengthened Human Capital, 4) Improvement in the Quality of Governance, and 5) Balanced and Sustainable Development at the National Level." "Water and sanitation infrastructure" is recognized as the issue of top

[4] The survey team interviewed 241 beneficiaries (43 in Collines, 43 in Zou, 56 in Couffo, 51 in Ouémé and 48 in Mono department) who are currently using the facilities developed by the Project from February to March 2015 in the five targeted departments. The objective of the survey was to collect information on the operational status of the facilities, project effects, and impacts generated.
[5] Local administrative authorities
[6] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory
[7] ③: High, ②: Fair, ①: Low

focus in "2. Infrastructure Development," and the target rural water supply rate to be achieved by 2015 was set at 67.3 %[8]. "Goal 7: Ensure Environmental Sustainability" in the MDGs mentioned above aimed to halve the proportion of the population without sustainable access to safe drinking water and sanitary facility by 2015. And the targeted rural water supply rate continuously remained at 67.3% by 2015.

3.1.1.2 Relevance to Water Sector Plan

During the project planning stage, the "National Strategy for Rural Water Supply 2005-2015" aimed to increase the water-served population in rural areas up to 3.9 million within 10 years from 2005. According to the "Public Investment Program (PIP)" which placed Infrastructure investment, Water and Electricity, Health, Agriculture and Education as top priorities, the amounts of investment towards Water and Electricity between 2005 and 2007 had greatly increased from 10,596 million Franc CFA (hereafter F.CFA) to 36,415 million F.CFA. The percentage of the investment towards Water and Electricity out of all the public investments had also increased from 6.2% to 12.7 %. The "National Strategy for Rural Water Supply 2005-2015" was still in practice during the ex-post evaluation. This strategy emphasized the need for community initiatives on the O&M of facilities and appropriate and secure water fare collection in order for communities to take initiatives for the sustainable management of their water facilities.

In addition to the above, the "Growth Strategy for Poverty Reduction 2011-2015 (SCRP)," which was not formulated during the project planning stage, mentioned that the improvement and development of the economic infrastructure (such as road and water supply services) promotes not only national development, but also the life of the people. The "National Water Policy (2008)" outlined the importance of increasing the understanding of people towards drinking water supply and hygiene management in order to contribute to the living standards of the people. The policy also indicated that fair water resource distribution by 2015 to the people would greatly contribute to economic reform and poverty reduction. While none of the PIP documents collected at the ex-post evaluation described the amounts invested in Water and Electricity (investment) out of the total Public Investment, the interview with the DG Eau confirmed that the budgets for the development of the rural water supply facilities gradually increased every year from the time of the project planning to the ex-post evaluation.

Accordingly, the Project was consistent with the National Development Plan and Water Sector Plan both during the project planning stage and the time of the ex-project

[8] In 2011 when the PRSPIII was formulated, the target rural water supply rate to be achieved by 2015 was set to 69.5 %. At the ex-post evaluation, according to the results of interviews with the DG Eau, the target rural water supply rate was revised downward to 67.3%.

evaluation.

3.1.2 Relevance to the Development Needs of Benin

During the project planning stage[9], the average water supply rate of the five targeted departments was 43.2%, which was lower than the national average of 44.5%. According to the result of the interviews with DG Eau conducted during the project planning stage, the development of water facilities was prioritized as the most urgent infrastructure requirement in more than 95% of the targeted communities. Furthermore, the demand for the provision of hygienic water facilities in the communities was urgent.

The Ministry of Health reported that the people in the five targeted departments were more prone to water-borne diseases such as diarrhea, typhoid fever, and cholera. In the Ouémé department, where the water supply rate was the lowest (22.5%), more than 6,000 patients were identified per year (versus 2,000-3,000 patients in the other four departments).

Some of the regions in the five targeted departments have difficulties in developing groundwater due to exposed bedrock. People there have less access to reliable water. It was confirmed that many children there are struggling to go to school due to the long hours required for water-fetching labor. The target departments (Collines, Zou, Couffo, Mono and Ouémé) were selected after the consultation between the Government of Benin and the Government of Japan on the following challenges: high poverty rate, lack of access to safe drinking water (small number of water supply facilities for the population); cost effectiveness, and the assurance of safety in the project implementation. Therefore, the project objective of developing water facilities was in agreement with the development needs on the ground during the project planning stage, and the need for the Project was rated as high.

During the ex-post evaluation, the average water supply ratio and the number of persons supplied by the project facilities in the five targeted departments were both improved. On the other hand, there are still many people who lack access to safe water. The population growth rate in the five targeted departments was 3.09% (2002-2013), and this growth rate is expected to continue[10]. As such, the water facilities in the targeted departments will not possibly be sufficient and the needs in these areas will remain high.

3.1.3 Relevance to Japan's ODA Policy

According to "ODA data book (2008)," in consideration of the poverty situation in Benin, Basic Human Needs (BHN) (i.e., education, water, and health sectors that contribute to the improvement of living standards) were prioritized as a basic policy. The Project, which aims to contribute to the improvement of hygiene through the provision of water facilities, is therefore

[9] During the project planning stage: the information source is Basic Design Study Report.
[10] The information source is the questionnaire to DG Eau.

relevant to the Japan's ODA policy and priority sectors.

As mentioned above, this project has been highly relevant to the Benin's development plan (including water sector plan) and development needs, as well as Japan's ODA policy. Therefore its relevance is high.

3.2 Efficiency (Rating: ③)

3.2.1 Project Outputs

3.2.1.1 Outputs from Japanese Side

All facilities, Level 1 and Level 2 (elevated water tank, transmission and distribution pipe, public faucet), were developed by the Project as planned. Details of facilities developed are shown in Table 1 and Table 2. Note that, out of 124 facilities for Level 1, six turned out to be artesian wells. Appurtenant facilities were therefore placed instead of hand pumps.

Table 1 Planned and Actual of the Project Outputs (Level 1)

Name of Departments	Planned	Actual	
	No of hand pumps	No of hand pumps	No of artesian wells
Collines	34	36	0
Zou	35	36	3
Couffo	13	12	0
Ouémé	19	19	0
Mono	23	15	3
Total	124	118	6

Source：Planned：Basic Design (B/D) Study Report, Actual：Results of the questionnaires for DG Eau

Table 2 Planned and Actual of the Project Outputs (Level 2)

Name of outputs	Planned	Actual
Small-scale water supply facilities	Total：10 Collines : 1　Zou : 3 Couffo : 2　Ouémé : 3 Mono : 1	Total：10 Collines : 1　Zou : 3 Couffo : 2　Ouémé : 3 Mono : 1
Elevated water tanks (m^3)	$20m^3$x4, $30m^3$x3, $40m^3$x3	$20m^3$x4, $30m^3$x3, $40m^3$x3
Transmission and distribution pipe (length)	31,890m	31,890m
Public faucets	80	80

Source：Planned：B/D Study Report, Actual：Results of the questionnaires for DG Eau

3.2.1.2 Outputs from Benin Side

According to the interviews with DG Eau and the project consultant, 8 out of 10 project outputs, or the equivalent of 21.8 million yen out of the total planned 25 million yen from the

Benin side, were confirmed. This is equal to 87.2% of the planned amount at the ex-post evaluation. Details of the Benin side outputs and the explanations for uncompleted outputs are shown in Table 3.

Table 3 Planned and Actual Outputs from the Benin Side and Implementation Status

Outputs		Implementation Status
1	To secure necessary land, office space, and budget for the project implementation	Completed
2	To conduct awareness activities at 10 facilities for Level 2 and 124 facilities for Level 1.	Completed
3	To secure the costs for connecting the commercial power lines for the 5 facility sites for Level 2	Completed
	Due to budget shortfalls during the Project, no activities for connecting the commercial power with facilities were conducted. Instead, this work was done after the completion of the Project. The facilities are designed to run on generators, but connection between commercial power lines and facilities was planned to save maintenance costs for the generators in the future. Therefore, the delays in connecting the commercial power lines had no effect on the project progress.	
4	To install fences around 10 facilities (Level 2)	Uncompleted
	Fences were set up in only 4 out of 10 facilities (Level 2) due to budget shortfalls but this had no effect on the progress of the Project.	
5	To secure the project supervisors and costs.	Completed
6	To exempt taxes for all imported materials and equipment necessary for the Project.	Completed
7	To secure the way within Benin for shipping and transporting equipment related to the Project.	Completed
8	To secure the safety of Japanese engineers.	Completed
9	To pay bank commissions based on the B/A[11].	Completed
10	To secure the costs for the regular monitoring after the construction of the facilities (2 people x 12 months).	Uncompleted
	During the project planning stage, the team planned to engage two monitoring staff persons from DG Eau. However, with the process of national decentralization, the responsibility for regular monitoring was moved from DG Eau to the communes. Therefore, DG Eau no longer needed to allocate staff.	

Source：Planned：B/D Study Report, Actual：Results of the questionnaires for DG Eau

3.2.1.3 Type/Details of Changes on the Project Components during the Project

Three changes from the B/D and the Detailed Design (D/D) were confirmed. Interviews with DG Eau and the project consultant revealed that these changes were appropriate and necessary to generate the project outcomes. Details on and reasons for the changes are shown in Table 4.

[11] The Government of Benin will open a bank account in Japan and the project money for the grant aid will be transferred to that account. This procedure mentioned above is referred to as the “Banking Arrangement: B/A.”

Table 4 Changes Made and the Reasons for the Changes

NO	Changes made	Reasons for the changes
1	・ Change in the beam section design for Level 2 ・ Re-conduct pumping test and water quality analysis for Level 2 facilities	・ Top part of the beam section design needed to be changed to secure enough strength of the structure ・ Two years had passed since B/D and there was a possibility that the results of the pumping test and water quality analysis had changed
2	・ Change the design at 6 artesian well facilities, out of 124 facilities for Level 1	・ It was uncertain if any artesian wells could be found. Artesian wells do not require hand pumps, so water supply taps were fitted instead
3	・ Canceled the original 8 target sites due to other donor's intention to construct water facilities. Accordingly raised the priority of the 8 sites from alternative sites to target sites ・ Newly identified 28 candidate sites	・ In coordinating with other donors who intend to construct water facilities, several sites were changed from the original plan in order to avoid duplication ・ The number of new candidate sites was determined from the estimated success rate of the borehole drilling called for in the existing documents and field assessment

Source：Results of the questionnaires for DG Eau

3.2.2 Project Inputs

3.2.2.1 Project Cost

The actual project cost from the Japanese side was 762 million yen, while the planned cost (limit on E/N of grant aid) was 1,041 million yen. Therefore, the actual project cost was lower than planned (73% of the planned cost). The decreased cost was attributed to the competitive bidding, which reduced the order contract prices from the estimates. The actual project cost from the Benin side was 21.8 million yen, which was also lower than the plan (25 million yen). Two conditions accounted for much of the difference between the planned and actual costs from the Benin side: six of the fences from the Level 2 facilities were not installed; and no monitoring costs were charged.

3.2.2.2 Project Period

The planned project period was a total of 28 months between January 2009 (E/N date) and May 2011. The actual project period was 25.8 months between March 2009 and May 2011, which was shorter than planned (92% of the planned period). Breaking down the project period, the period between the time of agreement with the contractors and the completion of the construction work was as planned. The period for the D/D turned out to be shorter than planned. This reduction can be credited to the efforts of the consultants.

As mentioned above, both the project cost and project period were as the plan. Therefore, efficiency of the Project is high.

3.3 Effectiveness[12] (Rating:③)

3.3.1 Quantitative Effects

As no operation indicators were set during the project planning stage, the operational status of the water facilities (Level 1 and Level 2) was considered as an operation indicator at the ex-post evaluation. The quantitative effects in the project effectiveness was evaluated based on the operational status of the Level 1 and Level 2 facilities (an operation indicator) and water served population as well as water supply rate (effect indicators).

3.3.1.1 Operation Indicators

(1) Operational status of the water facilities

The target ratio for the operational status of the water facilities was not set at the project planning stage but the project objective had already been set as follows: "the number of population who can acquire the safe and reliable water increases." The operation of all facilities developed by the Project was therefore a prerequisite condition, and the targeted operational status was presumed to be 100% at the ex-post evaluation.

Furthermore, if the operational rate[13] of the water facilities developed by the Project went beyond 80% at the ex-post evaluation, the operational rate was to be evaluated as high, which would result in a high effectiveness overall[14].

It was confirmed that 83% of the Level 1 facilities and 100% of the Level 2 facilities were operational at the ex-post evaluation (See Tables 5 and 6). The operational rate for the Level 1 and Level 2 facilities were both beyond 80%, with the conditional expectation that most of the non-operational facilities would be repaired in the months ahead. The effectiveness in terms of the operational level of the water facilities is rated as high.

Table 5 Operational Status of Level 1 (124 Facilities)

Name of Department	Number of facilities		Reason(s) for the non-operational status (Number of facilities not functioning)	Response to the non-operational facilities (Number of facilities)	Operational rate (%)
	Operational	Not-operational			
Collines	36		Broke down (1)	・Planned to be operated by the end of April 2015 (1)	97.2
	35	1			
Zou	39		Broke down (2)	・Repair fees are being collected from the Community. The operational time to be spent is not determined (1) ・Planned to be operated by the end of March 2015 (1)	94.8
	37	2			

[12] Sub-rating for Effectiveness is to be put with consideration of evaluation of the Impact.
[13] Concerning the operational rate, facilities that were operational at the end of February in 2015 were "Operational facilities at the ex-post evaluation," and the operational rate was calculated accordingly.
[14] This is based on the rating system and criteria of the ex-post evaluation.
(http://www.jica.go.jp/activities/evaluation/general_new/2011/pdf/shiryou_02.pdf)

Couffo	12 8 4	Broke down（4）	・Planned to be operated by the end of March 2015 (1) ・Planned to be operated by the end of June 2015 (1) ・Planned to be operation by the end of December 2015 (2)	58.3
Ouémé	19 12 7	Broke down（2） Depletion in dry season（5）	・Planned to be operated by the end of June 2015 (2) ・Reviewing response (5)	63.1
Mono	18 11 7	Broke down（7）	・Planned to be operated by the end of March 2015 (1) ・Planned to be operated by the end of June 2015 (1) ・Planned to be operation by the end of December 2015 (1) ・Reviewing response (4)	61.1
Total	124 103 21			83.1[15]

Notes：As of February 2015

Source：Results of the 1st field study, the beneficiary survey, and the telephone interviews with the communes

Table 6 Operational/Functioning Status of Level 2 Facilities (10 Facilities)

Name of departments	Submersible motor pump			Public faucets		
	Number of operational facilities	Number of non-operational facilities	Operational rate	Number of operational facilities	Number of non-operational facilities	Operational rate
Collines	1	0	100%	12	0	100%
Zou	3	0	100%	21	0	100%
Couffo	2	0	100%	17	0	100%
Ouémé	3	0	100%	24	0	100%
Mono	1	0	100%	6	0	100%
Total	10	0	100%	80	0	100%

Notes：As of February 2015

Source：Results of the 1st field study, the beneficiary survey and the telephone interviews with communes

3.3.1.2 Effect Indicators

（1）Water served population

At the ex-post evaluation, “the number of people who had access to safe and stable water increases by an approximately 89,000” was set as an indicator of the project effects.

As a result of the project outputs, including the development of water facilities, the number of people who has access to safe and stable water in the target departments in 2011 is estimated to increase by approximately 101,000 based on the population growth rate. That result exceeded the target value of 89,000. Moreover, as the population is

[15] The value is calculated by dividing 103（Number of operational facilities observed, Level 1）by 124（Total number of facilities, Level 1）.

expected to further increase and in light of the operational rates of the water facilities[16], the number of people who has access to safe and stable water is estimated to increase by 97,000 by 2013, two years after the completion of the Project. As all facilities are completed in 2011 and were handed to the Government of Benin, the operational rate of facilities were set to 100%. Some non-operational facilities were confirmed in 2013 and the water served population is lower than that of 2011. However, more people can have access to safe water more than expected, thus, the project objective in terms of the water-served population is likely to be achieved.

Table 7 Changes in Population Having Access to Safe Water

Indicators	Target	Actual[17]	Actual[18]
	2011	2011	2013
	Completion year	Completion year	2 years after completion
Number of people affected by the Project (gained access to safe water) in the targeted area	89,000	101,000	97,000

Source : Target : B/D Study Report、Actual : B/D Study Report and Results of the 1st field study, the beneficiary survey and the telephone interviews with communes

(2) Water supply rate

Table 8 shows water supply rate for each targeted department, the average rate for five departments, and the national average.

Table 8 Water Supply Rates for the Targeted Departments (Unit: %)

Indicator: Water supply rates in the targeted departments (Unit: %)	Baseline	Target	Actual	Actual	Actual
	2007	2013	2011	2012	2013
	Baseline year	2 years after completion	Completion year	1 year after completion	2 years after completion
Collines	57.4	－	65.8	65.2	65.7
Zou	41.6	－	61.0	85.3	80.5
Couffo	46.1	－	60.9	68.8	71.1
Ouémé	22.5	－	37.0	40.4	43.0
Mono	48.5	－	80.7	84.5	78.3
Average in 5	43.2	－	61.1	68.8	67.7

[16] There is no data on the operational water facilities in 2011. Presuming that the facilities are broken at a fixed probability and are repaired whenever broken, the operational ratio reaches the ratio in 2015: thus the resulting operational rate is generally used for the calculation.

[17] This value is calculated by: "Water-Served Population 400 people / Level 1 × No of Level 1 × Average population growth rate in the five targeted departments（3.09%）(=A formula)＋Water-Served Population 500 people/Level 2 ×No of Level 2 × Average population growth rate in the five targeted departments（3.09%）(=B formula)
Average population growth rate is multiplied from 2007 when the B/D was conducted by the target year ("average population growth rate" to the power of "target year").

[18] This value is calculated by (A formula)× Operational rate of Level 1（83.1%）＋(B formula)× Operational rate of Level 2（100%）

target department					
National average	44.5	62.7	61.2	68.8	65.6

Notes：No target value determined in 2013

Source：Baseline and Target：B/D Study Report, Actual：Results of the questionnaires for DG Eau

No water supply rate is set for the target departments in 2013. Therefore, comparing the target national average with the actual national average in 2013, the actual national average of 65.6% exceeds the target of 62.7% by 2.9%. The average water supply rate of the five targeted departments was 43.2% during the project planning stage, which was below the national average of 44.5%. A great improvement is recognized, because the average water supply rate of the five departments in 2013 (67.7%) was over the national average (65.6%). Because the targeted indicator was not set during project planning stage, it is difficult to measure the achievement of the water supply rate. In view of the actual water supply rate in 2013, 2 years after the project completion, which went beyond the national average, it is clearly shown that the project improved the water supply rate. Likewise, during the project planning stage, the MDGs (2000 - 2015) targeted improvement in the rural water supply rate to 67.3% by 2015, and this target was already achieved in the five targeted departments by 2013. The interviews with DG Eau indicated that one of the factors responsible for the reduced water supply rate from 2012 to 2013 was the increased population in the targeted departments. Another possible factor was temporal reductions in the water supply rate due to breakdowns in some of the water facilities.

As mentioned in the project outline, UNICEF has targeted improved water supply facilities for the Ouémé and Zou departments since 2006, and GIZ has targeted the same for the Couffo, Ouémé and Mono departments since 2009. According to both organizations, the targeted communities by the Project did not overlap the communities targeted by UNICEF and GIZ.

3.3.2 Qualitative Effects

3.3.2.1 Achievement of Soft Components

As the indicators of the project objective were not set during the project planning and the project implementation stages, it is presumed that the achievement of all outputs is equivalent to the achievement of the project objective in the soft components. Outputs 3 and 5 are considered inappropriate indicators and have been eliminated. These outputs were eliminated because none of the communities' water facility maintenance operations were led by the Water Management Committee or Water User Rights' Unions after the operation and maintenance responsibilities were decentralized to communes. The achievement (status) of Outputs 1, 2 and 4 is shown in Table 9. It can be said that the project objective has been almost achieved.

Table 9 Achievement Status for Each Soft Component

Soft component		Achievement status
Project objective	Community people in the targeted areas properly maintain the water facilities and continuously use water from the facilities	Based on the achievement of outputs 1, 2 and 4, the project objective is almost achieved.
Output 1	DG Eau and the communes understand the method of implementation for the educational activities.	Each commune continues to conduct training in hygiene management/control for the community with funding from budgets from the Government of Benin.
Output 2	Community people understand the importance of hygiene management/control.	The people of the community have a thorough understanding through hygiene education (100%) and have come to wash their hands, clean the water facilities. etc.
Output 3	The water management committee develops an appropriate framework for O&M of water facilities continuously as a leader (the Communities adapted to the original/old method[19]).	Through the introduction of new method, no communities were found to still be using to the old/original method.
Output 4	Appointed water facility officers acting as leaders in targeted communities develop an appropriate sustainable framework for O&M of water facilities (Communities adapted to the new method[20]) (Level 1 facilities).	Twenty-one facilities were run properly by the appointed water facility officers. On the other hand, four facilities were not managed appropriately by the appointed water facility officers. Accordingly, 84% of the total water facilities are said to be properly managed.
Output 5	Water user rights' unions act as leaders in the targeted community to prepare/develop a sustainable framework for O&M of water facilities (the Communities adapted to the new method).	Through the introduction of the new method, O&M of water facilities is being conducted by private firms contracted with the communes.

Source：Soft components：B/D Study Report, Achievement status：Results of the questionnaires for DG Eau

3.3.2.2 Improvement in Water Quality

It was agreed that when the Project had drilled new boreholes, the water quality test would be conducted based on the drinking water standards of Benin, and that a borehole would be available as a water source only after the standards were met.

Accordingly, the quality of the water provided by the water facilities of the Project is assured. At the ex-project evaluation, it was confirmed that the quality of water from the facilities developed by the Project had been tested as planned. The results of the beneficiary

[19] Water Management Committees (Level 1) and Water User Rights unions (Level 2) were established, and the costs for the development of water facilities were collected by community people. The facilities were operated and maintained by these bodies.

[20] The O&M of water facilities by the new method was commenced in January 2007. Community people are not obliged to pay their share of the expenses for facility construction, and no Water Management Committee or Water User Rights' unions are established. The O&M of water facilities is conducted by private firms.

survey revealed that 96.7% of the total respondents (233 out of 241) answered “satisfactory” or “almost satisfactory” to the questions about the quality of the water (smell, water color/cloudiness, taste) provided by the facilities (Level 1 and Level 2). Ninety-percent of the respondents who answered “satisfactory” or “almost satisfactory” cited the following reasons (or the like): “able to drink tasty water,” “able to secure sanitary water and reduce the incidence of diarrhea,” “the water is not smelly like the shallow boreholes,” “the water is not cloudy like river water.” Moreover, staff members from the communes who were responsible for the O&M of water facilities accompanied the team on the 1st field visit for the ex-post evaluation and found no problems with the water quality in their tests of the smell, color/cloudiness, and taste of the water.

3.4 Impacts

3.4.1 Intended Impacts

During the project planning stage, the following 3 expected indicators were set to measure the project effects.

- Providing safe water through the development of water facilities will improve the sanitary conditions and help reduce the incidence of water-borne diseases.
- Decreasing the time and labor for fetching water
- Reducing labor for fetching water will bring secondary effects (improved standard of living for women and improved school enrollment rate)

Occurrence of impacts observed at the ex-post evaluation are shown below.

3.4.1.1 Reduction in the Incidence of Water-borne Diseases

The statistics on the incidence of water-borne diseases available from Ministry of Health were broken down for each department. There were no further breakdowns available by community, so it was difficult to clarify the numerical changes, namely, whether the Project helped reduce the incidence of water-borne diseases in the targeted communities.

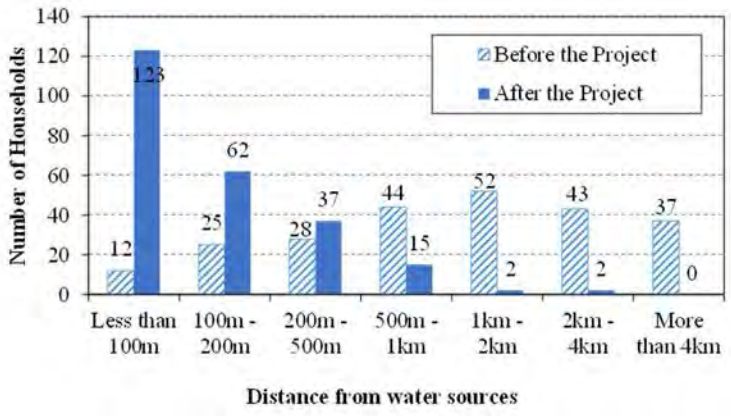
According to the interview results with the Ministry of Health, people are susceptible to water-borne diseases when they suffer malnutrition or live in poor living environments. On the other hand, surely acquiring safe water was one of the factors helping to reduce the incidence of water-borne diseases.

The results of the beneficiary survey pointed out that community people gained access to safe water sources instead of unsanitary water sources through the construction of water facilities under the Project. And comparing before and after the Project, 97.9% (236 out of 241 respondents) answered as follows: “lower incidence of diarrheas,” “lower incidence of stomach pains,” ”The Project has contributed to the improved health condition amongst community people.”

3.4.1.2 Distance to Water Sources

Responses to the question on “distances from each household to the water source” in the beneficiary survey at the ex-project evaluation are shown in Figure 1. Before the Project, approximately 54.8% (132 out of 241 respondents) answered that the distance to the nearest water source was more than 1 km. After the Project, only 1.7% (4 out of 241 respondents) gave the same answer. Before the Project, only approximately 15.4% (37 out of 241 respondents) of the respondents had access to water resources within 200 meters from their houses. After the Project, the percentage improved to 76.8% (185 out of 241 people). On the other hand, 5.8% (14 out of 241 respondents) of the total number of respondents answered, “The distance to the water source is now longer than it was before the Project.”

According to these respondents mentioned above, “A greater distance does not matter, so long as they can surely securing safe water.” This explained why some respondents had voluntarily chosen to come all the way to the new water source developed by the Project to acquire safe water. The distance from each household to the water source during the project planning stage and during the ex-post evaluation is shown in Figure 1.



Source：241 respondents of the beneficiary survey

Figure 1 Distance from Each Household to the Water Houses

3.4.1.3 Reducing Water-fetching Labor

According to the results of the beneficiary survey, about 95.9% (231 out of 241 respondents) answered that the “water-fetching time had been shortened.” Time-saving factors included not only the distance from the water source, but also differences in the methods for fetching water, such as fetching water with pumps instead of ropes with rubber bags attached to the ends of them. Ten of the respondents who answered that the “water-fetching time has not been shortened” explained that they used to collect water from rivers and shallow wells nearby their households before the Project but now are coming to get safe water from the new water facilities in spite of the greater distance.” It was

confirmed with the people mentioned above that although their water-fetching time has not been shortened, they spent less than 1 hour a day for fetching water. Table 10 shows the change for each household in the time spent for fetching water per day before and after the Project.

Table 10 Changes of each Household for Spending Time for Fetching Water per Day

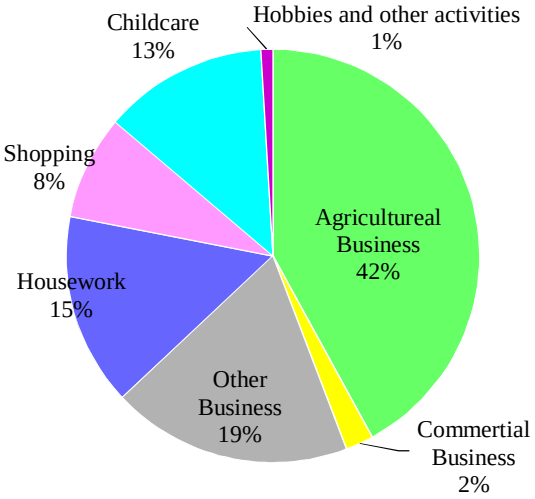
(Unit: Number of households)

Time for fetching water per day	At project planning	At the ex-post evaluation	Average time
Less than 1 hour	87	238	At project planning ： approximately120mins/day At the ex-post evaluation ： Approximately 10mins/day
From 1 hour to 2 hours	70	3	
From 2 hours to 3 hours	38	0	
More than 3 hours	46	0	

Source：Results of the beneficiary survey

3.4.1.4 Secondary Effects from the Reduced Water-fetching Labor

According to the results of beneficiary survey, by securing water source nearby (185 out of 241 respondents answered their households were within 200 meters from water sources), people spend less time fetching water and are instead able to spend more time selling agricultural products in markets and engaging in other activities (childcare, job hunting, etc.). The ex-post evaluation confirmed an increased in harvests as a secondary effect brought from the reduced water-fetching labor. Details on the activities performed in place of water-fetching are shown in Figure 2. All of the respondents had children. Approximately 97.1% (234 out of 241 respondents) answered, “Children spend less time fetching water after school and more time in studying at home.”



Source: Results of the beneficiary survey

Figure 3 Details of the Alternative Time Use Instead of Fetching Water

3.4.2 Other Impacts

3.4.2.1 Impacts on the Natural Environment

According to the interviews with DG Eau and the beneficiaries, impacts on the natural environment such as problems relating water usage rights, the drying out of boreholes, the excessive use of water, or cases of ground subsidence were not specially observed.

3.4.2.2 Land Acquisition and Resettlement

The interviews with DG Eau and the consultant revealed that because the project facilities were located on common lands for communities, land acquisition and resettlement were not implemented.

3.4.2.3 Other impacts

The interviews with beneficiaries and communes highlighted the promotion of the empowerment of women through the O&M of water facilities as one impact from the Project. Some women announced plans to run as candidates for positions as Level 1 officers and were selected. During the ex-post evaluation, some women proactively involved themselves in O&M of the facilities. Furthermore, 2 out of 10 Level 2 facilities were run by private firms headed by women, and women's involvement in the O&M of the water facilities was confirmed. The interviews with the beneficiaries and interviews with the women involved in the O&M of the water facilities revealed that the Project has further promoted the empowerment of women through O&M by encouraging more women engaged in water-fetching labor to participate in hygiene educational training.

As mentioned above, the ex-post evaluation confirmed that the operational rate of water supply facilities has reached 83.1% effectiveness for Level 1 and 100% effectiveness for Level 2. As a result of the construction of water facilities through the Project, the number of people with continuous access to safe water is estimated to increase by more than 89,000, the target value in 2011. In 2013, two years after the project completion, the number of people who has access to safe water is estimated to increase by 97,000. Therefore, the project objective with regard to the water-served population is considered to be achieved in the targeted areas. The Project had positive impacts by reducing the incidence of water-borne diseases and water-fetching time and labor for women, resulting in more time for women to engage in other economic activities. This project has largely achieved its objective. Therefore, effectiveness and impact of the Project are high.

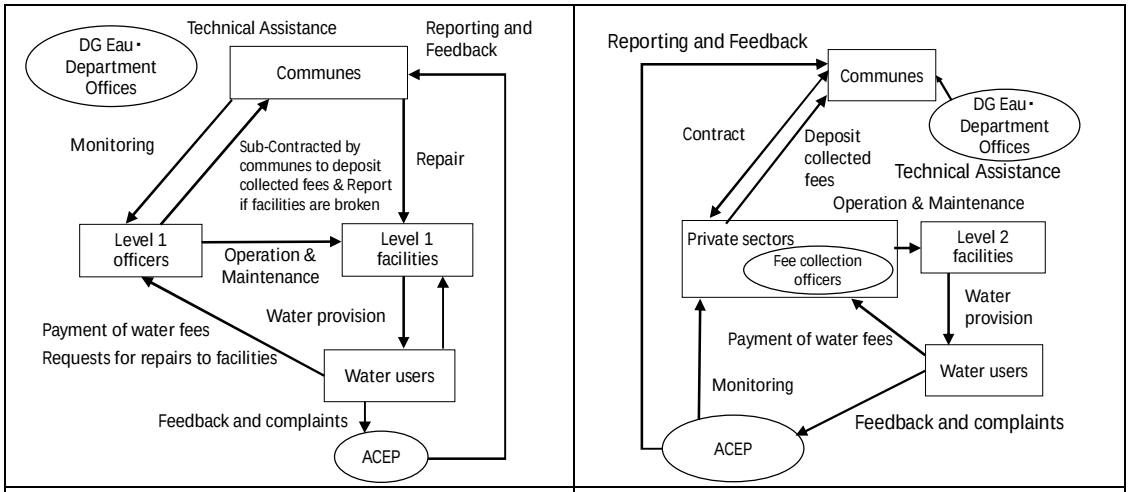
3.5 Sustainability (Rating:②)

3.5.1 Institutional Aspects of Operation and Maintenance

Based on the guideline for communes newly formulated by the Central Government of Benin in December 2008, the prime O&M roles and responsibilities for water supply facilities have shifted from the Central Government to the communes, which are local administrative

governments[21].

During the ex-post evaluation, it was confirmed that the communes play the central role in O&M for both Level 1 and Level 2 facilities. The O&M framework during the ex-post evaluation is shown in Figure 3.



Source: Results of the interviews with DG Eau, the communes, and the beneficiaries

Note: ACEP stands for Water User Rights Unions in English

Figure 3 Operational and Management System for Level 1 (left) and Level 2 (right)

Following are the roles and responsibilities of each stakeholder/actor related to the O&M for Level 1 and Level 2 water facilities.

3.5.1.1 Level 1 Water Facilities

< Communes >

During the project planning stage, it was agreed that the roles and responsibilities of the communes would include the regular monitoring of the O&M of the Level 1 water facilities. The roles changed, however, during the ex-post evaluation, the commune played a major role in the O&M of the water facilities together with the Level 1 officers elected from water users (villagers).

The communes collect water fees collected by the Level 1 officers from water users and the Level 1 officers receive salary from the communes according to their contracts. Salary paid to the officers is sourced from the collected water fees. The rest of the water fees are

[21] O&M water facilities were transferred from the Central Government to the communes in September 2006 to enable DG Eau to implement a decentralization policy along with the national structural adjustment plan. The roles and responsibilities are described in "Decree No.2006-461 issued on September 7, 2006." DG Eau manages the water resources and formulates a national strategic paper concerning the provision of drinking water and treatment of sewage and effluent, with the cooperation of other related agencies. DG Eau also manages the activities mentioned.

used to purchase spare parts, cover repairs, and cover other running costs of the water facilities.

During the period between the project completion and the ex-post evaluation, 82% of the communities[22] were found to have handled water facility failures properly when they occurred. However, as some water facilities were not properly maintained by communes, it was observed that those water facilities were maintained by communities instead of communes. From the interviews with the DG Eau and Service Eau[23] in the five targeted departments, as to Level 1, the Level 1 officers are assigned in each Level 1 water facility and roles and responsibilities of O&M facilities including monitoring are intend to transfer to communes for the future. However, due to a lack of inappropriate personnel or budgets, some of the communes were unable to conduct monitoring regularly and appropriately. The communes facing these problems with O&M firstly need to again recognize their roles and responsibilities in the O&M of their water facilities and then discuss a better and more workable framework for O&M with the residents.

＜Level 1 officers＞

While Level 1 officers were not placed during the project planning stage, it is confirmed that Level 1 officers were selected among the communities and contracted individually with communes on the O&M of water facilities during the ex-post evaluation. The major roles for Level 1 officers are to sell water, collect water fees and pay them to the communes. Some of the Level 1 officers collect water fees whenever water users use water. Others prepare account books and collect water fees on a weekly or monthly basis. The Level 1 officers presumably have a heightened awareness of the importance of collecting water fees, as their own salaries are paid with the fees collected.

< Water users (Community villagers) >

Some officers at Level 1 water facilities in some of the communities formerly had contracts for O&M with the communes, but the communities took up this responsibility because the communes failed to deal with problems arising in facility O&M. Communities that operate and maintain the facilities without commune intervention do not collect water fees from users. Instead they collect necessary repair fees from water users when repairs are needed and purchase spare parts and hire engineers in their networks with the collected money.

[22] 18 out of 22 communities managed by communes where the 1st field study was conducted
[23] Local administrative offices of DG Eau

3.5.1.2 Level 2 Water Facilities

＜Communes＞

During the project planning stage, the Level 2 water facilities were operated and maintained by AUE (Association des utilisateurs d'eau, Water Users Association in English), a body organized by the beneficiaries. However, the water fee collection and financial management system did not function as well as planned and was later replaced by a new framework under which the communes and private firms signed all-in-one contracts where private firms took responsibility for the fee collection and also operated and maintained water facilities. The firms now pay the communes per $1m^3$ of water used as agreed in the contract. The communes pool the fees paid by private firms when a large-scale repair or the purchase of generators for the water facilities is required. During the ex-post evaluation, the same O&M framework was observed for the Level 2 facilities.

<Private firms>

During the project planning stage and the ex-post evaluation, the private firms signed the contracts with the communes on O&M Level 2 facilities. Private firms were generally selected not only by their capacity at O&M, but also by their previous business experiences.

3.5.1.3 Level 1 Water Facilities and Level 2 Water Facilities

＜DG Eau and Service Eau＞

Roles and responsibilities of DG Eau and Service Eau have not changed greatly between the project planning stage and ex-post evaluation: to conduct training for hygiene activities and to provide technical support and advice to the communes. According to Service Eau, at least 1 staff person capable of water facility O&M belongs to each commune and is able to respond to technical problems beyond the capacity of the commune.

< ACEP (Associations des Consommateurs d'Eau Potable, Associations of Potable Water Consumers in English) >

No ACEP was established during the project planning stage, but an ACEP consisting of villagers from surrounding communities (villages) had been set up to monitor the water provision service by the time of the ex-post evaluation. If any issues arose they would communicate to the communes and Service Eau. In some villages where no ACEP had been established, villagers would report any emerging issues to the ACEP at the district level[24]. An ACEP is a voluntary entity/unity and there is no obligation to perform ACEP activities.

[24] The administrative levels in Benin are commune, district, and village (community), in descending order.

< AUE (Association des utilisateurs d'eau, Water users association in English) >

During the project planning stage, the Level 1 facilities were operated and maintained by the AUE. The O&M of Level 2 facilities was not operating or functioning well, and its roles and responsibilities had already shifted from the AUE to the private firms. During the ex-post evaluation, the AUE was found to have discontinued operating for both Level 1 and Level 2 facilities.

Regarding the institutional aspects of O&M framework, while there seemed to be problems/issues with the role of the communes in Level 1 facilities, there was no problem/issue observed for the Level 2 facilities.

3.5.2 Technical Aspects of Operation and Maintenance

3.5.2.1 Level 1 Facilities

During the project planning stage, the O&M for the Level 1 facilities was handled mainly by the AUE with technical support from Service Eau, but the AUE lacked sufficient experience and knowledge in the O&M of water facilities. During the ex-post evaluation, the AUE was no longer operating. When repairs were required, the Level 1 officers sent requests to the communes. Then, engineers who had been trained to a certain standard by the communes were sent to do the repairs. In this way, the standard of skills for O&M was maintained properly.

In the villages where contracts with communes had been cancelled and the O&M of facilities was conducted by the communities themselves, there were cases that engineers who had not been trained or engaged by the communes were requested to repair the water facilities when repairs were necessary. Namely, those engineers who are requested to repair facilities by communities are not necessarily having a certain level of skills and being skillful to maintain properly the facilities developed by the Project. As mentioned above, there remain concerns whether the water facilities will be properly and appropriately operated and maintained by the communities alone in the future. However, according to results of the beneficiary survey and the 1st field study, the communities where the contracts with the communes had been canceled dealt with repairs successfully over the period between the project completion and the ex-post evaluation.

3.5.2.2 Level 2 Facilities

During the ex-post evaluation, the private firms contracted to do the O&M with communes received technical training and advice from the communes, DG Eau, and other donors. Therefore, there was no doubt that those private firms had sufficient skills to engage in O&M appropriately for Level 2 facilities. The interviews with the communes and

private firms confirmed that these private firms have appointed staff in each water facility who collect water fees from villagers. If any problem is confirmed to arise in the facilities, the staff will contact the private firms to ensure that the water facility is repaired by skilled private firms. Furthermore, training on water facility O&M for ACEP members is being conducted by Service Eau. The knowledge on O&M the ACEP members absorb will contribute to ACEP's ability to inform the communes of the accurate information collected by the communities.

Regarding O&M skills, there is concern about the appropriateness of the O&M at some of the Level 1 facilities because engineers not equipped with the skills required by communes are sometimes placed for repairing water facilities by communities.

3.5.3 Financial Aspects for O&M

It is agreed that water fees collected from water users are used to cover necessary expenses for the O&M of water facilities. Current water fees are different for Level 1 facilities and Level 2 facilities but the interview with DG Eau revealed that a plan for nationally unified water fees is being examined. The timing of that is yet to be decided. Details of the financial status of water facilities are shown below.

3.5.3.1 Level 1 Facilities

During the project planning stage, it was estimated that water fees of 10F.CFA per unit (30 liter tub) would have to be collected. During the ex-post evaluation, the same amount was charged as water fees. In the beneficiary survey, 99.5% of the respondents (240 out of 241) answered that they were "satisfied with the water fees." The price is clearly not too high for their budgets. Note that the water fees differ slightly according to the size of measuring tub or the size of the communities (water user population).

During the ex-post evaluation, it was observed that the water fees collected were used for the salaries of the Level 1 officers and for covering the costs for necessary repairs. A necessary repair cost when problems arise are covered by costs collected and paid by Level 1 officers to communes. While water fees are monthly paid to communes and pooled for the O&M of water facilities in 18 of 22 communities[25] visited by the 1st field study, water fees were not regularly collected or pooled in the 4 other communities because Level 1 officers were appropriately placed in facilities. When repairs were needed in the villages that had failed to save fees, the commune could temporarily supplement the repair fees. In some

[25] Twenty-five villages (communities) were visited in the 1st field study. Facilities in 3 out of 25 were operated and maintained by communities. Therefore, 22 villages (communities) operated and maintained by communes were recognized as the total villages (communities) analyzed.

cases, however, the repairs were left undone due to financial constraints in the respective communes. One possible reason for this was the transfer of the facility management role from DG Eau to communes that had failed to secure budgets to play this role. The situation is apparently transitional, however, from the 1st field study, it was confirmed that the communes were aware of the need to secure budget to cover additional costs for monitoring and purchasing spare parts, etc. Budget planning is gradually improving. In three villages where villagers themselves operated and maintained the water facilities without relying on the communes, the water fees were not collected and no money was paid to the communes.

3.5.3.2 Level 2 Facilities

During the project planning stage, it was estimated that fees of 30F.CFA per unit (30 liter tub) would be necessary, and the same amount was actually charged as water fees during the ex-post evaluation. Note that the water fees differ slightly according to the size of the measuring tub or the running cost (for generator or commercial electricity). During the ex-post evaluation, the water fees collected were used/distributed for the following purposes: 1. Salary to the fee collection officers deployed by private firms, 2. O&M savings in case of facility breakdown, 3. Payments to the communes, and 4. Profits to private firms. The water fees collected every month varied, so the allocated amounts would vary as well. There is no financial problem in exchanging spare parts, and when generators need repairs the work is done not only by private firms, but also through financial support from the communes and DG Eau. It was observed that 9 out of 10 Level 2 facilities had been collecting water fees without any issues. One Level 2 facility, however, failed to collect water fees due to user complaints about the amount of water fees.

There were some concerns over the financial aspects of O&M for Level 1 facilities. There were some communities that had established their own O&M systems (3 out of 25 communities) and others that did not pay the communes (4 out of 25 communities). They are not saving enough to sustainably operate and maintain their water facilities, so they may fail to repair the facilities due to lack of money for repairs. There was a case when a facility needed repair and the commune temporarily supplemented the repair fees for the community. However, temporal financial issues are confirmed in communes that were unable to respond to the recent transfer of the facility management role from DG Eau to the communes. Moreover, as water users in 1 facility out of the Level 2 facilities have many grievances against water fees, water fees have not been appropriately collected. This is considered a problem for the sustainability of the water facilities. If major facility repairs are needed, a lack of maintenance and repair budget might be a crucial issue. There is an urgent need for discussion between the communities and communes, but first the communes

need to explain about water fees and persuade the communities to agree to water fees to be newly established (keeping in mind that the Benin Government is planning to unify the fees). When the water fees are unified nationally and the communities agree to pay through discussion on the water fees with the communes, it is very possible that maintenance costs can be secured for the repair of water facilities in the future.

3.5.4 Current Status of Operation and Maintenance

As was noted in "3.3 Effectiveness, 3.3.1.1 Operation Indicators," the operational rates for Level 1 and Level 2 are 83.1% and 100%, respectively.

3.5.4.1 Level 1 Facilities

According to the 1st field visit, the results of the beneficiary survey, and telephone interviews with the communes, 103 out of 124 facilities (Level 1) were handling O&M very well and the facilities were in good operational condition.

On the other hand, 21 facilities were not operational. The major reasons for this are: the communes have not conducted appropriate monitoring; lack of communication from Level 1 officers to the communes; delays in responding by the communes; lack of budget for repair due the embezzlement of collected water fees by some Level 1 officers.

Out of these 21 communities, 16 had identified the breakdown problem properly and promptly communicated them to the communes and were still waiting for repairs. On the other hand, it is confirmed that when water facility problems arose in the remaining 5 communities, both the communes and Level 1 officers were unable to respond to the problems appropriately. It is clear that the level of capacity and awareness on O&M amongst communities and communes varies.

As a result of the implementation of soft components, training in hygiene awareness and technical skills for monitoring has been conducted for the communes by DG Eau and other donors. When the facilities have breakdowns, Level 1 officers contracted with the communes directly inform the communes of the breakdown so that the communes can arrange engineers for repairs. In regard to changing spare parts, some tiny repairs are done by the Level 1 officers and other repairs requiring higher skills are handled by the communes, depending on the parts and the cost. The details are agreed in writing in their contracts.

3.5.4.2 Level 2 Facilities

It is confirmed that technical training for the private firms that deal with the O&M of 10 Level 2 facilities was conducted by DG Eau and Service Eau. The private firms agreed to submit monthly reports on the O&M and pay the collected fees to the communes.

The following summarizes the progress made in solving some of the problems that arose during the project completion

- Spare parts, including generators, can be purchased at the central town of each department or Cotonou.
- Although the budgets for monitoring staff and activities apart from the general budgets were not secured appropriately by Service Eau, but at least 1 staff person who conducts the educational activities and budget were secured for O&M water facilities.
- As a result of hygiene awareness training conducted by the communes, people's awareness about hygiene has been elevated and the hygiene environment has improved.

As mentioned above, most of the O&M for Level 1 facilities was progressing well without major problems during the ex-post evaluation, but some Level 1 facilities were non-operational. Problems arose, because some of the communes and Level 1 officers were not properly performing their roles or meeting their responsibilities. There were no O&M issues raised for the Level 2 facilities apart from one facility where the water users were unwilling to pay the water fees.

Some minor problems have been observed in the institutional, technical, financial and current status of operation and maintenance of the water facilities. Therefore, the sustainability of the project effects is rated as fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The objective of this project is to increase the number of people with reliable access to safe water in the five targeted departments in rural Benin (Collines, Zou, Couffo, Mono and Ouémé) by constructing water facilities, and thereby improve the standard of living in these departments. This project has been highly relevant to the Benin's development plan and development needs, as well as Japan's ODA policy, so its relevance is high. The efficiency of both the project cost and project period were within the plan and the efficiency of the Project is high. The ex-post evaluation confirmed that the operational rate of deep wells with hand pumps (hereafter Level 1) and small-scale water supply facilities (hereafter Level 2) developed by the Project has exceeded the 80% target value. Furthermore, it is confirmed the number of people who had access to safe and stable water increased by approximately 89,000. Improvement of hygienic conditions due to the provision of safe water and reductions in water-borne diseases and water-fetching labor were confirmed as positive impacts, resulting in improved school enrollment rates and an improved standard of living amongst women. Accordingly, the effectiveness and impacts are high. The operational rate for water facilities is very high (83.1%

for Level 1 and 100% for Level 2), and it is summarized that almost all of these facilities are properly maintained. However, small problems were observed in operation and maintenance (hereafter O&M) with regard to the institutional, technical, and financial aspects for Level 1, and to the financial aspect for Level 2. There is clearly still room for the Government of Benin to improve the capacity to manage the facilities, and thus the sustainability of the effect is rated as fair.

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

4.2 Recommendations

4.2.1 Recommendations to the Implementing Agency

One of the Level 2 facilities has a financial concern because water fees were not collected as planned due to user dissatisfaction with the increased water fees. The implementing agency is in a position to set the water fees, so it is recommended that the implementing agency work with the communes to identify the cause of the failure to collect water fees. The appropriate water fees water users are willing to pay should be examined together with communes. Water fees that are to be revised should be determined based on the result of the verification. The implementing agency needs to analyze the results of monitoring conducted by the communes to verify the relevance of the new water fees.

4.2.2 Recommendations to the Communes

Issues and concerns on inappropriate water facility O&M, such as delays in the commune responses when problems arise, appropriate deficiency management of water fees collected, and insufficient timely communication with the communes were confirmed in some communities. These issues and concerns can be attributed to a failure by the communes to fulfill their O&M roles and responsibilities due to a lack of necessary staff and budget. Thus, the communes need to secure budgets and allocate staff appropriately to improve the current O&M status and framework. Eventually, the O&M framework and status are expected to be established as planned. Water is essential for everyday life: when a facility breaks down, urgent responses by the communes are mandatory.

In addition, as was mentioned in the recommendations for the implementing agency, one of the Level 2 facilities has an issue with collecting water fees from water users due to user complaints about the water fees. The commune needs to explain the water fees to the users and persuade them to pay them, keeping in mind that the Benin Government is planning to unify the fees in the future.

4.2.3 Recommendations to JICA

None.

4.3 Lessons Learned

High operational rate of the water facilities by adopting a functional O&M framework

During the ex-post evaluation, the operational rate of water facilities reached 83.1% for Level 1 and 100% for Level 2. One of the factors encouraging the boosting of the rate to more than 80% is classification of the roles and responsibilities of each stakeholder. This contributed to the proper functioning of the O&M framework. For example, due to the promotion of national decentralization in Benin, the O&M framework for the water facilities has been reviewed and the communes have played major roles in the O&M of Level 1 and Level 2 facilities. In Level 1 facilities, each community deals with the daily O&M. When problems beyond the capacity of the communes arise, the DG Eau and Service Eau will provide technical support. Expert and technical knowledge is vital for the O&M of Level 2 facilities. The outsourcing of O&M to private firms who met the levels required by the communes contributed to the 100% operational rate reached in Level 2. The communes recognize their role and responsibilities in the O&M framework and clarify the responsibilities and role-sharing between the stakeholders. This has helped the O&M framework become operational and functional. The high operational rate of the water facilities was brought about by the adoption of a workable O&M framework reflecting each stakeholder's capacity and skills. Therefore, when similar water supply projects are planned in the future, the stakeholders' roles and capacities should be analyzed during the project planning stages in order to establish workable and practical O&M frameworks with the implementing agencies playing the central role. In light of this, the Project can serve as a good model for future projects.

Response of the implementing agency and JICA when in the government's organizational reform

Due to the process of national decentralization, the major O&M role for the water facilities shifted from DG Eau to the communes during the project implementation. During the ex-post evaluation, among the communes that controlled the non-operated Level 1 facilities (16.9%), it was confirmed that some communes were unable to secure the budgets and staffs necessary for operating and maintaining water facilities due to the decentralization. This is because the communes were not positioned under DG Eau, the implementing agency, when the O&M role shifted from DG Eau to the communes. DG Eau could therefore not intervene to help the communes formulate personnel and budget plans. When the reform of an implementing agency causes the transfer of O&M roles to another agency during a similar case in the future, the implementing agency should support the formulation of O&M plans in order for the new agency to secure appropriate budgets and personnel. When an implementing agency and an agency with roles and responsibilities in water facility O&M are not the same agencies during a transfer of

O&M, the implementing agency should give as much necessary advice as it can for better planning for the O&M. The implementing agency should also push the newly appointed agency to formulate O&M plan and secure the necessary budgets.

During the Project, the project consultant advised the implementing agency that water facility O&M contracts should be concluded between the private firms and communes at an early stage. The consultant, however, did not approach the communes directly regarding this matter. The communes are not in the direct contact with the implementing agency, and the consultant did not have a right to make suggestions directly to the communes. Assuming that implementing agencies are reformed when implementing projects in the future and that advice from implementing agencies and consultants regarding appropriate staff allocation and budgets is necessary for the newly appointed organizations who are to operate and maintain water facilities, the following actions are necessary: in order for the newly appointed organizations to operate and maintain water facilities appropriately, JICA needs to inform the newly appointed organizations about the significance of cooperation between the Government of Japan and the government of the recipient country, and also thoroughly explain the roles and responsibilities involved in the O&M of water facilities; and moreover, JICA should recommend the newly appointed organizations to get exact advice concerning the plan of O&M facilities from an implementing agency or consultant where necessary.

(End)

Republic of Benin

Ex-Post Evaluation of Japanese Grant Aid Project

"The Project for Construction of Primary Schools in the Republic of Benin (Phase IV)"

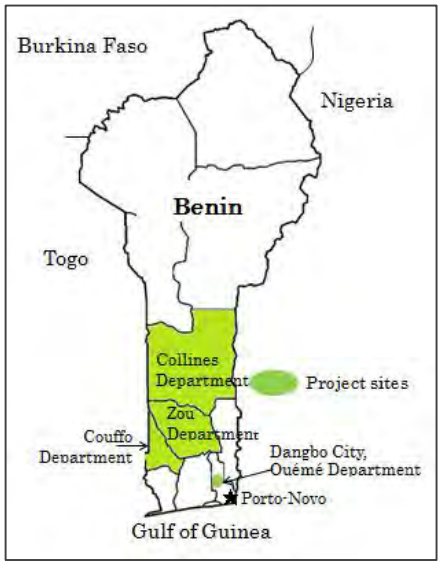
External Evaluator: Hisae Takahashi, Ernst & Young Sustainability Co., Ltd.

0. Summary

In order to improve the educational environment in target schools in Benin, this project constructed classrooms and toilet booths, procured school furniture, and established adequate systems for the management, operation, and maintenance of schools and school facilities. Benin has been working to improve access to primary education. However, the rapid increase in the number of students led to a shortage of classrooms. Moreover, many classes had to be held in poor-quality classrooms, leading to a serious deterioration in the educational environment in the country. The implementation of this project has therefore been highly relevant to Benin's national policy, their needs, as well as Japan's aid policy toward Benin. Although the project cost was as planned, the project period exceeded the plan due to the longer period required for the material procurement and cash flow of the contractors, as this was the very first Grant Aid for Community Empowerment Project implemented in the country. Therefore, the efficiency of the project is rated as fair. Furthermore, the construction of school facilities and procurement of desks and chairs helped increase enrollment numbers and decrease the number of students per classroom, and also improved both the education and hygiene environments. They also significantly helped reduce the financial burden and work hours required for the Operation and Maintenance (O&M) of facilities. It was also acknowledged that the training conducted under this project improved the understanding of the concept and importance of O&M for school facilities among the people engaged in the O&M of schools. Improved enrollment numbers and completion rates for girls were also confirmed as impacts, as well as an increased motivation to study. The effectiveness and impact of the project are therefore rated as high. As for the institutional aspect on O&M, issues have been observed in lack of teachers and staff of Inspector Office (Circonscription Scolaire: CS), and in understanding of reporting procedure regarding O&M of school facilities. From a technical viewpoint, the effective use of O&M manuals for related facilities and understanding of the O&M costs are expected in the future. Therefore, the sustainability of the project effect is fair.

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

1. Project Description



Project Locations

Classroom Built under This Project
(Sodohome primary school, Zou department)

1.1 Background

The Republic of Benin (Benin) identified the education sector as a necessary sector for improving the basic social life of the country and was working to improve the enrollment rate and quality of education. At the project planning stage, Benin introduced a "10 year Development Plan for education sector" (PDDSE: 2006-2015) in cooperation with the major donors and allocated 23% of the national budget for the education sector. The Government of Japan provided three phases of grant aid (construction of classrooms of primary schools, etc.) and contributed to measures to improve access to education. In fact, the gross enrollment rate of primary education in Benin increased drastically to 99% in 2004.

On the other hand, the sharp increase in the number of students caused a shortage in the number of classrooms and overcrowding, and many schools had to give classes in poor-quality classrooms built of sun-dried bricks or wood. This deterioration of the educational environment led to decreases in the quality of education and affected the enrollment rate, and the Government of Benin lacked funds to construct sufficient school facilities. Under these circumstances, the Government of Benin requested the Government of Japan to provide grant aid to rebuild primary school classrooms. The Government of Japan implemented this project using Grant Aid for Community Empowerment[1] (hereafter referred to as "Community Grant Aid") based on the result of an earlier study conducted to investigate the feasibility of having local contractors construct primary schools with low-cost designs according to the local

[1] Grant Aid for Community Empowerment is a grant aid program established in fiscal 2006 to support comprehensive capacity development of communities facing threats to human life and safe living such as poverty, hunger, and disease. To reduce costs, the program is implemented using local contractors, equipment, and materials based on local specifications and designs.

specifications, in response to requests from the Government of Benin, the general demand for classrooms and education policy guidance in Benin.

1.2 Project Outline

The objective of this project was to improve the educational environment in target schools in Benin by constructing school facilities such as classrooms, offices for school heads, and toilet booths, providing school furniture and a soft component for school management, the operation and maintenance of school facilities, and school health, and to thereby improve enrollment rates in the target area (Couffo department, Zou department, Collines department, and Dangbo city in Ouémé department).

Grant Limit / Actual Grant Amount	1,030 million yen / 1,030 million yen
Exchange of Notes Date	December, 2007
Implementing Agency	Ministry of Preschool and Primary Education (Ministère de l'Enseignement Maternel et Primaire) (MEMP)
Project Completion Date	June, 2011
Main Contractor(s)	15 construction companies, 8 furniture companies
Main Consultant(s)	Procurement Agent: Japan International Cooperation System (JICS) Facility Construction: Ecoplan Sarl Soft Component: (Management) JICS, (Operation) World Education
Basic Design	September, 2007
Detailed Design	July, 2008
Related Projects	"Project for Primary School Construction" Phase I - Phase III and Phase V: Construction of classrooms and the incidental facilities, and material procurement" Phase I (1996) Mono Department, Atlantique Department Phase II (1997-1999) Borgou Department, Atakora Department, Zou Department and Ouémé Department Phase III (2003-2005) All Departments in Benin Phase V (2012-2015) Atakora Department and Donga Department

2. Outline of the Evaluation Study

2.1 External Evaluator

Hisae Takahashi, Ernst & Young Sustainability Co., Ltd.

2.2 Duration of Evaluation Study

Duration of the Study: October, 2014 – September, 2015

Duration of the Field Study: January 11 – January 30, 2015 and April 5 – April 10, 2015

2.3 Constraints during the Evaluation Study

- The project site covers a wide geographic area of three departments and one city. The 51 target schools are scattered across this area. To understand the whole context of the situation and perform the evaluation efficiently, the External Evaluator conducted site visits mainly at the Couffo and Zou departments, where 80% of the target schools were located. The site visits in the other departments were carried out mainly by local consultants.
- Although attempts were made to collect the basic data on the target schools necessary for an analysis of effectiveness (capacity of students in solid classrooms, total number of students, number of students per classroom), no reliable data could be obtained from the Implementing Agency during the planning stages or at the ex-post evaluation. The analysis for this ex-post evaluation was therefore carried out using data for the target departments/city. Qualitative information obtained through the interview survey conducted during the site visits and beneficiary survey was used as complementary information.

3. Results of the Evaluation (Overall Rating: B[2])

3.1 Relevance (Rating: ③[3])

3.1.1 Relevance to the Development Plan of Benin

Benin's development policy at the planning stage, the "Growth Strategy for Poverty Reduction" (Stratégie de Réduction de la Pauvreté) (SCRP)(2006), aimed at poverty reduction and defined the following as priority sectors that contribute to poverty reduction: education, basic healthcare, social-infrastructure improvement, rural development, economic revitalization, administrative reform and decentralization, social security, and the maintenance of public order. Within the education sector, the policy declared that primary education was the highest-priority category and emphasized that the most important issue was to provide all students of school age with access to educational opportunities. "The third Growth Strategy for Poverty Reduction (SCRP) (2011-2015), the development policy in place during the ex-post evaluation, identified "continuous acceleration of growth and economic reform," "basic infrastructure development including the sanitary sector," "reinforcement of human resources," "enhanced quality of governance," and "equal and sustainable growth" as essential frameworks and recognized the education sector as an important sector for the "reinforcement of human resources."

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

The “10 year Development Plan for education sector” (PDDSE: 2006-2015), a plan formulated with a basic framework reflecting policy guidance for the education sector such as SCRP, prescribed a basic policy of improving the quality of education and promoting education for all students up to the sixth grade of primary school. “Free preschool and primary education” (2006) had also been implemented in Benin. These sector plans were still underway at the time of the ex-post evaluation.

As such, the implementation of this project and the project’s aims of increasing enrollment in the target area through the construction of school facilities to improve the educational environment were highly relevant to the country’s development plan and education sector plan both at the planning stage and during the ex-post evaluation.

3.1.2 Relevance to the Development Needs of Benin

In the planning stage, the net enrollment rate of primary education in Benin increased to 94% (2005) through the efforts of the Government of Benin to improve the enrollment rate and quality of education. However, a rapid increase in the number of students led to a shortage of classrooms and serious overcrowding. This deterioration of the educational environment decreased the quality of education and affected the enrollment rate. Under this circumstance, PDDSE declared that it would be necessary to construct 25,000 classrooms over the 10-year period leading up to 2015. The national budget, however, was insufficient to fund the construction of the target number of school facilities. Support from the Government of Japan and other donors was therefore requested.

As a result of the implementation of free primary education and measures to reduce the gender and regional gaps, the net enrollment rate in primary education had increased to 98% as of the ex-post evaluation. On the other hand, 13,720 out of the 25,000 classrooms required under the PDDSE had been constructed by 2013; that is, there was still a shortage of 11,280 classrooms (see Table 1). There was therefore a strong and persistent need to construct classrooms and supply them with accompanying furniture at the time of the ex-post evaluation.

The target area of this project was selected by the Implementing Agency based on the enrollment rate and shortage of classrooms. During the selection process, priority was given to the departments and cities that still had significant shortages of classrooms in the area where Phases I to III of the Project for Primary School Construction had been implemented in the past. This was in line with local needs and therefore rated as relevant.

Table 1　Number of Classrooms Constructed After 2007 in Benin

(Unit: Number of classrooms)

Year	2007	2008	2009	2010	2011	2012	2013	Total
Number of classrooms	1,565	1,144	1,359	2,212	3,648	915	2,877	13,720

Source：Documents provided by MEMP

3.1.3 Relevance to Japan's ODA Policy

In order to assist Benin's efforts to reduce poverty during the planning stage, Japan set the basic human needs as priority sectors. Specifically, these were sectors that contributed to improved living conditions for community residents, including the education, water supply, sanitation, health, and medical care sectors.[4] This project implemented the construction of school facilities and provided technical assistance (soft component) for O&M, school health, and the improvement of hygiene conditions. This project was therefore consistent with Japan's aid policy toward Benin, which designates the education sector as a priority sector.

Therefore, this project has been highly relevant to the Benin's development plan and development needs, as well as Japan's ODA policy. Therefore its relevance is high.

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

【Japanese Portion】

This project constructed solid classrooms, offices for school heads, and toilet booths built of concrete block at 51 schools in three departments and one city. As shown in table 2, the number of target schools increased by six, hence the actual number was 106% compared to the plan. This increase was funded with remaining budget as a result of tender, so the change was both efficient and effective. The additional target schools were selected by the Implementing Agency based on basic data from the targeted city and three departments regarding access to primary education, including enrollment rates, and classroom sufficiency rates. The judgment was therefore in accordance with the local needs. As for the school furniture, the procurement was conducted for newly constructed classrooms as planned as shown in table 3. Furthermore, the soft component provided in this project for the school officials, parents associations, community leaders (training for school management, O&M of school facilities, and improvement of school health and hygiene conditions) was conducted as planned.

[4] Official Development Assistance (ODA) Data Book by country 2007

Table 2　Planned and Actual Output (Facilities)

Department/City	Items	Planned	Actual	Difference
Couffo department	Number of target school	17	17	As planned
	Classrooms	92	92	
	Office of school head	17	17	
	Toilet／Toilet booths	12／48	12／48	
Zou department	Number of target school	19	19	
	Classrooms	93	93	
	Office of school head	11	11	
	Toilet／Toilet booths	16／64	16／64	
Collines department Dangbo City, Ouémé department	**Number of target school**	**9**	**15**	**6 schools more than planned**
	Classrooms	**46**	**64**	**18classrooms more than planned**
	Office of school head	9	9	As planned
	Toilet／Toilet booths	7／28	9／36	2toiltes・8toilet booths more than planned

Source：Documents provided by JICA

Table 3　Planned and Actual Output per School (School furniture)

	Name of furniture	Planned	Actual
Classroom	Desk and chair for students	25 set	As planned (the total number was increased because an increased number of classrooms were constructed)
	Desk and chair for teachers	1set	
	Blackboard (fixed)	1for front and 1 for back of the classroom	
	Blackboard (mobile)	1	
	Build-in cabinet	1	
Office of school head	Desk and chair for school head	1set	
	Chair for meeting	4	
Storage room (in school head's Office)	Build-in cabinet	1set	

Source：Documents provided by JICA

【Benin Portion】

The Benin Portion, including the cost for implementation of the soft component and removal of vacated buildings in the areas where classrooms were constructed, was carried out as planned (see Table 4).

Table 4　Major Output (Benin Portion)

Output	Planned	Actual
Implementation of soft component	1set (4,000CFA)	As planned
Removal of existed building	1set (114,000CFA)	

Source：Documents provided by JICA

3.2.2 Project Inputs

3.2.2.1 Project Cost

The actual project cost covered by the Japanese side was as planned, at 1,030 million yen, the exact amount from the Exchange of Notes (100% of the plan). The total planned project cost, including the 28 million yen Benin portion, was 1,058 million yen. It turned out to be difficult, however, to compare this planned total with the actual total, because Benin's expenditure records could not be obtained. However, given the fact that Benin's component was implemented as planned without any problem, it was recognized that an amount equivalent to the planned cost was disbursed (see 3.2.1 "Output").

3.2.2.2 Project Period

The project took a period of 36.8 months from April 10, 2008 to June 9, 2011. This was longer than the 28-month period planned for all phases of the project, including the detailed design stage and tender period (131% of the plan). This extension in the project period was mainly caused by "delays in material procurement," "delays in construction due to deteriorated cash flow of the contractors," and "work delays during the rainy season":

- Delays in material procurement

  This project proactively used local materials in accordance with the intent of the Community Grant Aid. After the project started, the timber planned for the roofs could not be procured as scheduled due to reduced amounts available in the domestic market. Although alternative timber was procured, this change resulted in a three-to-four-month delay. In the "Project for Primary School Construction (Phase V)," subsequent project implemented with Community Grant Aid, the project decided to use steel material for roofing based on the experience from this project.

- Delays in construction due to deteriorated cash flow of the contractors

  In accordance with the intent of the Community Grant Aid, many local contractors were hired to construct the classrooms. Many of these local contractors were small-scale entrepreneurs, who faced cash-flow problems for paying wages due to poor finance capacities. The delays in wage payment by the contractors to their workers delayed the construction. The relatively ambiguous selection criteria for local contractors at the planning stage were a major factor underlying this issue. The project implementers attempted to alleviate this issue during the project by changing[5] the payment condition for contractors and taking various other steps. In the "Project for Primary School Construction (Phase V)," meanwhile, the project expanded the sizes of the lots and

[5] Six payments during the construction period were initially planned. Yet there were many cases where delays in payments to subcontractors and workers led to suspension of work. The frequency of payment to contractors was therefore increased to prevent cash-flow problems from delaying the project. (Based on the interview survey with the procurement agent of this project)

considered financial capacity as a criterion for local contractor selection based on the experiences from this project.

- Work delays during the rainy season
  Work delays in the rainy season prolonged the project period because the impacts of the rainy season had not been fully reflected in the work schedule. In the "Project for Primary School Construction (Phase V)", a longer construction period was scheduled to include the rainy season.

As mentioned above, the most of the delays were attributed to the fact that the project was the first Community Grant Aid project in the country. The scheme encouraged the use of local contractors and materials based on local specifications and designs in order to reduce the cost and improve efficiency. The local contractors involved in construction and procurement in this project were therefore often small and faced difficulties with financial capacity and cash flow. The scattering of target schools over this wide area posed considerable challenges to the technical manager and local consultant who supervised the project construction, both of whom were based in the capital city[6]. As above, the experience in this project provided valuable guidance for the implementation of the "Project for Primary School Construction (Phase V)".

As above, although the project cost was as planned, the project period exceeded the plan. Therefore, efficiency of the project is fair.

3.3 Effectiveness[7] (Rating: ③)

At the planning stage, no operation and effect indicators were defined clearly except the two output indicators: "capacity of students in solid classrooms" and "number of toilet booths." These indicators shown at the planning stage were recognized as outputs of the project, while the basic operation and effect indicators for the construction and renovation of school facilities ("total number of students" and "number of students per classroom") were used for the analysis. The information and results obtained through the interview survey and the beneficiary survey[8] were also used for the analysis, since the basic data on the target schools could not be obtained for the reasons described in "Constraints during the Evaluation Study."

[6] Under this project, the procurement agent assigned the Japanese technical manager, and the detailed design and the construction works were supervised by the local consultant.
[7] Sub-rating for Effectiveness is to be put with consideration of Impact.
[8] Beneficiary surveys were conducted at the target schools in Couffo Department (5 schools), Zou Department (6 schools), Collines Department (2 schools), and Dangbo City in Ouémé Department (2 schools) via interview survey using questionnaires with a total of 223 concerned parties (school heads/teachers (38), parents associations/community members (35), students (150)).

3.3.1 Quantitative Effects

3.3.1.1 Number of Students Newly Enrolled

The Implementing Agency was requested to provide reliable data on the number of students newly enrolled after the project, but this data which only covered the target schools was not organized, thus could not be obtained at the ex-post evaluation. However, according to the interview survey with the Implementing Agency, CS, target schools, and parents associations, many schools had to give classes to students of several different grades together or classes outdoors under trees, due to the lack of classrooms before the solid classrooms were built by this project. The number of classrooms constructed at the target schools under this project was sufficient to accommodate one classroom for each grade of students, so it was concluded that the number of students had increased. Furthermore, as mentioned above, the project constructed 249 classrooms at 51 schools. Given that one classroom has the capacity to accommodate 50 students, the new classrooms allowed the target schools to accept 12,450 new student enrollments. Because it was also confirmed that the constructed classrooms were utilized effectively at the ex-post evaluation, the project was recognized to have contributed to an increase in the number of accepted students.

In the results of the beneficiary survey as well, all of the school heads and teachers who responded to the question about the increase in number of accepted students after the project implementation responded that the number of students at their schools indeed increased[9].

3.3.1.2 Number of Students per Classroom

By the construction of new classrooms, the number of students per classroom dropped from an average of 69 at the planning stage to 48 in the project completion year, as shown in table 5. Later it increased slightly to 51 with the increase in enrollment, according to the result of the ex-post evaluation (see Table 5). However, considering that the number dropped compared to the number at the planning stage, the project can be judged as having contributed to the alleviation of classroom congestion in target schools to some degree. Moreover, the project could meet the national standard of 50 students per classroom, according to the Implementing Agency. In fact, it was confirmed that more than 51 students were studying in classrooms at some of the schools visited due to the increasing numbers of students. However, some of the primary schools in remote areas with fewer students were included in the calculation of the average. Thus, the average number of students per classroom is counted as 51.

[9] Regarding the acceptable number of students, 82% of the respondents answered “significantly increased” and 18% answered “increased.”

Table 5 Number of Students per Classroom

	Baseline	Target	Actual	Actual
	2007		2011	2014
	Baseline Year		Project Completion Year	3 Years After Completion (Ex-post evaluation)
Number of students in one classroom				
Couffo Department	83	None	57	55
Zou Department	64		44	48
Collines Department	69		51	54
Ouémé Department /Dangbo City	60		39	45
Average	69		48	51

Source：Documents provided by the Implementing Agency

3.3.2 Qualitative Effects

3.3.2.1 Improvement of Learning and Teaching Environments

The construction of solid classrooms and the procurement of school furniture helped improve the learning and teaching environments for students and teachers. According to the interview surveys with teachers, staff, parents associations, and community leaders, almost all of the schools had given classes in simple wooden classrooms or outdoors under trees before the construction of solid classrooms under the project. The classes were affected by the weather and could not be held on rainy or extremely hot days. In addition, many students had to use unstable desks and chairs in their classes, or had to sit on stones or the ground without adequate desks or chairs. After the project, it was heard that the classes could be held in good environments because the classrooms constructed by the project enabled them to hold classes without impacts from the weather. The classrooms received good sunlight, had good air flow even on hot days, and had new school furniture.

In the results of the beneficiary survey as well, all of the students, parents associations, school heads, and teachers who responded mentioned that the conditions were improved compared with before the project implementation, and that they were satisfied with the current learning and teaching environment. The same respondents also explained that learning and teaching in the new, clean, and comfortable classrooms with new desks and chairs helped to significantly improve the educational environment.

3.3.2.2 Improvement of Hygiene Conditions

The construction of toilets and classrooms and the implementation of the program to improve school health and hygiene (soft component) at the target schools contributed to improve hygiene conditions at the primary schools, as below:

- Effect of the construction of toilets

From the results of the interview survey at the primary schools, the construction of toilets was found to have effects such as the following: “The number of boys who relieve themselves on the school grounds or in the bushes around the school dropped, and the bad smell decreased” and “Fewer students have diarrhea.” In the results of the beneficiary survey as well, all respondents (only at the schools where toilets were constructed) said that the construction of toilets had improved the hygienic environment.

・ Effect of the construction of the classrooms

At the planning stage, an improved hygienic environment at the school was expected as an effect of the construction of toilets. In fact, the results of the interview survey showed that the construction of classrooms helped improve the hygienic environment, in addition to the construction of toilets. Prior to the implementation of this project, the simple classrooms did not have concrete floors, which caused hygienic problems such as “soil dust in the classroom,” “got injured in the foot,” and “feet got dirty with mud.” The school buildings with concrete floors constructed by the project significantly improved the classroom environment.

・ Effect of the program for the improvement of school health and hygiene condition

As for the soft component of this project, an awareness-raising campaign was conducted for teachers, parents associations, and community leaders in order to implement the health and sanitary activities in the schools. Regular health and sanitary improvement activities were implemented at almost all of the schools visited at the ex-post evaluation. The activities included “encouraging hand-washing before eating and after using the toilet,” “teaching the proper use of toilets,” “instruction on the routine cleaning of classrooms and toilets,” and “giving hygiene advice to people selling food and snacks on the school compound.” In the rural area in the country, the appropriate use of toilets and correct hand-washing practices before and after meals were not commonly taught in the home. There was therefore a high possibility that toilets were used improperly without health and sanitary instructions at the schools even after the toilets were constructed. According to the interview survey with the Implementing Agency and school staff, the effects of the implementation of the soft component of this project as well as the activities conducted in cooperation with the Implementing Agency, Ministry of Health, NGO, and United Nations Children’s Fund (UNICEF) were considered to have contributed to the continuous implementation of these activities.

3.3.2.3 Capacity Building of Organization in Charge of School Management and O&M

As part of the soft component, this project established the committee of school maintenance (CME) at the target schools with an expectation of establishing an O&M system for maintaining facilities and school furniture in the long-term, activating school

health activities, and building a sense of ownership in the communities surrounding the schools.

Although CMEs were functioning as organizations at fewer than half of the schools visited at the ex-post evaluation, both schools and parents associations understood the importance of O&M of the school facilities from their experience in the project, and almost all of the schools implemented regular O&M with cooperation from the parents associations. For example, the cleaning of high ceilings, a necessary O&M task for the solid classrooms, was implemented regularly, while tasks that had previously been common in Benin such as the annual rebuilding[10] of classrooms or frequent repairs of broken fixtures, etc. became unnecessary. There were also systems established to clean sediment in the rainy season, to take care of the flowerbeds, and to receive cooperation from surrounding communities when issues occurred at many of the schools. Thus, though CME did not continue their functions in the form of the committee at target schools, the school staff and parents associations came to commonly recognize the importance of O&M of the solid classrooms, a task not experienced prior to the project, and were incentivized to establish a cooperation system through the effects of this project. The low number of schools with functioning CMEs was attributed to failure of the schools and parents associations to recognize that the new organizations were created.

3.4 Impacts

3.4.1 Intended Impacts

The following impacts were expected at the time of planning as an indirect effect of this project implementation:

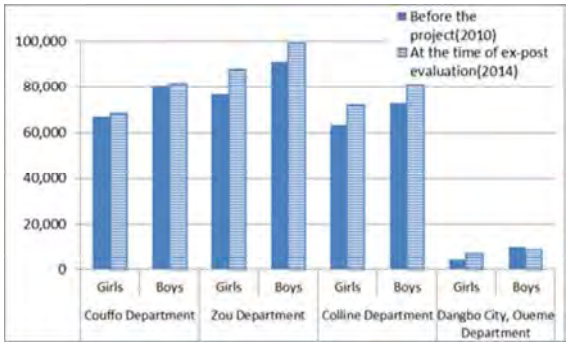
- An increase in the enrollment number of girl students was expected due to the improvement of the hygiene environment of the primary school by the construction of classrooms and toilet booths. By reducing the financial or non-financial burden of parents and communities for repairs to the simple school building - thereby improving their economic condition - it was expected to alleviate household work which was one of the reasons inhibiting girls from continuing school, and therefore increase the continuous enrollment rate of girls.
- The cost for the repair and maintenance of facilities was expected to be reduced by the construction of classroom wings designed with improved durability and strength.

The following were confirmed through the ex-post evaluation:

[10] It is considered necessary to rebuild school buildings annually or once every few years because simple school buildings built with straw or sun-dried brick, the common building materials in the country, are damaged easily.

3.4.1.1 Increase in the Enrollment Number and Completion Rate of Girls

As shown in Figure 1, the primary school enrollment numbers increased at the time of the ex-post evaluation compared with before the project implementation in all target departments and city. It also indicated that the rate of increase in the enrollment number of girls was higher than that of boys. In the results of the beneficiary survey as well, all responses from school heads, teachers, and parents associations cited that the number of girl students increased compared with before the project implementation. It was also confirmed that the completion rate of girl students at the time of the ex-post evaluation improved in the target departments and city as indicated in Figure 2. Although the completion rate of girl students was still lower than that of boy students, the rate of increase in the completion rate of girl students was higher than that of boy students. According to an interview survey conducted with the Implementing Agency and school staff, the construction of solid classrooms and toilets and provision of school furniture by the project improved the educational and hygiene environments, which allows parents to send girls to school without worries. In addition, girls developed a motivation to study and attend schools with clean classrooms, which is believed to have contributed to the improvement of the enrollment number and completion rate of girls.



Source: Documents provided by the Implementing Agency

Figure 1. The Number of Enrolled Students at Primary Schools in Target Departments/City

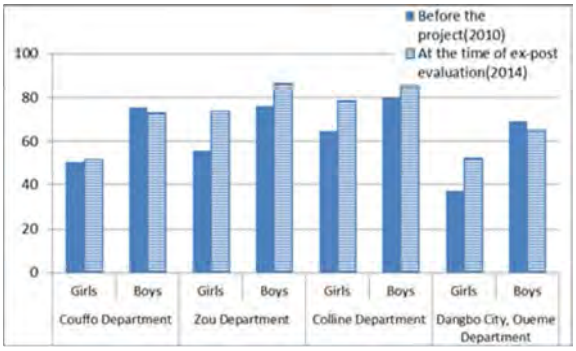


Figure 2. The Completion Rate of Primary Schools in Target Departments/City

On the other hand, many opinions were heard that free primary education policy and awareness raising activities for improving girls' enrollment conducted by the Implementing Agency also played a significant role in improving the enrollment number and completion rate of girls. Therefore, in terms of the increase in the enrollment number and completion rate of girls, the impact was considered to be brought about not only by the project but as a synergistic effect with other activities implemented by the Government of Benin and the Implementing Agency. As for the impact and effect of the project on the "alleviation of household work while reducing financial burden of parents for O&M," which was expected

at the time of planning, could not be confirmed through the interview survey, and thus considered to be limited.

3.4.1.2 Reduction of O&M Cost

According to the interview survey at the schools visited, the financial burden of parents associations for repairs to classrooms was significantly reduced at almost all schools after the construction of solid classrooms. For example, at a school which was using simple classrooms as shown below, parents association collected and donated roughly 100,000 – 120,000 West African CFA franc[11] (CFA) (approximately 20,000 – 25,000 Japanese yen) per year for classroom repair costs because it was necessary to rebuild or repair classrooms every year before the project implementation. In addition to financial burdens, about 30 people at one time participated in repair and rebuilding work, which was carried out about three times a year. After the construction of solid classrooms by the project, it was confirmed that financial burdens were virtually eliminated and repair work was significantly reduced.

Photo (Left) Simple classroom

Photo (Right) Solid classrooms constructed by the project

(Dangbo-Home Primary School, Dangbo City, Ouémé Department)

3.4.2 Other Impacts, Unintended Positive/Negative Impact

3.4.2.1 Impacts on the Natural Environment

It was confirmed that there was no negative environmental impact during or after project implementation according to the results of the interview surveys with school staff, CS, the Implementing Agency and site visits to the target schools.

3.4.2.2 Land Acquisition and Resettlement

The project constructed classroom wings and toilets at the location of existing primary schools, and thus no land acquisitions or resettlement took place as a result of implementing the project, which was confirmed through the interview survey with CS, and school staff of

[11] Cost per three classrooms.

the target schools visited.

3.4.2.3 Other Impacts

(1) Improvement of Learning and Teaching Motivation

Motivation for students to learn and teachers to teach at the target schools increased as a result of improvement of the learning and teaching environment by the construction of classroom and procurement of school furniture. As a result, according to school heads and CS, the passing rate of students for the final unified examination (which is conducted by the Government of Benin) taken by sixth grade students, was raised. Moreover, in the results of beneficiary survey, all students who responded to the survey answered that motivation to learn increased after the project implementation, and also all teachers who responded mentioned that their motivation to teach increased as well.

(2) Capacity Building of Local Contractors

Under the project, many local contractors were involved in the construction of facilities. Included among them were many contractors who had no experience with aid projects financed by foreign countries, and so experiences gained through the project contributed to improving their level of competency. In particular, these competencies include: project management, including “time management” by implementing the project in accordance with the plan and strictly adhering to time schedules; “quality control” by checking quality at each process until the completion of the facility; and “safety control” by mandating helmet use. Many of the local contractors have made use of the experiences and competencies obtained through the implementation of this project even after the project completion, therefore the project contributed to the capacity building of local contractors (see column below).

Column: Capacity building of local contractors through Grant Aid for Community Empowerment

The project using Grant Aid for Community Empowerment (Community Grant Aid) proactively uses local contractors, resource and materials in order to save costs and achieve efficiency. In this project as well, more than 20 local contractors were involved in the construction of classroom buildings and toilets and procurement of school furniture.

As the first project using Community Grant Aid in Benin, many local contractors involved in the project had no experience with a foreign project, and so there were gaps among the technical manager, local consultants in charge of supervision of construction work and local contractors at the beginning of the project. Due to perception gaps in several areas, such as attitude, accuracy, experience, and knowledge toward project operations, conflicts among participants occurred at the beginning of the project. In order to bridge these gaps, regular meetings were held among the technical manager, local consultants, designers, local engineers, and other related parties. At the very beginning, awareness regarding the importance of "Time Management;" starting operations on time, and "Safety Control;" wearing helmets and safety jackets were shared among participants. In addition, the technical manager visited operation sites and conducted quality and technical checks on the buildings under construction in each process.

According to local contractors involved in this project, they did not recognize the importance of starting work on time, wearing safety equipment during work, meeting deadlines. Moreover, it was their first experience to work based on the concept of "Quality Control," such as preparing materials (including concrete) in a set composition, checking the strength of materials to be used, and redoing work when the quality standards were not met in quality checks conducted during the process. Therefore, it was acknowledged that local contractors learned new knowledge and experience regarding "Time Management", "Quality Control", and "Safety Control" through this project. Moreover, many contractors who participated in the project mentioned that new business opportunities were created based on this experience, and, in fact, they are actively engaged in the follow-up project "Project for Primary School Construction (Phase V)."

As a result of the implementation of this project, enrollment numbers increased and the number of students per classroom dropped at the target schools in which solid classrooms, toilets, chairs, and desks were provided. The improvement of the education and teaching environments unaffected by weather and health and sanitary conditions through school healthcare activities was also confirmed. Understanding of the concept and importance of O&M of school facilities gained from school heads, teachers, and parents associations was acknowledged as soft component effect. Furthermore, it was confirmed that the enrollment number and the completion rate of girls increased as a result of a synergistic effect between the project and other activities conducted by the Implementing Agency, and the Government, and the impact on raising students' and teachers' motivation to learn and teach, respectively, was confirmed as well. Based on this, the project has largely achieved its objectives. Therefore

effectiveness and impact of the project are high.

3.5 Sustainability (Rating: ②)

3.5.1 Institutional Aspects of Operation and Maintenance

Each target school would be responsible for O&M of school facilities and furniture constructed and procured by the project. Although CME — established through the soft component of this project — did not exist in many schools, each school had been implementing O&M activities including necessary support for minor repairs and maintenance of school grounds with the parents associations playing a central role as described above[12].

Figure 6 Number of CS Inspection Staff

Department/ City	Commune	Number of Schools	Number of inspection Staff	Required Number of inspections Staff
Ouémé Department /Dangbo City	Dangbo	81	3	5
Cuffo Department	Dogbo	120	3	4
	Aplahoue	184	4	18
	Klouekanmey	100	3	8
	Lalo	120	3	5
Zou Department	Abomey	116	2	5
	Bohicon	104	5	10
	Zogbodome	101	3	5
	Zangnanado	90	3	5
	Agbangnizoun	122	3	4
	Ouinhi	61	3	4
Collines Department	Dassa-Zoume	136	3	5
	Glazoue	135	4	5

Source: Based on the interview survey with CSs

CS, an organization under MEMP, would monitor the O&M conditions of school facilities. CS would check not only school facilities but also whether or not school curriculums and number of classes are implemented in accordance with rules and classes are being conducted that follow appropriate teaching guidelines. Therefore, inspection by CS staff would be conducted in two separate patterns for teaching guidelines and for school facilities, respectively. At the time of the ex-post evaluation, an issue was found in the number of CS staff conducting school inspections because there was insufficient allocation of staff to conduct adequate inspections.

In cases where relatively large-scale facility renovations are required, each school would report to CSs in the region, and then CS would request the commune[13] to organize a support structure, although minor repairs would be handled using school budgets (see "3.5.3 Financial Aspects of Operation and Maintenance" for detailed information) distributed by CS and with support from parents associations. When this reporting line was confirmed with heads of schools visited, some school heads did not clearly understand this official reporting line, therefore concern remains about the O&M structure for large-scale renovations required for facilities and school furniture. As described below ("3.5.4 Current Status of Operation and Maintenance"), at a school which required roof repair, the school could not carry out the repairs even after the rainy season since school head did not know where to report. Regarding

[12] From the interview survey at site visits of each school
[13] Administrative organization corresponding to city under Ministry of Local Municipality and Land

this issue, it is necessary to ensure that each school head is fully informed.

According to documents provided by JICA, it was expected that a total of 29 teachers need to be added for new classrooms constructed by the projects at the time of the planning. At the completion of the project, the number of teachers as planned were assigned, however it was identified at school visits that there were schools which did not have a sufficient number of teachers because many schools did not replace retired teachers. At these schools, teacher shortages were handled by having one teacher conduct classes for two classrooms, or giving classes to several groups of students in the same grade at the same school grounds together[14]. Insufficient number of teachers was an issue not only at the target schools but also at the schools all over the country, and the early resolution of this issue is considered difficult. However, it is necessary to understand the current conditions at each target school and allocate additional teachers to primary schools which are lacking an adequate number of teachers, since the Implementing Agency is working on a plan to increase teachers[15].

3.5.2 Technical Aspects of Operation and Maintenance

In this project, measures were taken to reduce costs and technical burden required for O&M by applying design and specification which make it possible to use facilities long-term with easy maintenance. It was confirmed through interview surveys with school staff at the time of post-evaluation that necessary minor maintenance such as repainting black boards and repairing broken keys was implemented by each school. During project implementation, a soft component was implemented mainly for school teachers and staff, and parents associations who play key role in the O&M structure, in which a simple manual was prepared and distributed that described in detail requirements for O&M of solid facilities and minor renovation methods. However, the manuals were not kept in the school but at the homes of members of the parents associations. Thus it is difficult to consider that the manuals were being utilized effectively. According to school teachers and staff, and parents associations, it was confirmed that there have been no damages occurred that were difficult to handle from a technical aspect and non-usage of the manual has not caused any issues. On the other hand, work which would be required after a certain period of time such as painting and cleaning toilet water tanks would be O&M work which each school and parents association had never carried out at the existing facilities. In the manual, the necessary O&M for a solid classroom is described in detail, it is expected that the need for O&M of the facilities would continue to

[14] In Benin, several groups, such as X primary school group A, group B, are giving classes in the same school grounds. Each group has students from first grade to sixth grade, but each group is operated as different organization. However, a cooperative system, such as accommodating teachers in their absence and classrooms are established as described above.

[15] According to the Implementing Agency, the primary schools in Benin were lacking 10,000 teachers in 2014. This is attributed to the tight financial situation and also an increase in the number of students resulting from the free education policy. After 2010, 1,200 teachers were added annually, and a plan to supplement the insufficient number of teachers by 2020 is being undertaken by adding 1,438 teachers in 2014 and 1,875 teachers in 2015.

increase, therefore effective usage in the future is expected.

3.5.3 Financial Aspects of Operation and Maintenance

As for O&M costs for school facilities, minor repair costs including damage to windows and keys is paid by each school's budget allocated by CS as well as through support from parents associations. The budget[16] distributed to each school through CS is 150,000 CFA (30,000 Japanese yen) per classroom annually, and part of this budget is used for necessary repair costs. Although it was stated that this amount was insufficient during interviews at schools, the Implementing Agency maintained that it was enough for paying consumable goods and minor repairs. Some schools which face teacher shortages hire part-time teachers temporally using this budget, and this is reason that is believed to have resulted in the answer "the budget is not enough."

The major financial source of O&M cost for school facilities is benefit provided by the government to communes. Amounts allocated to communes at the time of planning were 6,108 million CFA (2006), and 5,118 million CFA (2013) at the time of the ex-post evaluation (see Table 7). Although the actual spending on O&M for facilities related to this project could not be confirmed, the estimated cost at the time of planning was 18.98 million yen, which accounts for about 0.3-0.4% of the total money allocated to communes, and thus it should not be a big burden. However, it is recommended that each school prepare future O&M plans and understand budgets required, and also share information with CS in order for smooth budget allocation in preparation for necessary O&M in the future, such as painting, and cleaning of toilet water tanks as well as unexpected large-scale damages.

Table 7 Commune Budget in Benin (Education Sector)

(Unit: Millions of CFA)

	At the time of planning (2006)	FY 2010-2012	FY 2013
O&M for classrooms and toiles	18.98	NA	NA
Budget allocated to communes	6,108	12,190	5,118
Ratio of O&M costs to allocated budget	0.3%	0.5%	0.4%

Note: The figure for fiscal years 2010-2012, indicates total budget for three years. The estimated O&M at the time of planning only includes costs for target schools. Because the O&M costs for the target schools only could not be confirmed after the project completion, the ratio of O&M costs to allocated budget was calculated based on the estimated O&M costs at the time of planning.

Source: Documents provided by JICA and "Fonds d'Appui au Développement des Communes", Commission Nationale des Finances Locales," 2013 & 2014.

3.5.4 Current Status of Operation and Maintenance

It was confirmed through site visits that classrooms were cleaned twice a day in the

[16] This budget basically includes consumable goods used in each classroom (chalk, making copies of materials, purchasing books, and miscellaneous costs)

morning and evening, and toilets were cleaned once a day or every two days by students under their teacher's guidance. Since the facilities constructed by this project are solid unlike the simple classrooms which are common to Benin from a long time ago, very good conditions were maintained overall at the schools visited except one school requiring the large-scale renovation. At the school where a problem was detected, the shape of the roof started changing due to a roof leak. According to the school head, the roof leak started in the previous year but it was left without repair for a certain period because it could not be fixed within the school budget and support from the parents association. In addition, school head was unaware of where to report such a damage. The lack of awareness on the reporting procedure as described in "3.5.1 Institutional Aspects of Operation and Maintenance" is regarded to have caused this problem. Furthermore, according to the Implementing Agency, the training of teachers when they get promoted to school heads is not conducted in Benin, and information that should be understood by school heads has not been fully distributed. It was explained that it would be necessary for the Implementing Agency to hold orientation training at the time of the appointment of school heads or the conferences to familiarize school heads with the importance of reporting and its procedures.

As indicated above, some minor problems have been observed in terms of institutional and technical aspects of O&M, and therefore sustainability of the project effects is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

In order to improve the educational environment in target schools in Benin, this project constructed classrooms and toilet booths, procured school furniture, and established adequate systems for the management, operation, and maintenance of schools and school facilities. Benin has been working to improve access to primary education. However, the rapid increase in the number of students led to a shortage of classrooms. Moreover, many classes had to be held in poor-quality classrooms, leading to a serious deterioration in the educational environment in the country. The implementation of this project has therefore been highly relevant to Benin's national policy, their needs, as well as Japan's aid policy toward Benin. Although the project cost was as planned, the project period exceeded the plan due to the longer period required for the material procurement and cash flow of the contractors, as this was the very first Grant Aid for Community Empowerment Project implemented in the country. Therefore, the efficiency of the project is rated as fair. Furthermore, the construction of school facilities and procurement of desks and chairs helped increase enrollment numbers and decrease the number of students per classroom, and also improved both the education and hygiene environments. They also significantly helped reduce the financial burden and work hours required for the O&M of

facilities. It was also acknowledged that the training conducted under this project improved the understanding of the concept and importance of O&M for school facilities among the people engaged in the O&M of schools. Improved enrollment numbers and completion rates for girls were also confirmed as impacts, as well as an increased motivation to study. The effectiveness and impact of the project are therefore rated as high. As for the institutional aspect on O&M, issues have been observed in lack of teachers and staff of CS, and in understanding of reporting procedure regarding O&M of school facilities. From a technical viewpoint, the effective use of O&M manuals for related facilities and understanding of the O&M costs are expected in the future. Therefore, the sustainability of the project effect is fair.

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

4.2 Recommendations

4.2.1 Recommendations to the Implementing Agency

・ Securing a sufficient number of CS staff for conducting school inspections

CS which would be responsible to visit schools and check whether or not school facilities are used properly and if there is a need for repairs, does not have enough staff to conduct adequate visits. Therefore, there is a need to increase the number of staff. In order to conduct appropriate monitoring, it is expected that CS would report the required number of staff to the department office of the Implementing Agency accurately, and the Implementing Agency would allocate the necessary number of staff to CS immediately.

・Building awareness of reporting line

At some schools, it was observed that school heads and parents associations did not understand clearly where to request support when damage to buildings and facilities occurs that cannot be handled by schools and parents associations. It is required for the Implementing Agency and CS to inform each school regarding the reporting line and organize the system to make it possible to respond to such damages.

・ Ensuring one teacher one classroom structure

At some target schools visited, schools have not secured a sufficient number of teachers, and conduct classes with students in different grades or other groups of students in a same grade in a same school grounds together. Although the required number of teachers estimated at the time of planning was allocated after the project completion, many schools could not subsequently replace retired teachers, therefore the issue is raised that many schools cannot allocate one teacher for one classroom. It is necessary for each school to report to CS immediately the number of teachers when it is short, and for CS and the Implementing Agency to secure the necessary number of teachers immediately as well.

・Providing guidance about the proper use of O&M manual

At the time of the ex-post evaluation, it was observed that facility O&M manual which was prepared as a soft component of the project was not fully utilized. Several reasons for this issue have been raised; manual was kept at home by members of parents association; manual was not taken over when a leader of parents association changed to another; also the existence of manual was not informed to new school heads when there was a change of school head. It is required that the Implementing Agency inform each school again about the importance of using the manual, and give guidance to each school to take thorough measures when handing over the manual at the time of personnel transfer.

・Follow-up activity in order to secure adequate O&M budget

Each school is handling O&M using their limited allocated budgets. At the time of the ex-post evaluation, there were no serious issues identified since the facilities were relatively new and only minimal repair costs were necessary. However, there is concern for day-to-day O&M costs rising in the future. Also, large-scale renovations are required which cannot be handled within the allocated budget to each school. Therefore, it is necessary for each school and CS to estimate and understand O&M costs required in the future, and report to the MEMP and commune in order to secure the budget.

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

・Adequate explanation for continuous usage of O&M manual

O&M manual was utilized only at some schools to a limited extent. According to the leader of parents association, it was advised at the training that the leader of the parents association should take responsibility of keeping the manual. Following this advice, many leaders of the parents associations have kept the manual at home; however they were not informed sufficiently on how to handover the manual. Therefore, several cases were found in which the manual was kept at the first leader's home after a change of leaders. It is recommended that an explanation be provided on how to handover the manual in detail in order to ensure continuous usage for the implementation of a similar project.

・Selection method and implementation structure for the usage of small local contractors

As a Community Grant Aid project, this project proactively used local contractors and materials. Therefore, many relatively small local contractors were involved in construction

and procurement work. Because small-scale construction and procurement work were implemented across a widespread area, in addition to the existence of contractors who did not have sufficient finances and experience, which caused a significant burden to technical managers and local consultants who supervised construction work in terms of managing technical aspects and supervising the work since they were based in the capital city. This situation also caused a delay in the project's implementation due to delays of the contractor's financing. When using small local contractors in future projects, regarding the selection of local contractors and project management structure, the following should be considered in order to ensure smooth implementation of the project:

(Selection of local contractors)

Although confirmation was carried out by establishing criteria for participation during the selection of local contractors (e.g., actual contract amount in the past year and equipment on hand), the selection was conducted without clear criteria for understanding the capacity of each contractors, including their financial situation. As a result, smooth project implementation was affected due to payment delays. In the future, when small scale contractors are selected for a project, it is necessary to set clear selection criteria and also prepare a schedule and support system (payment method to contractors and technical assistance) as necessary.

(Project management structure)

Although the target schools of this project were spread out in 3 departments and 1 city, local consultants handling project management and supervision of construction were based mainly in the capital and visited target departments as necessary. However, since many contractors who implemented the work are scattered across a wide region, the burden on the responsible persons to handle progress management, quality control, and supervision of construction from the capital city was heavy. As a result, such conditions became one of the reasons of delay. In future projects in which target sites are spread out in regions and many contractors are involved, it is recommended that adequate structures are established, such as allocating technical manager and local consultants by region, in order to provide detailed support by the project manager. Another potential measure is to centralize the target sites as much as possible based on supervising and construction management systems.

(End)

Islamic Republic of Mauritania

Ex-post evaluation of Japanese Grant Aid Project

"Water Supply Project in the Southern Region in the Islamic Republic of Mauritania"

(Projet d'Approvisionnement en Potable dans la Région Australe en République Ismamique de Mauritanie)

External Evaluator: Hisae Takahashi, Ernst & Young Sustainability Co., Ltd.
Maki Hamaoka ,Ernst & Young Sustainability Co., Ltd.

0. Summary

This project developed water supply facilities and procured survey and maintenance equipment and introduced an operation and maintenance system by community participation for the purpose of a sustainable safe water supply in 47 villages in Hodh El Gharbi Province and Assaba Province. The project objective is consistent with the development policy and development needs of Mauritania as well as with Japan's ODA policy; therefore its relevance is proved to be high. In addition, the actual percentage of the population that was provided with water, as well as constructed water facilities, through the implementation of the project reached more than 90% of the target value. As a result, expected positive effects of the project were confirmed, such as the following: the waterborne disease rate in the project target areas has decreased, and opportunities to effectively utilize time for daily activities by reduced water-fetching workload have increased. On the other hand, effects of the project are limited compared to the initial plan in terms of improvement of operation and maintenance of boreholes with foot pumps and water supply facilities (hereinafter called "Level 1 water supply facilities") and improvement of water quality survey technology of the implementing agency. Thus, the effectiveness and impact of the project is fair. Both the project cost and project period were within the plan. Therefore, efficiency of the project is high. While the functioning rate of water supply facilities constructed by the project is relatively good, as shown by the figure of 76% at the time of the ex-post evaluation, operation and maintenance of the facilities leave room for improvement in many ways, such as personnel deployment and financial capacity of the National Office for Rural Water Service (*Office National des Services d'Eau en milieu Rural*, hereinafter called "ONSER"), which is a central organization of maintenance of rural water supply facilities; personnel deployment, technical and financial capacity of community organizations for Level 1 water supply facilities and a system for implementing water quality monitoring. Thus, the sustainability of the project effect is fair.

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

1. Project Description

Project Locations

Water Supply Facility Constructed by the Project

1.1 Background

In Mauritania, two-thirds of the territory is covered by the Sahara Desert. The country was in a state of chronic water shortages because of repeated drought. In particular, people in rural areas were forced to get water from unsanitary water sources such as shallow wells, swamps and rainwater. Unsanitary water use was one of the main causes of waterborne diseases such as diarrhea and parasites like guinea worm, causing high mortality and morbidity of infants in the country. In addition, women and children in rural areas traveled long distances in search of drinking water. Such harsh labor deprived children from opportunities for education.

Hodh El Gharbi Province and the eastern parts of Assaba Province, target areas of the project are situated in the inland area of Mauritania, 600–800 km from Nouakchott, the capital of the country. The proportion of the poor is relatively high in these provinces. In addition, the safe water supply coverage in rural areas was very low. The people were forced to migrate to get drinking water and water for livestock or to go on with the cattle to Mali nomadically. Such unstable water situations were not only an obstacle to securing health conditions and stable livelihoods of residents but also had a significant impact on social and industrial development and adverse effects, such as concentration of population to urban areas.

Amid such situations, the government of Mauritania requested grant aid from the Japanese government to construct water supply facilities in Hodh El Gharbi Province and the eastern part of Assaba Province for the purpose of a sustainable safe water supply.

1.2 Project Outline

The objective of this project was to increase the safe and stable water supply coverage by constructing water supply facilities and procuring survey and maintenance equipment in the 47 target sites in Hodh El Gharbi Province and the eastern part of Assaba Province, thereby contributing to the improvement of living conditions of the local residents.

Grant Limit / Actual Grant Amount	617 million yen / 587 million yen
Exchange of Notes Date (/Grant Agreement Date)	Phase 1/2: June, 2004 Phase 2/2: July, 2005
Implementing Agency	Direction of Water Supply, Ministry of Water Supply and Sewerage *(Direction Hydraulique/Ministère de l'Hydraulique et de l'Assainissement)*
Project Completion Date	Phase 1/2 : March, 2006 Phase 2/2 : February, 2007
Main Contractor(s)	Koken Kogyo Co., Ltd.
Main Consultant(s)	Kokusai Kogyo Co., Ltd.
Basic Design	May, 2004
Detailed Design	Phase 1/2: December, 2004 Phase 2/2: N/A
Related Projects	<u>Technical Cooperation</u> (1) Study on groundwater development for Kiffa city (1997-1999) (2) Study on the development of the Oasis zone (2001-2004) (3) Dispatch of expert in water resources development (1999-2001) <u>Grant Aid Projects</u> (1) Rural water supply project in south-central region (1993-1997) (2) Drinking water supply project for the eradication of Guinea worm (First Phase) (1997-1998) (3) Project for construction of drinking water supply facilities in the city of Kiffa (2002-2003) <u>Other donors</u> (1) Construction of boreholes and installation of hand pumps in Assaba province and Hodh El Gharbi province and another province (African Development Bank, Government of Mauritania (1992-2001)) (2) Construction and rehabilitation of shallow wells, construction of boreholes in Assaba province, Hodh El Gharbi province and other eight provinces (French Development Fund (1993-1999))

2. Outline of the Evaluation Study

2.1 External Evaluators

Hisae Takahashi, Ernst & Young Sustainability Co., Ltd.

Maki Hamaoka, Ernst & Young Sustainability Co., Ltd.[1]

[1] Joined the evaluation team of Ernst & Young Sustainability Co., Ltd. as a team member from Foundation for

2.2 Duration of Evaluation Study

Duration of the Study: October 2014 - August 2015

Duration of the Field Study: January 21, 2015 - February 9, 2015 (by the local consultant), April 15, 2015 - April 19, 2015

2.3 Constraints during the Evaluation Study

(1) The Basic Design study confirmed that existing wells in the project target area had problems in water quality such as water contamination by nitrate-nitrogen and salinization. Therefore, it was important to ensure a safe water supply through regular water quality monitoring even after the construction of new boreholes[2]. In the project, equipment for water quality analysis was put in place in the Regional Direction of the Direction of Water Supply of the Ministry of Water Supply and Sewerage (*Direction Régionale de l'Hydraulique et de l'Assainissement*, hereinafter called as "DRHA") based on the plan that the DRHA would conduct water quality monitoring regularly. However, the water quality monitoring has been rarely conducted. Therefore, "sustainable safe water supply," one of the viewpoints to evaluate the effectiveness and impact of the project could not be evaluated based on the result of the water quality monitoring. In this ex-post evaluation, "safe water" is judged based on Mauritanian and international standards of safe drinking water[3].

(2) As stated in 3.3.2 below, the project supported establishment of an operation and maintenance system by community participation through soft component activities. However, it was confirmed that effects have not been obtained as expected. Since the ex-post evaluation was conducted nearly 10 years after the project completion, it was not easy to contact concerned parties such as staff of the implementing agency and members of community organizations who knew situation of the project implementation stage and subsequent stage. Since the ex-post evaluation team had to follow memories of the above parties to verify project-related information, it was difficult to analyze in detail reasons why soft component activities produced limited effects.

Advanced Studies on International Development

[2] Water quality monitoring recommended by the project included the measurement of salt density, nitric nitrogen, fluorine, iron and manganese density by simple water analysis equipment, measurement of salt contained in the water by conductance meter and observation of penetration of contaminated water from the surface with an oxidation-reduction potential (ORP) meter (Source: Basic Design study report).

[3] In evaluating one of the Millennium Development Goals, "Halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation," safe drinking water refers to water from improved water sources. As definition, to monitor and evaluate the trends of this goal, an improved drinking water source is one that, by the nature of its construction, adequately protects the source from outside contamination, particularly fecal matter. An improved water source includes piped water, public tap/standpost, tubewell/borehole, protected dug well, protected spring and rainwater. Less safe water sources, namely, an unimproved drinking water source, refers to an unprotected dug well, unprotected spring, river, lake, pond, irrigation channels and canals *(Source: Progress on drinking water and sanitation 2014 updated (World Health Organization and UNICEF 2014)).*

3. Results of the Evaluation (Overall Rating: B[4])

3.1 Relevance (Rating: ③[5])

3.1.1 Relevance to the Development Plan of Mauritania

The government of Mauritania placed the top priority on the improvement of the access to drinking water at the planning stage. With regard to the national development plan, the government of Mauritania formulated the "Strategic Framework for Poverty Reduction" (*Cadre Strategique de Lutte contre la Pauvreté (CSLP)*) in December 2000, which stated its medium- and long-term development goals to be achieved in the period of 2001–2015. The CSLP included water supply and sanitation as one of the five priority development areas.

With regard to the water sector policy, the National Water Supply Program (2001) stated goals of the construction of at least one modern water supply facility in all villages of over 150 inhabitants and water supply facilities providing more than 20 liters per person per day in all villages of over 500 inhabitants by 2015.

The improvement of the access rate to drinking water remained a top priority at the time of ex-post evaluation. The second CSLP (2006-2010), which was revised in 2007, included "education," "health," "water" and "infrastructures" as the most prioritized four sectors. Having been revised in January 2010, the third CSLP (2011-2015) placed a priority on the water sector. With regard to the water sector policy, the "Development Strategy for the Water and Sanitation Sector" (*Stratégie de Développement du Secteur de l'Eau et de l'Assainissement*), which was established in 2012, stated the national objective to increase drinking water supply coverage in rural areas from 52% in 2010 to 74% in 2015. In order to achieve this objective, the national program for the access to drinking water is being implemented by introducing renewable energy for a sustainable water supply.

In light of the above, the project, which aimed at sustainable safe drinking water supply through construction of water supply facilities, has been highly relevant to the national development plan and water sector plan of the government of Mauritania.

3.1.2 Relevance to the Development Needs of Mauritania

At the planning stage, the percentage of the poor in Assaba Province and Hodh El Gharbi Province was higher than in other provinces in Mauritania. The safe water supply coverage in rural areas was about 8% in 2000, which is lower than the national average (41% in 1999). This unstable water supply affected the health of residents and the assurance of stable living bases.

At the time of ex-post evaluation, the safe water supply coverage was 49.6% as a national average, 52.3% in urban areas and 47.7% in rural areas in 2012[6]. The six priority provinces to

[4] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory
[5] ③: High, ② Fair, ① Low
[6] Source: *MDG Report 2014: Assessing Progress in Africa toward the Millennium Development Goal*

improve the safe water supply coverage included Assaba Province and Hodh El Gharbi Province[7]. In light of the above, the development needs for the construction of water supply facilities are high at the time of the ex-post evaluation following the time of the ex-ante evaluation.

3.1.3 Relevance to Japan's ODA Policy

Japan has been supporting Mauritania to grow out of poverty to help socially and economically vulnerable people by improving basic human needs and developing basic socioeconomic infrastructure in terms of "poverty reduction" and "sustainable development," which are priority issues of Japan's ODA Charter (2003). Support to ensure safe drinking water was positioned as one of the priority sectors in the basic ODA policy to Mauritania along with basic education, health and fishery[8]. In addition, this project was implemented based on the then Japanese prime minister's announcement made at the Tokyo International Conference on African Development (TICAD) III held in Tokyo in September 2003 and is consistent with "human-centered development," which was one of the three pillars of African development: namely, 1) human-centered development aid, 2) poverty reduction through economic growth and 3) consolidation of peace.

In light of the above, the project, which aimed to support to ensure safe drinking water and improvement of living conditions, was highly relevant to the Japan's ODA policy at the time of ex-ante evaluation.

3.1.4 Appropriateness of the Project Plan and Approach

In this project, there was concern that water quality would be deteriorated due to secondary contamination along with the groundwater use, considering natural conditions such as geology and climate of the target area[9]. Therefore, the DRHA was expected to monitor water safety continuously through regular monitoring of water quality after the project completion for the purpose of maintaining the project objective that was "sustainable safe water supply." In the project implementation stage, the consultant in charge conducted a technology transfer briefing on the use of water quality survey equipment with DRHA staff. However, the ex-post evaluation found that water safety had not been monitored since the above equipment procured had not been fully utilized and water quality monitoring had been rarely implemented[10]. The main reasons are the following:

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[7] Source: Results of the questionnaires

[8] Source: ODA Data Book 2003, Ministry of Foreign Affairs

[9] The results of the evaluation of ground water quality of existing wells of the target area in the Basic Design study showed the following characteristics: (1) There were existing wells contaminated with nitrate ion and nitrite ion due to livestock excreta; (2) sandy ground of the surface part had a high permeability, and precipitation and drainage rainwater penetrated the ground along with contaminants and (3) salts integrate easily due to a large amount of evaporation as a dry land peculiar phenomenon (Source: Basic Design study report).

[10] Among different equipment for water quality survey put in place in the DRHA of Assaba Province, the pH meter and the conductance meter have been sometimes used and the simple water quality analysis equipment and the ORP meter have not been used due to the lack of staff, budget and means of transportation. The equipment put in place in the DRHA

(1) In Mauritania after the water sector reform in 2002, operation and maintenance services of constructed water supply facilities became duties of an organization in charge of operation and maintenance, which was the National Agency for Water Supply and Sewerage (*Agence Nationale de l'Eau Potable et de l'Assainissement*, hereinafter called "ANEPA") until May 2010 and the ONSER after June 2010. Monitoring of water quality has been considered the jurisdiction of the ANEPA or the ONSER. However, through the Basic Design study implemented in 2004, the concerned parties of Japan and Mauritania agreed that water quality monitoring after the project completion would be the responsibility of the DRHA of the target two provinces, located in the respective provincial capitals. In addition, in the implementation stage, the Japanese consultant explained operation of the water quality survey equipment to DRHA staff, and the water quality survey equipment was put in place in the DRHA. In this regard, the organization where the water quality survey equipment was put in place was not consistent with the duties of water-related organizations.

(2) Water quality is evaluated when boreholes are newly constructed. It is, however, rarely tested in the operation stage of water supply facilities in Mauritania[11]. It seems that the importance of regular water quality monitoring was not fully recognized by officials in the water sector in Mauritania. An implementation system for water quality monitoring has not been established.

(3) A detailed plan to use the equipment in the future that includes frequency, executor, necessary reagents and methods for collecting, management of monitoring the results and sharing among parties concerned was not prepared at the planning and the implementation stages, and the technology transfer from the Japanese consultant to the staff of the DRHA of the target provinces was limited to the use of the equipment. Thus, a mechanism to implement water quality monitoring by the DRHA after the project completion was not established.

(4) Opportunities for provincial offices of the ONSER to conduct an inspection of water supply facilities in the field have been limited due to the lack of budget, personnel and means of transportation. In particular, a field visit has been not conducted except for repair of damaged facilities with regard to the Level 1 water supply facilities.

In light of the above, the project plan and approach to achieve a sustainable safe water supply seemed insufficiently considered.

Although some problems were observed with respect to the appropriateness of the project plan and approach, as described in 3.4 Impact, they do not affect the relevance of the project from the viewpoint that boreholes are internationally classified as "safe water" and they have been used in the project target area. This project has been highly relevant to Mauritania's development plan and development needs as well as Japan's ODA policy. Therefore its relevance is high.

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of Hodh El Gharbi Province has not been used due to the lack of staff, budget and means of transportation (Source: questionnaires).

[11] Water quality is tested in cases when users of water supply facilities raise the problem (Source: Interviews with the implementing agency (April 30, 2015)).

3.2 Efficiency (Rating: ③)

3.2.1 Project Outputs

A total of 40 Level 1 water supply facilities were constructed by the project, as planned. With regard to the boreholes with motor pumps and water supply facilities including elevated water tanks (hereinafter called "Level 2 water supply facilities"), a total of five against the planned seven facilities were constructed. As total output of Level 1 and Level 2 water supply facilities, 45 water supply facilities were constructed against the planned 47 facilities. The actual number of constructed water supply facilities is 96% of the planned number (see Table 1). The difference between the planned outputs and the actual outputs was caused by the following: as a result of the Detailed Design of Phase 2/2, it was found that a water supply facility had been constructed in one of the target villages in Hodh El Gharbi Province and a water supply facility was being constructed in another village in the same province[12]; however, as a result of discussion between the Mauritanian government and the Japanese consultant, two sites were reduced without replacing them with alternative sites. When constructing a new water supply facility, it is necessary to coordinate to avoid overlapping of target sites of the project and those of projects of other organizations. However, the coordination among different ministries seemed difficult in Mauritania due to frequent mergers and abolitions of ministries. There was a problem with the coordination capacity of the implementing agency, considering that the lack of coordination among different ministries caused decrease in outputs. Even so, the site reduction was a reasonable decision as far as overlapping of the same facilities in the same village was avoided for when water supply needs were met.

Table 1 Project Outputs for Facilities (Comparison between Planned and Actual Values)

Type of facility	Planned Value			Actual Value			Achievement
	Phase 1/2	Phase 2/2	Total	Phase 1/2	Phase 2/2	Total	
1. Level 1 water supply facilities							
Assaba	14		14	14		14	100%
Hodh El Gharbi	1	25	26	1	25	26	100%
Level 1 Total	15	25	40	15	25	40	100%
2. Level 2 water supply facilities							
Assaba	1		1	1		1	100%
Hodh El Gharbi	1	5	6	1	3	4	67%
Level 2 Total	2	5	7	2	3	5	71%
Total	17	30	47	17	28	45	96%

Source: Documents provided by JICA

[12] A water supply facility had been constructed in one of the target villages in Hodh El Gharbi Province in May 2005 with funding from the wealthy class of the village after the Basic Design study. In another village, a water supply facility was being constructed by an affiliated organization of the Ministry of Economic Development of Mauritania since November 2004 (Source: Documents provided by JICA).

With regard to the procurement of equipment, survey equipment for borehole construction and maintenance equipment for operation and maintenance of constructed water supply facilities were procured as planned (see Table 2).

Table 2 Project Outputs for Equipment (Comparison between Planned and Actual Values)

Item	Planned Quantity	Actual Quantity
1. Survey equipment		
Borehole logging device	1	1
Submersible pump for pumping test	1	1
Generator for pumping test	1	1
Simple water quality analysis equipment	2	2
2. Maintenance equipment		
Pick-Up	2	2

Source: Documents provided by JICA

In addition, this project planned to introduce awareness-raising activities (hereinafter called "soft component"), aiming to establish the operation and maintenance system of constructed water supply facilities by local residents of the target villages. Based on this plan, formation of users organizations, awareness-raising activities for users on the importance of community-based operation and maintenance of water supply facilities, and technical training on daily check and minor repair of water supply facilities were implemented as planned.

The inputs of the Mauritanian side included land acquisition and leveling works for construction and installation of fences around the Level 1 water supply facilities[13]. The former was implemented without any problem. On the other hand, with regard to the latter, fences were installed in 25 out of 40 facilities at the time of the inspection after a one-year guarantee. The achievement level was 63%. Reasons for non-installation of fences are assumed as follows:

(1) In the construction stage, the Japanese consultant and the implementing agency instructed users to install fences after all construction works finished. However, opportunities to verify the status of fences were limited since the Japanese consultant rarely visited target villages after the completion of construction works.

(2) After constructed facilities started their operation, the ANEPA, an agency in charge of operation and maintenance at that time, rarely implemented field inspection of the Level 1 water supply facilities, and the ANEPA did not continuously encourage users of Level 1 water supply facilities without fences to install fences.

The installation of a fence is necessary to prevent groundwater from direct contamination; excreta have not entered directly inside the facility because of its structure. In addition, since

[13] As part of awareness-raising activities, fences were planned to be installed by users under the direction of the Japanese consultant and the implementing agency (Source: Basic Design study report).

influence on the groundwater caused by excreta mixing into the ground through penetration from the surface takes time, it seemed that the non-installation of fences did not significantly affect the objective of the project, which was "sustainable supply of safe water," at the time of project completion when achievement of outputs were verified. Thus, the non-installation of the fences was not taken into account in evaluating efficiency.

3.2.2 Project Inputs

3.2.2.1 Project Cost[14]

With regard to the cost incurred by Japan with this project, the E/N grant limit was 617 million yen (290 million yen for Phase 1/2 and 327 million yen for Phase 2/2), yet the actual grant amount was 587 million yen (288 million yen for Phase 1/2 and 299 million yen for Phase 2/2), which was lower than initially planned (95% of the planned amount). When the project's planned cost and actual cost are compared based on the decreased number of facilities with regard to the net construction cost[15] that directly affects the construction of facilities, the actual cost was 313 million yen, which was lower than the planned cost (322 million yen), making up 97% of the planned cost. The difference between the planned cost and the actual cost was caused by construction cost revision associated with the reduction of two sites in Phase 2/2, fluctuation changes and the difference between the ceiling cost of the tender and the contract cost for the construction works brought by the competitive logic of the tender.

3.2.2.2 Project Period

The project was planned to be 32 months long. It was actually 32 months from June 2004 to February 2007 (100%), as planned.

Both the project cost and project period were within the plan. Therefore, efficiency of the project is high.

3.3 Effectiveness[16] (Rating:②)

3.3.1 Quantitative Effects (Operation and Effect Indicators)

(1) Increase of water supplied population as a result of this project

As described in Table 3, the actual number of people who were newly served with water

[14] For this ex-post evaluation, only the costs of the Japanese side were compared since the data about the actual cost borne by the Mauritanian side was not available.

[15] The net construction, which is composed of direct construction cost and common temporary works cost, refers to cost directly necessary to implement construction works. When the project's planned cost and actual cost are compared based on the decreased number of facilities with regard to the net construction cost, (1) the actual direct construction cost was 269 million yen (111 million yen for Phase 1/2 and 158 million yen for Phase 2/2) against the planned direction cost, which was 278 million yen (111 million yen for Phase 1 and 166 million yen for Phase 2), and (2) the actual temporary works cost was 44 million yen (30 million yen for Phase 1/2 and 14 million yen for Phase 2/2) against the planned temporary works cost, which was 44 million yen (30 million yen for Phase 1/2 and 14 million yen for Phase 2/2).

[16] Sub-rating for Effectiveness is to be put with consideration of Impact.

through this project was 23,145 at the time of the project completion (2006 and 2007). Although it is slightly less than the original target value of 24,454, as set out in the Basic Design study, it reached 95% of the planned target. Therefore, the intended target value of this project was largely achieved. The actual number being slightly lower than the target was because borehole constructions were reduced by two of the Level 2 facilities in Hodh El Gharbi Province as a result of the Detailed Design in Phase 2/2, as stated in 3.2.1. The planned target water-supplied population after removal of the excluded two sites was 22,489, which is 103% of the actual number of people of 23,145 as of the project completion. In light of the above, effects of the project are worth outputs of the project, and the target value was achieved as expected.

Table 3 Water-supplied Population and Functioning rate of the Constructed Facilities in the Project Target Villages[17,18]

Indicator	Target	Result							
	(2006)	Project completion (Phase 1/2:2006, Phase 2/2:2007)		Inspection survey (Phase 1/2:2006, Phase 2/2:2007)		Ex-post evaluation (2015)			
	Pop. served with water	No. of facility	Pop. served with water	No. of functioning facility	Functioning rate	No. of facility	No. of functioning facility	Functioning rate	Pop. served with water
Level 1water supply facilities									
Assaba	5,892	14	6,187	13	93%	6	6	100%	3,059
Hodh El Gharbi	12,778	26	12,898	23	88%	20	12	60%	6,147
Level 1 Total	18,670	40	19,085	36	90%	26	18	69%	9,206
Level 2 water supply facilities									
Assaba	1,197	1	1,175	1	100%	9	7	78%	5,237
Hodh El Gharbi	4,587	4	2,885	4	100%	10	9	90%	6,016
Level 2 Total	5,784	5	4,060	5	100%	19	16	84%	11,253
Total	24,454	45	23,145	41	91%	45	34	76%	20,459

Source: Target: Basic Design study report (2004), Result (2006) (2006) (2007): Documents provided by JICA, Result (2015): Documents provided by the implementing agency.

(2) Functioning rate of the facilities

As shown in Table 3, functioning rates of the facilities at the time of project completion, inspection survey and ex-post evaluation are the following, respectively: (1) with regard to Level 1 water supply facilities, 100% (40/40 facilities), 90% (36/40 facilities) and 69% (18/26 facilities); (2) with regard to Level 2 water supply facilities, 100% (5/5 facilities), 100% (5/5 facilities) and 84% (16/19 facilities, 89% (8/9 solar-powered facilities) and 80% (8/10 generator-powered

[17] In the ex-post evaluation, for the purpose of grasping whether constructed water supply facilities are utilized effectively or not, non-functioning facilities are defined as the following; (1) facilities out of operation at the time of the ex-post evaluation and (2) facilities which were in operation but were not utilized.

[18] 14 out of 40 Level 1 water supply facilities constructed through the project were upgraded to Level 2 water supply facilities after the project completion with support from the government of Mauritania, other donors such as the World Bank, GIZ and NGOs. Background factors for this change were that Government of Mauritania announced in 2009 a policy to upgrade Level 1 water supply facilities to Level 2 water supply facilities gradually due to problems that financial capacity of community organizations was not sufficient and some spare parts were not available. Through such a government policy, the number of Level 1 water supply facilities decreased from 40 to 26 and that of Level 2 water supply facilities increased from 5 to 19 from the project completion to the ex-post evaluation.

facilities)); and (3) the total functioning rate of Level 1 and 2 water supply facilities was 100% (45/45 facilities), 91% (41/45 facilities) and 76% (34/45 facilities).

The average functioning rate of Level 1 water supply facilities is 50% in Mauritania. Although the functioning rates at the time of inspection survey and ex-post evaluation were much higher than the national average, it did not reach the target value (80%) set by the Ministry of Water Supply and Sewerage. Therefore, the functioning rate of Level 1 facilities is moderate.

With regard to the Level 2 water supply facilities, the national average functioning rate is 98% for solar-powered facilities and 75% for generator-powered facilities. The target value set by the Ministry of Water Supply and Sewerage is 90% for solar-powered facilities and 80% for generator-powered facilities. In this regard, the functioning rate of Level 2 water supply facilities constructed through the project is nearly equal to the national average. The overall functioning rate of water supply facilities constructed through the project is high from the project completion to the ex-post evaluation. In this respect, project effects have been maintained at the time of the ex-post evaluation.

Causes of nonfunction of Level 1 water supply facilities were the following: (1) water from the boreholes constructed through the project was salty in three facilities which were left unused[19] and (2) malfunction of pumps in five facilities. Users of nonfunctioning Level 1 water supply facilities used traditional shallow wells or Level 2 facilities near to or in the same villages[20] as alternative sources. Causes of nonfunctioning of Level 2 water supply facilities were malfunction of electric systems, such as generator and switchboard, in two facilities and malfunction of the pump in one facility. Users of nonfunctioning Level 2 water supply facilities used protected shallow wells near to or in the same villages during the period of facilities being out of operation.

3.3.2 Qualitative Effects

(1) Sustainable safe water supply[21]

1) Change in water sources used by the target population

[19] One of these 3 sites was not a target of the field survey of the ex-post evaluation. Therefore, the reason for non-utilization of the facility was based on the interview with the implementing agency.

[20] A traditional shallow well is located in the 2-10 meters of shallow ground water level. Since the well wall is encased in wood and straw, this type of well is collapsed easily and another well is then dug frequently (Source: Basic Design study report).

[21] In this project, with respect to the Level 1 water supply facilities, the installation of the fence was planned in order to avoid the effects of direct groundwater contamination by excreta of livestock. In order to evaluate the use of safe water more strictly, it should be evaluated whether the fence has been functioning effectively in ensuring water quality safely at the time of the ex-post evaluation, however, the safe water was evaluated mainly based on the definition of safe drinking water that is used in Mauritania and internationally, as described in 2.3 in consideration of the following. As stated in 3.2.1, the installation of fence was not completed in some of the target sites at the time of inspection survey. Among the 19 Level 1 water supply facilities as of the ex-post evaluation, the fence was not installed in six facilities at the time of inspection survey. Among these six facilities, five facilities were broken or not utilized without fence. With regard to the one functioning facility, the installation of fence was not verified since this facility was not visited through the field survey of the ex-post evaluation and information on the fence was not available from the implementing agency. In addition, the fence was not verified with regard to 13 Level 1 water supply facilities since the field survey of the ex-post evaluation Study prioritized water supply facilities for which fences were not installed at the time of the inspection survey and facilities for which fences had been installed at the time of the inspection survey were not surveyed.

As a result of study on drinking water sources before and after the project through a beneficiary survey[22], 80% of interviewed households used protected shallow wells in both the rainy season and dry season. In addition, about 20% used traditional shallow wells and hand-dug wells[23] which are classified as less safe water sources[24]. About 30% of the interviewed households used those less safe water sources in the dry season. The ex-post evaluation study confirmed that none of the interviewed households used less safe water sources both in the rainy and the dry seasons and that 90% of the interviewed households used safer water sources that are water supply facilities with boreholes, such as communal taps, yard connections and hand pumps (see Figures 1 to 4).

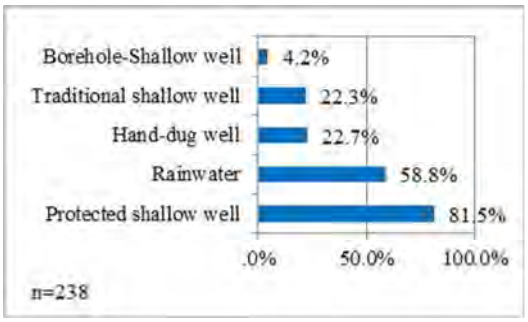


Figure 1 Water Sources in the Rainy Season Before the Project (Multiple Answers)

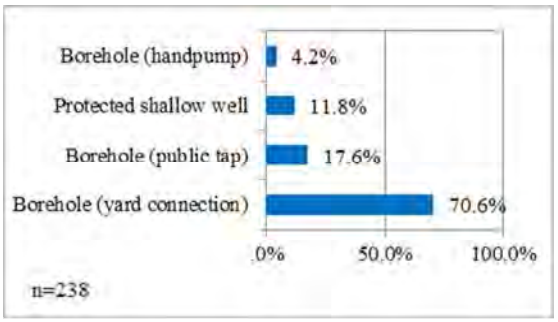


Figure 2 Water Sources in the Rainy Season After the Project (Multiple Answers)

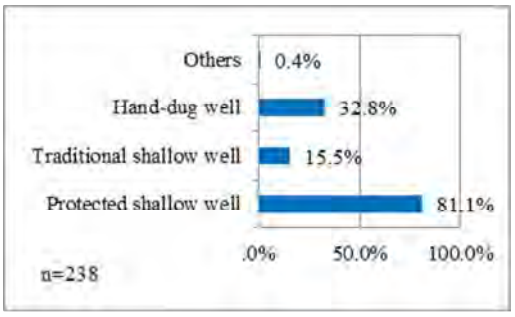


Figure 3 Water Sources in the Dry Season Before the Project (Multiple Answers)

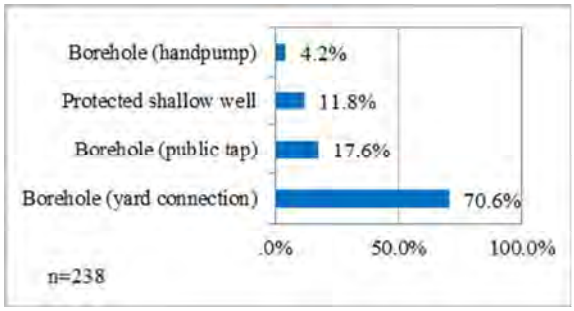


Figure 4 Water Sources in the Dry Season After the Project (Multiple Answers)

Source: Results of the beneficiary survey

[22] The beneficiary survey targeted 19 water supply facilities in total: six Level 1 water supply facilities and 13 Level 2 water supply facilities (eight generator-powered facilities and five solar-powered facilities) among 45 facilities constructed through the project. Target facilities were selected based on the following criteria: (1) easier to access from the provincial capital in consideration of time constraints and (2) the fence was not installed at the time of the inspection survey. Users of the above targeted facilities were interviewed based on the questionnaire. Samples of the survey were selected at random from residents who lived in the target villages before the project. Sampling size was 238. The breakdown of respondents is 161 males and 77 females. The age composition is the following: four samples from respondents 20-29 years old, 40 samples from respondents 30-39 years old, 68 samples from respondents 40-49 years old, 72 samples from respondents 50-59 years old, 48 samples from respondents 60-69 years old and 6 samples from respondents over 70 years old.

[23] Simple holes dug in low grounds or wadi where people get water from the surface (Source: Basic Design study report)

[24] See footnote 3.

2) Change in water consumption

While 80% of the respondent families used less than 20 liters of water per day on average before the project, more than 80% of respondent families used more than 20 liters of water at the time of the ex-post evaluation. Improvement was confirmed in quantitative terms.

(2) Water quality monitoring to ensure safe water and utilisation of the monitoring result

As stated in 3.1.4, the equipment for water analysis was procured through the project in order to continuously check the safety of water quality as drinking water through regular monitoring of water quality with the goal of ensuring the project objective, which is "sustainable safe water supply." However, the above equipment was used in a limited manner, and the monitoring of water quality has been rarely implemented. In this regard, effects intended at the planning stage were not produced with regard to the water quality monitoring and utilization of the monitoring result. The reasons for this include the equipment was put in place in the organization which was not consistent with the job description of organizations of the water sector and a concrete system of monitoring of water quality was not established before the project completion.

(3) Improvement in operation and maintenance of Level 1 water supply facilities

At the planning stage, it was recognized as an issue that, with regard to operation and maintenance of Level 1 water supply facilities in particular, water supply facilities were not well repaired when they were broken due to insufficient operation and maintenance by community participation since methods to organize user groups composed of residents and those to conduct technical trainings for them had not been established. In order to avoid such an issue, in the implementation stage of the project, a water point committee formed for each water point (hereinafter called "WPC"), and a village water committee formed at the village level (hereinafter called "VWC"). A facility utilization plan was developed with prospective users as well as training on accounting, and technical training on daily inspection of water supply facilities and repair of minor breakdowns was implemented through soft component activities.

In the ex-post evaluation, improvement in operation and maintenance of Level 1 water supply facilities was evaluated based on the following: 1) frequency of meetings of the VWC and the WPC, 2) frequency of cleaning around water supply facilities and 3) frequency and content of daily inspection of water supply facilities by caretakers.

1) Frequency of VWC and WPC meetings

At the time of the ex-post evaluation study, the field survey on some of the water supply found that the VWC and the WPC did not exist and that regular meetings of the VWC and the WPC were not held[25]. Assumed reasons of this phenomenon are the following. The soft component did not

[25] In addition to the Level 1 water supply facilities directly verified through the field survey of the ex-post evaluation, a VWC and WPC also did not exist in most of the Level 1 water supply facilities, and regular meetings of these

spend enough time to organize a VWC and WPC. As a result, the right people were not selected. One training session was not sufficient for VWC and WPC members who attended the training to understand role of VWC and WPC members fully. The ANEPA, an organization in charge of operation and maintenance at the time of the project completion, did not make periodical follow-ups on operation and maintenance by the VWC and the WPC sufficiently[26].

2) Frequency of cleaning around water supply facilities

With regard to six water supply facilities surveyed, cleaning was not implemented in five nonfunctioning facilities. It was rarely implemented in Level 1 facility since the facility was rarely used[27]. According to an interview conducted in the field survey of the ex-post evaluation, cleaning was implemented twice a week when water supply facilities were in operation.

3) Frequency and content of daily inspection of water supply facilities by caretakers

According to the operation and maintenance manual developed through soft component activities, the function of the pump and the discharge volume (whether discharged water is enough or not) are to be verified every six months as regular inspection. Such a regular inspection has not been implemented in the six facilities directly verified. Assumed reasons are that since technical intervention in Level 1 water supply facilities has been limited in the same type of facilities in Mauritania except for repair of malfunctioning facilities, the necessity of preventive maintenance was not well recognized by the ONSER and users of water supply facilities[28]. Under such circumstances, only soft component activities were not sufficient to make VWC and WPC members recognize the importance of regular inspection of the facility.

In light of the above, effects are produced in limited manner with regard to operation and maintenance of Level 1 water supply facilities.

(3) Improvement of survey technology of the implementing agency

At the planning stage, improvement of borehole survey technology and water quality survey technology was listed as one of the intended project effects. The Basic Design study found that the borehole survey equipment of the implementing agency was decrepit, and the borehole survey technology was particularly poor in the rock site where the success rate of borehole drilling was low. With regard to water quality survey technology, while the necessity of regular water quality monitoring to ensure sustainable safe water supply was recognized, the implementing agency did not have water quality survey equipment and the experience of the above survey. Thus, the project

committees have not been held (Source: Interview with the implementing agency).

[26] Source: Interview with the implementing agency (January, 2015).

[27] This functioning Level 1 water supply facility was used only when the Level 2 water supply facility constructed in the same village was out of operation (Source: Interview with residents of village at the time of field survey).

[28] With regard to Level 1 water supply facilities, the ONSER does not conduct periodical visits except for visits to respond to requests for repair of malfunctioning facilities by users (Source: Result of questionnaire survey).

was planned to procure the water quality survey equipment and to implement technology transfer of operation of the above equipment.

With regard to the improvement of borehole survey technology, the Japanese contractor conducted a technology transfer briefing on operation of a borehole logging device and submersible pump for pumping tests procured through the project for the drilling team of the implementing agency (4-5 persons in a team) during the construction period. After the project completion, when staff without knowledge on operation of the above equipment is newly assigned to the Direction of Water Supply, a technology transfer briefing is provided within the division. The ex-post evaluation study confirmed that the equipment, such as the borehole logging device and submersible pump for pumping tests, was effectively utilized in drilling new boreholes, ensuring sufficient water discharge[29]. In this regard, the borehole survey technology has been improved.

On the other hand, with regard to the water quality survey technology, although simple water quality analysis devices and water quality analysis measurement devices were procured following the above objective, effects were not produced as initially intended since the water quality analysis equipment has been used in a limited manner.

3.4 Impacts

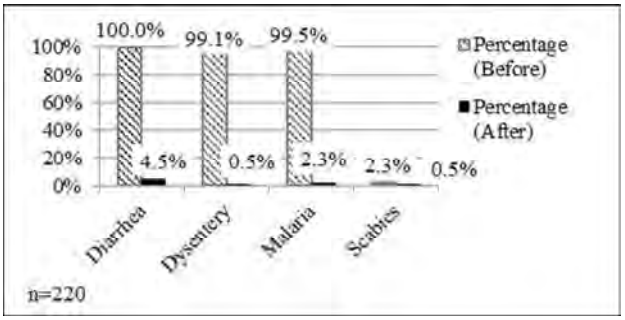
3.4.1 Intended Impacts

(1) Decrease in the number of people affected by waterborne diseases[30]

The result of the beneficiary survey showed that health condition improved largely in 92% of the respondents (220/238 households). In particular, a significant decrease was observed in the waterborne diseases such as diarrhea and dysentery (see Figures 5 and 6). Diarrhea and dysentery may be caused by factors other than water (unsanitary food, fecal-oral infection, etc.); it cannot be said categorically that only use of highly safe water contributes to the reduction of waterborne diseases. However, the project seems to contribute to the reduction of waterborne diseases to a certain degree in view of the point that households responding that there has been a change in health condition are users of boreholes and households responding that there is no change in health condition are users of protected shallow wells without using Level 1 water supply facilities constructed through this project because of salty taste of water from the boreholes.

[29] Source: Result of the questionnaire survey

[30] With regard to waterborne diseases, morbidity of diarrhea, and cholera, dysentery, malaria, Guinea worm, virus hepatitis, typhoid, scabies, food poisoning and stomach infection before and after the project was surveyed. Prevalence of diseases except for diarrhea, dysentery, malaria and scabies were not reported both before and after the project.



Source: Results of the beneficiary survey

Figure 5 Change in Major Diseases Prevalence Before and After the Project (Children) (Multiple Answers)

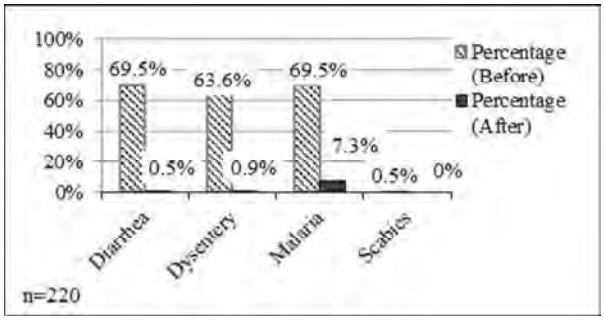
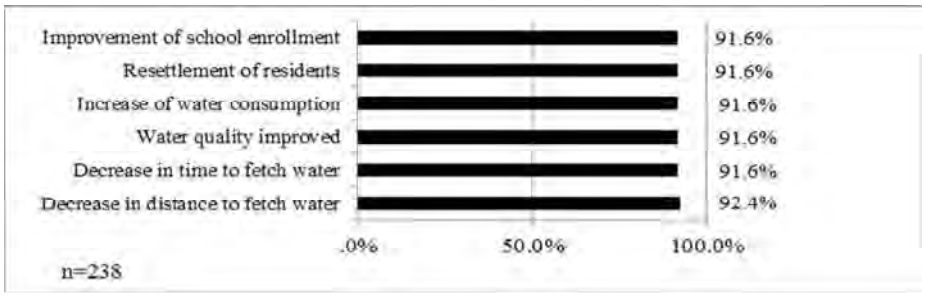


Figure 6 Change in Major Diseases Prevalence Before and After the Project (Adults) (Multiple Answers)

(2) Improvement of living and hygienic conditions of residents

According to the results of the beneficiary survey, there has been a change in living conditions after the project in 92% of the surveyed households (220/238 households). Details of changes include settlement of residents and improvement of school enrollment in addition to improvement of conditions of water use, as Figure 7 shows.

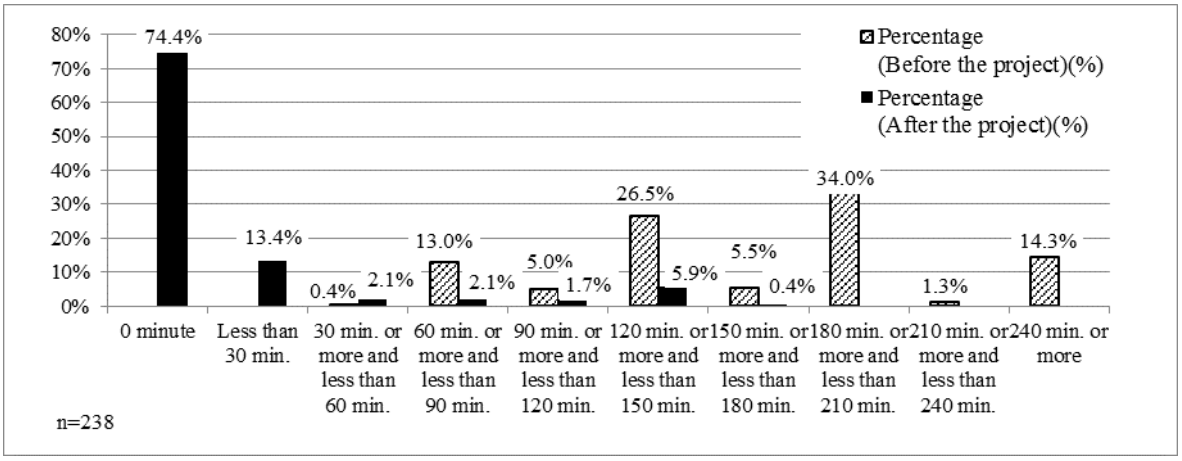


Source: Results of the beneficiary survey

Figure 7 Changes Observed After the Project (Multiple Answers)

Time to fetch water was reduced after the project in 92% of the surveyed households (220/238 households). As shown in Figure 8, while around 80% of the surveyed households spent more than 2 hours per day fetching water before the project, 80% of the surveyed households spent less than 30 minutes fetching water at the time of the ex-post evaluation study[31]. Great impacts were observed in households that could reduce time to fetch water; women transferred time previously spent for fetching water to other economic activities (agriculture/vegetable gardening, commerce, etc.), and children were able to go to school and so on.

[31] 74% of the surveyed households did not spent time fetching water at the time of the ex-post evaluation study since these households used yard connections. 14 of 19 Level 2 water supply facilities as of the ex-post evaluation study were upgraded from Level 1 water supply facilities after the project completion with support of the government of Mauritania and other donors. All of the 13Level 2 water supply facilities introduced yard connections, and the time taken to fetch water has been greatly reduced. It should be noted, however, that a significant reduction in time to fetch water was achieved not only through this project but also due to the Mauritanian government and other donors.



Source: Results of the beneficiary survey

Figure 8 Water Fetching Time Before and After the Project

3.4.2 Other Impacts

(1) Impacts on the natural environment

At the planning stage, it was recommended that regular water quality monitoring was to be implemented in order to ensure sustainable safe water supply in the project and that the implementing agency conduct detailed water quality analysis in collaboration with relevant organizations in case of water quality problems. At the time of the ex-post evaluation, three water supply facilities were found to be unused due to salty taste. There is a possibility that the salinity of these facilities is beyond the environmental standards of Mauritania[32]; however, water quality has never been checked by relevant organizations of Mauritania such as the ONSER and the National Institute of Public Health after the facilities started their operation.

(2) Land acquisition and resettlement

There was no resettlement in this project. The land for construction of water supply facilities was agreed upon representatives of local residents in community meetings before the commencement of construction works[33]; therefore, no problems were found in the process of acquiring the land.

(3) Other Unintended Positive/Negative Impact

Other indirect positive and negative impact was not observed.

[32] In general, the electrical conductivity (EC) has a high correlation with the salt concentration and is used for estimation of the quality and salinity of the water. The value of EC as a water quality standard and guideline was not set in Mauritania. According to the interview with the Direction of Water Supply and Sewerage in the planning stage, water with EC over 50mS/m was judged not suitable for drinking. The interview with residents of the target area in the planning stage showed that most of them feel the water is salty with EC over 150mS/m and some of them feel the water is salty with 100mS/m (Source: Basic Design study report).

[33] Individual consensus document was not exchanged between the project and the land owner (Source: Interview with the consultant in charge).

With regard to effects intended at the planning stage, firstly, the project objective, namely, sustainable safe water supply, was achieved to a certain degree in view of the following point: although regular water quality monitoring aiming at ensuring sustainable safe water supply has not been implemented, as stated in 2.3, use of water sources that are considered unsafe internationally has not been observed through construction of water supply facilities with boreholes in this project; hence, safe water sources (boreholes) have been in use continuously. Users except for those using shallow wells are satisfied with water supply services and have been using water supply facilities with boreholes, and negative influence on health due to water quality has not been reported.

On the other hand, among other effects expected at the planning stage, while borehole drilling technology, one of the intended improvements of survey technologies, was improved to a certain degree, effects were limited in some aspects; improvement of operation and maintenance was limited since operation and maintenance activities such as regular meetings and cleaning around water supply facilities have not been sufficiently practiced; water quality analysis technology, another intended improvement of survey technology of the implementing agency, was not improved as intended since the procured equipment for water quality survey has been poorly used. In addition, many positive impacts have been confirmed, such as significant reduction in water fetching time, and the reduced time has allowed the use of time for other economic activities and school attendance. In particular, the life of women and children has improved; moreover, the number of people affected by waterborne diseases has decreased. Meanwhile, some problems were observed in the environment aspect since no measures have been taken with respect to possible water quality problems observed in some of the constructed water supply facilities.

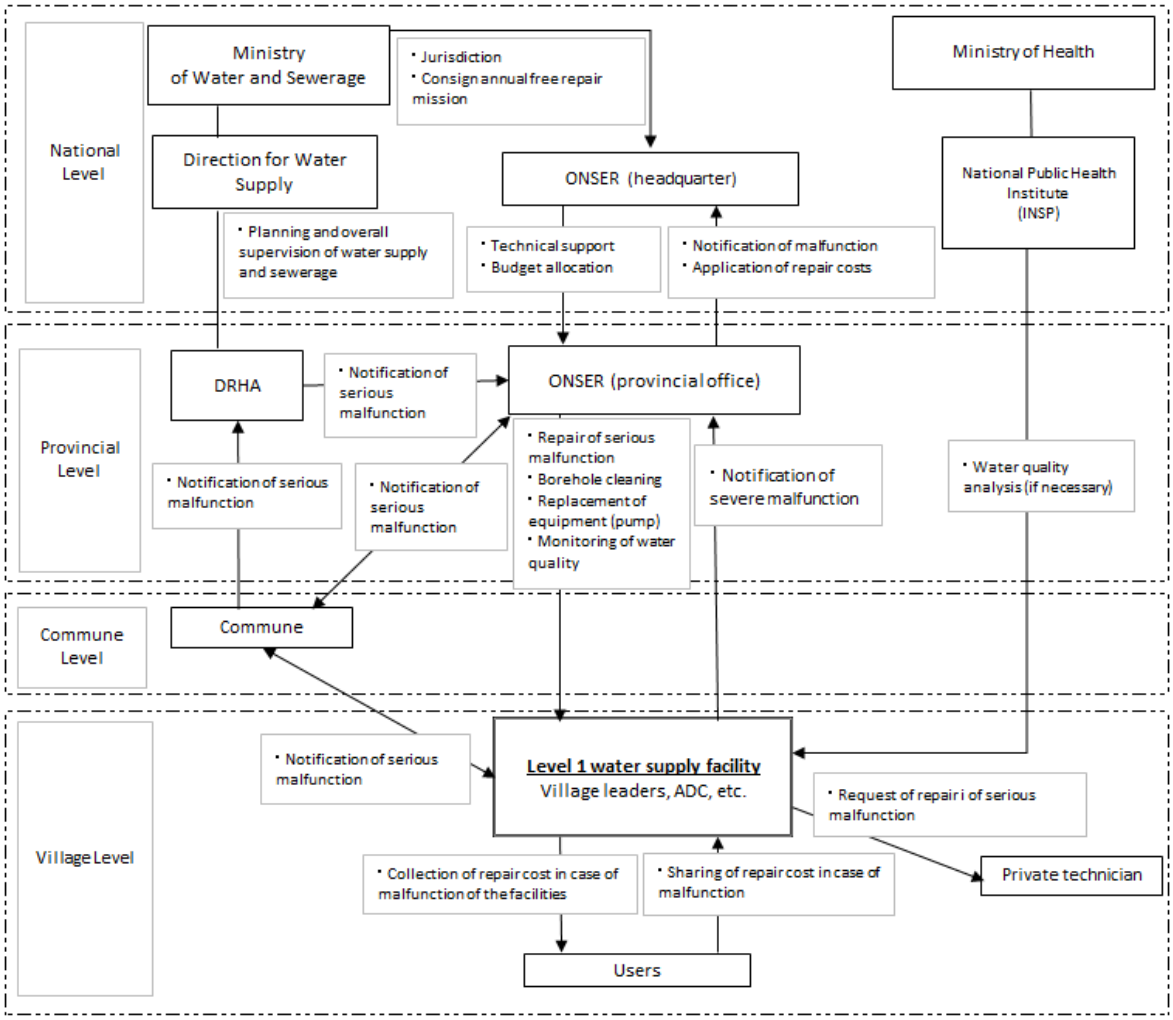
In light of the above, this project has to some extent achieved its objectives as intended, including the project purpose. Some of effects have not been achieved. Therefore, effectiveness and impact of the project are fair.

3.5 Sustainability (Rating: ②)

3.5.1 Institutional Aspects of Operation and Maintenance

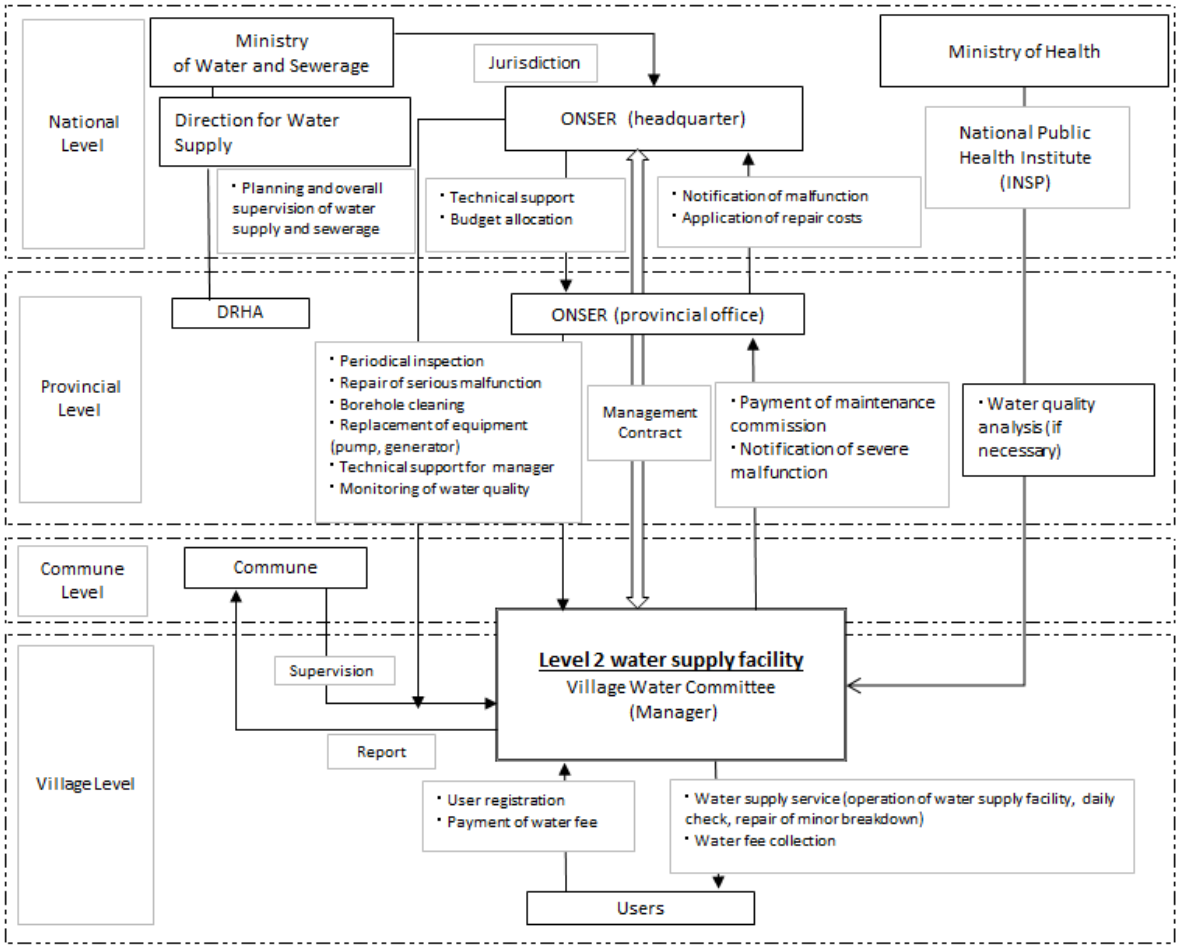
(1) Framework of operation and maintenance and role of relevant organizations

The role of organizations in operation and maintenance of rural water supply facilities is shown in Figure 9 and 10.



Source: Developed by the evaluators of the ex-post evaluation based on the interview with the implementing agency

Figure 9 Organizational Chart of Operation and Maintenance (Level 1 Water Supply Facilities)



Source: Developed by the evaluators of the ex-post evaluation based on the interview with the implementing agency

Figure 10 Organizational Chart of Operation and Maintenance (Level 2 Water Supply Facilities)

1) National level

The Direction of Water Supply of Ministry of Water Supply and Sewerage, the implementing agency of the project, is responsible for the planning of construction of new water supply facilities, overall supervision and coordination of the water sector. As part of this role, the Direction of Water Supply and the DRHA are required to grasp the current status of water supply facilities such as the operation of facilities and usage of facilities by target users; however, they have not pooled, shared and managed relevant information sufficiently. As a result, the following problems were observed: Level 2 water supply facilities were constructed, despite that Level 1 water supply facilities had been constructed by this project. As a result, Level 1 water supply facilities are rarely used; Level 2 water supply facilities were constructed while Level 1 water supply facilities remain unrepaired. In addition, they got to know cases where there were water supply facilities unused due to salty taste for the first time through the field survey of the ex-post evaluation. In this regard, there is room for improvement on the supervision to the ONSER and overall information management.

With regard to operation and maintenance of water supply facilities, operation and maintenance

section of boreholes that belonged to the DRHA was transferred to the ANEPA through water sector reform in 2002. As organizations playing central roles in operation and maintenance of rural water supply facilities under the jurisdiction of the Ministry of Water Supply and Sewerage, the ANEPA was responsible for regular field visits to Level 1 water supply facilities, repairs of severe breakdowns beyond capacity of community users to repair, regular inspection of, repairs of severe breakdowns and collection of operation and maintenance commission fee of Level 2 water supply facilities. The Government of Mauritania changed the organization in charge of operation and maintenance from the ANEPA to the ONSER in June 2010 with view to reinforcement of operation and maintenance of rural water supply facilities. The name of the organization in charge of operation and maintenance changed, but the fundamental role of the ANEPA and the ONSER has been the same. The number of staff of ANEPA headquarters was 65 from 2003 to 2006 and has doubled to more than 130 since 2007. Even after the ONSER was established, there has not been a significant change in the number of staff. The number of staff of ONSER headquarters was 137 in 2013. Similarly to information management of the Direction of Water Supply, as pointed out above, there is also room for improvement in information management of the ONSER, since the ONSER has pooled, shared and managed information on water supply facilities poorly due the lack of staff in its provincial offices and capacity of information management of staff assigned in provincial offices.

The ONSER implements charge-free annual missions for repairs of Level 1 water supply facilities on behalf of the Ministry of Water Supply and Sewerage. However, this mission is not able to cover a sufficient number of water supply facilities due to limited inputs such as personnel, commission fee and means of transport. The frequency of visit per facility is once every 2-3 years.

In principle, water quality inspection is under the control of the Direction of Water Supply of the Ministry of Water Supply and Sewerage at the time of drilling of new boreholes and under the control of the ONSER after water supply facilities are operated. The National Institute for Public Health under the Ministry of Health conducts water quality inspection in case of necessity. However, in practice, water quality has rarely been inspected after water supply facilities start their operation in Mauritania. Causes of this phenomenon are assumed as follows: the importance of regular water quality inspection is not fully recognized since water quality is rarely inspected after water supply facilities start their operation[34]; and a system for implementing water quality inspection, analysis, management and sharing of results from the inspection has not been built.

2) Provincial level

The DRHA, a provincial division of the Direction of Water Supply, is placed in the provincial capital, and undertakes the role of planning of water and sewerage, coordination of related organizations, and overall supervision. Although the DRHA transfers the information to the

[34] In Mauritania, water quality is tested upon request from users (Source: Interview with implementing agency; April 30, 2015).

provincial office of the ONSER when there is a notification of breakdown from the residents or community, it does not perform substantial maintenance activities.

The ONSER, an organization in charge of operation and maintenance, also places its provincial office in the provincial capital, undertaking the role of the operation and maintenance of water supply facilities in the province. For the Level 1 water supply facilities, it repairs a facility when it received the request from residents, the DRHA or community for a serious breakdown of the facility. For the Level 2 water supply facilities, the ONSER concludes a management contract with the village water committee (actually one manager, with one assistant in some cases) to perform the regular inspections of equipment, repair of the facility for a serious breakdown, cleaning of boreholes and replacement of equipment and the like based on this contract. For the target provinces of the project, the provincial office of Assaba Province has four personnel (office head and three technicians), that of Hodh El Gharbi Province had three personnel until 2011, and has increased to five personnel (office head, two electricians, one mechanic and one personnel in charge of periodic maintenance) since 2013.

Institutional aspects of operation and maintenance at the provincial level are not sufficient for performing the operation and maintenance activities such the regular inspections of water supply facilities that are scattered in the provinces including those constructed through the project[35] as well as repairing a facility at the time of breakdown since the personnel, means of transportation and repair materials are not sufficient[36].

3) Commune level

In Mauritania, in particular, with respect to operation and maintenance of the Level 1 water supply facilities, many problems were observed as the following; the regular inspections of the facilities and water fee collection were hardly done since the community organization did not continue for a long time even if the community people were organized; they were not able to quickly repair a facility at the time of breakdown since there were spare parts difficult to obtain. In response to this situation, the commune[37], which is a one-level higher administrative unit than the village, has begun to intervene in the operation and maintenance of the water supply facilities as a coordinator since a few three years ago. The role of the commune is to request the ONSER or the DRHA for repairing a facility without delay when there is a request for repairing the facility from residents, to supervise the maintenance activities of the manager in the Level 2 water supply

[35] At the time of the ex-post evaluation, the number of Level 2 water supply facilities for which users and the ONSER conclude a management contract is 616 in Mauritania in total, 96 in Assaba Province and 168 in Hodh El Gharbi Province. The number of technical staff in charge of operation and maintenance is 30 at national level, 4 in the provincial office of Assaba Province and 3 in the provincial office of Hodh El Gharbi. The number of facilities per one personnel is 20 at national level, 24 in Assaba Province and 35 in Hodh El Gharbi Province. Although the exact number of the facilities is not available, repair works and annual mission for free-charge repair works of Level 1 water supply facilities is also the duties of the ONSER (Source: Documents provided by the ONSER).

[36] Source: Answer to questionnaires and interview (February 2015).

[37] Administrative division of Mauritania is composed of the province (*Wilaya*), prefecture (*Moughataa*), county (*Commune*), and village (*Localité*).

facilities. Although the mechanism that the commune intervenes has not passed so long time after introducing it, a certain effect of intervention has been recognized for the Level 1 water supply facilities, such as urging the ONSER to repair them on behalf of the residents.

4) Village (facility) level

1) Level 1 water supply facilities

For the Level 1 water supply facilities, a system has been planned for establishing the WPC composed of three people for each pump and the VWC composed of four people in each village to make these organizations perform the daily operation and inspection of the facilities, repair of the facilities at the time of breakdown, cleaning, water fee collection, etc. at the time of planning. In the project implementation stage, organization of these community organizations, establishment of management system (developing the facility use rules, training on the daily accounting (water fee collection and accounting management method)), and technical training on the daily inspections and the repair for minor breakdowns were implemented through the soft component activities.

As previously described in 3.4.1, the VWC and the WPC did not exist for six facilities among the Level 1 water supply facilities for which the field survey was conducted at the time of post-evaluation. Among them, five facilities are not used because of facilities' breakdown or salty, and for 1 facility, the manager of the Level 2 water supply facilities in the same village repairs the Level 1 water supply facilities at the time of breakdown. According to the interviews with the relevant people such as the former staff of the DRHA, the ONSER and the VWC, the following reasons why community organizations for operation and maintenance had not continued were listed: adequate persons were not selected because the time spent on the selection of committee members during the soft component activities was not sufficient[38]; the time spent on strengthening the capacity of the selected committee members was too short to establish the understanding of the role and the content of the community based operation and maintenance; regular inspection by the organization in charge of operation and maintenance (the ANEPA or the ONSER) after the completion of the project were hardly performed because of the lack of personnel, budget, transportation means, without having conducted adequate follow-up for WPC and VWC; and the like.

While the VWC and the WPC have not continued, with respect to the repairs to the breakdown of the water supply facilities, there are various ways at present, such as that the residents having received technical training in this project or neighboring technicians repair the facility in the case of minor breakdown, the manager of the Level 2 water supply facilities responds it if the Level 2

[38] As an example, there was a case that persons who are not residents (nomads) were selected as members of the WPC and VWC according to the interviews with the implementing agency. Since there are many nomads in the project target area, sometimes there were only women depending on the timing of the implementation of activities. The absence of male residents made it difficult to make decisions easily. Such a situation was the target area-specific difficulties (Source: Interviews with the consultant in charge).

water supply facilities exist in the same village, the Association for Community Development[39] (hereinafter called "ADC") responds it if the ADC exists. Whenever a breakdown occurs, the leader group of the village, the manager of the Level 2 water supply facilities and the ADC collect the repair costs from the users without carrying out the planned accumulation of the operation and maintenance costs. In the case of a serious breakdown, village leaders, the manager of the Level 2 water supply facilities, and the ADC request the repair to the DRHA, the ONSER provincial office or private technicians. In this way, although somehow repairing the facility in a spot fashion when a breakdown occurs, it does not become a system that can daily implement the operation and maintenance, such as the regular facility inspections and accumulation of repair costs that will occur in the future.

2) Level 2 water supply facilities

For the Level 2 water supply facilities, it was planned to organize the WPC for each public tap and the VWC for each village, and to make the VWC perform the collection of maintenance costs from the users depending on the amount of usage, the payment of operation and maintenance cost to the ANEPA, regular inspections of the facilities and repair of the facility when a minor failure occurs, based on the management contract with the ANEPA.

At the time of ex-post evaluation, not the operation and maintenance system by the WPC and the VWC organized through soft component activities but one manager (with one assistant in some cases) has performed the daily operation of the facilities, water fee collection from users, regular inspections, request of repair to the ONSER or private technicians at the time of serious breakdown of the facility, and the payment of maintenance cost to ONSER (if a management contract with ONSER is concluded). In the background that one manager performs the operation and maintenance, there may be a reason such as that it has become possible to perform the operation and maintenance fee collection more efficiently along with the introduction of water supply by yard connection in many Level 2 water supply facilities[40], but there is no systematic problem because necessary activities have been carried out without any problem.

The maintenance management contract of each water supply facility with the ONSER is concluded in eight facilities among the 13 facilities that we visited in the field survey at the post-evaluation. If the contract is not concluded, private technicians repair the facility or the ONSER undertakes the repair with a free service when a serious breakdown occurs.

As described above, for sustainability from institutional aspects of the operation and maintenance, there is no particular problem in the staff assignment of the Direction of Water Supply, though showing a room for improvement in the supervisory function for the ONSER. In

[39] ADC is a community organization formed by the rural development project funded by the World Bank. *Association de Développement Communautaire*

[40] At the time of the ex-post evaluation, yard connection water supply is introduced in 17/26 Level 2 water supply facilities (Source: Interview with the implementing agency).

addition, for the ONSER headquarters, there are problems in the mechanism for implementing water quality inspection and the free-repair mission of the Level 1 water supply facilities, and also for the ONSER provincial offices, there is a slight shortage in the funding to intervene in the timely and appropriate water supply facilities and to continuously provide the technical support to the residents. For the community based operation and maintenance system, there is no particular problem in the Level 2 water supply facilities, but for the Level 1 water supply facilities, there is no organization to undertake the daily operation and maintenance, revealing the necessity to rebuild the operation and maintenance system. In light of the above, sustainability from technical aspects is fair.

3.5.2 Technical Aspects of Operation and Maintenance

(1) ONSER headquarter and provincial offices

At the time of planning, the ANEPA (presently the ONSER) headquarters was expected to dispatch technicians for boreholes cleaning and repair works of broken facilities beyond the repair capacity of the regional offices. Currently, the ONSER headquarters allocates budget, dispatches technicians and repairs broken facilities each time the regional offices are not able to repair broken facilities. After the project completion, the ANEPA or the ONSER manage most of repairs requested by users, therefore, the ONSER can be said to have the basic technical skills for carrying out maintenance of facilities. For instance, among 13 Level 2 water supply facilities surveyed during the field survey, ONSER repaired nine facilities when they were severely broken.

Meanwhile, with regard to Level 1 water supply facilities, the ex-post evaluation study found that there were facilities left unrepaired for a few years and that no measure had been taken for facilities that had been faced with eventual salinization. In this regard, some problems have been observed in terms of technical capacity of the ONSER headquarters and provincial offices.

(2) Village (facility) Level

1) Level 1 water supply facilities

At the planning time, VWC and WPC organized through soft component activities were expected to implement cleaning of the surroundings of the facility, daily maintenance of the facility and repair works in case of minor breakdown. At the time of the ex-post evaluation, broken facilities are repaired by residents trained through the project, operators or managers of Level 2 water supply facilities constructed in the same village. Sometimes, users ask for repairs byprivate technicians. Technical intervention to the facility occurs only when it breaks down; preventive maintenance such as periodical inspection of inside of the pump and replacement of consumable parts is rarely implemented. Although users have managed to repair broken facilities, it is difficult to say that they have sufficient technical capacity to conduct daily maintenance, inspection and repairs.

2) Level 2 water supply facilities

As described above, although the current operation and maintenance system is different from the planned system in which the WPC is formed for (every public tap and VWC manages the entire facility at the village level), water supply facilities have been well maintained in general since managers or the ONSER inspect equipment of the facility periodically[41] and have managed to repair minor breakdowns of the facility. Managers have the basic technical skills required for operation and maintenance of the facility.

In light of the above, there is no problem in principle with respect to technical capacity of ONSER headquarters and provincial offices judging from their periodic inspection and repairs of broken facilities. However, some problems have been observed as seen in some of the Level 1 water supply facilities that have been left unused due to malfunction or possibility of salinization. With regard to technical capacity of users, no particular problem has been observed in Level 2 water supply facilities; however, users' technical capacity of Level 1 water supply facilities is found to be insufficient to conduct daily maintenance, inspection and repairs. In light of the above, sustainability from technical aspects is fair.

3.5.3 Financial Aspects of Operation and Maintenance

(1) Financial aspects of the ONSER

Financial resources of the ONSER are from the budget of the government of Mauritania, income from water fee collection and others. The percentage of each item in the total income, which differs from year to year, is 30-60% from the government budget, 20-40% from income from water fee collection[42] and 10-20% from others[43]. In Mauritania, Level 1 water supply facilities have been upgraded to Level 2 water supply facilities following the government policy. With the number of Level 2 water supply facilities increasing, the income of ONSER is also expected to increase along with an increase in income from water sales. However, there are water supply facilities getting older and breaking down frequently. The water fee is not collected in the downtime of such facilities. Then, the income from water fee collection, which is one of financial resources of operation and maintenance for the ONSER, may not reach an expected level, affecting the ONSER in stabilizing its income.

[41] For instance, in most of the 13 facilities surveyed in the field, inspection of pump and generator is conducted once a year; that of elevated tank is once a month, every six months or once a year. Pipelines and valves are checked out every six months (Source: Result of the questionnaire).

[42] When operation and maintenance services were transferred from the ANEPA to the ONSER in June 2010, the ONSER was not able to collect the water fee in the fiscal year 2010 and 2011 in due time. The ONSER regained the water fee for the fiscal years 2010 and 2011 in 2012. Therefore, the amount of the fiscal year 2012 is much larger than others (Source: Interview with the implementing agency (April 2015)).

[43] As stated in Table 4, since some information was not available in some of the fiscal years surveyed, it was difficult to judge whether the income of the ONSER was stable or not over these years.

Table 4　Budget of ONSER

(Unit: Mauritanian Ouguiya)

Item	2010	2011	2012	2013	2014
Income					
Government subsidy	192,178,324	179,790,152	264,581,882	n.a.	273,925,143
Water fee collection	120,000,000	130,000,000	242,099,633	134,021,130	140,000,000
Replacement of equipment	275,747,240	n.a.	95,540,000	31,925,143	130,000,000
Total	587,925,564	n.a.	602,221,515	n.a.	543,925,143
Expenditure					
Personnel expenses	220,842,170	242,617,913	258,446,715	n.a.	284,097,104
Maintenance (repair works)	69,770,759	41,213,840	125,303,427	n.a.	50,001,450
External charges	56,300,637	n.a.	40,682,521	n.a.	47,405,507
Miscellaneous expense	14,271,118	n.a.	6,387,850	n.a.	4,283,000
Purchase of equipment	235,351,663	169,233,126	223,024,969	n.a.	103,859,852
Total	596,536,347	n.a.	653,845,482	n.a.	489,646,913

Source：Documents provided by ONSER

The budget for the provincial offices of the ONSER comes from the headquarters upon each request instead of a one-time transfer in the beginning of the fiscal year, except for personnel expense. There is almost no budget secured for different activities at the regional offices, which has prevented implementation of regular inspection of facilities. As a result, the provincial offices are not able to know the status of a problem facility, and appropriate interventions are not provided[44].

Thus, there are some problems in financial aspects of the ONSER in grasping the status of water supply facilities through regular inspection and repairing broken facilities promptly.

(2) Village (Facility) level

1) Level 1 water supply facilities

Through soft component activities implemented within the project, users agreed on the payment of the water fee by a monthly flat rate. VWC members were trained on the management including account management bookkeeping. Since the VWC and the WPC did not exist in the Level 1 water supply facilities surveyed in the field survey of the ex-post evaluation, daily water fee collection and keeping an account book were not implemented in these facilities. When these water supply facilities break down, stopgap measures are taken such as collection of repair costs by village leaders or ADC. There are problems in terms of financial sustainability of Level 1 water supply facilities in that the water fee has not been collected and operation and maintenance costs

[44] In addition to budget, other factors such as the lack of personnel and means of transport may be causes of such problems. For instance, since the ONSER has not checked the status of utilization of facilities regularly, the ONSER got to know cases for the first time through the field survey of the ex-post evaluation in which there were facilities that residents had not used due to salty taste.

have not been saved systematically in preparation for expenses for repair works in case of the breakdown of facilities.

2) Level 2 water supply facilities

With regard to the Level 2 water supply facilities, the field survey of the ex-post evaluation study confirmed that the water fee has been collected and an account book has been kept in 11 out of 13 facilities. The result of the beneficiary survey shows that the current water fee is set at an affordable level to pay for most of the users as far as 76% of households paying for water consider the current water fee "reasonable" and "cheap"[45].

There is no problem in principle in financial aspects of Level 2 water supply facilities. However, the interview and questionnaire survey of the ex-post evaluation found that expenditure (in particular, that of fuel of generator) had so increased that running costs had not been generated in generator-powered water supply facilities. As a result, the discharge time was limited and then the discharge volume became insufficient. Users of such facilities request the ONSER to change the power source from the generator to the solar power generation. Since the ONSER set the maximum water rate as 250UM/m3 according to the management contract between the ONSER and users of the water supply facility, it is not possible to collect the water fee additionally in case of the deficit of the income or to increase the water rate. In this regard, there are slight problems in financial sustainability of generator-powered water supply facilities.

In light of the above, with regard to financial sustainability, some problems are identified in financial capacity of the ONSER. Although some issues remain, problems are not seen in general in financial aspects of Level 2 water supply facilities. With regard to the Level 1 water supply facilities, there is room for improvement in water fee collection and saving of operation and maintenance costs. In light of the above, sustainability from technical aspects is fair.

3.5.4 Current Status of Operation and Maintenance

(1) Status of operation and maintenance of water supply facilities

As stated in 3.3, the functioning rate of the water supply facilities constructed through the project as of the ex-post evaluation is 69% for Level 1 water supply facilities (18/26 functioning facilities), 84% for Level 2 facilities (by pumping power source, 89% (8/9 functioning facilities powered by solar power generation)) and 80% (8/10 functioning facilities powered by generator). The total functioning rate is 76% (34/45 functioning facilities). The functioning rate is evaluated to be satisfactory in general, and project effects have been produced continuously as of the ex-post evaluation although the functioning rate of Level 1 water supply facilities is below 80%, which is

[45] Among 178 households paying for water at the time of ex-post evaluation, three of them (2%) consider the current water fee "very expensive," 40 of them (22%) consider it "a bit expensive," 116 of them (65%) consider it "reasonable" and 19 of them (11%) consider it "cheap" (Source: Result of the beneficiary survey).

the national target set by the Ministry of Water Supply and Sewerage. The reasons for a relatively high functioning rate are as follows. Since 2010, among 40 Level 1 water supply facilities as of the project completion, 15 facilities were upgraded to Level 2 water supply facilities following the government policy[46]. These upgraded facilities have not been used long since they started operation. Moreover, the operation and maintenance system for Level 2 water supply facilities was already established at the planning stage and the same system has been maintained even after the operation and maintenance services were transferred from the ANEPA to the ONSER.

Although the functioning status of the water supply facilities is generally satisfactory, looking at the project objective that is "sustainable safe water supply" from qualitative aspects, there remain concerns to implement monitoring of water quality continuously, since mechanism to perform water quality monitoring in systematic manners is not established due to insufficient implementation system and budget of ONSER and insufficient supervisory function of the Direction of Water Supply. In addition, there is a problem that no prospect has seen in repairing Level 1 water supply facilities that were left unrepaired, especially with regard to the Level 1 water supply facilities newly constructed in villages where Level 2 water supply facilities had been constructed in the same village.

(2) Status of operation and maintenance of procured equipment

Among the equipment procured through the project, the borehole survey equipment, such as the borehole logging device put in place in the Direction of Water Supply of the Ministry of Water Supply and Sewerage, are being utilized as initially planned. There is no problem in maintenance and inspection of the equipment.

On the other hand, the ex-post evaluation study found that the equipment for water quality analysis put in place in the DRHA had not been fully utilized. The reasons are described in 3.1.4.

(3) Availability of spare parts

With regard to the procurement of spare parts for Level 2 water supply facilities, no concern was identified as far as users did not find any particular problem to get necessary parts. On the other hand, with regard to Level 1 water supply facilities, a part positioned at the bottom of the pump called "bladder" is often difficult to procure[47]. Taking such a situation into account, the government of Mauritania decided to upgrade Level 1 water supply facilities to Level 2 water supply facilities gradually after 2009.

[46] The number of Level 1 water supply facilities upgraded to Level 2 water supply facilities was three in 2010, one in 2011, eight in 2012 and three in 2013 through funding from the Mauritanian government, other donors and NGOs (Source: Documents provided by the implementing agency).

[47] Source: Result of questionnaires

Some minor problems have been observed in terms of institutional, financial and technical aspects. Therefore, sustainability of the project effects is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project developed water supply facilities and procured survey and maintenance equipment and introduced an operation and maintenance system by community participation for the purpose of a sustainable safe water supply in 47 villages in Hodh El Gharbi Province and Assaba Province. The project objective is consistent with the development policy and development needs of Mauritania as well as with Japan's ODA policy; therefore its relevance is proved to be high. In addition, the actual percentage of the population that was provided with water, as well as constructed water facilities, through the implementation of the project reached more than 90% of the target value. As a result, expected positive effects of the project were confirmed, such as the following: the waterborne disease rate in the project target areas has decreased, and opportunities to effectively utilize time for daily activities by reduced water-fetching workload have increased. On the other hand, effects of the project are limited compared to the initial plan in terms of improvement of operation and maintenance of Level 1 water supply facilities and improvement of water quality survey technology of the implementing agency. Thus, the effectiveness and impact of the project is fair. Both the project cost and project period were within the plan. Therefore, efficiency of the project is high. While the functioning rate of water supply facilities constructed by the project is relatively good, as shown by the figure of 76% at the time of the ex-post evaluation, operation and maintenance of the facilities leave room for improvement in many ways, such as personnel deployment and financial capacity of the ONSER, which is a central organization of maintenance of rural water supply facilities; personnel deployment, technical and financial capacity of community organizations for Level 1 water supply facilities and a system for implementing water quality monitoring. Thus, the sustainability of the project effect is fair.

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

4.2 Recommendations

4.2.1 Recommendations to the Implementing Agency

Short-term actions

(1) Improvement of the functioning rate of the water supply facilities (recommendations to the Direction of Water Supply and the ONSER)

Especially with regard to the Level 1 water supply facilities, the ex-post evaluation study confirmed the facilities that remain out of order or are left unused; thus, it is advisable that the ONSER allocates needed human resources and budget for repairable non-operational facilities. Moreover, for the water supply facilities with the possibility of water salinization, it is advisable to conduct detailed analysis of water quality, and when there is no safe alternative water source in the

same village, to plan development of a new water source or take other measures.

Mid-Long Term Measures

(2) Establishment of a system for water quality monitoring (recommendations to the Direction of Water Supply and the ONSER)

With regard to the equipment for water quality analysis, which is confirmed not to have been fully utilized at the time of the ex-post evaluation, it is advisable for it to be transferred from the DRHA, where the equipment is currently put in place, to the regional office of the ONSER, the main implementer of water quality monitoring. Furthermore, it is recommended that the ONSER draw up a feasible, detailed plan of water quality monitoring (who does monitoring, when/how often, etc.) and allocate human resources and budget for it. In such case, it is advisable to establish a method of sharing the results of water quality monitoring and a coordination mechanism with relevant organizations under the Ministry of Health, which are to be supervised by the Direction of Water Supply in an appropriate manner.

(3) Improvement of management of basic information on water supply facilities (recommendations to the Direction of Water Supply and the ONSER)

In this ex-post evaluation, it is confirmed that the ONSER, the operation and maintenance body, does not grasp the current situations of the respective facilities, including the operational status of the water supply facilities, the utilization status by the local residents, construction of facilities by other donors and NGOs and the introduction of yard connection water supply. These are due to a lack of regular visits to the facilities, insufficient water fee collection, consolidation, recording of data and so on. From now on, it is recommended to upgrade the Level 1 water supply facility to the Level 2 water supply facility efficiently, without overlapping among donors, and to review the communication and reporting system and information management between the Direction of Water Supply and the ONSER in order to establish new water supply facilities.

4.2.2 Recommendations to JICA

Considering that the water sector in Mauritania does not have much experience and knowledge in regular water quality monitoring, and that the implementation mechanism has not been fully established, it is hoped that the following be considered to support establishment of a water quality monitoring system when implementing the abovementioned recommendation (4.2.1(2) Establishment of a system for water quality monitoring): to plan assistance with feasible means in the capital (e.g., to invite staff from the regional offices of the DRHA and the ONSER to the capital to transfer the skills on how to use the equipment and manage data, to jointly make a monitoring plan, to introduce cases from other countries, etc.) when the situation continuously prevents entrance into the project target areas due to an security issue, as at the time of the ex-post evaluation, and to provide on-the-job training at the ONSER provincial offices when it is possible

to enter into the project areas.

4.3 Lessons Learned

(1) Assistance to the implementing agency for an effective utilization of the procured equipment for water quality monitoring

In the project, the equipment for water quality analysis, one of the procured equipment, has been little used. One of the reasons is the insufficient consideration on where to allocate the equipment for water quality monitoring after the project's end by those concerned, including the main implementers. Moreover, the water sector in Mauritania does not have much experience in water quality monitoring after construction of a water supply facility. Despite the fact that the implementation management system had not been fully established, the technical transfer during the project implementation mainly focused on how to use the equipment. Moreover, no consideration was given to implementers and frequency of water quality monitoring, budget for supply of reagent, and detailed plan for utilization of the equipment such as method of consolidation and sharing of results from water quality monitoring.

When the rural water supply sector in the subject country does not have much experience in water quality monitoring at the time of operation of a water supply facility, it is necessary to carry out capacity assessment of concerned organizations during the planning stage and to carefully review the appropriateness of the organizations to place the equipment. The assessment includes such issues as personnel of the organizations in charge of water quality monitoring and their experiences in water quality testing, sources of budget for reagent supply and others, and capacity of a supervising organization. On that basis, it is desirable to include in the Basic Design study a detailed water quality monitoring plan that is linked to effective use of the procured equipment. When the host organization does not fully possess the capacity to utilize the equipment, technical assistance by soft component is desirable to be included. Furthermore, it is preferable during the project implementation to check the appropriateness of the organization that received the equipment—namely, whether there is no problem in the number of personnel who use the equipment, their capacity, and continuously securing inputs including budget and vehicles. It is also desirable to check the method of sharing of the monitoring results among the concerned organizations and whether it is possible to coordinate with the concerned organizations under the Ministry of Health when there is a problem. It is desirable to complete the project in the state where it has established the system that can sustain water quality monitoring even after the project's completion.

(2) Establishment of the community based operation and maintenance of rural water supply facilities

In the project, with the aim of establishing the mechanism of community-based operation and maintenance, the training was conducted on community organization and operation and

maintenance. However, with regard to the Level 1 water supply facilities, the time spent on organization and capacity building of the community members was short, and in addition, the follow-up by the ONSER on the activities of the community organizations was limited. Thus, the local residents who were selected as members of the operation and maintenance committee did not understand the importance of preventative operation and maintenance and the role expected of them to allow operation and maintenance activities by local residents themselves. Especially, with regard to the water supply project through the grant aid, soon after the start of the operation of a facility, the project period ends, and the follow-up by the Japanese side until the community organizations become independent and are able to engage in operations and maintenance activities is often limited. In the case of rural development programs by other donors in Mauritania, some cases are reported where the community groups have become well-functioning by spending a long time on community organization and capacity building. In the case where time is limited for the capacity building of community organizations, as with the grant aid, and where it is deemed necessary for further assistance at the time of the project completion, it is desirable to consider coordination with other schemes such as dispatch of volunteers and experts or with technical cooperation projects while evaluating possible assistance schemes in the subject country.

(End)