Ex-Post Project Evaluation 2010:

Package I-2 (Guatemala, Nicaragua)

November 2011

JAPAN INTERNATIONAL COOPERATION AGENCY

FOUNDATION FOR ADVANCED STUDIES ON INTERNATIONAL DEVELOPMENT

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Preface

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

This volume shows the results of the ex-post evaluation of ODA Loan projects that were mainly completed in fiscal year 2008, and Technical Cooperation projects and Grant Aid projects, most of which project cost exceeds 1 billion JPY, that were mainly completed in fiscal year 2007. The ex-post evaluation was entrusted to external evaluators to ensure objective analysis of the projects' effects and to draw lessons and recommendations to be utilized in similar projects.

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

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

November 2011
Masato Watanabe
Vice President
Japan International Cooperation Agency (JICA)

Disclaimer

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

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

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

Guatemala

Ex-Post Evaluation of Japanese Grant Aid Project

"The Project for the Water Supply for the Urban Area of Quetzaltenango City"

External Evaluator: Keiko Asato,
Foundation for Advanced Studies on International Development

0. Summary

The Project aimed to achieve a stable supply of clean water through the improvement and construction of facilities for water resources, reservoirs, and transmission and distribution pipelines. This is consistent with the development plan and development needs of the Republic of Guatemala, and also with Japan's ODA (Official Development Assistance) policy; therefore, the relevance of the Project is high. Efficiency is also high because the cost and the period of the Project were within the planned budget and schedule.

The Project Purpose was to ensure that 100% of families in the target area could access "a 24-hour continuous water supply" and "a water supply without water pressure problems". Even though this purpose was not achieved, more than 90% of families can use water continuously 24 hours a day, and are free from the problem of low water pressure. We can observe the effects of the Project. Moreover, we can observe the following effects: the unaccounted-for water rate has decreased from 40% (in 2000, before the Project implementation) to 20% (in 2010); the leakage rate has also decreased from 44.59% (in 2007, the year of the completion of the Project) to 19.92% (in 2010); the rate of collection of water service charges has increased; users have expressed their satisfaction that they can consume water stably at any time with good pressure. These effects are also attributed to complementary technical assistance for the improvement of the management of public water corporations, as well as the construction of facilities and the provision of equipment. (Regarding the reduction of the leakage rate, the replacement of old asbestos pipes by EMAX also partially contributed). On the other hand, we can also observe the wastage of water and the increase of sewage water as the supply of water has increased. Even with these concerns, we can evaluate that the effectiveness of the Project is relatively high.

EMAX, the implementing agency, does not have sufficient staff, but the terms of reference in each position are clearly defined and qualified staff are recruited and assigned to the respective positions. They have enough capacity to operate and maintain the facilities and equipment, to respond to the leakage of water, and to manage the public water supply. The financial status is also improving with a surplus of balance. Current concern regarding the sustainability of the Project relates to the technical enhancement of the detection of underground water leakages and the expansion of the application of a new service charge system.

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

1．Project Description

Project Site in Guatemala

Barehole at Zoologico

1.1 Background

The government of Guatemala made it a high priority to improve facilities related to clean and sewage water, hygiene and sanitation. The improvement of health and daily life conditions was considered important and the decrease of water-related diseases can be attained through a stable supply of good quality clean water. The city of Quetzaltenango, the target area of this Project, is the second largest city in Guatemala, and the regional economic and industrial center. Indigenous people make up 50% of residents. The water supply system in Quetzaltenango had been expanded with no long-term plan. Therefore, even though the rate of supply of clean water in urban areas was high at 94.3 % (in 2000), ongoing problems continued, such as the suspension of water supply, the instability of water supply, the lack of total volume of water for supply, low water pressure and so on. Reliable service delivery of clean water had not been achieved.

Under such circumstances, Quetzaltenango City developed the "Master Plan for Drinking Water Supply (hereinafter referred to as "Master Plan") up until 2018, supported by the Government of Austria. In line with this Master Plan, Empresa Municipal Aguas de Xelaju, Municipalidad de Quetzaltenango (Municipal Water Authority of Xelaju, Quetzaltenango City, hereinafter referred to as "EMAX") was established in 2000. EMAX promoted the construction of new facilities and the improvement of existing facilities for water resources, water reservoirs, and the transmission and distribution pipelines. However, due to budget constraints, the realization of the Master Plan had been suspended. As a consequence, in July 2002, the government of Guatemala requested a Grant Aid Project for the construction and improvement of facilities for the supply of clean water from the Japanese Government.

1.2 Project Outline

The objective of this Project is to provide a stable drinking water supply to residents in the center of Quetzaltenango City by constructing and improving the water supply facilities, such

as water resources, reservoirs, and transmission and distribution pipe-lines.

Grant Limit/Actual Grant Amount	17.59 million JPY/17.54 million JPY
Exchange of Notes Date	August, 2004 (First phase)/June, 2005(Second phase)
Implementing Agency	Municipal Water Authority of Xelaju, Quetzaltenango City (EMAX)
Project Completion Date	March, 2007
Main Contractor	Hazama Corporation
Main Consultant	Kyowa Engineering Consultants Co., Ltd. Nihon Suido Consultants CO., Ltd. (Joint venture)
Basic Design	Basic design report of "The Project for the Water Supply for the Urban Area of Quetzaltenango City" October 15, 2003～March 26, 2004
Detailed Design	N.A.
Related Project (if any)	＜Technical cooperation＞ ・Strengthening Water Associations and community Development（2009-2013） ＜Grant Aid Project＞ ・"Rehabilitation of Plants for Drinking water Treatment"（1994～1997） ・"Plan of Groundwater Development in the Central Highland Area"（1997～1998） ・"Rehabilitation Plan of Rural Purification Plant"(1998～2001） ・"Rehabilitation of Plants for Drinking water Treatment, Second Phase"（2001～2004） ＜Yen Loan＞ ・"Groundwater Development Plan of Guatemala City" (1990） ＜Others＞ ・Cooperation from Austria "Master Plan of Drinking Water Supply"（1999）

2. Outline of the Evaluation Study

2.1 External Evaluator

Keiko Asato, Foundation for Advanced Studies on International Development

2.2 Duration of Evaluation Study

Duration of the Study：November 2010 - October 2011

Duration of the Field Study：February 2 - 12, 2010,　May 11 - 14, 2011

2.3 Constraints during the Evaluation Study

It was difficult to obtain numerical data to see the transition of achievement of indicators to evaluate the effectiveness. Therefore, the situation before the Project was compared with the situation after the Project to evaluate the Project effects.

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

3.1 Relevance（Rating：③[2]）

3.1.1 Relevance with the Development Plan of Guatemala

At the time of the ex-ante evaluation, there was a Master Plan for the supply of water to urban areas up until 2018 as a water supply related development policy, with which this project is aligned. In the Poverty Reduction Strategy Paper (hereinafter referred to as "PRSP") 2001, the construction and improvement of infrastructure were considered as important development issues, and the improvement of water supply facilities was also listed as one of these issues. The Social Policy Matrix 2000-2004, which was developed by the Administration of Portillo, also put the stable supply of drinking water as a high priority.

At the time of the ex-post evaluation, the "National Plan for the Health of all Guatemalans"（Plan Nacional, Para la Salud de Todas y Todos los Guatemalteco）set "the improvement of the drinking water and sanitation environment for the progress of daily life of people" as a prioritized policy for 2008-2012. In this policy paper, the construction and improvement of drinking water facilities was also set as a prioritized development issue.

3.1.2 Relevance with the Development Needs of Guatemala

At the time of the ex-ante evaluation, the coverage of drinking water supply in urban areas of Quetzaltenango city was 94.3% (2000), which is relatively high. However, this water supply system had been expanded without a long-term plan as the city developed. As a result, many chronological problems had occurred, such as the inappropriate location of the reservoirs and distribution areas, the suspension of water supply, instability in the supply of water, the lack of total volume of water and water pressure. At the same time, problems in the operation, maintenance and management of the water supply system were not few, and included an ineffective water service charge system, the inappropriate collection of service charges based on the consumption of water use, many illegal users, many problems with water meters and substantial leakage of water. As a result, the accounted-for water rate was low at

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

[2] ③：High, ② Fair, ① Low

65%.

At the time of the ex-post evaluation, full utilization of existing water resources was an important issue as well as the development of new water resources and the collection of service charges for its consumption. In particular, because the suburban area of Quetzaltenango had developed, the incoming population for work and study during the day-time is growing. Hence the gap of water consumption between night and day is getting bigger. To handle this complicated balance of demand and supply, the appropriate planning and operation of water management is considered as an important issue.

3.1.3 Relevance with Japan's ODA Policy

According to the "ODA data book" in 2004 at the time of the ex-ante evaluation, one of the important development issues for Japanese ODA was: "Rural development with consideration to the indigenous people". It was agreed with the Administration of Berger that agriculture, education, health and sanitation are the prioritized areas in supporting indigenous people. 50% of the population in Quetzaltenango city is made up of indigenous people. From this perspective, cooperation for the stable supply of drinking water to this city is consistent with Japan's ODA policy.

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

3.2 Efficiency（rating：③）

3.2.1 Project Outputs

As Outputs on the Japanese side, there are three components: construction, procurement and technical transfer related to the detection of leakages and the improvement of the management of EMAX. These components were planned during the Basic Design Study (hereinafter referred to as "BD"). The construction component includes the following items: the expansion of the San Isidro reservoir, the construction of the Zone Media reservoir, the construction of a pump station at the San Isidro reservoir, the installation of transmission and distribution pipelines in the Media and Baja Area, the renewal of electro-mechanical equipment at seven existing boreholes, and the renewal of pumps at two existing boreholes. The procurement component includes a correlative type leakage detector, a portable ultrasonic meter for water flow, an acoustic bar, a small excavator, a compressor, a water CAD, and a meter. The complementary technical assistance component was conducted in relation to the detection of leakages utilizing the equipment procured by this Project, as well as in the improvement of the operation and management of EMAX, targeting issues such as the conversion of illegal users to registered users, the revision of the water service charge system, customer surveys, the revision of user categories, the installation of water meters and so on.

The construction and procurement components were changed partially due to technical reasons; however, this did not impact on the effect of the Project. The changes were mainly

related to the exact location of the construction of facilities and installation of equipment based on the actual measurements of the related sites. These changes were accompanied by the modification of specifications, such as the quantity and the length of the equipment, which would not change the effect of the Project.

The Outputs planned by the Guatemalan side are as follows: to obtain and level the site of construction for a distribution reservoir and pump station; to transfer the existing facilities; to clean up the construction site; to install the electric line, access road and transformer to the site; to get approval from the municipality; and so on. In addition to these outputs for construction, as for the procurement component, the following outputs were planned: to secure a place to stock the water meters and the equipment for leakage detection; to install the distribution pipelines; and, to formulate the working team for the detection of underground water leakages. These outputs were conducted without problems.

3.2.2 Input

3.2.2.1 Project Cost[3]

Comparing the original planned cost of 1,759 million JPY on the Japanese side, the actual cost was 1,754 million JPY (99.7% of the original plan).

Table 1: Planned and actual project cost on the Japanese side

（Unit：thousand yen）

	First phase	Second phase	Total
Plan	711,000	1,048,000	1,759,000
Actual	710,000	1,044,000	1,754,000

(Source) Project Completion Report

Regarding the project cost on the Guatemalan side, a total of 880,000 GTQ (equivalent to 11,977,000 JPY[4]) was planned, which was composed of: 1) lead of electricity (370,000 GTQ); 2) the pavement of access roads (Q 350,000 GTQ); 3) the arrangement of fences and so on (140,000 GTQ); and, 4) the separation of the distribution areas (20,000 GTQ). Among these costs, components 1, 3 and 4 cost 403,000 GTQ in total[5], even though 530,000 GTQ had been planned (76% of plan). In addition to these expenses originally calculated in the BD, 2.5 million GTQ for the acquisition of land for the distribution reservoir and the receiving reservoir and 2.745 million GTQ for tax related to the Grant Aid project was also borne by EMAX.

Even though the total cost and expensed items borne by the Guatemalan side exceeded the

[3] Some information related to the input from the Guatemalan side could not be obtained. Therefore, the rating was done based on only the information from the Japanese side.

[4] 1 GTQ =13.61 JPY is applied for the calculation of the exchange rate, which is the rate at the time of the Exchange of Notes (August 2004).

[5] The information of costs for component 2, arrangement of access roads, could be attained.

original plan, this was necessary for the Project. Regarding the planned expense items, the cost of component 2 was not calculated. But in general, it is expected that the cost was roughly within the original plan.

3.2.2.2 Project Period

The project period was planned to be 32 months (August 2004 – March 2007) at the ex-ante evaluation, including the detailed design period. The actual period was 30.5 months (August 31, 2004 – March 15, 2007), which was lower than planned. (95% of plan).

In light of the above, the project cost was mostly as planned, and the project period was within the plan; therefore, efficiency of the project is high.

3.3 Effectiveness [6] (Rating：③)

3.3.1 Quantitative Effect

3.3.1.1 The Number of Families with "24-hour Continuous Water Supply" and "No Problems with Water Pressure"

As indicators to measure the effect of this Project, "24-hour continuous water supply" and "No problem with water pressure" were set. The level of achievement of these indicators is as follows:

Table 2: % of families with 24-hour continuous water supply and without water pressure problems

（Unit ：%）

Indicator	2004 （Actual）	After 2008 （Target）	2011 Ex-post evaluation
Families with 24-hour continuous water supply	55	100	91
Family without water pressure problems	60	100	91

(Source) Data offered by EMAX

According to the data offered by EMAX, the rates of families with 24-hour continuous water supply and without water pressure problems were both 91% at the time of the ex-post evaluation (2011). Some areas in Zone 8 are restricted from receiving 24-hour running water, which impedes the achievement of the target. According to EMAX, the reason which impedes the 100% water supply is attributed to the restriction of water supply at Zone 8 due to insufficient water production. Even with that circumstance, 20-hour continuous water supply a day, by average, is achieved in the Zone 8. In addition, the beneficiary survey at the time of the ex-post evaluation reveals that 85% of families can enjoy a 24-hour running water supply.

[6] The rating for the effectiveness was evaluated considering the achievement of impact.

In this survey, it was found that even families that cannot receive water continuously 24-hours-a-day have water in the morning and afternoon when they need it. On the other hand, regarding the water pressure, 94% of the families responded that they had no problems based on the result of the beneficiary survey.

The target year to attain the level of indicators was 2008. However, the transition data showing the achievement of the indicators since 2008 could not be obtained. Even given that situation, the production volume of water resources remains at the same level from 2008 to the time of ex-post evaluation, as stated in the next section (3.3.1.2.). We can anticipate that the achievement level in 2008 was not so different from that in 2011.

In summarizing, 85 – 90% of families can enjoy a 24-hour continuous water supply, and more than 90% of them also have no problems with water pressure. This represents substantial progress in the supply of water.

3.3.1.2 Production Volume from Water Sources

At the time of the ex-ante evaluation, the production volume of water was 87% of the maximum water demand. In this Project, the enhancement of production capacity at boreholes was directed at the renovation of pumps, the control panel, tubes and accessories around the boreholes and not by developing a new water source (such as a spring or borehole).[7] The production volume at each water source, and the distribution volume from each reservoir to the distribution area before and after the Project, is as stated in Table 3. All boreholes, except for the one at San Isidro, have increased their production capacity. In particular, the boreholes at Zoologico and Pacaja, which had pumps renovated, have remarkably increased their production volume by 170% and 191% respectively, compared to the time of the ex-ante evaluation. On the other hand, the borehole at San Isidro is decrepit, but in 2010, it could still produce 89% of the volume of 2004.

Table 3: Production volume at each water source

（Unit： ㎥/day）

Boreholes	2004 年	2007 年	2008 年	2009 年	2010 年	Volatility rate (%)
Production at each borehole under the San Isidro Reservoir						
Spring	13,727	13,727	13,727	13,727	13,727	100
San Isidro	1,104	0	982	982	982	89
Democracia	2,127	2,491	2,491	2,491	2,491	117
(Sub-total)	16,958	16,218	17,200	17,200	17,200	101
Distribution volume from San Isidro Reservoir (To Baja Area)						

[7] The pump renovation was done at the Zoologico and Pacaja boreholes. The renovations of the control panel, tubes and accessories around the boreholes were done at all seven boreholes, including Zoologico and Pacaja.

	14,831	(***)---	16,958	16,958	16,958	
Production at each borehole under the Zone Media Reservoir						
Ciprezada	0	0	2,453	2,453	2,453	---
Zoologico	1,666	2,837	2,837	2,837	2,837	170
El Paraiso	1,302	2,177	2,177	2,177	2,177	167
Pacaja	1,384	2,650	2,650	2,650	2,650	191
Las Americas	1,744	1,744	1,744	1,741	1,741	106
Zona 8	(*) 0	(*) 0	2,177	2,177	2,177	---
(Sub-total)	8,549	9,408	14,038	14,035	14,035	164
Distribution volume from the Zona Media Reservoir						
	(**) 0	(***)---	11,750	11,750	13,927	
Total production/Distribution volume						
Production	25,507	25,626	31,238	31,235	31,235	122
Distribution	23,380	(***)---	28,708	28,708	30,885	132

（Resource）Data offered by EMAX

(*)：The Zona 8 borehole was developed by the EMAX project after the ex-ante evaluation.
(**)：The reservoir at Zone Media was constructed by this project. (It did not exist before 2004)
(***)：The distribution volume in 2007 could not be obtained.

3.3.1.3 Complaints Sent to EMAX

EMAX records the complaints they receive. The transition of the number of complaints is as follows:

Table 4: Number of complaints to EMAX

（Unit：number of complaints）

Year	2001	2002	2003	2007	2008	2009	2010
Number	2,086	2,043	2,512	4,243	3,650	2,140	3,254

(Source) Response by EMAX to the questionnaire

According to the number of complaints that EMAX recorded, the most frequent complaints are related to “leakage of water-pipes” before and after the Project, which began to decrease gradually after the completion of the Project. EMAX also explains that the number of complaints sent to the radio program in which the Mayor is open to listening to the opinions of citizens, has also reduced.

It has been noted that the number of complaints increased in 2007 compared with in 2003, before the Project. This increase of complaints could be attributed to the bursting of old asbestos pipes in Zone Media.[8] In 2007, after the completion of the Project, the asbestos pipes in Zone Media burst due to high water pressure and the number of complaints related to this problem increased. EMAX replaced these old asbestos pipes with new pipes to reinforce the distribution pipe network, as well as adjusting the water pressure by shifting the distribution reservoir from Media reservoir to San Isidro reservoir to lessen the water

[8] This information is based on the interview with EMAX.

pressure[9]. The San Isidro reservoir is located at a lower altitude than the other. With these measures, the complaints from citizens have been alleviated. Other than this problem, the change in the complaints record system might be one of the reasons. Previously, the Department of Public Services exclusively received complaints from users. However, in addition to the Department of Public Services, the Department of Operations and Maintenance now also responds to and records complaints. The complaint record process has not been adjusted accordingly, and complaints are recorded in duplication. This might be the cause of the increase in complaints since 2003. Also EMAX explained that residents outside of the target area of this Project registered complaints comparing the service they received with the service provided in the target area.

The increase of complaints from 2009 to 2010 is attributed to the unusual climate with much rain in 2010. The heavy rain caused the leakage of distribution line, and unstable electricity supply to function the machines at boreholes. With these temporary problems, the complaints from the residents increased in 2010.

3.3.2 Qualitative Effect

In this Project, indicators to measure the qualitative effect were not set. In the ex-post evaluation, the following qualitative effects were observed.

3.3.2.1 Centralized Control of Supply and Demand of Water by Reservoir

Before this Project, 70% of water was provided directly from boreholes, which was out of the centralized control of EMAX of its comprehensive supply and demand of water. Under these circumstances, even though the total production volume exceeded the total demand, water shortages occurred due to the inefficient distribution of water. In the Master Plan, it was recommended that distribution reservoirs be constructed to deliver water to the respective distribution area. Following this plan, the Zona Media reservoir was constructed for the Media distribution area, and the San Isidro reservoir was set for the Baja distribution area. EMAX was to be responsible for the total management of water supply and demand. Through this process, the total volume of water came to be distributed effectively, and the rate of 24-hour continuous supply has increased.[10]

In light of the above, even though the original target of 100% families with a 24-hour continuous water supply and without water pressure problems could not be attained, more than 90% of them could enjoy the expected target situation. This project has largely achieved

[9] The San Isidro reservoir is located in Zone Media (altitude 2350m–2390m), and the Zona Media reservoir is in Zone Alta (altitude 2390m-2430m). It was planned that the San Isidro reservoir was to deliver its water to the Baja distribution zone, and the Zona Media reservoir was to deliver to the Media distribution zone. However, the water pressure from Zona Media reservoir was too high for the Media distribution zone , and led to the bursting of pipes. So until the completion of the change of pipes, the San Isidro reservoir, which is located at a lower altitude, delivered its water to the Media distribution zone.

[10] The water from springs and boreholes at San Isidro and Democracia is sent to the San Isidro reservoir. The water from boreholes at Ciprezada, Zoologico, El Paraiso, Pacaja Las Americas and Zona 8 is sent to the Zona Media reservoir. The water from the latter six boreholes is sent to the old San Isidro reservoir, and transmitted to the Zona Media reservoir.

its objective; therefore its effectiveness is high.

3.4 Impact

3.4.1 Intended Impact

At the time of the ex-ante evaluation, the following three indicators were set to measure the effect of the Project indirectly: 1) the number of registered families, 2) the amount of collected water service charges, and 3) the opinion of users.

3.4.1.1 The Number of Registered Families

The population around Quetzaltenango has drastically increased[11]. Hence the number of newly registered beneficiaries is also growing. The effort to convert illegal connectors to registered beneficiaries also went successfully, and the number of newly contracted families has grown. The transition to registered beneficiaries is as stated in Table 5.

Table 5: The number of registered beneficiaries

Year	2004	2007	2008	2009	2010
Newly registered beneficiaries (number of families)	730	1051	893	690	653
Total registered beneficiaries (number of families)	22,641	24,988	25,881	26,571	27,224
Water supply population	113,205	124,940	128,405	132,85	135,620
Illegal connectors (number of families)	---	1,264	1,195	1,139	1,095
Rate of water supply (%)	83.7	84.36	84.74	84.37	83.53

(Source) Documents offered by EMAX

The Department of Public Services fines illegal connectors, in cooperation with the Municipality of Quetzaltenango. If illegal connectors do not pay the fine within the specified period, water supply will be suspended[12]. By this measure, the conversion from illegal to legal connectors has been promoted.

On the other hand, the rate of water supply remains stable because the total population is growing in parallel with the increase in newly registered beneficiaries. The actual total of registered beneficiaries has increased from 22,641 families/113,205 persons in 2004 to 27,124 families/135,620 persons in 2010, which represents a 20% increase.

3.4.1.2 Collection of Water Service Charges

Based on the complementary technical assistance for improving of the management of the

[11] The rate of population growth in 2004 was 3.11%.

[12] Once the illegal connectors are detected, 1,200 GTQ is fined. If they do not pay the fine before the deadline, the Municipality fines them 2,500 GTQ. If payment is still not paid, the water supply is suspended. It takes about a month from the first fine request till the final suspension of water supply.

water supply, a committee to enforce financial regulations (composed of four members, headed by a vice president, directors of the Departments of Planning and Project,, and Finance and Administration and others) was established. This committee has discussed measures to increase the collection of water service charges. Up to the time of the ex-post evaluation, four measures, such as: 1) the enforcement of detection of illegal connectors and the collection of their fines, 2) the conversion of illegal connectors to registered users, 3) capacity enhancement of inspectors for correct reading of meters, and 4) the revision of the water service charge system, were discussed and put into practice. In regards to measures 1 and 2, EMAX has been detecting illegal connectors and trying to convert them to registered users, in cooperation with the Municipality, as stated in 3.4.1.1. As for measure 3, training for the inspectors has been undertaken. For measure 4, it is expected that the simplification of the charge system and the introduction of a pay-as-you-go system starting with a lower fixed price will enable EMAX to increase its revenue.

With these measures, the portion of water service charges in EMAX's total revenue has been growing as stated in Table 6.

Table 6: Portion of collected service charges in the revenue of EMAX

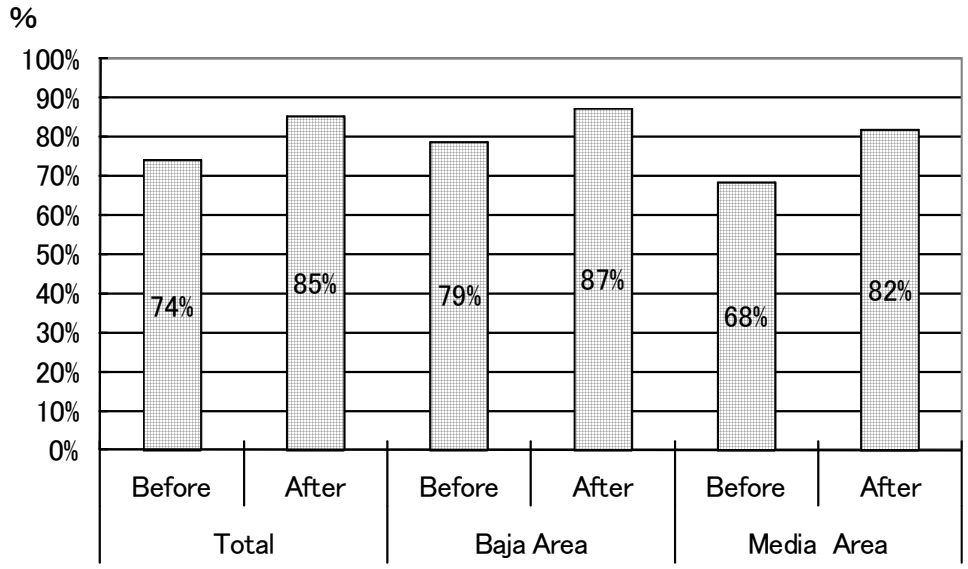
Year	Total revenue (GTQ)	Collected service charge (GTQ)	Portion of service charges in total revenue (%)
2007	5,829,397	4,378,377	75.10
2008	6,350,625	4,807,094	75.69
2009	6,802,228	4,926,280	72.42
2010	6,900,186	5,652,010	81.91

(Source) Documents offered by EMAX

3.4.1.3 Opinion of Users

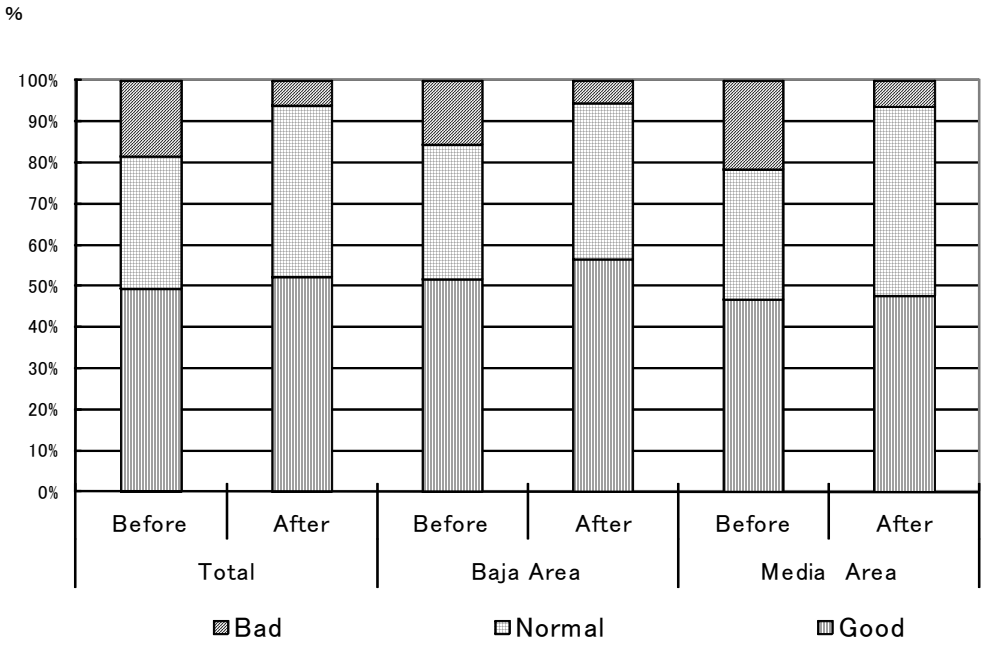
The results of the beneficiary survey at the time of the ex-post evaluation are as follows.[13] Regarding the 24-hour continuous water supply, 85% of families can use water at any time of the day. In the Media distribution area, we can observe a greater improvement than that of the Baja area. As for the water pressure, families experiencing problems total 6%. As in the 24-hours continuous water supply case, we can observe a better improvement in the Media distribution area.

[13] The beneficiary survey was conducted from February to March 2011 to assess the impact of this Project. The target sample was 132 households. The number of sample households in the target administrative area was decided at a rate proportional to the population in each area, and EMAX extracted the sample household at random from their users list. When the external evaluator visited the site in February 2011, she conducted a sample survey with a local consultant to finalize the questionnaire. After these processes, the local consultant visited each household and held face-to-face interviews.



Graph 1: % of families accessing 24-hour continuous water supply

(Source: Beneficiary survey in the ex-post evaluation survey)



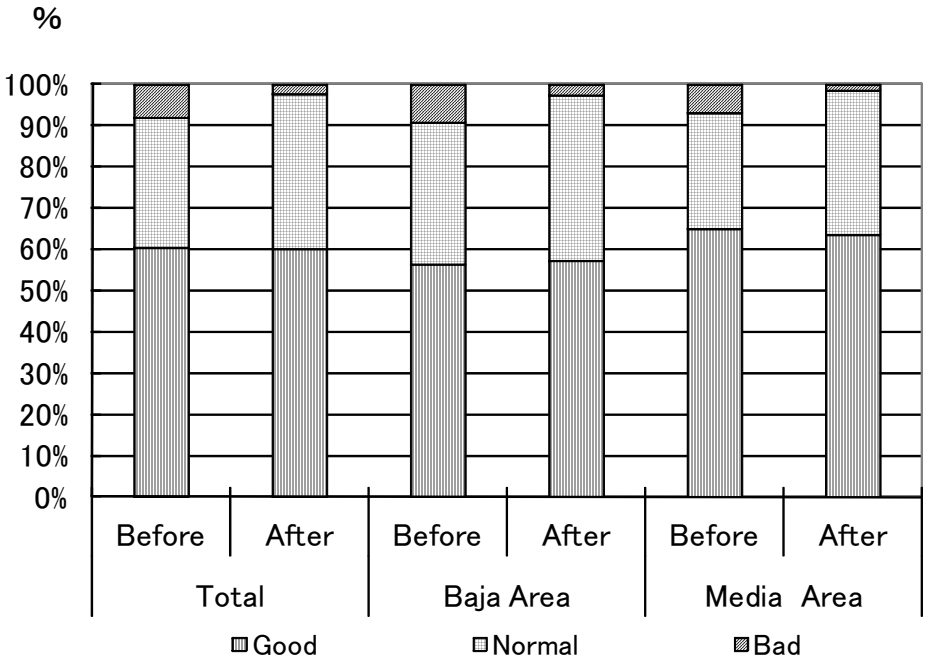
Graph 2: Status of water pressure

（Source: Beneficiary survey in the ex-post evaluation survey)

Not many residents felt that the quality of water was bad even before the Project; at the time of the ex-post evaluation, a smaller number of people found its quality to be bad. Still, only less than 10% people have access to tap water to drink. Most people purchase drinking water

or boil tap water. Even though not many residents find the quality of water to be bad, quite a few residents pointed out the smell of chlorine after the Project. Due to the installation of an automatic chlorine injecting machine, 44% of respondents in the beneficiary survey noted the smell of chlorine.

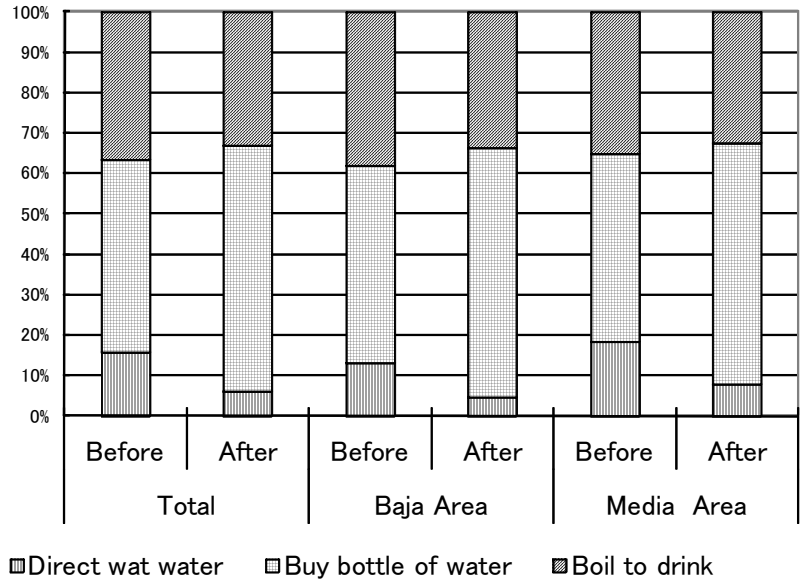
On the other hand, the injection of chlorine is a necessary procedure to secure safe water. With this procedure, microbes which cause water-related diseases such as diarrhea are sterilized and safe water is provided.[14]



Graph 3: Opinion of water quality

（Source: Beneficiary survey in the ex-post evaluation survey)

[14] According to the consultant of this Project, it is a common case even in Japan that a person who is not accustomed to chlorine-sterilized water may feel uneasy from its smell. The website of the Department of Clean and Sewage Water in Kaitzuka City indicates, “The smell of chlorine of tap water is not abnormal, and rather, is the evidence of safe water. The smell is recognized depending on the distribution area, the weather and physical condition. Without the sterilization of chlorine, the germs in the tap water might grow. To prevent the germs from growing, a certain amount of chlorine is injected.”



Graph 4: The method of obtaining drinking water

（Source: Beneficiary survey in the ex-post evaluation survey)

In addition to the above, the beneficiaries expressed the following opinions about the utilization of water at the time of the ex-post evaluation.

- They can spend daily life free from any problems related to water.
- There is no need to carry water.
- The pressure of water is higher than before.
- They can take longer showers.
- Every day, they can take a shower at a different time of the day.
- They can use water when they need it with enough volume.
- There is no suspension of water supply.
- There is no turbidity in water, and they can get clean water.
- They can wash their clothes any time at their home.
- It takes less time to repair leakages.
- The water smells of chlorine.

3.4.2 Other Impacts

3.4.2.1 Leakage Rate and Unaccounted-for Water Rate

（Unit: %）

年	2000	2004	2007	2008	2009	2010
Leakage rate	---	---	44.59	18.40	20.82	19.92
Unaccounted-for water rate	40	---	---	35	30	20

（Source） Response to the questionnaire by EMAX

The leakage rate, which was 44.59% at the completion of the Project, decreased to 19.92% in 2010, utilizing the equipment provided by the Project. Since the completion of the Project,

it takes less time to respond to superficial leakages. While it took 2-3 days to undertake repairs before the Project, repair within a day was possible at the time of the ex-post evaluation. The replacement of old pipes by the EMAX project is also contributing to the reduction of the leakage rate. In this Project, equipment used to detect underground leakages was procured, and technical assistance on how to use the equipment was conducted. However, the detection of underground leakages is not conducted effectively. According to the Implementing Agency, detection at night-time, which is common practice in other countries, is difficult to undertake in Guatemala due to budget and security constraints. Moreover, the understanding of equipment use was not enough to utilize equipment practically and accurately on specific occasions and to interpret the data correctly. For these reasons, the equipment is not being fully utilized.

The reduction of the unaccounted-for water rate is attributed to the various measures introduced in order to increase the collection rate of service charges as stated in 3.4.1.2. It was 40% in 2000, before the Project, and had been reduced to 20% in 2010.

3.4.2.2 Increase in the Consumption of Water beyond its Increase of Production

As the supply of water increases, the consumption of water per person has also grown. The increased rate of the latter exceeds that of the former. The consumption volume per person per day is as below in Table 8.

Table 8: Consumption volume of water per person per day (on average)

Year	2000	2004	2007	2008	2009	2010
Consumption (Ltr)	150	187	N.A.	235.80	N.A.	240.40
Increase rate (%)	---	1	---	26%	---	29%
Production volume (m^3)	---	25,507	25,626	31,238	31,235	31,235
Increase rate (%)	---	1	0%	22%	22%	22%

(Source) Response to the questionnaire by EMAX

As stated in 3.3.1.2, while the production volume at the water source has increased by 22% compared with in 2004, the consumption volume per person per day has increased by 29%. EMAX is concerned about the balance of supply and demand in the future. They have been promoting a campaign program to conserve water use. They call on citizens to save water through announcements on TV or the radio, and also promote various programs to teachers and students, in collaboration with schools[15].

The consumption volume stated above is per household. However, there is some suspicion that commercial/industrial users might register as households to be charged a lower fee. The figure stated above infers a bigger volume than the actual consumed volume.

[15] EMAX gives lectures to teachers on saving water, conducts tours to observe the water supply facilities, and organizes water saving contests for children. In addition to these measures, plans have been made to develop another program collaborating with the private sector from now on.

3.4.2.3 Environmental and Social Impact

A negative environmental impact by the Project has not been observed. However, an increase in water supply causes an increase in sewage water. In Guatemala, a regulation regarding the residual and re-use of discharge water and the disposal of sludge was established in May 2006. In this regulation, the quality of water in discharging sewage water was defined. However, the disposal facilities have not been set up yet, and sewage water has been directly discharged into the river without disposal. The critics of this inappropriate treatment of sewage water and contamination of water are growing.

The land for the construction of the Zona Media reservoir was the property of a religious school of U.S. origin. EMAX purchased this land at its own expense. There was no case of transferring residents caused by the reservoir construction.

3.4.2.4 Smell of Chlorine in Tap Water

The users criticize the smell of chlorine in tap water. As described in 3.4.1.2, 44% of users expressed their concern about this issue according to the beneficiary survey. In response to these concerns, it has been explained on the municipal radio program that even though the water smells of chlorine, the injection volume is under the limit set by the regulation. As a result of this announcement, the critics have calmed down. In the Project, the chlorine injection machines were installed at the old and new San Isidro water reservoirs. The chlorine is injected automatically, observing the volume regulated by the national guidelines. In addition to the automatic injection, the operator at the Zone Media reservoir checks its concentration. The EMAX laboratory also inspects the water quality twice a year, and confirms that the density of chlorine is within the regulation. The result of the inspection is as below in Table 9.

Table 9: The result of the water quality inspection by EMAX laboratory for the San Isidro reservoir and the Zona Media reservoir

Year	2007	2008	2009	2010	LMA*	LMP**
San Isidro reservoir						
Turbidity	0.25	0.1	0.2	0.15	5UNT	15UNT
Chlorine	0.42	0.4	0.45	0.45	0.5mg/L	1.0mg/L
pH	7.22	7.135	7.15	6.89	7.0-7.5	6.5-8.5
Smell	Normal	Normal	Normal	Normal	Normal	Normal
Colon bacillus	0	0	0	0	0	0
Zone Media reservoir						
Turbidity	0.2	0.14	0.15	0.1	5UNT	15UNT
Chlorine	0.4	0.39	0.38	0.36	0.5mg/L	1.0mg/L
pH	7.55	7.15	7.2	7.1	7.0-7.5	6.5-8.5
Smell	Normal	Normal	Normal	Normal	Normal	Normal
Colon bacillus	0	0	0	0	0	0

（Source） Documents offered by EMAX

In principle, water from springs and boreholes is underground water of good quality. But colon bacillus was found in the spring water, which requires sterilization by chlorine for use. Even in Japan, there are some cases that citizens who are not accustomed to using water sterilized by chlorine complain about the smell of chlorine.

The volume of chlorine in this Project is under the limitation of national guidelines, and this is not a big problem.

3.5 Sustainability （Rating：③）

3.5.1 Structural Aspects of Operation and Maintenance

Before 1999, the operation of the water supply was handled by four persons in charge in the Municipality of Quetzaltenango. At the establishment of EMAX in 2000, four departments were set up:1) the Department of Finance and Administration, 2) the Department of Public Services, 3) the Department of Operations and Maintenance, and 4) the Department of Planning and Projects. The Department of Finance and Administration takes care of finance, accounts and procurement. The Department of Public Services handles the registration of users, installation of meters, and then collection of water service charges. The Department of Operations and Maintenance manages the facilities of springs, boreholes, water reservoirs and so on, and operates the network of distribution pipes, repairs leakages, and the installation of pipes. The Department of Planning and Projects is responsible for projections of the supply and demand of water, the expansion of pipes and the management of surveys and construction contracts. The number of staff in EMAX at the time of the ex-ante evaluation was 96, and was 106 at the time of the ex-post evaluation. While the total number of staff has increased, some departments decreased their staff. The allocation of staff at each Department is as follows in Table 10.

Table 10: Number of staff in each department

（Unit：person）

年 / Department	2004	2010	Volatility
Management	3	8	+5
Finance and Administration	11	5	△6
Public Services	24	19	△5
Operations and Maintenance	35	51	+16
Planning and Projects	28	23	△5
Total	98	106	+8

（Source）Response to the questionnaire by EMAX

To respond to the decrease in the number of staff, the Department of Finance and Administration has taken measures to introduce a new accounting system, Siscon (Sistema Integrado de Contabilidad), and adjust the workload among its staff. On the other hand, the

Department of Public Services and Planning and Projects confronts the challenges of the increased workload of each staff member, and the suspension of work (centralized record system of complaints from users) due to the decrease in the number staff. The Department of Operations and Maintenance has increased its staff. However, their work is growing as the facilities (such as pipes and water reservoirs) are expanding. The Department still needs more staff.

EMAX recruit their staff in line with the guidelines set out in the "Organizational Regulation of EMAX" (Codificación de Unidades Organizativas de EMAX). Based on this policy, competent staff have been recruited who meet the qualification requirements of the position and department. require.

EMAX provides with the stable supply of water through the allocation of competent staff, and sufficient staff at the Department of Operations and Maintenance. However, in order to carry out the tasks efficiently in the future, the appropriate allocation of staff in the Department of Public Services and the Department of Planning and Project will be required.

As stated in 3.4.2.3, the volume of sewage water is increasing as the consumption of clean water grows. The direct discharge of sewage water has been criticized. To respond to this issue, EMAX integrated the sewage water section, which was part of the Municipal organization since before 2009. At the time of the ex-post evaluation, they were still dormant without a clear job description. However, EMAX recognizes the seriousness of this issue, and has started to restructure their organization to handle the comprehensive treatment of clean and sewage water.

3.5.2 Technical Aspects of Operations and Maintenance

The staff at EMAX have opportunities to brush-up their skills through OJT (on-the-job training) or off-JT (off-the-job training).

The Department of Finance and Administration trains their staff so that they can use Siscon (accounting system), and conduct their job efficiently. The Department of Public Services has its inspectors attend training on the correct reading and functioning of meters. The staff of the Department of Planning and Projects have attended training courses on water resources management, to develop their capacity to plan balanced water supply and demand. However, specialized software to calculate the water flow is not utilized because they cannot use it correctly. At the time of the ex-post evaluation, they were using other software. The technical staff of the Department of Operations and Maintenance joined the training at ESMAT, which is the public water supply organization in Torino, Italy. The operators at the facilities are trained on mechanical issues and occupational safety.

In addition to staff at EMAX having opportunities to strengthen their capacity, the staff that participated in the complementary technical assistance remain working at EMAX. The "detection of underground water leakage" and "the improvement of the management of water supply organizations" were topics taught in the complementary technical assistance sessions. Eleven out of fourteen staff members are still working at EMAX. What they learned

is shared and transferred to the other staff members, and technical manuals are also in use. Regarding the detection of underground water leakages, even though participants could learn basic techniques during the complementary technical assistance, it was found that they could not reach an adequate level for practical use of the equipment at the time of the ex-post evaluation.

The operation of springs, boreholes and water reservoirs is taken care of by operators, and there have not been any major problems. The water from the reservoirs has been discharged to the respective distribution areas. The operators at each borehole and reservoir operate the facilities based on the operation manuals. The senior staff are assigned accordingly to operate the distribution water reservoirs.

Superficial water leakages are acted upon more quickly than before using the equipment provided by the Project. On the other hand, underground water leakages are not responded to sufficiently. The staff at EMAX understand the basic use of the equipment used to detect underground water. However, they cannot utilize the equipment adequately in different specific situations. Nor they can interpret or analyze the data that the equipment shows. They take time to detect the area of leakage of underground water. EMAX cannot assign staff that are exclusively engaged in this task. Detection at night, which is common practice in Japan, is difficult to conduct in Guatemala due to security and budget issues. These difficult situations do not encourage EMAX to detect underground water leakages. EMAX responds to underground water leakages not by using the equipment, but by adjusting the volume of water delivered from the reservoir by decreasing its pressure at night.

The staff that joined the technical assistance for the improvement of the management of public water supply organizations take various measures towards the improvement of the operation and management of EMAX, such as negotiating with users in regards to the installation and calibration of meters, the modification of the water service charge system, the detection of illegal connectors and so on.

3.5.3 Financial Aspects of Operations and Maintenance

（1）Financial Status

EMAX has been working to reduce the unaccounted-for water rate, as well as to engage itself in the detection of water leakages and the modification of the water service charge system, which were points to be improved at the time of the ex-ante evaluation. Taking measures towards these points, the ratio of revenue from water supply of the entire EMAX revenue is gradually increasing. The record of EMAX’s financial balance is described in Table 11.

Table 11: Balance of EMAX

（Unit: thousand Quetzal）

	2007	2008	2009	2010
Entire revenue	5,829	6,350	6,802	6,900

(Revenue from water supply)	(4,378)	(4,807)	(4,926)	(5,652)
(Ratio of revenue from water supply against the entire revenue)	75.10	75.69	72.42	81.91
Expenditure	8,459	6,105	5,578	5,643.
Balance	△2, 630	245	1,224	1,257
Subsidy from the Municipality for the new project	2,172	943	1,449	1,558

（Source) Reponses to the questionnaire by EMAX

Since 2008, the annual financial balance is increasing its surplus. The revenue of EMAX is mainly expensed for the cost of operations and maintenance of existing facilities. The budget for the new investments has been subsidized by the Municipality. This budget system will continue from now on.

In the year 2008, the water service charge system was modified to simplify the system and to increase the revenue from the water supply. For example, the service charge was set according to the category of customers, whether they are residents, commercial sector or industrial sector. A pay-as-you-go system was introduced, so that the more water people consume, the more they pay. EMAX now has a system to increase their revenue. The complementary technical assistance for this Project for the improvement of the management of public corporations has contributed to the modification. However, the application of the new charge system is limited only to newly registered users, which comprises 2-3% of total users. For its expanded application, approval by the Municipality is required. At the time of the ex-post evaluation, it was difficult to get approval because the new system enforced an economic burden on citizens. Moreover, the citizens who have not received the improved service will not accept the increase in charges. Under these circumstances, most of users remain under the old charge system.

Since 2011, EMAX can expense all the revenue of their service charges due to changes in the budgetary system. The conventional budget system required that the water service charges be paid to the account of the Municipality, together with other public service fees. Once it was paid to the Municipality, not all of which havecharges were necessarily transferred to the account of EMAX. Now with the new budgetary system, it is expected that the direct payment of water service charges will enable EMAX to increase its revenue. In addition to this, the new system motivates EMAX to reduce their costs because the reduction of costs brings surplus to their account balance. Such motivation could not be expected before because the Municipality compensated its deficit whenever it occurred. In this manner, the financial status of EMAX can be expected to improve. On the other hand, EMAX still needs the additional budget for new investments. To push through the Master Plan, the strengthening of the financial status is desirable by expanding the application of the new service charge system and so on.

3.5.4 Current Status of Operations and Maintenance

（1） Status of Equipment and Facilities

The equipment is kept in a locker with a key, and the excavator and truck is utilized and maintained well within the same premises. The boreholes and water reservoirs are operated by operators, who take care of the cleaning of the facilities and the equipment. Even though the boreholes are located in the middle of the city, they are surrounded by fences so that the general public cannot get in.

（2） Status of Maintenance of Equipment and Facilities

The operators operate and inspect the facilities for 24 hours at the water reservoirs and boreholes, every second day. They operate the facilities in accordance with the manuals. The volume of water production, transmission and distribution is recorded in a standardized form. The borehole operators take care of multiple boreholes and springs are taken care of by two operators on rotation. At the water reservoirs, the operators adjust the number of operating transmission pumps and the volume of incoming water. This task, the management of the volume of incoming and outgoing water, requires skillful techniques. Hence the operators with more experience are assigned to work at the water reservoirs. In addition to the adjustment of the water volume, they handle the injection of chlorine, the management of operation records and other tasks. The operators can manage the level of water volume with no problems.

The maintenance of equipment is done properly. The band of excavator will be replaced at the agency in the Guatemala.

The distribution pipes made of old asbestos burst in the first year after the completion of the Project. This happened due to the elevated water pressure as a result of the Project. After this incident, EMAX replaced the faulty pipes with new ones, which had been completed at the time of the ex-post evaluation. Superficial leakages are acted upon by EMAX by regular inspection and also in response to complaints from citizens. Regarding underground leakages, EMAX staff have tried to respond using the equipment provided by this Project. However, they cannot hit the leakages accurately, and their work continues on inefficiently.

In light of the above, no major problems have been observed in the operations and maintenance system in terms of organizational, technical and financial aspects; therefore, the sustainability of the Project effects is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The Project aimed to achieve a stable supply of clean water through the improvement and construction of facilities for water resources, reservoirs, and transmission and distribution pipelines. This is consistent with the development plan and development needs of the Republic of Guatemala, and also with Japan's ODA (Official Development Assistance) policy; therefore, the relevance of the Project is high. Efficiency is also high because the cost and the

period of the Project were within the planned budget and schedule.

The Project Purpose was to ensure that 100% of families in the target area could access “a 24-hour continuous water supply” and “a water supply without water pressure problems”. Even though this purpose was not achieved, more than 90% of families can use water continuously 24 hours a day, and are free from the problem of low water pressure. We can observe the effects of the Project. Moreover, we can observe the following effects: the unaccounted-for water rate has decreased from 40% (in 2000, before the Project implementation) to 20% (in 2010); the leakage rate has also decreased from 44.59% (in 2007, the year of the completion of the Project) to 19.92% (in 2010); the rate of collection of water service charges has increased; users have expressed their satisfaction that they can consume water stably at any time with good pressure. These effects are also attributed to complementary technical assistance for the improvement of the management of public water corporations, as well as the construction of facilities and the provision of equipment. (Regarding the reduction of the leakage rate, the replacement of old asbestos pipes by EMAX also partially contributed). On the other hand, we can also observe the wastage of water and the increase of sewage water as the supply of water has increased. Even with these concerns, we can evaluate that the effectiveness of the Project is relatively high.

EMAX, the implementing agency, does not have sufficient staff, but the terms of reference in each position are clearly defined and qualified staff are recruited and assigned to the respective positions. They have enough capacity to operate and maintain the facilities and equipment, to respond to the leakage of water, and to manage the public water supply. The financial status is also improving with a surplus of balance. Current concern regarding the sustainability of the Project relates to the technical enhancement of the detection of underground water leakages and the expansion of the application of a new service charge system.

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

4.2 Recommendations

4.2.1 Recommendations to the Implementing Agency

- The information collected by the different departments is not managed in a unified way, and is not utilized effectively for the improvement of service delivery. (The Department of Public Services and the Department of Operations and Maintenance treat the complaints in duplication, and information and responses are not shared with each other). A centralized system for the management of complaints, the efficient recording of complaints,[16] the establishment of a system of information sharing which strengthens the improvement of service delivery, are desirable.
- Discussion with the Municipality of Quetzaltenango is recommended to expand the

[16] The complaints can be classified based on the contents. Encoding of complaints might facilitate the simplification of records.

application of the modified water service charge system and the reinforcement of the financial status of EMAX.

- The achievement of practical use of equipment for the detection of underground water leakages is recommended. The response to underground leakages, as well as action in response to superficial leakages, should be strengthened.
- The negative impact of increasing sewage water discharged directly into rivers along with the increase of clean water consumption has been criticized by environmental organizations. Define the job description of the department of sewage water incorporated by EMAX, and take action to alleviate the damage caused by water contamination.

4.2.2 Recommendations to the Municipality of Quetzaltenango

- The approval of the application of the new water service charge system is recommendable, not only to newly registered users but also to conventional users. In this way, the Municipality can support the reinforcement of the financial status of EMAX, which enables it to provide a stable supply of clean water, responding to the expanding demand for water.
- The treatment of sewage water is not done properly. Budgetary assistance to EMAX is necessary so that the incorporated sewage department can take appropriate action.

4.2.3 Recommendations to JICA

- Follow-up training for the practical use of equipment to respond to underground leakages is recommended. This equipment is not utilized effectively because EMAX staff do not understand how to use it in practice. JICA should provide the opportunity to train staff on how to use this equipment on a practical basis.

4.3 Lessons Learned

At the time of the defect inspection one year after the completion of the Project, follow-up technical assistance regarding the practical use of equipment The Project aimed to achieve a stable supply of clean water through the improvement and construction of facilities for water resources, reservoirs, and transmission and distribution pipelines. This is consistent with the development plan and development needs of the Republic of Guatemala, and also with Japan's ODA (Official Development Assistance) policy; therefore, the relevance of the Project is high. Efficiency is also high because the cost and the period of the Project were within the planned budget and schedule.

The Project Purpose was to ensure that 100% of families in the target area could access "a 24-hour continuous water supply" and "a water supply without water pressure problems". Even though this purpose was not achieved, more than 90% of families can use water continuously 24 hours a day, and are free from the problem of low water pressure. We can observe the effects of the Project. Moreover, we can observe the following effects: the unaccounted-for water rate has decreased from 40% (in 2000, before the Project

implementation) to 20% (in 2010); the leakage rate has also decreased from 44.59% (in 2007, the year of the completion of the Project) to 19.92% (in 2010); the rate of collection of water service charges has increased; users have expressed their satisfaction that they can consume water stably at any time with good pressure. These effects are also attributed to complementary technical assistance for the improvement of the management of public water corporations, as well as the construction of facilities and the provision of equipment. (Regarding the reduction of the leakage rate, the replacement of old asbestos pipes by EMAX also partially contributed). On the other hand, we can also observe the wastage of water and the increase of sewage water as the supply of water has increased. Even with these concerns, we can evaluate that the effectiveness of the Project is relatively high.

EMAX, the implementing agency, does not have sufficient staff, but the terms of reference in each position are clearly defined and qualified staff are recruited and assigned to the respective positions. They have enough capacity to operate and maintain the facilities and equipment, to respond to the leakage of water, and to manage the public water supply. The financial status is also improving with a surplus of balance. Current concern regarding the sustainability of the Project relates to the technical enhancement of the detection of underground water leakages and the expansion of the application of a new service charge system.

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

- Should be undertaken as well as an inspection of the operation of equipment. After the utilization of the equipment by themselves, the implementing agency will have practical and concrete concerns to be clarified, and its understanding on how to use the equipment practically will be deepened and promoted. Hence, a question-and-answer style follow-up is recommended to be included in the process of defect inspection. On this occasion, the target project should be defined only to the one which raises the concrete questions through their actual utilization, not to all the projects so that the follow-up training will be practical and substantive.
- The increase in the consumption of clean water results in the increase of sewage water. It is recommended that the partner government be encouraged to implement sewage water disposal appropriately during the formulation of clean water projects.

Nicaragua

Ex-post Evaluation of Japanese Grant Aid Project
"The Project for Improvement of Fishery Facilities at
San Juan del Sur Port in the Republic of Nicaragua"

External Evaluator: Keiko Asato,
Foundation for Advanced Studies on International Development

0. Summary

The Sun Juan del Sur (hereinafter referred to as "SJDS") fishing port used to be where the largest amount of fish was brought to docks compared with other fishing ports on the Pacific Coast in the Republic of Nicaragua. However, the discharging efficiency was low, and the port had problems in maintaining the freshness of fish caught as well as in respect to post-harvest losses. Against this background, this project was carried out with a view to reducing post-harvest losses through improvements to the discharging efficiency as well as maintaining the freshness of fish caught, thereby increasing the total catch of fish to be handled at this port.

Through the implementation of this project, although no improvement has been seen in terms of the discharging efficiency, the freshness of fish caught has improved and the objective of reducing post-harvest losses has partially been achieved. On the other hand, due to the significant effects of external factors such as the decline of fish stock in nearby waters, the objective of this project, i.e. to increase the total catch handled at this port, has not been met. Therefore, the overall effectiveness of the project is low. At the time of ex-post evaluation, another project plan has been formulated to make additional investments and to transform the facilities constructed under this project into a base for processing and exporting the catch, in order to achieve the Overall Goal at the time of the ex-ante evaluation, i.e. "to improve the lives and the revenue of local fishermen". However, in spite of efforts having been made by relevant persons in our partner country as well as in Japan, the project implementation structure is far from stabilized and deficits have continued due to the effects of political regime change. In this respect, the sustainability of the project is low. On the other hand, measures are being undertaken at the moment to develop an implementation structure (e.g. recruitment of persons who have been involved in similar projects, organizational restructuring, etc.) and to ensure sufficient budgets (i.e. approval for loans from private financial institutions) at the time of Ex-post evaluation. Should these positive elements be pursued in the future, it is expected that the sustainability may rise.

The partial achievement of the Project Purpose can be attributed to the internal factor of the project design, which was formulated based on activities that might have been difficult for our partner government to carry out. In addition, even though the Overall Goal, "to improve the lives and the revenue of local fishermen" is still in place, as the policy of utilization of the port facilities has changed due to the political regime change

after the completion of this project, the approach to implement the Project may not be fully compatible with the policy of the current government. In this context, the relevance of this project is fair.

In light of the above, even though we can observe the effect of the Project at certain level, the Project Purpose has been achieved partially due to change of the external factor and unfeasible project design. Therefore, this Project is evaluated to be unsatisfactory.

1．Project Description

Map of Project Site

Overview of facility of SJDS port

1.1 Background

SJDS is a fishing village located on the Pacific Coast. The port used to be a major one, accounting for approximately 30% of the total volume of fish discharged from the docks along the Pacific Coast of Nicaragua and approximately 16% of the total catch nationwide. However, it faced some issues in discharging efficiency and maintaining the freshness of fish, and post-harvest losses became a problem.

The Nicaraguan government made a request for aid in the form of a grant to renovate the fishery facilities and equipment to increase the handling and sales volume of fresh fish at SJDS port.

1.2 Summary of the Project

The objective of this project is to reduce post-harvest losses by renovating the fishery facilities and equipment at SJDS port.

Grant Limit/Actual Grant Amount	119.6 million JPY／119.6 million JPY
Exchange of Notes Date	June 2005
Implementing Agency	ADPESCA (Administración Nacional de Pesca y Acuicultural) (ADPESCA was restructured and

	transformed into INPECA, Instituto Nicaragüense de la Pesca y Acuicultura, as of January 2007.)
Project Completion Date	January 2007
Main Contractor	WAKACHIKU CONSTRUCTION CO., LTD
Main Consultant	ECOH CORPORATION
Basic Design	(First) October 2004 - March 2005 (Second) April 2005 - June 2005
Related Projects (if any)	＜Technical cooperation＞ ・ Five experts (till 2002) ・ Two JOCV personnel (till 1998) ・ Training in Japan (technical training) for eight trainees (till 2002) ・ Overseas senior volunteer personnel (for two years from 2002) ＜Grant aid project＞ ・ Project to develop small-scale fisheries on the North Atlantic Coast (in 1995) ＜Other＞ ・ The Netherlands “Comprehensive Development Plan for Small-scale Fisheries in Pearl Lagoon” (from 1998 to 2001)

2. Outline of the Evaluation Study

2.1 External Evaluators

Keiko Asato, Foundation for Advanced Studies on International Development

2.2 Duration of Evaluation Study

Duration of the Study: November 2010 – October 2011

Duration of the Field Study: January 23, 2011 – February 2, 2011

May 14, 2011 – May 20, 2011

2.3 Constraints during the Evaluation Study

First of all, the numerical indicators of the amount of post-harvest losses and the total amount and volume handled at the port, as an indicator to directly measure the degree of achievement of the Project Purpose, were not set at the time of the ex-ante evaluation. Furthermore, at the time of the ex-post evaluation, the SJDS port had not identified the volume of post-harvest losses and it was unable to obtain the numerical information as

well as the total volume handled at the port. As a result, the degree of achievement of the objective was indirectly assessed by the degrees of achievement of what would have an effect thereon, i.e. “measures for maintaining the freshness of fresh fish” and “the discharging efficiency”. These parameters show the similar effect with the effect of original two indicators; the amount of post-harvest losses and the total amount and volume handled at the port. Therefore, the adoption of these indirect parameters is considered appropriate to measure the effect of the Project Purpose. Moreover, with regard to the impact on the lives of local fishermen, the number of fishermen to be interviewed was limited due to their absence in order to undertake their work at sea (interviews were held with 81 of 208 registered fishermen).

Secondly, with regard to the factors that affect the project effectiveness, it was difficult to obtain the numerical information concerning the volume of fisheries resources, and so the evaluation was performed in reference to data provided by the secondary source. In addition to these constraints, sufficient information regarding the background of the project formulation could not be obtained either.

3. Result of the evaluation (Overall rating D[1])

3.1 Relevance (Rating：②[2])

3.1.1 Relevance to the Development Plan of Nicaragua

At the time of the ex-ante evaluation, under the National Development Plan of the Republic of Nicaragua, “Strengthened Growth and Poverty Reduction Strategy” (“SGPRS” hereinafter) (July 2001), the fishing industry was a valuable foreign exchange earner and was considered to provide a source of protein to its people. Within the framework of the fishing industry, 80% of the fishery production came from fresh fish at sea, of which 50% was accounted for by the catch brought to the SJDS port. The “Fisheries Development Plan” (2003) aimed to transform the fishing industry into: ① an industry that generates over 100 million USD per year in ex; ② a major foreign exchange earner; ③ a source of employment; and ④ a source of a stable food supply for its people.

Under the “National Human Development Plan (Nacional de Desarrollo Humano 2008-2012)” carried out by the current Ortega administration, fishing is regarded as a major industry ranked third in terms of export trade value. Fishing is also considered to be an effective method to earn foreign currencies through efforts to stop overfishing and the need to formulate a strategy for sustainable fishing is emphasized. The “National Fisheries Plan (Plan Nacional de Pesca y Acuicultra, 2007-2011)” has set its objective to improve the lives of local fishermen by maintaining the sustainability of fishery resources,

[1] A：”highly satisfactory”, B “satisfactory”, C “partially satisfactory”, D “low”
[2] ③：”high”, ② “fair”, ①：”low”

to increase profits of people involved in fishing, to promote the effective use of existing fishing facilities, to facilitate loans to fishermen, and to improve fishing techniques.

3.1.2 Relevance to the Development Needs of Nicaragua

At the time of the ex-ante evaluation, the SJDS fishing port was one of the major fishing ports in the Republic of Nicaragua, but the efficiency of discharging fish to its docks was inferior due to a large height difference between the sea level and the level of the wharf, causing difficulties in keeping order within the port premises. Ice, brought in from the capital, was expensive and the melting rate was high: it was therefore not possible to procure a sufficient amount of ice to maintain the freshness of fish caught. Furthermore, as the berth was small, the fish was discharged at the beach, piled up on the sandy beach, causing concern about freshness as well as sanitation problems.

Additionally, due to the lack of a loan system, fishermen had to rely on brokers and export traders for the costs of ship repairs and for the costs of going to sea. As a result, a broker-dominant business relationship had been established between fishermen and brokers/export traders. Fishermen were obliged to sell their catch to the brokers who had borne the costs of their going to sea and had no discretion in choosing brokers who would buy their catch at fair price. Commercial practices had been that fishermen sell the catch at a price determined by brokers based on foreign/domestic markets and the revenue for fishermen was kept small.

In response to the issues listed above, this project set its objective to reduce post-harvest losses and to increase the total amount and volume to be handled at the port by improving the discharging efficiency with the introduction of auction trading, taking measures to maintain the freshness of fish caught, and improving sanitation in fish cargo handling. These improvements were expected to bring about an increase in revenue and an improvement in the lives of local fishermen.

However, with the political regime change in February 2007, the government's policy changed. Auction trading was not implemented and the policy to make use of fishing port facilities was abandoned and a revised policy "to transform these facilities into a base which buys the catch from fishermen, processes the catch, and exports the processed products" was formulated. It should be noted that, even after the change in policy, the government maintains "improvement in the revenue and the lives of local fishermen" as the Overall Goal (an important issue) of this project.

With the change of the direction of the project in the Nicaraguan side, the goals set at the time of the ex-ante evaluation, i.e. to reduce post-harvest losses and to increase the total catch to be handled at the port with the introduction of auction trading, are not consistent with the development needs of the current administration.

3.1.3 Relevance to Japan's ODA Policy

An aid policy for the Republic of Nicaragua was formulated in 2002. Japan identified

six key target areas in order to facilitate poverty reduction and promote economic growth in Nicaragua, i.e. 1) agriculture and rural development; 2) medical and public health; 3) education; 4) road/transportation infrastructure; 5) support for democratization; and 6) disaster prevention. The fourth key target area, "road/transportation infrastructure", refers to investment in the production sector to achieve economic growth, and the development of economic infrastructure to raise export capacity. Specific measures in this context include support for initiatives to ensure access to commercial and industrial zones, to promote export and import trade, and to improve production and distribution routes of agricultural products.

In this respect, the development of these fishing port facilities is also consistent with Japan's aid policy at the time of the ex-ante evaluation.

3.1.4 Adequacy of Project Design

This project aimed to "reduce post-harvest losses and to increase the total catch handled at the SJDS port." However, judging from information from the basic design study ("BD" hereinafter), it is believed that by carrying out this project, the Project Purpose (i.e. increase the total catch to be handled at the port) would be achieved and that, at the same time, the broker dependence of fishermen would be reduced and a new trading system to guarantee a fair price for their catch would be set up through the introduction of auction trading. Through these changes, it was expected that the Overall Goal, "to improve the lives of local fishermen" would be achieved.

The scope of the project, the Project Purpose, the Overall Goal, and the activities carried out by the partner country are summarized in Figure 1.

Auction trading, which was to be introduced in Nicaragua, is a type of trading that was previously unfamiliar to the republic. Moreover, the introduction of auction trading is closely related to the pricing process of the catch applied in this country, as well as to the financial dependence of fishermen on brokers. Addition to the change of these conventional business practices, the introduction of micro finance system was also necessary in order to implement the auction trading system. Therefore, the auction training may not have been a commercial practice that can easily be introduced[3].

This project was designed to incorporate the introduction of auction trading in consideration of a ripple effect on the Project Purpose as well as on the Overall Goal[4]. However, this commercial practice was quite new for the partner country as stated in

[3] According to the interviews with the staff of INPESCA and the fishermen, they expressed the difficulty in changing these business practices

[4] (5) 7th issue faced in the fishing industry in SJDS in Chapter 2 on page 21 of the BD: "The urgent issue is to improve the distribution structure in such a way as to ensure that both fishermen and distributors are on an equal footing in trading." Also, in the section "Flow of fish and equipment for disposal of cargo" in Chapter 3 on page 50, it was planned that the catch should be unloaded with a crane mounted on a truck carrier from the pangas and the lanchas in the deck, in order to conduct an auction (bidding) and sale at the cargo disposal are.

above, and might have been difficult to be introduced, and in fact this trading modality was not introduced. As a consequence, the Project Purpose was achieved only partially. At the time of the ex-ante evaluation, difficulties in implementing activities related to the auction trading were already acknowledged and complementary technical assistance was brought in to support these activities by the partner government. However, such efforts were not sufficient to succeed at introducing and establishing a completely new commercial practice.[5] If the project had exclusively focused on the achievement of the Project Purpose, it may not have been an absolute necessity to introduce the method of auction style trading in order to improve the discharging efficiency. However, in this case, it was intended to reach the effect of Project Purpose as well as the Overall Goal. As a result, the introduction of a new commercial practice whose feasibility was unclear (i.e. auction trading), was contemplated, which ultimately contributed to a rather unrealistic project design.

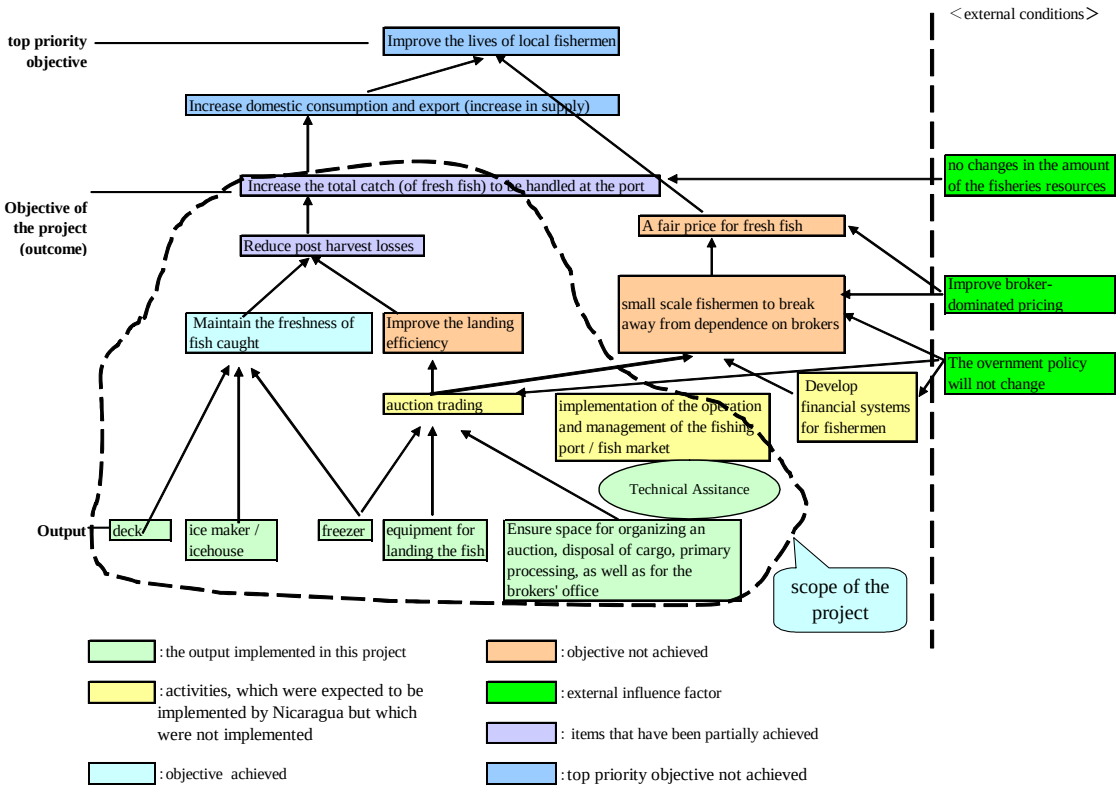


Figure 1 : Scope of the project (the Project Purpose/the Overall Goal) and activities carried out by the partner country

[5] From 17th to 26th January 2007, technical assistance was given to the Entity in respect of market management, the procedures to sort and measure the catch, the technology for primary processing of fish to be stored frozen, and the method to identify the price of the catch unloaded and that of the wholesale shipment, etc. A manual, i.e. a guideline for the use of fishing port facilities was produced, but it was insufficient to make the parties in Nicaragua comprehend, implement and establish a completely new facility operation method.

（Source）produced in reference to the BD as well as to the results of interviews carried out with the persons involved in the project

The previous government was willing to work on this difficult hurdle to change the business practices. However, as stated in 3.1.2, the current government aims to achieve the goal of improving the lives and the revenue of local fishermen by the different approach, and the government policy to use this port facility has change, which is considered as external condition to the Project. These are the factors which have impeded the achievement of the Project Purpose.

Due to the change of the policy mentioned above because of the government alteration, this project was partly irrelevant to the country's development needs at the time of the ex-post evaluation, and the project design included the issue to be considered, therefore its relevance is fair.

3.2 Efficiency（Rating：③）

3.2.1 Project Outputs

With regard to the output from the Japanese side, what was planned included: deployment of fishing facilities, equipment and the pier; and provision of technical assistance for the operation and maintenance of the SJDS fishing port (i.e. complementary technical assistance).

Table 1 Major outputs

Major output	Difference from the plan
Deck repair (quays development, landfill, development and maintenance of slipway, etc.)	As per plan
Facilities (two-story administration building : cargo disposal area, ice-maker/icehouse, brokers' offices/administration office, etc.)	As per plan
Equipment for disposal of goods	As per plan
Ship repair equipment	As per plan except the high-speed cutting machine
Complementary technical assistance (technical assistance on market management, the procedures to sort and measure the catch, the techniques for primary processing of fish to be stored frozen, and the method to identify the amount of the catch unloaded and that of the wholesale shipment were given to the Entity)	As per plan

（Source） Project Completion Report

The construction/procurement of facilities and equipment, except the high-speed cutting machine and the tow truck, were carried out as per plan. The incidence of ship repair work that requires a high-speed cutting machine was not high, and the tow truck was judged unnecessary as it can be substituted with other equipment. No impediment to the operation of the fishing port facilities due to a lack of this equipment has been identified. (For the details of each output, please see the appendix attached to the last page.)

In respect to the output from the Republic of Nicaragua, what was envisaged and implemented without trouble included: deployment of personnel for the operation and maintenance of this project; procurement of electricity**,** water and telephone services; removal of existing facilities (warehouses, etc.) that may affect the construction of facilities in the plan, etc.

3.2.2 Project Inputs

3.2.2.1 Project Cost

The project cost to be borne by Japan was estimated at 119.6 million JPY and the actual cost incurred was also 119.6 million JPY as per plan (100% compared to plan).

Table 2 Estimate of the project cost and the actual cost incurred
By the Japanese side (unit: 1,000 JPY)

	Estimate	Local procurement	Procurement in Japan	Procurement in the third country	Total
Construction costs		504,724	504,387	43,889	1,053,000
Equipment costs		0	33,400	3,600	37,000
Design and administrative costs		0	96,920	8,857	105,777
合計	1,196,000	504,724	634,707	56,346	1,195,777

（Source） Project Completion Report

The project cost incurred by Nicaragua was 59,233 USD (equivalent to 6.4 million JPY) against the estimate of 7.9 million JPY, i.e. an input of 81% compared to the estimate. While the cost incurred for the procurement of water services was more or less equal to the estimate, procurement of electricity services was achieved at 83% of the estimated cost. It should be noted that there are some office spaces that have not been used as originally planned. This is why only 70% of the total equipment envisaged has been installed at facilities. As a result, the total cost incurred on the Nicaraguan side was

81%, which was lower than planned.

3.2.2.2 Project Period

The project period was designed to be 21 months (from June 2005 to February 2007) at the time of the BD including the period for detailed design. The actual project period was a 20-month period from June 2005 to January 2007 (at 95% of the estimated cost), which was shorter than planned.

The project cost was as planned and the project period was within the plan, therefore the efficiency of the project is high.

3.3 Effectiveness[6] （Rating：①）

The degree of achievement of the Project Purpose was determined in a comprehensive manner in reference to the quantitative effects, the level of use of output (i.e. status of use of the equipment and facilities deployed in this project), as well as the qualitative effects.

Although the improvement of discharging efficiency is limited, the freshness of fish caught has improved, which can contribute to the reduction of the volume of fish caught that cannot be sold. Therefore, even though the numerical data could not be obtained, it is assessed that post-harvest losses, attributable to the improvement in freshness, have been reduced partially as a result of the project. On the other hand, due to the fact that the envisaged auction trading has not been introduced, a number of facilities and equipment were left under-used. Furthermore, because the external condition that was set, i.e. “the maintenance of fishery resources in nearby waters”, has not been satisfied, the Project Purpose, i.e. an increase in the total catch to be handled at the port, has only partially been achieved.

3.3.1 Quantitative Effects

As an indicator to measure quantitative effects of this project, a direct indicator for the Project Purpose, i.e. “the amount of post-harvest losses” and “an increase in the volume of fresh fish to be handled at the port” had not been set at the time of the ex-ante evaluation. Nor had the numerical information been identified by the SJDS port even at the time of the ex-post evaluation. However, it can be considered that the change of “improvement in the discharging efficiency” and “the freshness of fish caught” have the similar tendency with that of the Project Purpose. As a consequence, “a decline in the number of workers involved in the discharging operation on small fishing boats (panga and lancha[7])” was set to measure the achievement of the former indicator, and “a decline in the price of ice” was set for the latter indicator. By this method, the level of achievement of the Project Purpose was evaluated.

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6 In determining the effectiveness, the rating is identified in reference to the impact.

7 “Panga” is a small fishing boat with an outboard motor, and “Lancha” is a small fishing boat with an inboard motor.

3.3.1.1 Improvement in the Discharging Efficiency

Table 3： Changes in the number of workers involved in the discharging operation

Indicator	Actual performance in 2005	2009 (target)	2009 (actual performance)	2011 (at the time of ex-post evaluation)
Number of workers involved in the discharging operation on panga	Three persons/ discharging	Two persons/ discharging	NA	Four persons/discharging (crew members of panga)
Number of workers involved in the discharging operation on lancha	Six persons/ discharging	Three persons / discharging	NA	6 persons/discharging (crew members of lancha) + brokers

(Source) An interview with INPESCA

Discharging of the catch is still being performed by the crew members of the fishing boat. They directly transfer the cargo from their fishing boat to the truck carriers parked alongside the deck by brokers and export traders. At the time of the BD, it was planned that the catch would be directly discharged from the deck to the cargo disposal area, using the discharging equipment (i.e. a crane mounted on a truck carrier), with a view to reducing the number of workers involved in the discharging operation and minimizing the time required to complete the discharging operation. However, the same method employed prior to this project is still being used at the moment and at the time of ex-post evaluation. As a consequence, neither the number of workers nor the time required to unload the cargo has been reduced.

Crew member of fish boat to unload the fish caught

It is considered that one of the reasons for a lack of change in the method of discharging the catch before and after the project is that “auction style trading” was not introduced for fish trade.

Auction trading is a commercial practice quite new to Nicaragua as described in 3.1.4. It was not the system to be introduced easily in Nicaragua, and in fact it was not introduced due to the policy change by the administration transfer. At the commencement of this project, training sessions were organized to give guidance on the method of operating a fishing port through complementary technical assistance. However, its implementation period was short and the Entity had not yet been set up. The

training was targeted exclusively at the managing director of that Entity.[8] Under these circumstances, it was difficult to introduce and establish a new commercial practice through unilateral efforts on the Nicaraguan side. As a result, there was no longer the necessity to carry the catch directly into the cargo disposal area utilizing the discharging machines procured by this project. As was the case in the past, truck carriers belonging to brokers are still brought directly alongside the deck, onto which crew members of the fishing boats load the catch. There has been no improvement made in respect to the discharging efficiency.

Moreover, the facilities and the equipment developed in order to implement auction trading have not been used for their initial purposes, and are at best, being used irregularly.[9]

Although offices for brokers had been installed in which to conduct auctions, no broker has moved into the facility. At the moment, these spaces are being used for other purposes, e.g. as an office for HACCP projects;[10] an office housing the fishermen's association; and a kiosk where daily commodities for fishermen are being sold.

Areas for disposal of fish caught

Truck without crane

3.3.1.2 Measures to Maintain the Freshness of Fish Caught

Although the purchase price of the ice offered to fishermen has not come down to the target level at the time of ex-ante evaluation, it is still lower than the market price (by 40%). Fishermen are therefore able to buy ice at a preferential price.

Table 4： Changes in the price of the ice

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[8] In addition, representatives from the SJDS Town Hall, fishermen and brokers also attended the training sessions but they were not parties directly involved in the operation of fishing port facilities.

[9] In January, April, May and June in 2010, a demonstration of fish processing work and a seafood festival were organized. On these occasions, these facilities and equipment were utilized for the disposal of cargo and sales of fish, such as sardines, swordfish, sharks and others.

[10] HACCP (Hazard Analysis and Critical Control Point) is a systematic preventive approach used at all stages of food production and preparation processes to identify potential food safety hazards, so that key actions can be taken to reduce or eliminate the risk of the hazards being realized.

Indicator	2005(actual performance)	2009 (target)	2009 (actual performance)	2011 (at the time of ex-post evaluation)
Purchase price offered to the SJDS fishermen	0.056 USD/kg	0.037 USD/kg	NA	0.058 USD/kg (C65/QTR)
Market price of ice		NA	NA	0.08 USD/kg (C110/QTR)

（Source） Reference materials collected from the Entity

The results of interviews with fishermen identified that 96% of them would buy crushed ice at the fishing port and would keep the catch cool with ice while at sea. 77% of them also responded that the freshness of fish caught had improved after they started buying ice under this project. Some fishermen also indicated that ice would last longer than before.

Table 5：Levels of usage of ice and its impact on the freshness of fish caught (%)

	Yes	No
Do you keep your fish on ice while at sea?	96	4
Do you find your fish in a fresher condition than before when you return to port?	77	23

（Source） Results of interviews with 81 fishermen (composed of 24 ship owners, 57 small-scale fishermen)

3.3.1.3 Decline of Fishery Resources in nearby Waters

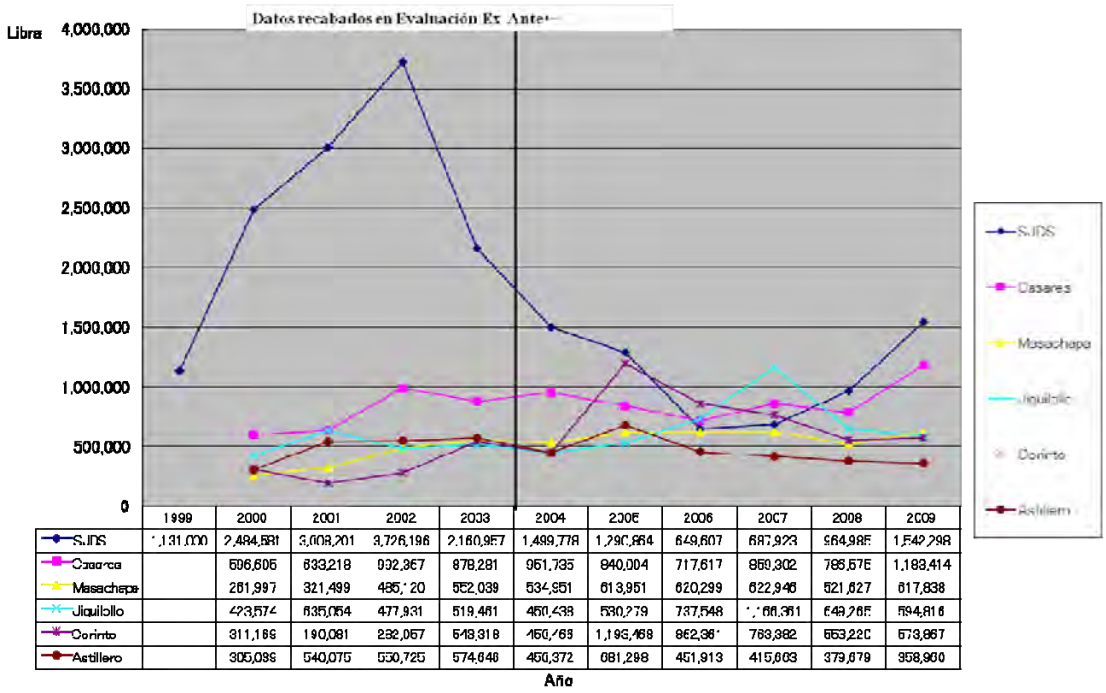
The external factor that prevented the total volume of catch handled at SJDS port from increasing can be attributed to “a decrease in fishery resources in the waters around SJDS”.

Figure 2 shows a transition in the volume of the catch landed per major fishing port on the Pacific Coast in Nicaragua. Prior to the implementation of this project, the volume of the catch landed at SJDS fishing port was by far greater than other major fishing ports on the Pacific Coast with the discharge of commercial fishing vessels. However, since 2003 onward, the volume of the catch landed at this port has rapidly declined. The reason being cited by people working at SJDS fishing port is the decline of fishery resources in nearby waters. Since the 1990s, a survey has not been conducted on the volume of fishery resources and it was not possible to obtain objective data. However, according to the SJDS fishing port director and people at the fishing port, overexploitation of fishery resources by “gillnet (trasmallo) fishing” is one of the causes of the decline of fishery resources in the waters around the SJDS fishing port.

With little prospect of finding a good catch at sea, fishermen refrained from going to sea. As a consequence, the volume of the catch being landed at SJDS fishing port did not

increase. In the meantime, there were some fishermen who left the SJDS port or who changed their jobs and became employed in the tourism industry. Furthermore, commercial fishing vessels that had visited the SJDS port for unloading their catch until 2003 stopped coming to the waters around SJDS. These vessels stopped visiting the water area around SJDS due to its decline in fishery resources, and shifted to other ports to land their catch. This has also contributed to a decline in the total catch handled at SJDS Port.

It should be noted that gillnet (trasmallo) fishing, which causes substantial damage to fish, was banned in 2006 and since then the volume of fishery resources has gradually grown.



	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
S.JDS	1,131,000	2,484,581	3,008,201	3,726,196	2,160,957	1,499,778	1,290,864	649,607	687,923	964,985	1,542,298
Casares		606,606	633,218	932,367	878,281	951,735	840,004	717,617	859,302	766,576	1,183,414
Masachapa		261,997	321,499	485,720	552,039	534,951	613,951	620,299	622,946	521,627	617,838
Jiquilillo		423,574	635,054	477,931	519,461	450,438	530,279	737,548	1,166,361	649,265	594,816
Corinto		311,189	190,081	232,057	548,318	450,769	1,193,488	862,367	763,382	653,220	573,867
Astillero		305,096	540,075	550,725	574,648	450,372	681,298	451,913	415,603	379,079	358,900

Figure 3：Changes in the amount of the catch landed per major fishing port on the Pacific Coast in Nicaragua

（Source） Produced in reference to “Anuario Pesquero y Acuicola en Nicaragua” published by ADPESCA and INPESCA

Addition to the factors mentioned above, the increase of the fuel cost due to the global price rise of the crude oil affected the frequency of the fishing. This was another external factor which impeded the increase of the volumen of fish catch at SJDS fishery port.

3.3.2 Qualitative Effects

Fishing vessels based at SJDS port now use the deck constructed under this project. The facilities are available from 0600hrs until 1800hrs in principle and anyone can freely access its services as long as they have permission granted. Permission is granted to

fishermen, personnel working at fishing port facilities, brokers, etc. Services will be made available outside these hours if necessary and, as such, the facilities are in reality operable 24 hours a day.

3.3.3 The Level of Use of Facilities and Equipment

The level of use of major output developed under this project is shown in Table 6 below. (For the level of use as well as the reason for not being in use, please refer to the relevant section/s.)

Table 6：Levels of use of major outputs

Major output	Level of use
Repaired deck (quays development, landfill, development and maintenance of ramps, etc.)	In use
Facilities -cargo disposal area - ice-maker /icehouse - freezer - brokers' offices - administration office	In use for purposes other than its original ones irregularly (the reason described in 3.3.1.1.) In use In use for purposes other than its original ones (the reason described in 3.4.1.2.) In use for purposes other than its original ones (the reason described in 3.3.1.1.) In use
Equipment for disposal of cargo	In use for purposes other than its original ones irregularly (the reason described in 3.3.1.1.)
Ship repair equipment	In use

(Source) Elaborated by the evaluator based on the result of the survey

Deck is used every day. According to the interview to the fishermen at the time of ex-post evaluation, all the fishermen responded that they use deck for discharging the fish caught. On the other hand, other facilities or the equipment related to disposal of cargo are used for the different purpose as stated in 3.3.1.1. For example, the space for the disposal of cargo is used for the exposition of fishery product irregularly, the freezer is used to keep bait, the brokers' offices are used for the project office of HACCP, the office of fishermen's association and a kiosk where daily commodities are being sold.

From the above it is clear that in regards to the effects of this project, because auction trading was not introduced, the facilities and the equipment installed and deployed on the assumption that new trading would be established have not been put into use, and there have been little effects attributed to an improvement in the discharging efficiency. The

freshness of fish caught was maintained using the equipment developed under this project, and post-harvest losses attributable could have reduced, although partially. On the other hand, the external condition in this project, i.e. “no decline of fishery resources in the waters around SJDS” has not been met and, as a result, the amount of fresh fish handled at SJDS fishing port has plummeted substantially.

From the above, this project has achieved its objectives at a very limited level, therefore, it’s effectiveness is low due to internal and external reasons.

3.4 Impact

3.4.1 Intended Impacts

3.4.1.1 Proactive Trade Practices by Fishermen Independent from Brokers

Fishermen have not developed the capacity to trade their catch in a proactive manner free from a dependence on brokers. Small-scale financial systems have not been developed and fishermen remain dependent on brokers for expenses incurred for going to sea (i.e. crew expenses, food, ship fuel, containers to store the catch, etc.) as well as ship repair costs. As a result, due to their financial dependence on brokers, fishermen are still unable to choose from among brokers to whom they will sell their catch. The dependence on brokers of fishermen continues to exist.

3.4.1.2 Sales of Catch at a Fair Price

The system has not yet progressed so that the catch is sold at a fair price. According to personnel working at SJDS fishing port, within a range of price fluctuation subject to the international and domestic markets, brokers may buy the catch if it maintains its freshness. However, due to the fishermen remaining dependent on brokers, it is difficult for them to choose to whom they will sell their catch even when they have landed the freshest fish. As a result, the catch is not traded at a fair price, even at maximum freshness.

From interviews with fishermen, it has been identified that 77% acknowledge that the freshness of fish caught has improved as a result of this project, but the proportion of those who believe that its freshness is reflected in the sale price to brokers is less than 15%.

In addition, freezers were also procured in this project to prevent a price drop by adjusting the volume of sales of catch to brokers through the maintenance of freshness at freezers when the discharging volume is too big. However, the brokers are not convinced of the quality of frozen fish treated by others and do not buy it. As a result, the freezers are not sufficiently being made use of. [11]

[11] In Nicaragua, brokers are not convinced of the quality of frozen fish not processed by themselves and do not buy it. As such, the freezers are not being made use of to adjust the sales volume at the time of a big catch, nor do they contribute to fair trading. With regards to the level of use of equipment, please refer to the resource material attached to the last page.

3.4.1.3 Improve the Lives and the Revenue of Local Fishermen

We conducted interview surveys with fishermen in order to identify the changes this project has brought in the lives of fishermen. Only 16 of 81 fishermen (i.e. 20%) felt that the level of their income had risen as a result of this project. Also the number of fishermen who acknowledged a reduction in working hours was small because the discharging operation retains the traditional methods without making use of cranes (see Figure 4).

We interviewed the 16 fishermen who responded that "the level of their income had risen", asking them on what they would spend an increased portion of their income (a multiple answer question). The most common answer was, "Food and related goods". 87% of all the fishermen responded as such, on average. As far as small-scale fishermen go, all opted for this choice. An increased portion of their income is spent to enrich diet, which is one of the basic necessities of life. There was hardly any difference with respect to other purposes, with the results being: 50% allocated to health and sanitation; 44% to education of their children; and 40% to debt repayment. It should be noted that there are certain items of expenses, in respect to which there are differences in terms of purposes between ship owners and small-scale fishermen, e.g. 67% of ship owners referred to "education of their children" while only 30% of small-scale fishermen did so; and 50% of small-scale fishermen referred to "debt repayment" as opposed to only 30% of ship owners. It is dangerous to make a conclusion based on the results of this survey in which the sample size was small, but it can be observed that while the ship owners allocated more money to their children and other future investment expenditures, the small-scale fishermen are being forced to try to get out of debt repayment and to make ends meet. (See Figures 4 and 5).

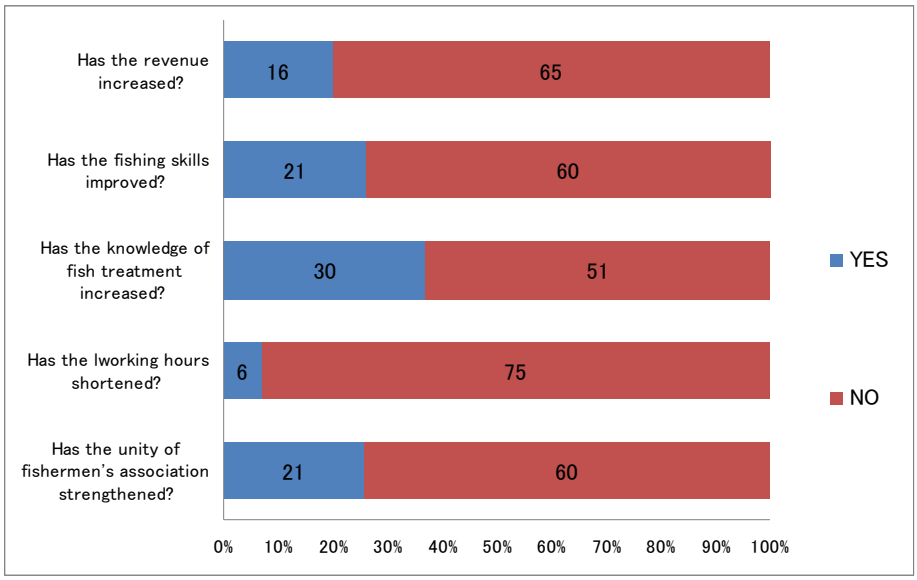


Figure 4： Changes this project has brought in the lives of fishermen

（Source） Results of interviews with 81 fishermen (breakdown: 24 ship owners; 57 small-scale fishermen)

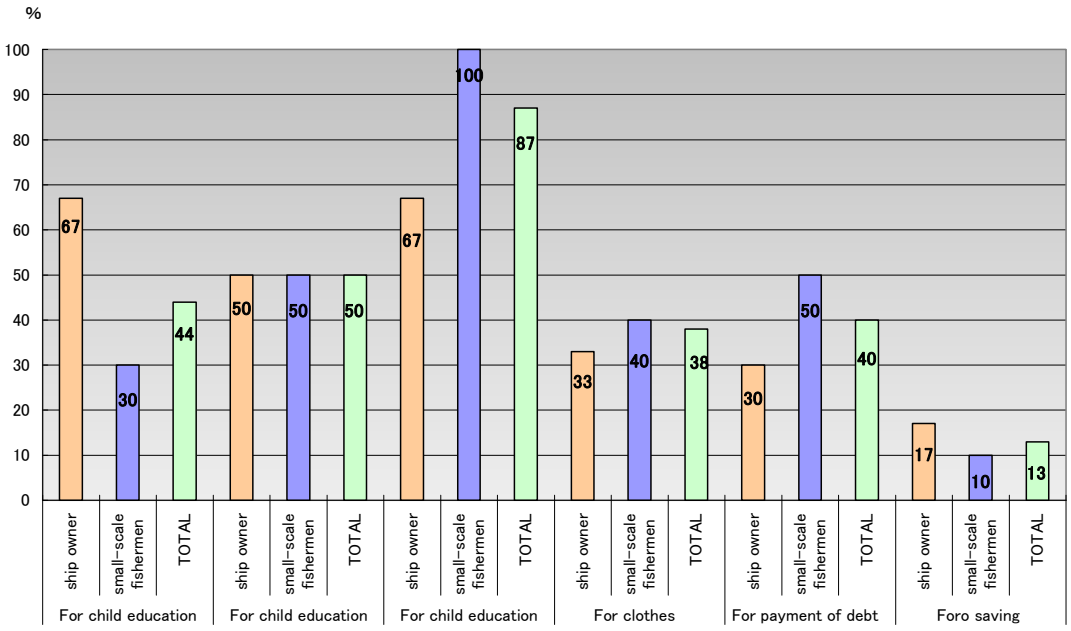


Figure 5： Purpose of use of increased income

（Source） Results of interviews to the 16 fishermen who answered that their revenue had increased

3.4.2 Other Impacts

3.4.2.1 Impact on the Environment and Society

In this project, 1) increased turbidity in the seawater caused by landfills; 2) wastewater discharged from the completed facilities; and, 3) effects on ecosystems (i.e. effects on the spawning habitat of the pelican bird and the sea turtle) were considered. Regarding to 1), the necessary measures to prevent the turbidity of the sea water was taken, and that kind of problem was not observed at the time of evaluation ex-post. As for the concern of 2), the facility to treat the residual water was installed in this Project, and the problem related to the sewage water had not occurred. For the 3), as the work areas for this project were limited to a narrow area at the southern end of the Gulf, which is located far from the habitats of pelicans and the spawning grounds for sea turtles, it was judged by the Ministry of Environment and Natural Resources of Nicaragua (Ministerio del Ambiente y los Recursos Naturales de Nicaragua, MARENA) that impacts on the environment from the SJDS port would be minimal. In the interview surveys conducted at the time of the ex-post evaluation with the Entity and local residents, no negative effect on the environment caused by the implementation of this project were reported. It is therefore judged that the project had no negative impact on the environment.

3.4.2.2 Conflicts among Personnel related to SJDS Fishing Port

Fishermen expressed during interviews that they had expected that the construction of fishing port facilities under this project would contribute to an improvement in their revenue level and lives. Immediately after the completion of the construction of the facilities, the catch was being processed and exported, offering employment to fishermen's families. There was a certain economic impact on that immediate occasion. However, thereafter, processing and exporting operations were stopped[12] and the managing director of the facility was also replaced.[13] Thereafter, INPESCA staff members from the headquarters in Managua were seconded to the position of managing director of the fishing port facility one after another on a frequent basis and the facilities were not made use of in a productive manner. Some fishermen believed that the inefficient operation of the facilities adopted by INPESCA was the cause of the lack of improvement in their lives and income. They were also dissatisfied with the fact that, although they were able to buy ice at a lower price and have access to the deck and the repair equipment, the facilities were not used in a way that fishermen had expected. Furthermore the catch was not traded at a fair price and there had been no increase in their income. As a result, there was a mutual sense of distrust generated between fishermen and the Entity. The decision-making process at the SJDS Fishing Port Facilities

12 At the time the fishing port facilities did not have an export permission granted and, as such, they did not have a choice but to stop their operation.

13 The managing director at the time had a background in the operation of fishing port facilities as well as in processing and exporting businesses.

Coordination Committee had for some time not been smooth.

However, reflecting a change of the policy on the use of the fishing port at SJDS, the person who was in charge of the operation of processing and exporting the catch following the completion of the construction of this facility, was appointed to the position of managing director in February 2011. In formulating a new business plan to be submitted to CARUNA[14] in order to apply for loans, the director formulated a project to work with the Fishermen's Association to bring the catch not only from the waters around the SJDS port but also from other regions to the SJDS fishing port, with a view to ensuring a certain volume of catch for the port. This was in response to a decline in the volume of fish being landed at SJDS port in recent years. As a result of such cooperation with fishermen, and with the project actually making solid progress, the reliable relations between fishermen and the Entity is being restored.

On the other hand, existing export traders view that investing public funds into the refurbishment of these facilities at SJDS fishery port in order to make them engage in exporting on an equal footing with private traders is nothing more than pressure on private enterprises. They are therefore taking a position against the transformation of SJDS fishing port facilities into processing/export trading facilities.

3.5 Sustainability（Rating：①）

3.5.1 Structural Aspects of Operation and Maintenance

With respect to operation and maintenance of the fishing port facilities, the SJDS Fishing Port Facilities Coordination Committee[15] was set up to formulate action policies. The daily operation of fishing port facilities was handled by the Entity, headed by the director manager of fishing port facility appointed by this Committee.

3.5.1.1 Current Operation of Entity

A change was introduced to the policy on the operation of the fishing port with the political regime change that took place in February 2007 and no measure is being undertaken at the moment to assert control over the market. The main services being offered include: access to the deck; access to the ice-maker (make and sell ice); and, repairing fishing vessels. Seminars and training sessions for fishermen are also being organized, though on a reduced scale.

With a reduction in the scope of its activities, as of January 2011, there are eighteen people in total working under the supervision of the managing director of the port facility,

[14] CARUNA stands for "Caja Rural Nacional", which is the private financial organization in Nicaragua. It has much experience in loan for the sector of agriculture, such as loan for dairy product or for plantation. The application of loan to transformation of the facilities was submitted to CARUNA on April 4, 2011, and all the amount was approved at the beginning of May 2011.

[15] It is comprised of MIFIC (Ministerio de Fomento, Industria y Comercio (Ministry of Promotion, Industry and Commerce), INPESCA (former ADPESCA), the SJDS Mayor, EPN (Empresa Poruaria Nacional (National Port Corporation) and a representative of fishermen.

e.g.: a finance officer, facilities/equipment operation maintenance officer, engineer, fishing port services officer, ice-maker operations staff, ice-maker operations support personnel, security guard and houseman. It was decided at the meeting of the SJDS Fishing Port Facilities Coordination Committee in November 2011 that the current organizational structure will be restructured in order to fit the transformation of the fishing port facilities into a processing/exporting facility and that there will be three departments with nineteen personnel, i.e. administration and finance department, facilities operation department and HACCP/Production department. A new organizational structure in line with the new business policy is being developed.

3.5.1.2 Current Operation of SJDS Fishing Port Facilities Coordination Committee

The Committee was to meet once a month and to discuss issues related to the operation policy. However, fishermen reported that it had met only once a year (once in 2009 and once in 2010) while INPESCA claimed that the Committee had met thee to four times a year to discuss issues related to the operation of the facilities, the financial report, future plans as well as general issues. Although a representative of fishermen sits at the Committee, four out of five committee members are government representatives. Fishermen expressed therefore dissatisfaction that their views might not be reflected when a decision is made by a majority vote and that decisions would not be made in an equitable manner. However, as at the time of the ex-post evaluation the committee members had formed a basic consensus on the policy concerning the operation of the fishing port facilities, i.e. the transformation of the port facility to process/export the catch, the sense of distrust among the committee members is disappearing.

During the time that the facilities were not used in an effective manner, the Japanese side patiently encouraged the senior representatives of the Nicaraguan government to facilitate greater use of the facilities and made recommendations on the best way to make use of the facilities based on the findings of the field survey. The Nicaraguan side also formulated a policy in February 2009, through consultation with the SJDS Port Authority, the Tourism Bureau, INPESCA, the SJDS mayor, the SJDS deputy mayor, and the Ministry of External Affairs of the Republic of Nicaragua, to promote and position the SJDS Bay as a fishing and tourism center of the country. Various measures to increase the usage of the SJDS fishing port facilities were considered. As a result of these developments and the restoration of the relationship between the committee members, the Fishing Port Facilities Coordination Committee has now become a forum where business policy is determined.

3.5.1.3 Transformation of Fishing Port Facilities into a Base for Processing and Exporting

A business plan was approved by the Fishing Port Facilities Coordination Committee to transform the fishing port facilities into a facility where the catch is bought by fishermen,

then processed and exported, and a new organizational structure has also been identified. It is expected that the fishing port facilities will thereby have an economic impact on the city of San Juan del Sur and contribute to improving the revenue performance and the lives of local fishermen. On the other hand, in order for the new facility to become an export base and to export fish to Western markets, it is necessary to be certified by HACCP. Technical assistance for fishing methods and fish handling was provided by the EU with a view to getting HACCP certification and the Entity has obtained corporate status.

In order to be certified by HACCP, the substantial renovation of existing facilities is required (to flatten the wall, improve ventilation and to ensure sufficient space for the disposal of cargo). The renovation cost and others, estimated at 273,205.50 USD[16], was submitted to CARUNA, and an approval was granted for the total loan amount. It had been the case that an INPESCA staff member was to be seconded to the position of managing director of the fishing port facility until February 2011 when an expert with a background in processing and exporting businesses at fishing port facilities was appointed.

With respect to the facilities and equipment developed under this project, although the target expected at the time of ex-ante evaluation was not achieved, measures are being undertaken to make additional investments so as to transform the existing facilities into a processing/exporting facility, as well as to develop the facilities and implementation structure and to allocate the budget with a view to achieving the Overall Goal, i.e. “to improve the revenue performance and the lives of local fishermen”.

3.5.2 Technical Aspects of Operation and Maintenance

3.5.2.1 Equipment

Two staff members who attended the operation check training conducted at the time of the delivery of equipment remain working in the Entity. Therefore, the methods of operation and maintenance of the main equipment, such as the ice-maker, the refrigerator and the water tank, are sufficiently understood. The senior workers will give guidance to new employees on how to operate the equipment. Therefore, no technical issue has occurred.

3.5.2.2 Ship Repair

Fishermen slide their ships up the slipway and repair their ships by themselves whenever necessary using the equipment being offered. Any major problems that cannot be fixed by fishermen themselves will be attended to by outside engineers under a contract between them.

[16] This amount includes the cost for construction of process area for fish caught, installation of gasoline tank, and labor cost.

3.5.2.3 Operation and Maintenance of the Fishing Port Facility

Operation guidance seminars were organized in January and February 2007 on the method how to manage and operate the facilities, since following the completion of this project it was anticipated that a new fish trading method would have been introduced once a new facility was put into operation. However, at the time the operation guidance seminars were organized, the Entity had not yet been set up. The personnel who ought to have participated to the seminar had not been employed, and only the managing director was able to attend the seminar. It was therefore unable to provide technical assistance directly to those staff that would actually be in charge of the operation and maintenance of the fishing port.[17] Also, during the operation guidance seminar, the operational guidelines (i.e. the guideline and the manual) were produced to be made use of when the Entity would be set up. However, with the political regime change and with the restructuring of governmental agencies such as the transformation of ADPESCA to INPESCA, the operational guidelines were not sufficiently handed over and the operational bylaws have not yet been formulated.

However, the current fishing port facilities have faced no operational difficulties as a result of a lack of guidelines and bylaws because none of the external parties including brokers and export traders inhabit the facility space as originally expected. At the moment, the facility use rules formulated by the Entity, which are announced at fishermen's meetings and put on the bulletin board in order to fully inform fishermen thereof. According to results of interviews with fishermen conducted in this survey, 60% of ship owners and 20% of fishermen are aware of these rules.

3.5.3 Financial Aspects of Operation and Maintenance

3.5.3.1 Financial Situation of the Facilities

At the time of the ex-ante evaluation, it was assumed that facility charges would be levied in order to supplement income and operate the facilities on a stand-alone basis. However, the sources of income, e.g. discharging charge (the crane fee), cargo disposal fees and the freezer fee, which were expected to account for approximately 40% of the total revenue, have not been materialized. According to INPESCA, the facilities are being run in the red. In the past, the deficit incurred in the operation of the SJDS facilities had been compensated for by INPESCA headquarters and it is reported that support from INPESCA headquarters will continue in the future to respond to any deficit that may occur. It should also be noted that, in respect to the budget for the operation and maintenance, the actual spending in 2010 was 53,000 córdoba, which was insufficient to procure necessary replacement parts and overhaul equipment. A sufficient amount has not

[17] Other people that attended these operation guidance seminars included: ADPESCA, the SJDS Town Hall, brokers, representatives from the Fishermen's Association and fishermen.

been allocated for the operation and maintenance of the facilities and equipment.

Table 7：Annual data on the balance of payments of the SJDS Fishing Port Facilities (unit: thousand córdoba)

	2008	2009	2010
Income	3,637	3,845	5,772
Expenditure	1,418	5,762	8,904
Balance between	2,219	△1,917	△3,132

（Source）Reponses from INPESCA to the questionnaire survey

Currently, the Entity had applied to a private financial company “CARUNA” for a fund to cover expenses to be incurred in relation to the project to transform the facilities into a processing/export base and approval for a loan of 273,205.50 USD was granted in May 2011. This ensured that they would have enough financial resources to cover expenses necessary for the renovation of the facilities into those that would meet the HACCP criteria, the expansion of the processing work space and the installation of a (ship) fuel tank. The business plan submitted to CARUNA projects that in the next two years, there would be sales of between 3,697 to 4,336 thousand dollars, with expenses of 2,012 to 2,598 thousand dollars to be incurred, which brings the annual surplus to 1,685 to 1,738 thousand dollars. In order to achieve this projection, it is necessary to ensure that there is a certain volume and amount of fish handled at SJDS fishing port. In this business plan, it is therefore intended that fish will be bought not only from fishermen based at SJDS fishing port but also from the fishermen’s associations operating in the whole area along the Pacific coast and from commercial fishing vessels.

3.5.4 Current Status of the Operation and Maintenance of the Facilities and Equipment

3.5.4.1 Condition of the Facilities and the Equipment

The ice-maker is in full operation, producing 240 marketa[18] (i.e. 10.91 tons) of ice per day. Part of the ice that is not picked up on the same day will be provisionally stored in the icehouse before being sold to fishermen and brokers. Two truck carriers with a crane are not being used to discharge the catch directly from the deck to the cargo disposal area, but one of them is used for moving as well as pulling up the general equipment deployed in the port, and the other has had a crane removed and is used as an ordinary truck carrier. The equipment for ship repair is stored in the locked workshop space and is used by fishermen when they repair their ships, while the equipment for discharging the fish

[18] “Marketa” is the unit used in Nicaragua to measure the weight. One marketa is nearly equivalent to 0.04545 tons.

brought to the docks (e.g. cooler box, etc.) is made use of for processing work and at the time of the seafood show to be organized irregularly.

The administration building was found to have some defects, including: leaks in ceiling (several locations); bubbling on the floor (two rooms); bubbling on the wall (the toilet on the first floor); interior paint peeling (one location); and cracks in exterior walls (floor roof/fence). Leaks in the ceiling may have been caused by the crack in the concrete floor roof, but this crack was already filled at the time of the completion of construction of the building. At the time of the inspection of the completion of construction, when a pool of water was made to cover the whole roof to see if there was water leaking through the top floor ceiling, no roof leak was observed.

The rails attached to the slipway to slide the ship up were rusted and bubbling on the stone paving beneath the slipway was found. It is therefore not possible to smoothly slide lancha up. The Entity acknowledges their responsibility to repair these defects and the necessity to do so. It intends to address the issue by taking necessary budgetary measures.

3.5.4.2 Status of Operation and Maintenance

With regard to the ice-maker, two staff members, who were trained on how to use the machine at the time of its delivery, set up a regular inspection system, operational records are to be kept, and operational problems are reported through a chain of command. The equipment is thereby properly operated and maintained. The operation manual for the machine is also kept in a place that is easy for the technical personnel to access and to take necessary measures in the event of any problems. Although one of the two truck carriers with a crane has had its crane removed, both of these two truck carriers are maintained and inspected. These are not used for the original purposes (i.e. to land the catch) but are used within the facilities.

Compressor spare parts and the ice-maker filters cannot be procured in Nicaragua and need to be purchased from agencies in Mexico or Costa Rica. The purchase of these parts has not been made due to price and the product being out of stock. In general, a compressor requires an overhaul after 100,000 hours of operation time. One of four compressors has already operated over 120,000 hours without an overhaul. Although clean water from SJDS City is used for the ice-maker, it contains a high level of lime particles and rapidly exhausts the filter. Genuine filters are expensive and the filter has not been replaced as often as necessary.

The facilities in general are inspected once a month. Any defects detected will be reported but, depending on the budgetary constraints, the necessary measures have not always been taken.

With regards to the rust on the slipway, the slipway was originally treated with an anticorrosive coating and periodic paint repair was required. These methods of operation and maintenance are detailed in the manual, but the manual is not made use of and paint repair or other measures have not been taken. Bubbling on the stone paving is a common

phenomenon in any harbor where there is a certain level of tidal variation. Re-pavement is necessary to make it flat. Maintenance staff at the Entity were not fully aware of these methods.

leaks in ceiling

functioning ice machine

It should be noted that the Nicaraguan side believed that it would be the responsibility of the Japanese side to repair these defects of the facilities at the time of first field survey in January 2011: but in May 2011, at the time of second field survey, having understood that it needs to be done by the Nicaraguan side, they are now reviewing the budgetary measures necessary for such repairs.

From 2011 onwards, a managing director with a background in processing and exporting businesses at fishing ports was brought in.[19] Along with his appointment, the organizational structure was restructured in line with the new business policy. The future business plan, combined with an application for a loan, has been approved by the private financial institution, CARUNA. Sustainability is improving in respect to the operation of the facilities in the future.

In light of the above, major problems have been observed in terms of structural and financial aspects, therefore sustainability of the project effect is low. On the other hand, it is believed that if positive outputs identified at the time of the ex-post evaluation continue in the future, sustainability will be improved.

4. Conclusions, Lessons Learned and Recommendations

4.1 Conclusions

The Sun Juan del Sur (hereinafter referred to as “SJDS”) fishing port used to be where the largest amount of fish was brought to docks compared with other fishing ports on the

[19] As explained in 3.4.2.2., this person was in charge of processing and exporting operations immediately after the completion of construction of facilities. He was then re-appointed to the position of facility director at this fishing port in February 2011.

Pacific Coast in the Republic of Nicaragua. However, the discharging efficiency was low, and the port had problems in maintaining the freshness of fish caught as well as in respect to post-harvest losses. Against this background, this project was carried out with a view to reducing post-harvest losses through improvements to the discharging efficiency as well as maintaining the freshness of fish caught, thereby increasing the total catch of fish to be handled at this port.

Through the implementation of this project, although no improvement has been seen in terms of the discharging efficiency, the freshness of fish caught has improved and the objective of reducing post-harvest losses has partially been achieved. On the other hand, due to the significant effects of external factors such as the decline of fish stock in nearby waters, the objective of this project, i.e. to increase the total catch handled at this port, has not been met. Therefore, the overall effectiveness of the project is low. At the time of ex-post evaluation, another project plan has been formulated to make additional investments and to transform the facilities constructed under this project into a base for processing and exporting the catch, in order to achieve the Overall Goal at the time of the ex-ante evaluation, i.e. “to improve the lives and the revenue of local fishermen”. However, in spite of efforts having been made by relevant persons in our partner country as well as in Japan, the project implementation structure is far from stabilized and deficits have continued due to the effects of political regime change. In this respect, the sustainability of the project is low. On the other hand, measures are being undertaken at the moment to develop an implementation structure (e.g. recruitment of persons who have been involved in similar projects, organizational restructuring, etc.) and to ensure sufficient budgets (i.e. approval for loans from private financial institutions) at the time of Ex-post evaluation. Should these positive elements be pursued in the future, it is expected that the sustainability may rise.

The partial achievement of the Project Purpose can be attributed to the internal factor of the project design, which was formulated based on activities that might have been difficult for our partner government to carry out. In addition, even though the Overall Goal, “to improve the lives and the revenue of local fishermen” is still in place, as the policy of utilization of the port facilities has changed due to the political regime change after the completion of this project, the approach to implement the Project may not be fully compatible with the policy of the current government. In this context, the relevance of this project is fair.

In light of the above, even though we can observe the effect of the Project at certain level, the Project Purpose has been achieved partially due to change of the external factor and unfeasible project design. Therefore, this Project is evaluated to be unsatisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Implementing Agency

So far, the Entity has identified neither the information detailing the volume of

discharging nor trading at the SJDS fishing port. In order to implement the business plan submitted to CARUNA and operate the fishing port facilities on a surplus basis, accurate financial information concerning sales and expenses is required. In order to identify the income, too, measures should be taken to confirm the total volume of discharging and training handled at the port. When the business plan does not show progress as planned, necessary measures should be taken to review the business plan so as to examine the method of purchasing the catch and review expenditures.

It is necessary to ensure a certain volume of catch handled at facilities in SJDS in order to implement the business plan. For this implementation, the establishment of reliable relations between the Entity and the fishermen/the fishermen's association is important. It is highly recommended to activate the SJDS Fishing Port Facilities Coordination Committee and to ensure thorough discussion based on consensus among the relevant parties (i.e. MIFIC, INPESCA, the SJDS Town Hall, the Port Authority and fishermen) on the policy concerning the operation of fishing port facilities.

Other than the recommendations referred to above, to take the following measures are also desirable.

- To appoint staff that are familiar with HACCP/exporting businesses in order to perform processing/exporting businesses in an efficient manner.
- To take budgetary measures necessary for responding to the defect/s of the facilities and equipment as well as for the operation and maintenance thereof, arrange maintenance and repair work, and replace consumables and parts with new ones.

4.2.2 Recommendations to JICA

- With the formulation of a new facility use policy, it was decided that the facilities provided through grant aid project would be renovated and made use of in different ways from what was designed in the original plan. Confirm with the partner government that the facilities and equipment will be put into use in accordance with the E/N agreement, through consultations between Japan and Nicaragua in the same manner as in the past.

4.3 Lessons Learned

- In this project, the project design was drawn up based on the assumption that activities whose feasibility was unclear, would be carried out by the Nicaraguan side, including the introduction of a new scheme which had never been put into place in the partner country, i.e. "auction trading", and of the changes to commercial practices. In addition to above, due to the change of the external factors, such as change of government policy for the use of SJDS port facilities, those activities were not implemented, which affected the achievement of the Project Purpose. At the time of project formulation, to identify what the partner country is required to do and to consider thoroughly its feasibility is requested. Furthermore, when there is any uncertainty relating to the feasibility of any activities to be carried out solely by the partner country, the possibility if the Japanese side can offer

additional support should be examined. And if such support is not feasible, to examine if the project component can be changed is also import amongst other things.

- Thorough consideration should be given to the project management skills of the implementing body, which will be in charge of the operation and maintenance of the facilities and equipment to be developed. In this project, the project was formulated on the assumption that the implementing body would be set up. However, the launch of this body was delayed and technical assistance on the port management to the appropriate personnel could not be done effectively by the complementary technical assistance. When the introduction of an unfamiliar scheme with the cooperation-receiving society is planned, it is important to assess the capacity of the implementing body to see whether they understand the scheme and are capable of putting it into practice.

Nicaragua

Ex-Post Evaluation of Japanese Grant Aid Project

"The Project for Improvement of Basic Education Facilities in the Department of Managua in the Republic of Nicaragua"

External Evaluator: Junko Noguchi, FASID

0. Summary

In Nicaragua, deficient and decrepit school and classroom conditions have hindered children's enrollment, and the Ministry of Education (MOE) has implemented a program for improving school facilities. This Project's relevancy is high since it aims to improve the learning environment in target areas by constructing facilities for basic education in Managua Department.

Although the Project cost and period were mostly as planned, bidding failure and unexpected price increase lead to slightly fewer classrooms being built than planned. Therefore the efficiency is fair. The learning environment is considered to have been improved based on the high appreciation expressed by school principals, teachers and students for improvements in the size of the classrooms, the use of daylight in the classrooms and the usage of desks and chairs. The effectiveness is high. Operation and management (O&M) of the facility largely depend on the success of a new needs prioritization system and on the financial capacity of the schools and parents. Therefore the sustainability is fair. In light of the above, this Project is evaluated to be satisfactory.

1. Project Description

Project Location

Two-story school building constructed by the Project (Alemania School, Managua City)

1.1 Background

In Nicaragua, public investments were not made in the education and social welfare sector including school construction during the civil conflicts, and school facilities were decrepit and damaged. The Nicaraguan Government established the Emergency Social

Investment Fund (FISE) in 1990 and started school construction mainly in rural areas where the poor resided. Further improvement in school facilities were needed due to the damages brought by Hurricane Mitch in 1998 and high rate of population growth. Also, as stated in "Strengthened Growth Poverty Reduction (SGPRS)," one of the priorities of the Government was an investment in human capital, and its targets by 2015 were set as follows: (i) net enrollment rate of primary education would increase to 90%; and (ii) illiteracy rate would decrease to 10%. Reform of secondary education was considered necessary to achieve the mid-term objective of increasing education years of 10 to 19 year-old children from 4.6 (in 1998) to 5 years by 2004. However, as the poverty level in Managua City and its neighboring areas was relatively low, priorities were not given to them by FISE or donors for construction and improvement of school facilities, even though there were many decrepit and damaged classrooms. Thus, classes were given in decrepit classrooms or neighbor's houses or storehouses, and improvement in educational environment at those schools was considered urgent.

1.2 Project Outline

The objective of this Project is to improve the learning environment of primary and secondary (first cycle) schools in Managua City and Ciudad Sandino by constructing classrooms and other facilities and procuring teaching materials for 34 target schools.

Grant Limit / Actual Grant Amount	547 million yen / 471.2 million yen (Phase 1) 515 million yen / 509.6 million yen (Phase 2) 610 million yen / 604.6 million yen (Phase 3)
Exchange of Notes Date	July 2003 (Phase 1) June 2004 (Phase 1) June 2005(Phase 1)
Implementing Agency	Ministry of Education
Project Completion Date	May 2005 (Phase 1) March 2006 (Phase 1) March 2007 (Phase 1)
Main Contractor	Daiken Sekkei, Inc.
Main Consultant	Fujita Corporation
Basic Design	"Basic Design Study for the Project for Improvement of Basic Education Facilities in the Department of Managua in the Republic of Nicaragua" Daiken Sekki, Inc, March 2003
Related Projects (if any)	"Project for Improvement of Primary Education Facilities" (1995-1997), "Project for Improvement of Primary Education Facilities: Phase 2" (1999-2002)

2. Outline of the Evaluation Study

2.1 External Evaluator

Junko Noguchi, Foundation for Advanced Studies on International Development

2.2 Duration of the Evaluation Study

Duration of the Study: November, 2010 – October, 2011

Duration of the Field Study: January 23, 2011 – February 6, 2011 (1st)

May 14, 2011 – May 20, 2011 (2nd)

2.3 Constraints during the Evaluation Study

There were the following three constraints in data collection and analysis. First, due to time constraints during the field visit, direct observation of the facilities and equipment and interviews with school teachers and parents were conducted at only 24 schools (equivalent to 75% of the total), out of the Project's originally targeted 34 schools (actually targeted 32 schools). Therefore this study may not have uncovered all effects and issues of the Project. Secondly, the accuracy level of students' enrollment data is not high. In Nicaragua, schools became autonomous in the mid-1990s, and under the system, school management subsidies were provided to each school by MOE according to the number of enrolled students. Apparently under the autonomous system many schools padded the number of students so that they would receive more subsidies[1] (Box 1). It is possible that schools registered more students than actually existed and therefore data cannot necessarily be accurately verified. Thirdly, because there were time constraints and the procured materials were only for primary education, interviews with principal beneficiaries and verification of some evaluation points were conducted mainly for the primary evaluation level.

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

3.1 Relevance (Rating: ③[3])

3.1.1 Relevance to the Development Plan of Nicaragua

At the time of ex-ante evaluation, two of the ten objectives set in SGPRS (July 2001) were: "improvement of net enrollment rate of primary education" and "decrease of illiteracy rate." These are in accordance with this Project's objectives (in other words, direct and indirect effects): "increase of students' enrollment" and "provision of opportunities of social education activities." In 2005, SGPRS was revised to become the "National Development Plan." In this plan, the strategies in the education sector

[1] Interview with MOE staff.
[2] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory
[3] ③: High, ②: Fair, ①: Low

include: quantitative expansion, educational reform and good governance. Regarding the quantitative expansion, improvement of and increase in the number of school facilities are regarded as factors for promoting educational services and student enrollment.

At the time of ex-post evaluation, in "Education Policies 2007-2011" one of the five pillars is "improvement of education" which includes improvement of school facilities. This document describes how school facilities are necessary for accommodating more students and improving the learning environment. To promote the government's education policies, an important guideline is completing six years of primary education. Following this guideline suggests that there is a need to provide enough classrooms and school infrastructure (such as water supply, electricity and latrines).

3.1.2 Relevance to the Development Needs of Nicaragua

Public investments in the education sector were not made during the civil conflicts. School facilities were decrepit and damaged and in some schools classes were given in neighbor's houses or garages. This situation was worsened by damage brought by Hurricane Mitch and population growth of school-age children[4].

According to MOE estimates (2010), in addition to 500,000 drop-outs, 700,000 students were out of school at the pre-primary, primary and secondary level. Lack of adequate school facilities, like other factors, hinder student enrollment, and therefore another reason for low enrollment is the fact that schools could not provide all six grades in 18.3% of schools in urban areas and 47.0% in rural areas. Furthermore, many rural schools had no water supply and electricity[5].

At the time of ex-post evaluation, the study conducted by MOE from September to October, 2010 revealed that 13,000 more classrooms are needed to accommodate all the school-age children who are currently out of school.

3.1.3 Relevance to Japan's ODA Policy

The Country Assistance Program for the Republic of Nicaragua was prepared based on the results of policy consultations held after Hurricane Mitch in 1999. In this Program, the priority areas for poverty reduction and economic development were set as (i) agricultural and rural development, (ii) health, (iii) education, (iv) transportation infrastructure, (v) assistance for democratization and (vi) disaster prevention. Related to the education sector, "assistance for improvement of enrollment rate and quality at the primary level" was planned. In Japan's ODA Charter, a high priority is placed on the education sector as assistance for poverty reduction through human development.

[4] JICA and Daiken Sekkei, Inc. (2003) "Report of Basic Design Study on the Project for Improvement of Basic Education Facilities in the Department of Managua in the Republic of Nicaragua."
[5] Visser-Valfrey, M., Dan Wilde, E. J., and Escobar, M. (2010) "Mid-Term Evaluation of the EFA Fast Track Initiative: Country Case Study: Nicaragua."

Especially in the sub-sector of basic education, “assistance for improvement of quality of education” is set as a priority in “Basic Education for Growth Initiative” announced at Kananaskis Summit in 2002.

Thus, this Project has been highly relevant with the country’s development plan, development needs, as well as Japan’s ODA policy; therefore its relevance is high.

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

Planned Outputs in the Basic Design Study (BD) for the Japanese side include the construction of 372 classrooms for 34 schools. However, two schools and 97 classrooms were cut from the original plan, resulting in the actual construction of 275 classrooms for 32 schools (in other words, 73.9% of the plan was implemented) (Table 1). Other outputs were shown in Annex 1.

Table 1 Planned and Actual Outputs

	Planned	Actual
Beneficiary schools	34	32 (94.1%)
Classrooms	372	275 (73.9%)
Multipurpose room (also used as preprimary classroom)	13	9 (69.2%)

(Source) Project Completion Report.

One reason for the cuts from the plan in Phase 1 is that it took two months to process the instruction and approval of the rebid after the first bid ended in failure. As a result, insufficient time was secured to construct two-story buildings in the scheduled work period and therefore all the buildings needed to be redesigned as one-story buildings. The other reason is that some classrooms needed to be cut from schools where all planed classrooms could not be built due because of its small area. In Phases 2 and 3, the price survey found out that material and manpower cost rose drastically compared to the time of the BD. Especially, the international price of ironstone which is the main material for construction soared after 2003[6], so design change was necessary before the bid. In some of the schools where classrooms were not constructed as planned, decrepit classrooms are still in use.

For the construction of buildings, seismic capacity was ensured with consideration to economic efficiency. The Government of Nicaragua had a seismic design standard but it was not necessarily strictly applied. Accepting Nicaragua’s seismic intensity, the buildings were designed for earthquake resistance with Japanese design techniques.

As for the Outputs by the Nicaraguan side, the plan included (i) removal of

[6] Japan Center for International Finance (2004) “Committee on Current Status and Perspectives on the market for oil and materials which has impact over international economy.” Only a Japanese paper is available.

existing on site structures and trees; (ii) land preparation construction; (iii) construction of border fences and gates; (iv) application for construction licenses; and (v) lifeline connections (such as water and electricity). Except one school where electricity was not connected, outputs for the Nicaraguan side were produced as planned.

3.2.2 Project Inputs

3.2.2.1 Project Cost

In regards to the Project cost funded by the Japanese side, of the total planned cost of 1,672 million, the actual cost was 1,585.4 million yen or 95% of the planned amount (Table 2). Although there was an increase of material and manpower cost, after the design change (cutback of the outputs) the cost was held to within that planned.

Table 2 Planned and Actual Cost by Japanese Side

	Planned	Actual (Grant Amount)
Phase 1	547 million yen	471.2 million yen
Phase 2	515 million yen	509.6 million yen
Phase 3	610 million yen	604.6 million yen
Total	1,672 million yen	1,585.4 million yen

(Source) Project Completion Report.

The budget by the Nicaraguan side was planned as 20 million yen (at the time of ex-ante evaluation), but the actual expenditure amounted US$717,448 (84 million yen)[7], which drastically surpassed the estimated cost by 420%. Although a strict comparison between the original plan and the extra outputs was not possible, according to MOE, the following outputs caused the excess.

Many schools want to have high walls for security reasons as this (Fernando Gordillo Cervantes School in Managua City).

- The border fences built around the school area were more extensive than planned.
- In the plan, the border fence was to be built with small stone blocks. However, in view of benefits and crime-prevention, it was built with rubble which was used for the groundwork.
- Sidewalks, playgrounds, pavements with tiles and water fountains were constructed, and light bulbs were procured.

[7] Converted with the rate at the time of the project completion, US$1=118 Japanese yen.

The Nicaraguan side's Project cost could not accurately be calculated. The Japanese side's costs, on the other hand, were lower than planned (95% of the planned).

3.2.2.2 Project Period

The work period was estimated at 58 months including the detailed design. Actually, it took 60.5 months in total from the exchange of notes in Phase 1 (July 2003) to the work completion in Phase 3 (March 2007). This was slightly longer than planned (104% of the planned). The work period of Phase 1 was extended by 4.5 months because it took 2 months to go through the procedure of the rebid after the first bid ended in failure, as mentioned earlier. In Phase 2, another price survey was implemented so it took one more month than planned to conduct the detailed design, bid and contract, but the total period was within the plan including construction and procurement works.

Summarizing the above, although the project cost was within the plan, the project period was slightly exceeded. Also the decrease of the outputs (less than 80% of those planned) was caused by the unexpected price increase of the construction materials. Thus, efficiency of the Project is fair.

3.3 Effectiveness[8] (Rating: ③)

3.3.1 Quantitative Effects

The direct effects specified in the BD are the "expansion of the capacity of accommodating students" and the "decrease of students accommodated in one classroom." Data for these indicators at the ex-ante evaluation in 2002 and after the completion of the Project in 2007 are shown in Table 3.

The proportion of sound classrooms to total classrooms was 83.2%, as some classrooms were cut from the plan as explained in 3.2.1. With regard to the operation of the facility, all classrooms are in use in all of the 24 schools visited during the field survey.

With regard to the indicators for the "number of the enrolled students" and for the "number of students accommodated in one sound classroom" in Table 3, numerically the former did not achieve the target but the latter did. However, as described in 2.3 and the last paragraph of this section, the available data is questionable, so it is difficult to accurately verify the level of achievement. One reason is that the necessary number of classrooms was estimated assuming an increase in the number of enrolled students but the population of school-age children did not increase as estimated. Another reason is that the data obtained was not very accurate as described in 2.3 and Box 1 and also the

[8] Effectiveness is scored also in the light of factors regarding Impact.

number of enrolled students may have been padded especially until 2007. It was not possible, therefore, to verify and judge the Project effects using the indicator of enrolled students.

As a point of reference, the number of enrolled students in 2007 was equivalent to 83.8% of the target. It also can be said that there was no big influence of the cut of the classrooms, as construction of classrooms was 73.9% of the planned total.

Table 3 Number of Constructed Classrooms and Enrolled Students before and after the Project

Indicator	Before	Target	Actual			
	2002	2007	2007	2008	2009	2010
Proportion of sound classrooms to total classrooms in beneficiary schools	208/436 (47.7%)	580/580 (100%)	483/580 (83.2%)	483/580 (83.2%)	483/580 (83.2%)	483/580 (83.2%)
Enrolled students at beneficiary schools (primary and secondary)	39,800	48,100	40,353	36,513	39,071	37,628
(Primary)	n.a.	n.a.	22,814	21,730	22,944	22,403
(Secondary)	n.a.	n.a.	17,539	14,783	16,129	15,225
Average number of students accommodated in one sound classroom at beneficiary schools	191	83	69.5	62.9	67.3	64.8
Average number of students accommodated in one sound classroom at beneficiary schools in the morning shift	102	45	39.6	37.3	39.3	39.1

(Source) Managua Department Office of MOE.

(Note) 580 = 208 usable classrooms which existed at the time of BD + 372 classrooms planned for construction; 483 = 208 usable classrooms which existed at the time of BD + 275 classrooms actually constructed.

Table 4 Enrolled Students in Managua Department and the Whole County

	2007	2008	2009	2010
Enrolled students at primary and secondary levels in Managua Department				
Primary	192,766	191,434	191,423	193,223
Secondary	130,709	125,762	123,646	126,004
Enrolled students at primary and secondary levels in the country				
Primary	952,964	944,341	926,969	923,745
Secondary	451,083	446,868	443,644	458,321

(Source) Managua Department Office of MOE.

For reference related to the data of average students in one classroom, as the Project could not cover all necessary classrooms as explained earlier, beneficiary schools have sound classrooms and those which need to be improved. When collecting data for Table 3, it was not possible to extract only the number of students accommodated at “sound” classrooms, and therefore the data after 2007 includes the students accommodated at “not sound classrooms because it was not covered by the

Project (in other words, classrooms still needed to be improved).” As long as it is shown in data, the target was achieved so the overpopulation in the classroom was alleviated supposedly. However, in the visited 24 schools, more than 40 students (recommended by MOE) were in one classroom at 180 classrooms out of 236, which demonstrates that the issue of overcrowded classrooms is still needed to be tackled.

Box 1 Autonomous School System

In Nicaragua, the education sector was decentralized after the early 1990’s with the purpose of efficiency of school management and improvement of education quality. Under this system, each school as an autonomous body received a subsidy and collected a fee and the School Management Committee independently managed school issues including hiring of teachers and janitors and small-scale repairs of the facility. However, some schools padded the number of the enrolled students to get more subsidies, so financial management became opaque. Therefore, the current administration established in January 2007 abolished this system based on the principles of free basic education.

Currently, teachers and janitors are employed by MOE and it is prohibited for schools to collect fees from the parents. The School Management Committee was formally dismissed but each school has a parents’ association. In most schools, parent representatives are selected from each class or grade, and these representatives organize a parents’ association, which usually has a president, vice-president, treasurer, public relations, etc.

(Source) Interview with the Vice Minister of MOE and other staff.

3.3.2 Qualitative Effects

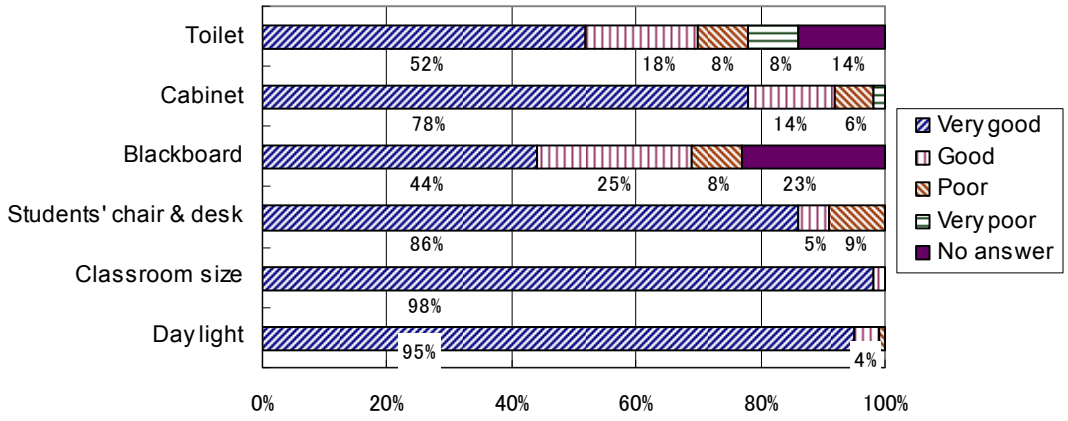
In general, with regard to the usage of the facilities, school principals, teachers and students evaluate it highly (Table 5 and Figure 1).

Table 5 Students’ Evaluation of Facility Usage

	Very good	Good	Poor	Very poor	No answer
Usage of the classroom	83%	16%	1%	0%	0%

(Source) Interview with 215 students of Grades 5 and 6 at 24 schools.

Figure 1 School Principals and Teachers’ Evaluation of the Facility Usage



(Source) 126 school principals and teachers of 24 out of 32 beneficiary schools. 119 teachers evaluated the usage of the toilets.

As for the blackboards, in more than half of the visited schools they are not used at all and so 14% did not answer. Most of the teachers who did not use the blackboard answered that chalk dust was unhealthy, and now they use the acrylic white board instead of the blackboard[9]. In five of the 24 visited schools, all or some of the toilets were not in use. Reasons cited include: the waste level in the tank rose and it is dangerous, and the drain does not function properly.

In light of the above, although the accommodation capacity of the facilities is lower than planned (80% of the planned) due to the outputs decrease, usage of the facility itself is highly appreciated. This Project has largely achieved its objectives; therefore its effectiveness is high.

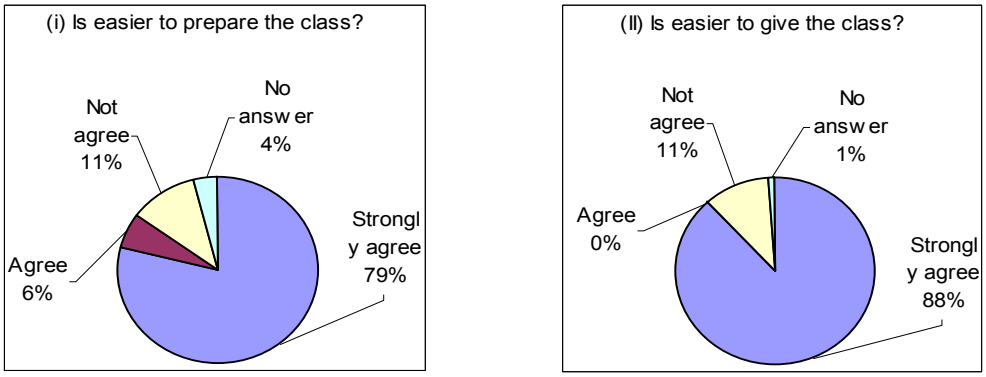
3.4 Impact

3.4.1 Intended Impacts

(1) Conduct and Contents of the Classes with Use of the Procured Equipment

The change from the pre-project period (observed by the school principals and teachers themselves) is as follows (Figure 2). Using the teaching aid materials procured by the Project, most (80%) answered that preparation and conduct of the classes was easier than before. In addition, in more than half of the schools the textbooks are lacking and the teachers in these schools commented that the procured materials were also able to be utilized as complementary materials to the textbooks.

Figure 2 Change in Preparation and Conduct of Classes with the Teaching Materials Procured by the Project



(Source) Interviews with 24 principals and teachers of 24 schools.

Interviewed teachers listed maps, terrestrial globes and instruction panels for natural science as materials used frequently. They explained the change in the class with uses of the materials as follows:

- They can now explain the theme more precisely and concretely (10 schools).

[9] MOE says that future school construction programs may be flexible in equipment purchasing such that schools can choose either blackboards or acrylic boards, considering teachers' needs and the ongoing financial feasibility of the school to purchase supplies.

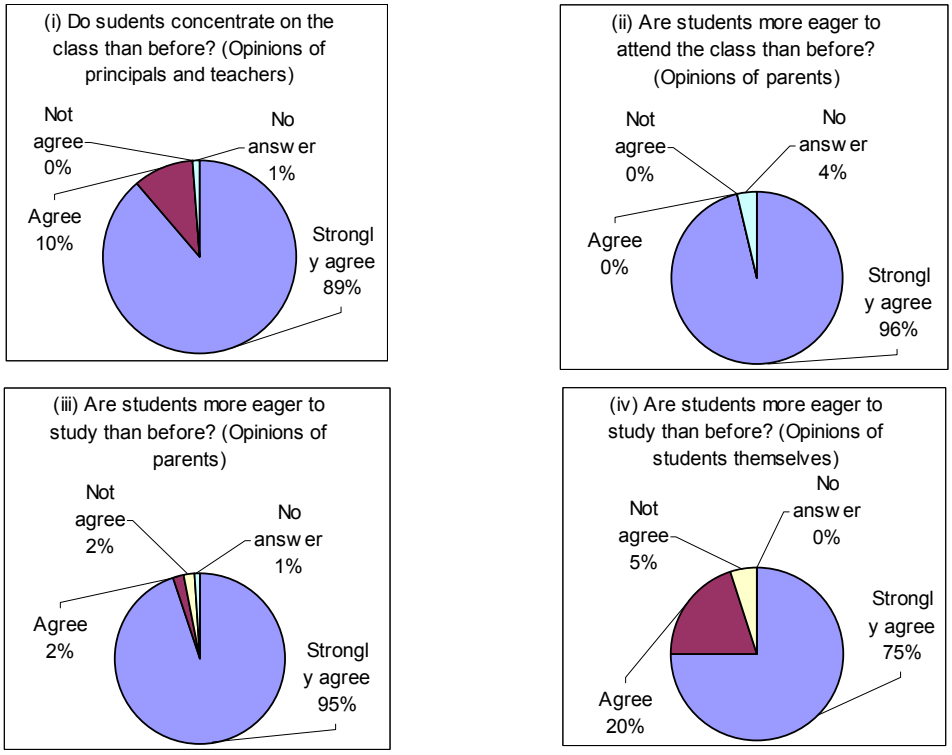
- The classes are more dynamic, having group exercises, etc. (6 schools).
- The classes are more practical (3 schools).
- Students participate in the class more actively (2 schools).

Students are working in group in the wide classroom (Frey Jesús de Pamplona School in Ciudad Sandino).

(2) Students' Eagerness in Attending School and Studying

School principals, teachers, parents and students themselves realize the change in students as shown in Figure 3. Most answered that there were positive changes in the students' willingness to learn and their attitudes during the class.

Figure 3 Change in Students' Attendance and Studying



(Source) Interviews with 91 principals and teachers of 24 schools, 118 parents and 215 students of Grades 5 and 6.

Although it is difficult to strictly verify the Project effects (Figure 1 and Table 6), it can be assumed that the classroom size was increased which was highly appreciated by most teachers and students, and this made it easier to conduct classes with group exercises, which in turn motivated the students to attend the school and actively

participate in the class.

Table 6 Change in the Students after the Project and Students' Evaluation of Facilities.

Change in students observed by teachers	- Students participate in the class more actively (4 schools). - Students now work together with other students in wider space (4 schools). - There is less absence (7 schools). - Students became more punctual (5 schools). - Students now pay more attention to cleaning and maintenance of the facility (5 schools).
Students' evaluation on the facility	- There is more space for studying and playing (7 schools). - Desks and chairs are cozy and sufficient in number (6 schools). - Dust doesn't come in the classroom. It's ventilated (5 schools). - There is a floor, walls and roof. It's comfortable (4 schools). - The school is clean (3 schools).

(Source) Interviews with 91 principals and teachers of 24 schools and 215 students of Grades5and 6.

(iii) Use of the Classrooms for Community Activities

In most schools, school facilities such as classrooms are used for purposes other than primary or secondary classes. It was assumed in the BD that the facility would be utilized for adult education, literacy classes, and community activities through parents' meetings (school management committee). In addition, schools are also used for voting, health activities (such as vaccination and blood donation), religious activities, etc.

Box 2 Situations of Non-beneficiary Schools

(1) Jose de la Cruz Mena School (Managua City)

390 enrolled in the morning shift and 135 enrolled in the afternoon shift. Among the students of Grade 1 in the morning and those of Grades 1 and 2 in the afternoon shift, 20 students dropped out or transferred to other schools during the year 2010. According to MOE, many students transfer to other schools during the school year due to their parents' work in some schools.

Table Students Enrollment (2010)

	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Classes
Morning	95	64	59	88	42	42	14
Afternoon	37		42		56		3

The classrooms were constructed in 1971, 1980 and 2009. In old classrooms, the blackboards are left broken and the teachers have difficulty in giving classes. The classrooms are dusty because there are no doors and window panes, and so students cannot concentrate on the classes. Some light bulbs are gone or broken, which is dangerous.

(2) Ruben Dario #3 School (Managua City)

It has only a morning shift and 534 enrolled students in 2010. There was no student transfer during the year.

Table Students Enrollment (2010)

	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Classes
Morning	114	91	94	95	72	68	8

Classrooms are insufficient for the number of students. Some classrooms possibly

accommodated more than 90 students. Teachers commented that they and the students cannot move freely and the classrooms are ill-ventilated. Students use the toilets frequently and they are in bad condition. Desks and chairs for students are lacking, so old ones are used after getting repaired or some students have to buy their own.

(Source) Interview with teachers of Jose de la Cruz School and Ruben Dario #3 School.

3.4.2 Other Impacts

There is no positive or negative unexpected impact in particular. Land acquisition and registration was done almost as planned, and there was no necessity of resettlement.

Summarizing the above, although it is difficult to strictly verify the Project impacts, compared to the pre-project period, teachers prepare and give the class more easily and students' attitude is more positive. The school facility is also utilized actively for purposes other than usual classes. No particular negative impact has been caused.

3.5 Sustainability (Rating: ②)

3.5.1 Structural Aspects of Operation and Maintenance

(1) Roles for the Facility Maintenance

Basically, cleaning and small-scale repair are done at each school, and large-scale repair such as repair or construction of fences and walls is conducted by MOE. Cleaning utensils, including brooms, are distributed by MOE every year. MOE assigns a technician to each of its Department Offices and this person also responds to repair issues that the schools cannot technically work out by themselves.

Each school tries to conduct O&M as far as it is financially and technically possible. For example, small-scale repairs such as repainting should be done by the school. However, as collecting fees from parents is officially prohibited, how the school acquires painting materials depends on each school. Disparities in O&M among schools are a small concern. In most schools, when a problem arises, the school principal consults parents, and deciding who to consult next depends on the principal's connections; some go to the Department Office or Municipal Office of MOE, and others reach out to the Municipal Government or FISE. Officers of the Municipal Offices of both Managua City and Ciudad Sandino answered that they sufficiently understand situations of the education sector (Box 3). Regarding problems of electricity or water, some schools directly contact the electric power company or water company.

Box 3 Assistance towards the School Facility by Municipal Governments

(i) Municipal Government of Managua City

Regarding the issues and needs for school construction and repair, the Municipal Government receives information from its officers in charge of areas or the Municipal Office of MOE. The Municipal Government "adequately understands the local situations" but all the

needs are not attended to due to budget constraints. In FY 2011, 10-20% of the budget for investment and O&M is allocated to the educational facilities. They understand that MOE constructs school buildings and the Municipality is in charge of their surroundings (pavement, fence, etc.)

(ii) Municipal Government of Ciudad Sandino

Officers in charge of cadastre investigate situations of the school facilities in the city, they "understand the situations enough". And, the Municipality organized meetings with the Municipal Office of MOE or with schools by area to collect further information. In FY 2011, 1,175 thousand cordobas[10] are earmarked for the education sector, and part of which will be used for construction of classrooms and toilets.

(Source) Interviews with the Municipal Government of Managua City (Director of Programs Department) and the Municipal Government of Ciudad Sandino (Staff of the Public Sector).

(2) School Management

According to MOE, a committee for school support was established at each level of the school, municipality, department and country[11], with the purpose of supporting students inside and outside the classroom so that they can complete primary education.

The committee at each level is convened twice a month to share issues and discuss solutions. For example, as needs in facility repair are identified at the school level, the municipal committee shares information and assigns priorities to them. In addition, the department committee examines and assigns priority to the needs identified from the several different municipal committees, and then reports to the national committee. Also, the national committee assigns priorities to competing budget items.

3.5.2 Technical Aspects of Operation and Maintenance

MOE started the Program for Identification of Needs on Infrastructure and Repair of Schools (Programa de Identificacion de Necesidades de Infraestructura y Reparaciones de Escuelas: PINRE) and has provided training to teachers and parents. In Managua Department, among the 20 schools visited, parents from six schools have received PINRE training, and most of them said that "the training was useful." Three schools have a PINRE manual. According to MOE, it has not expanded the program due to budget constraints. It is likely that more teachers and parents have received training, but that some of the teachers moved to another school or the parents' children graduated from the school, and therefore the number of the responses might be lower than the actual number.

According to the Vice President, MOE plans to distribute an O&M kit to each school for small-scale repairs, benefitting 30% to 40% of the schools in 2011. At the

[10] Approximately 4,240,000 yen, converted with the rate in January 2010, 1 cordoba = 3.62 Japanese yen.

[11] The committee (Comité de la Batalla por el Sexto Grado) is organized at the school (community), municipality, department, national levels, where related stakeholders participate and discuss improvement of learning environment and helping students complete primary education. The committee discusses issues and reports the prioritized needs to the upper level committee. For example, at the school level, participants are the school principal, teachers, parent representatives, a member of the president's party (Sandinista) in charge of education, members of the students' council of the secondary school, young members of Sandinista, community leaders, etc.

schools visited, nobody was informed of the kit. Even without the kit, parents and teachers do O&M using their own repair tools.

3.5.3 Financial Aspects of Operation and Maintenance

(1) Budget of the Ministry of Education

The budget and expenditure of MOE and its Infrastructure Department are shown in Table 7. In FY 2011, the budget of the Infrastructure Department decreased dramatically from the previous year. Moreover, 135.7 million cordobas earmarked for O&M for school facilities under the "National Plan for Dignified Schools (Plan de Dignificación de Escuelas a Nivel Nacional)," exceed the actual sum for FY 2010. Furthermore, according to the Department, it is planned that 10% of the subsidy from the Central Government to the municipalities (155.7 million cordobas) can be allocated to O&M for school facilities. However, MOE estimates that the budget is insufficient to cover all the identified needs in the country.

Table 7 Budget and Expenditure of MOE (million cordobas)

	2007	2008	2009	2010	2011
Budget in total	3,851	4,683	5,267	5,196	n.a.
Budget of the Infrastructure Department	n.a.	n.a.	n.a.	n.a.	205
Expenditure in total	3,593	4,519	4,283	4,873	n.a.
Expenditure of the Infrastructure Department	534	401	454	315	n.a.

(Source) MOE.

The Department and Municipal Offices of MOE do not have funds for school repair but only report (though the committee system mentioned in 3.5.1 (2)) to MOE about the prioritized needs.

(2) Current O&M at the School Levels

After the system of Autonomous Schools was abolished, the schools do not manage budgets. Each time they need facility repairs, they ask for donations or apply to MOE or the Municipal Government. (MOE does not support the removal of waste from toilets). At some schools, the parents' association asks parents for donation for repair (200-400 cordobas per year) or collects fees in the name of donation, and at other schools money (including donations) is not collected at the teachers' discretion; as such, O&M depends on each school. Also at some schools, parents provide manpower and materials such as keys and paint instead of paying in cash.

At the time of ex-ante evaluation, it was supposed that MOE would be responsible for repainting walls, fittings and blackboards and removing waste from the toilet tank and these costs would be born without problems as it was a small portion of the total budget. The fact is that, unbeknownst to the schools, the MOE pays only for the

construction of school buildings and fences and does not pay for repairs. However, the situations depends on school; there are some schools which asked MOE for purchase of paints and actually received them, and others didn't.

3.5.4 Current Status of Operation and Maintenance

(1) Current Status of the Facility

At the 24 schools visited, there are no problems which seriously hinder the class. Small problems common in more than 10 schools include: (i) light bulbs, (ii) broken light switches, (iii) locks (doors and cabinets), (iv) unstable chairs, and (v) loss of teaching materials. Compared to schools in the rural area, more problems were reported, including stones and trash on the roof, theft of lamps, window panes, and switches, and poor drainage in the lavatory. In Managua Department, materials are stolen for resale, while in rural schools food for school snacks or lunch is stolen.

The fluorescent was gone and it is replaced by a bulb because it is cheaper (Diriangén School). This is observed at other many schools.

As for the toilets, part or all was not in use, but used as garage at six schools. Regarding the use of the toilet, only one of the two basins was supposed to be used at one time while the other was covered and not used. When one tank was full of waste, the other could be used. In addition, waste needed to be dry for removal. However, the schools did not know the appropriate methods for use and removal.

With regard to the procured teaching materials, with the exception of one school, materials are stored at places where all teachers can freely access them. However, at half of the schools, small pieces of the materials are lost.

(2) Current Status of Operation and Management

The BD recommendations in regards to the constructed facilities were that the inside walls should be repainted every 10 years, the fittings should be repainted every five years, the blackboards should be repainted every two years, and the waste should be removed from the toilet tanks and cleaned every three years. The actual status is as follows (Table 8).

Table 8 Current Status of Facility Maintenance

	Conducted	Not yet conducted	Planned
Repaint outside walls (No regulation)	15 schools	5 schools	7 schools
Repaint inside walls (Once per 10 years)	16 schools	4 schools	7 schools
Repaint fittings (Once per 5 years)	0 schools	20 schools	1 schools
Repaint blackboards (Every two years)	**5** schools	**15** schools	**1** schools
Remove waste in the toilet (Once per three years)	**0** schools	**3** schools	**0** schools

(Source) Interview with principals and teachers of 24 schools.
(Note) The sum of "conducted," "not yet conducted" and "planned" doesn't equal 24 because some schools already conducted maintenance but have plans to do more maintenance, and others have not conducted maintenance and do not yet have plans to do so.

At the time of the field survey in February 2011, which was four to five years after the Project completion, it was expected that schools had repainted the blackboards and removed waste from the toilet, however, only five schools have repainted blackboards and no schools have removed waste from the toilet. As blackboards are not used in many schools, this can be one factor for not being repainted. Some schools wish to repaint the walls and blackboards in the future. No schools were aware of the maintenance schedule suggested by the BD.

At the school level, cleaning of the facilities and surrounding area is conducted as part of O&M. The frequency of cleaning and the assigning of roles for cleaning are decided at each school and all schools regularly (almost everyday) clean the school. Students are now more conscious of O&M after the facilities were constructed (Table 6). Among the 24 visited schools, janitors are employed by MOE at 20 schools. In small suburban schools janitors are not assigned. Janitors clean the facility but do not repair it.

Also, schools which suffer damages from theft have constructed high fences or arrange a security guard at night.

Summarizing the above, some problems have been observed in regards to structural and financial aspects but there are no problems which seriously hinder the class; therefore sustainability of the Project effect is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

In Nicaragua, deficient and decrepit school and classroom conditions have hindered children's enrollment, and MOE has implemented a program for improving school facilities. This Project's relevancy is high since it aims to improve the learning environment in target areas by constructing facilities for basic education in Managua Department.

Although the Project cost and period were mostly as planned, bidding failure and

unexpected price increase lead to slightly fewer classrooms being built than planned. Therefore the efficiency is fair. The learning environment is considered to have been improved based on the high appreciation expressed by school principals, teachers and students for improvements in the size of the classrooms, the use of daylight in the classrooms and the usage of desks and chairs. The effectiveness is high. O&M of the facility largely depend on the success of a new needs prioritization system and on the financial capacity of the schools and parents. Therefore the sustainability is fair.

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

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency'

- Among the current existing problems, those which can be dealt with by small-scale repair should be resolved immediately. It is recommended to give instructions to those schools on appropriate repair methods. In particular, it is necessary to disseminate information explaining the proper use of the vault toilets (latrines). When constructing and repairing the facility, it is necessary to set budget priorities in light of each school's needs in the learning environment, hygienic environment, security, etc.
- It is necessary to take measures to resolve property loss, for example by hiring security guards during the night if financially possible. If it is not possible, schools should have higher and/or sturdier fences or walls.
- It is very important to alleviate information and financial disparities among the schools and communities regarding facility repair and its application method.
- So as to maximize the effects of the Project, it is recommended to improve the learning environment (distribution of textbooks, adequate number of students in one classroom, etc.) in addition to addressing infrastructure factors such as facilities and equipment.

4.3 Lessons Learned

- It is indispensable to accurately estimate the number of the enrolled students and forecast any increases or decreases, in order to set Output targets (number of necessary classrooms, etc.). It is necessary to request accurate data from the MOE of the partner country, and at the same time make sure that the reported number of enrolled students is accurate by sampling several schools if necessary.
- Regarding construction of vault toilets (latrines), the project does not necessarily construct the same toilets for all schools. Considering and discussing the site size and financial feasibility for O&M with the implementing agency or the partner county, the project should decide whether toilets should be fixed-type as provided in this Project or mobile-type which is the standard in the partner country.

- Regarding O&M of the facility and equipment, Japanese contractors or consultants should prepare manuals which precisely include the frequency, role, method and material procurement for O&M, and share them with the implementing agency and beneficiary schools. The contractors or consultants should make sure that the school teachers, parents and staff in charge in the implementing agency are informed about O&M methods when they hand over the facilities and equipment.

Annex 1

Planned and Actual Outputs

	Plan				Actual			
	Total	Phase 1	Phase 2	Phase 3	**Total**	Phase 1	Phase 2	Phase 3
1. Outputs								
(1) Facility Construction								
Beneficiary school	**34**	14	10	10	**32**	14	8	10
Classroom	**372**	113	129	130	**275**	90	85	100
Multi-purpose room	**13**	4	3	6	**9**	2	1	6
Library	**1**	0	0	1	**0**	0	0	0
Pricipal's room / Teachers' room / Storage	**36**	12	11	13	**19**	11	2	6
Toilet (sewage)	**24**	7	7	10	**28**	8	8	12
Toilet (individual sewage)	**7**	1	3	3	**0**	0	0	0
Toilet (letrine)	**4**	3	1	0	**4**	3	1	0
(2) Equipment Procurement								
Desk and chair for pupils	**14,880**	4,520	5,160	5,200	**11,140**	3,600	3,440	4,100
Desk and chair for teachers	**516**	161	173	182	**353**	134	94	125
Cabinet (without door)	**144**	48	44	52	**76**	44	8	24
Cabinet (with door)	**408**	125	140	143	**296**	101	88	107
(3) Material Procurement								
Teaching materials	**43**	14	15	14	**37**	14	11	12
2. Period								
Work period (month)	**58.0**	19.0	19.5	19.5	**60.5**	21.5	19.5	19.5
3. Costs								
Amount in foreign currency	**0**				**313,355**	68,293	119,378	125,684
Amount in local currency	**0**				**1,272,167**	402,944	390,280	478,943
Total (million yen)	**1,672**	547	515	610	**1,586**	471	510	605

Nicaragua

Ex-Post Evaluation of Japanese Grant Aid Project
"The Project for Improvement of Basic Education Facilities
in the Department of Rivas, Boaco y Chontales"

External Evaluator: Junko Noguchi, FASID

0. Summary

In Nicaragua, deficient and decrepit school and classroom conditions have hindered children's enrollment, and the Ministry of Education (MOE) has implemented a program for improving school facilities. This Project's relevancy is high since it aims to improve the learning environment in target areas by constructing facilities for basic education in Rivas, Boaco and Chontales.

Although the Project was completed within the planned costs and timeframe, delays in the preparatory work (such as land registration), lead to slightly fewer classrooms being built than planned. Therefore the efficiency is fair. The learning environment is considered to have been improved based on the high appreciation expressed by school principals, teachers and students for improvements in the size of the classrooms, the use of daylight in the classrooms and the usage of desks and chairs. The effectiveness is high. Operation and management (O&M) of the facility largely depend on the success of a new needs prioritization system and on the financial capacity of the schools and parents. Therefore the sustainability is fair. In light of the above, this Project is evaluated to be satisfactory.

1. Project Description

Project location.
(Rivas, Boaco and Chontales)

Standard structure.
(Virgen Guadalupe School in Boaco Department)

1.1 Background

In 2004, although the national net enrollment rate at the primary education level was 82.6%, universal enrollment was regarded as difficult to reach. Also although the

completion rate of primary education increased from 36.3% in 2001 to 40.8% in 2003, it was still necessary to improve both the quality and the quantity of primary education services. Regarding school facilities, from 2001 to 2004, 2,774 classrooms were improved with donors' support. However, some schools, especially in rural areas, were still holding classes in huts, neighbor's houses, or churches. Despite the great need for improvement of school facilities: the government budget was short. Given such circumstances, this Project was planned for the rural areas of Rivas, Boaco and Chontales which had great demand for human resources and which could contribute to future industrial development[1].

1.2 Project Outline

The objective of this Project is to improve the learning environment of primary and secondary schools in Rivas, Boaco y Chontales by constructing classrooms and other facilities and procuring teaching materials for 74 target schools.

Grant Limit / Actual Grant Amount	704 million yen / 683 million yen (Phase 1[2]) 641 million yen / 622 million yen (Phase 2)
Exchange of Notes Date	June 2005 (Phase 1) June 2006 (Phase 2)
Implementing Agency	Ministry of Education
Project Completion Date	November 2006 (Phase 1) February 2008 (Phase 2)
Main Contractor	Mohri, Architect & Associates, Inc.
Main Consultant	Fujita Corporation
Basic Design	"Basic Design Study for The Project for Improvement of Basic Education Facilities in the Department of Rivas, Boaco y Chontales" Mohri, Architect & Associates, Inc., March 2005
Related Projects (if any)	"Project for Improvement of Primary Education Facilities" (1995-1997) "Project for Improvement of Primary Education Facilities: Phase 2" (1999-2002) "Project for Improvement of Basic Education Facilities in the Department of Rivas, Boaco y Chontales" (2003-2007)

2. Outline of the Evaluation Study

2.1 External Evaluator

Junko Noguchi, Foundation for Advanced Studies on International Development

[1] JICA (2005), "Report on the Basic Design Study for The Project for Improvement of Basic Education Facilities in the Department of Rivas, Boaco y Chontales."
[2] The Project activities were conducted in Rivas and Boaco for Phase 1 and in Chontales for Phase 2.

2.2 Duration of the Evaluation Study

Duration of the Study: November, 2010 – October, 2011

Duration of the Field Study: January 23, 2011 – February 6, 2011 (1st)

May 14, 2011 – May 20, 2011 (2nd)

2.3 Constraints during the Evaluation Study

There were three constraints in data collection and analysis. First, due to time constraints during the field visit, direct observation of the facilities and equipment was conducted at only 41 schools (equivalent to 67% of the total), and school teachers and parents were interviewed at only 40 schools (equivalent to 65% of the total), out of the Project's originally targeted 74 schools (actually targeted 61 schools). Therefore this study may not have uncovered all effects and issues of the Project. Secondly, the accuracy level of students' enrollment data is not high. In Nicaragua, schools became autonomous in the mid-1990s, and under the system, school management subsidies were provided to each school by MOE according to the number of enrolled students. Apparently under the autonomous system many schools padded the number of students so that they would receive more subsidies[3] (Box 1). It is possible that schools registered more students than actually existed and therefore data cannot necessarily be accurately verified. Thirdly, because there were time constraints and the procured materials were only for primary education, interviews with principal beneficiaries and verification of some evaluation points were conducted mainly for the primary evaluation level.

Interview with parents (Nicarao school in Rivas). Most participants were women, probably because the interview was done during the day.

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

3.1 Relevance (Rating: ③[5])

3.1.1 Relevance to the Development Plan of Nicaragua

At the time of ex-ante evaluation, two of the ten objectives set in "Strengthened Growth Poverty Reduction (SGPRS)" (July 2001) were: "improvement of net enrollment rate of primary education" and "decrease of illiteracy rate." These are in

[3] Interview with MOE staff.

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

[5] ③: High, ②: Fair, ①: Low.

accordance with this Project's objectives (in other words, direct and indirect effects): "increase of students' enrollment" and "provision of opportunities of social education activities." In 2005, SGPRS was revised to become the "National Development Plan." In this plan, the strategies in the education sector include: quantitative expansion, educational reform and good governance. Regarding the quantitative expansion, improvement of and increase in the number of school facilities are regarded as factors for promoting educational services and student enrollment.

At the time of ex-post evaluation, in "Education Policies 2007-2011" one of the five pillars is "improvement of education" which includes improvement of school facilities. This document describes how school facilities are necessary for accommodating more students and improving the learning environment. To promote the government`s education policies, an important guideline is completing six years of primary education. Following this guideline suggests that there is a need to provide enough classrooms and school infrastructure (such as water supply, electricity and latrines).

3.1.2 Relevance to the Development Needs of Nicaragua

At the time of ex-ante evaluation, from 2001 to 2004, 2,774 classrooms were improved (through reconstruction, renovation and extension). However, in rural areas, many schools still held classes in huts, neighbor's houses, or churches. Some schools were also incomplete in that they could not provide instruction for all six grades[6].

According to MOE estimates (2010), in addition to 500,000 drop-outs, 700,000 students were out of school at the pre-primary, primary and secondary level. Lack of adequate school facilities, like other factors, hinder student enrollment, and therefore another reason for low enrollment is the fact that schools could not provide all six grades in 18.3% of schools in urban areas and 47.0% in rural areas. Furthermore, many rural schools had no water supply and electricity[7].

At the time of ex-post evaluation, the study conducted by MOE from September to October, 2010 revealed that 13,000 more classrooms are needed to accommodate all the school-age children who are currently out of school.

3.1.3 Relevance to Japan's ODA Policy

The Country Assistance Program for the Republic of Nicaragua was prepared based on the results of policy consultations held after Hurricane Mitch in 1999. In this Program, the priority areas for poverty reduction and economic development were set as (i) agricultural and rural development, (ii) health, (iii) education, (iv) transportation infrastructure, (v) assistance for democratization and (vi) disaster prevention. Related

[6] JICA (2005)
[7] Muriel Visser-Valfrey, Elisabet Jane, Dan Wilde and Marina Escobar (2010), "Mid-Term Evaluation of the EFA Fast Track Initiative: Country Case Study: Nicaragua."

to the education sector, “assistance for improvement of enrollment rate and quality at the primary level” was planned. In Japan’s ODA Charter, a high priority is placed on the education sector as assistance for poverty reduction through human development. Especially in the sub-sector of basic education, “assistance for improvement of quality of education” is set as a priority in “Basic Education for Growth Initiative” announced at Kananaskis Summit in 2002.

Thus, this Project has been highly relevant with the country’s development plan, development needs, as well as Japan’s ODA policy; therefore its relevance is high.

3.2 Efficiency (Rating: ②)

3.2.1 Outputs

Planned Outputs in the Basic Design Study (BD) for the Japanese side included the construction of 124 classrooms for 74 schools. However, 13 schools and 22 classrooms were cut from the original plan resulting in the actual construction of 102 classrooms for 61 schools: in other words, 82.2% of the plan was implemented (Table 1). Other outputs were shown in Annex 1.

Table 1 Planned and Actual Outputs

	Planned	Actual
Beneficiary schools	74	61 (82.4%)
Classrooms	124	102 (82.2%)
Support room (also used as preprimary classroom)	61	50 (81.9%)

(Source) Project Completion Report.

One reason for the cuts from the plan in Phase 1 is that land registration for eight school areas were not completed by the deadline. Beneficiary school selection in the BD included the criteria that “there is no problem related to proprietary rights (land registration was done at the time of the BD)” and eight schools could not clear this criteria in time. According to MOE, in rural areas in comparison with urban areas, there are many cases in which proprietary rights are not clear and it can take additional time to specify the owner and for the owner to prepare necessary documents[8]. More care should have been taken when selecting beneficiary schools in regards to land registration.

In addition, a rise in material costs from the time of the BD resulted in an additional four schools being cut from the plan. After the construction started, one more school was cut from the plan because the preparatory work by the Nicaraguan side was delayed. This delay was caused by the fact that many beneficiary schools were

[8] For reference, in the similar construction project implemented prior to this Project (for Managua Department), all land registration was completed by the deadline.

not accessible during bad weather[9]. As much as possible this Project tried to cover small schools located in rural areas which in the past could not benefit from construction projects[10].

As for construction of toilets, 96 were cut from the plan (45 of the plan in total three departments, but 0% of the plan in Chontales). The reason why the cut was proportionally bigger than that of the classrooms is that the Japanese side prioritized constructing classrooms over toilets and asked MOE to construct toilets[11].

As for the Outputs by the Nicaraguan side, the plan included (i) land preparation construction; (ii) removal of existing on site structures; (iii) construction of border fences and gates; (iv) lifeline connections (such as water and electricity). As a result, as mentioned above, land registration at eight schools and the preparatory work at one school were not completed by the deadline. Also, electricity was not connected to 20 schools due to budget constraints. Except for these issues, outputs for the Nicaraguan side were produced as planned.

3.2.2 Inputs

3.2.2.1 Project Cost

In regards to the Project cost funded by the Japanese side, of the total planned cost of 1,345 million yen the actual cost was 1,305 million yen or 97% of the planned amount (Table 2).

Table 2 Planned and Actual Cost by Japanese Side

	Planned	Actual (Grant Amount)
Phase 1	704 million yen	683 million yen
Phase 2	641 million yen	622 million yen
Total	1,345 million yen	1,305 million yen
Total	1,672 million yen	1,585.4 million yen

(Source) Project Completion Report.

The Nicaraguan side, however, had a planned budget of 15 million yen (at the time of the BD), but the actual expenditure amounted to US$1,068,121 (115 million yen) [12], which drastically surpassed the estimated cost by 763%. Although a strict comparison between the original plan and the extra outputs was not possible, according to MOE, the following outputs caused the excess.

- The materials transportation and manpower costs were difficult to estimate precisely in the BD. In addition, the BD was conducted in the dry season, but the actual construction work was done in the rainy season which lead to an under-estimation

[9] Interview with Chontales Department Office of MOE. This field survey was conducted in the dry season, but some schools in mountainous areas were not very accessible. In one case a 4WD car could only reach halfway to the school (Rigoberto Mayorga Palma School in Boaco).
[10] It was the intention of the Japanese side. Interview with the personnel engaged in the Project.
[11] Interview with the main contractor.
[12] Converted with the rate at the time of the project's completion, US$1=118 Japanese yen.

of materials transportation and manpower costs.

- The border fences built around the school area were more extensive than planned.
- The Nicaraguan side built the toilets that the Japanese side had originally planned to construct.
- Sidewalks and additional classrooms were constructed, and light bulbs were procured.

The Nicaraguan side's Project costs could not accurately be calculated. The Japanese side's costs, on the other hand, were lower than planned (97% of the planned).

3.2.2.2 Project Period

The work period was estimated at 38 months for Phase 1 and 2, and was completed in 34.5 months including the detailed design, bidding procurement and construction. This was within the plan. The period of bidding and subcontracting of Phase 2 was extended by 2.5 months because the first bid ended in failure and had to be rebid. However, procurement and construction took less time than planned. In total, the work period of the Project was within the plan.

Summarizing the above, although both the project cost and period were within the plan, considering the decrease of the outputs (approximately 80% of those planned) and that beneficiary schools could have been selected more carefully, efficiency of the Project is fair.

3.3 Effectiveness[13] (Rating: ③)

3.3.1 Quantitative Effects

Indicators for measuring effects of this Project are the "expansion of the capacity of accommodating students" and the actual "increase of students' enrollment." Data for these indicators at the ex-ante evaluation in 2004 and after the completion of the Project in 2007 are shown in Table 3[14].

The proportion of sound classrooms to total classrooms was 90.4%, as some classrooms were cut from the plan as explained in 3.2.1. However, with regard to the actual operation of the facility, eight classrooms at eight schools among the 41 schools visited are not being used for primary and secondary education classes (Table 4). Considering this, the indicator falls to 86.9%.

[13] Effectiveness is scored also in the light of factors regarding Impact.

[14] Data of 2011 were not available. Staff of the three Department Offices comment that enrollment increased in 2011 at both primary and secondary levels; In Rivas, primary enrollment is stable but secondary enrollment increased. Staff of Chontales had no comment.

Table 3 Number of Constructed Classrooms and Enrolled Students before and after the Project

Indicator	Before	Target	Actual			
	2004	2008	2007	2008	2009	2010
Proportion of sound classrooms to total classrooms in beneficiary schools	106/184 (57.6%)	230/230 (100%)	n.a.	208/230 (90.4%)	208/230 (90.4%)	208/230 (90.4%)
Enrolled students at beneficiary primary schools (3 departments)	7,623	Not set	7,179	7,079	6,655	6,839
Rivas Department	1,466	n.a.	1,446	1,366	1,330	1,260
(Increase from the previous year)				-5.5%	-2.6%	-5.2%
Boaco Department	3,291	n.a.	3,176	3,056	2,743	2,925
(Increase from the previous year)				-3.7%	-10.2%	6.6%
Chontales Department	2,866	n.a.	2,557	2,657	2,582	2,654
(Increase from the previous year)				3.9%	-2.8%	2.7%
Enrolled students at beneficiary secondary schools (3 departments)	1,609	Not set	1,999	2,145	1,680	2,029
(Increase from the previous year)	232	n.a.	364	352	349	357
Boaco Department				-0.8%	-0.8%	2.2%
(Increase from the previous year)	0	n.a.	0	43	77	103
Chontales Department				--	79%	33.7%
(Increase from the previous year)	1,377	n.a.	1,635	1,750	1,254	1,569
(Increase from the previous year)				7.0%	-28.3%	25.1%

(Source) Department Offices of Rivas, Boaco and Chontales, MOE.

(Note) 230 = 106 usable classrooms which existed at the time of BD + 124 classrooms planned for construction; 208 = 106 usable classrooms which existed at the time of BD + 102 classrooms actually constructed.

Table 4 Classrooms Used for Different Purposes

Department	School	Actual Status	Reason
Chontales	1 (Fuente del Saber School)	Not in use.	Student enrollment decreased and the school itself was closed.
Chontales	2 (including Flor Esmilda Diez School)	Exclusively used for computer classes	For the computer education program, a room with security and air-conditioning was necessary, but the school had no other choice.
Rivas, Boaco and Chontales	5 including (El Carmen School)	Used for preprimary education, principal's room or garage.	Student enrollment decreased and the multi-grade class was given in one classroom.

(Source) Interview with school principals and teachers from the above mentioned schools.

As for the indicator of student enrollment, in addition to the target not being set at the ex-ante evaluation both for the primary and secondary level, the data obtained was not very accurate as explained in 2.3. Also, the necessary number of classrooms was estimated assuming an increase in the number of enrolled students but the population of school-age children did not increase as estimated. Therefore, it was not possible to verify and judge the Project effects using the indicator of enrolled students.

Box 1 Autonomous School System

In Nicaragua, the education sector was decentralized after the early 1990's with the purpose of efficiency of school management and improvement of education quality. Under this system, each school as an autonomous body received a subsidy and collected a fee and the School Management Committee independently managed school issues including hiring of teachers and janitors and small-scale repairs of the facility. However, some schools padded the number of the enrolled students to get more subsidies, so financial management became opaque. Therefore, the current administration established in January 2007 abolished this system based on the principles of free basic education.

Currently, teachers and janitors are employed by MOE and it is prohibited for schools to collect fees from the parents. The School Management Committee was formally dismissed but each school has a parents' association. In most schools, parent representatives are selected from each class or grade, and these representatives organize a parents' association, which usually has a president, vice-president, treasurer, public relations, etc.

(Source) Interview with the Vice Minister of MOE and other staff.

According to the data in table 3, at the primary level, student enrollment has decreased every year in Rivas Department, but in Chontales there is a repeating pattern of small increases and decreases. Also at the secondary level the tendency depends on each of the three departments. Comparing the national data after 2007 (Table 5), the tendency of the beneficiary schools of the three departments is deferent and the range of increase and decrease is bigger. This may be caused by frequent migration in rural areas where most parents are engaged in small-scale pastoral farming[15].

Table 5 Enrolled Students in Managua Department and the Whole County

	2007	2008	2009	2010
Enrolled students at primary and secondary levels in Managua Department				
Primary	192,766	191,434	191,423	193,223
Secondary	130,709	125,762	123,646	126,004
Enrolled students at primary and secondary levels in the country				
Primary	952,964	944,341	926,969	923,745
Secondary	451,083	446,868	443,644	458,321

(Source) Managua Department Office of MOE.

The first item worth noting is the increase in the enrollment of secondary students at some beneficiary schools in Boaco Department. This is probably because the students who had not been able to attend school or had to commute to a distant school now can attend a nearby school constructed by this Project. This increase can be considered a big impact of the Project. Also noteworthy is that as a result of additional construction of the classrooms, either all six grades of primary education are now available, or multi-grade classes have been made into single-grade classes at nine of the beneficiary schools.

[15] Interview with Chontales Department office of MOE. Other rural departments have similar situations. MOE has a program named "School Passport" to make the procedure of student transfer smooth

3.3.2 Qualitative Effects

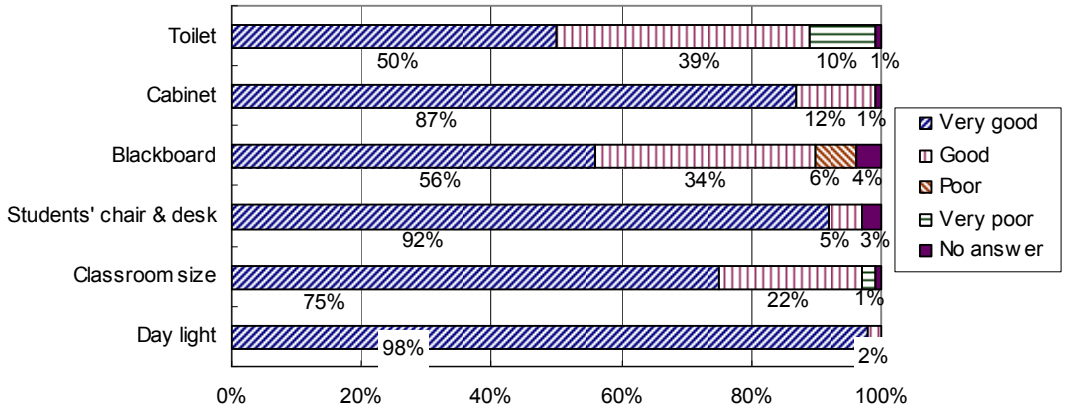
In general, with regard to the usage of the facilities, school principals, teachers and students evaluate it highly (Table 6 and Figure 1).

Table 6 Students' Evaluation of Facility Usage

	Very good	Good	Poor	Very poor	No answer
Usage of the classroom	88%	11%	1%	0%	0%

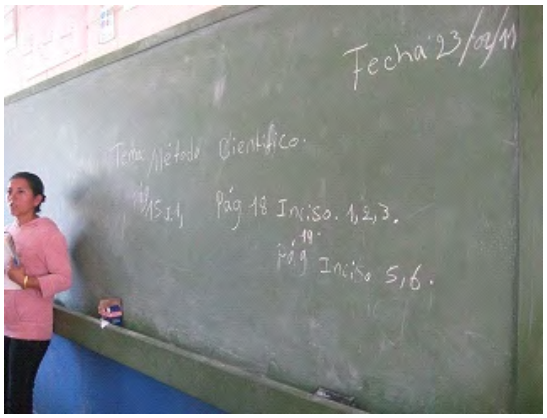
(Source) Interview with 113 students of Grades 5 and 6 at 18 schools of Rivas, Boaco and Chontales.

Figure 1 School Principals and Teachers' Evaluation of the Facility Usage



(Source) 115 school principals and teachers of 40 beneficiary schools of Rivas, Boaco and Chontales. 80 teachers evaluated the usage of the toilets.

As for the blackboards, in 14 of the 40 schools visited, they are not used. Most of the teachers who did not use the blackboard answered that chalk dust was unhealthy, and now they use the acrylic white board instead of the blackboard. Teachers who use the blackboard evaluate them highly, commenting that "they are sufficient in size and easy to use" and "students easily can look at the blackboard without light reflect." On the other hand, some say that "if they can purchase the acrylic board and pens, they prefer it[16]." With regard to the toilets, at the five schools visited, all or some are not in use. Reasons cited include: the waste level in the tank rose



Blackboards are used at more rural schools than urban schools.(Concepción de María School in Chontales). Some are well maintained.

[16] MOE says that future school construction programs may be flexible in equipment purchasing such that schools can choose either blackboards or acrylic boards, considering teachers' needs and the ongoing financial feasibility of the school to purchase supplies.

and it is dangerous, and the drain does not function properly.

In light of the above, although the accommodation capacity of the facilities is lower than planned (90% of planned or lower) due to the outputs decrease, usage of the facility itself is highly appreciated. This Project has largely achieved its objectives; therefore its effectiveness is high.

Classroom before the Project. Classes were sometimes canceled because of rain and wind (Puertas Rojas School in Chontales).

A new school improved by the Project (Puertas Rojas School in Chontales).

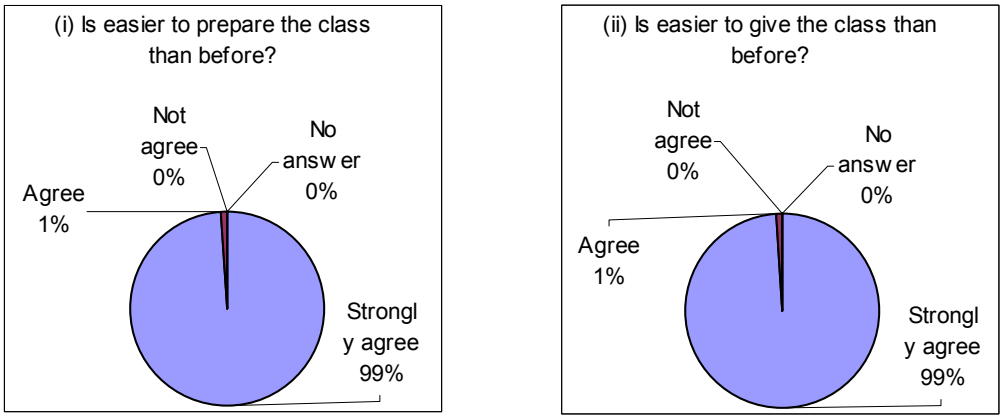
3.4 Impact

3.4.1 Intended Impacts

(1) Conduct and Contents of the Classes with Use of the Procured Equipment

The change from the pre-project period (observed by the school principals and teachers themselves) is as follows (Figure 2).

Figure 2 Change in Preparation and Conduct of Classes with the Teaching Materials Procured by the Project



(Source) Interviews with 85 principals and teachers of 40 schools of Rivas, Boaco and Chontales.

Using the teaching aid materials procured by the Project, most answered that preparation and conduct of the classes was easier than before. In addition, in more than half of the schools, textbooks are lacking and the teachers in these schools commented that the procured materials were also able to be utilized as complementary materials to the textbooks.

Students learning with a globe procured by the Project (El Silencio School in Chontales). The globe is one of the most frequently used materials.

Interviewed teachers listed maps, terrestrial globes, instruction panels for natural science and geometry kits as materials used frequently. 40 teachers explained the change in the class with uses of the materials as follows:

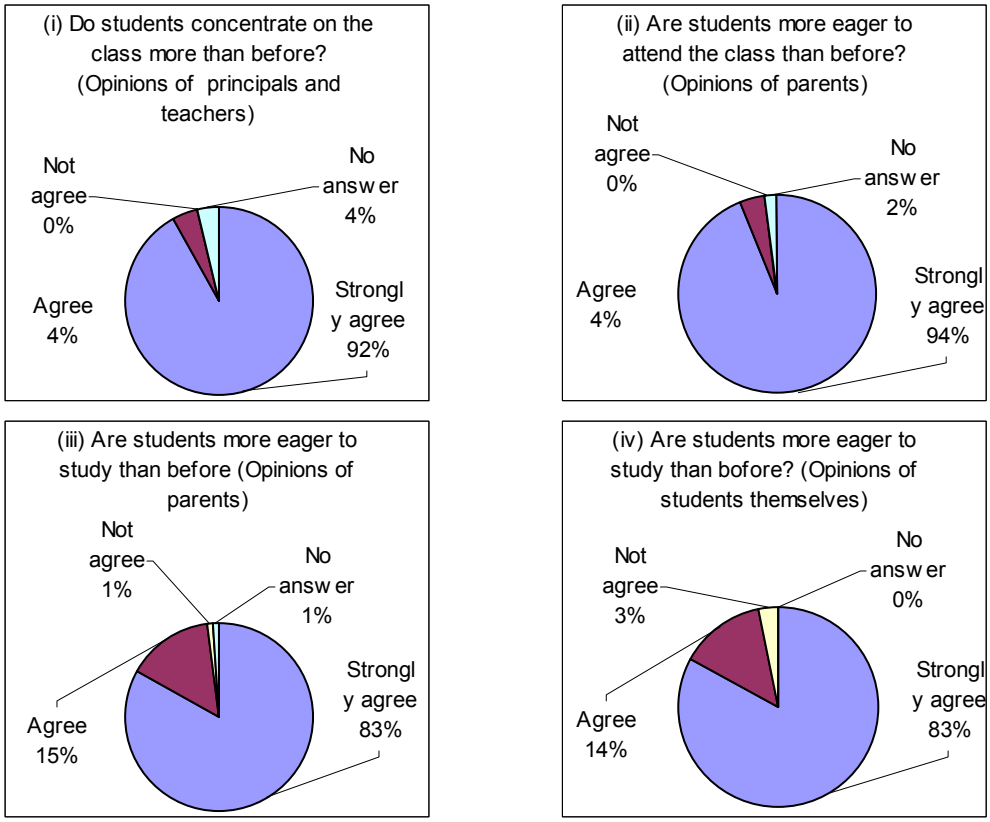
- They can now explain the theme more precisely and concretely (15 schools).
- The classes are more practical (6 schools).

In addition, some teachers commented that factors which helped them in class preparation include, "they can stay at school with security (constructed by the Project) at night during the weekdays, so the burden of commuting was mitigated" or "they can move more easily in the classroom because they now do not have to carry all their teaching materials and their baggage during the class, as they can store them in the cabinet."

(2) Students' Eagerness in Attending School and Studying

School principals, teachers, parents and students themselves realize the change in students as shown in Figure 3. Most answered that there were positive changes in the students' willingness to learn and their attitudes during the class. Although it is difficult to strictly verify the Project effects, it can be assumed that the classroom size and sufficient number of desks and chairs were highly appreciated by most teachers and students (Table 6) and procured materials partially compensate for the lack of textbooks, and made it easier to conduct classes with group exercises, which in turn motivated the students to attend the school and actively participate in the class.

Figure 3　Change in Students' Attendance and Studying



(Source) Interviews with 85 principals and teachers of 40 schools, 249 parents and 113 students of Grades 5 and 6 of Rivas, Boaco and Chontales.

Table 7　Change in the Students after the Project and Students' Evaluation of Facilities.

Change in students observed by teachers	- Students participate in the class more actively (14 schools). - Students now work together with other students in wider space (4 schools). - There is less absenteeism (6 schools). - Students became more punctual (3 schools). - Students now pay more attention to cleaning and maintenance of the facility (7 schools). - Student achievement increased (5 schools). - Students like the school more than before (2 schools). - Students are more hygienic (they use the toilet) (1 school).
Students' evaluation on the facility	- There is more space for studying and playing (11 schools). - Desks and chairs are cozy and sufficient in number (13 schools). - There is a floor, walls and roof. It's comfortable (5 schools). - The school is clean (3 schools). - The blackboard is big (2 schools). - Students from grade 1 to 6 can attend the school together (2 schools).

(Source) Interviews with 85 principals and teachers of 40 schools and 249 students of Grades5and 6 of Rivas, Boaco and Chontales.

(iii) Use of the Classrooms for Community Activities

In 90% of the schools visited, school facilities such as classrooms are used for purposes other than primary or secondary classes. It was assumed in the BD that the

facility would be utilized for adult education, literacy classes, and community activities. In addition, schools are also used for voting, shelter (in time of disaster), health activities (such as vaccination and blood donation), and training (organized by the Ministry of Agriculture or the municipality).

Box 2 Situations of Non-beneficiary Schools

Interviews were conducted at five non-beneficiary schools. The oldest classrooms were built in 1970 and the newest were constructed in 2005. Two of the three classrooms built in the 1970's were reconstructed and the other is to be renovated as a Grant Assistance for Grass-roots Human Security Project of Japanese ODA. Observation found that classrooms constructed by the Emergency Social Investment Fund (FISE) or by individual donations have almost the same structure as that of this Project: one small difference is that classrooms built for this Project have more space and ventilation. Problems cited for non-beneficiary schools relating to the maintenance and repair of the facilities are almost the same as those cited for this Project—Loss of window panes, door locks, unstable chairs, water discharge, etc.

(Source) Interview with teachers of Nicaraocalli and Rubén Darío of Rivas, Agustina Miranda Quezada and Primaria Simon Bolívar of Boaco, and Elizena Del Carmen Soto of Chontales.

3.4.2 Other Impacts

There is no positive or negative unexpected impact in particular. Land acquisition was done as planned, and there was no necessity of resettlement.

Summarizing the above, although it is difficult to strictly verify the Project impacts, compared to the pre-project period, teachers prepare and give the class more easily and students' attitude is more positive. The school facility is also utilized actively for purposes other than usual classes. No particular negative impact has been caused.

3.5 Sustainability (Rating: ②)

3.5.1 Structural Aspects of Operation and Maintenance

(1) Roles for the Facility Maintenance

Basically, cleaning and small-scale repair are done at each school, and large-scale repair such as repair or construction of fences and walls is conducted by MOE. Cleaning utensils, including brooms, are distributed by MOE every year. MOE assigns a technician to each of its Department Offices and this person also responds to repair issues that the schools cannot technically work out by themselves.

Each school tries to conduct O&M as far as it is financially and technically possible. For example, small-scale repairs such as repainting should be done by the school. However, as collecting fees from parents is officially prohibited, how the school acquires painting materials depends on each school. Disparities in O&M among schools are a small concern. In most schools, when a problem arises, the school head consults parents, and deciding who to consult next depends on the school head's

connections; some go to the principal of the "core school[17]," Department Office or Municipal Office of MOE, and others reach out to the Municipal Government. Officers of the relevant Municipal Offices answered that they sufficiently understand situations of the education sector (Box 3).

(2) School Management

According to MOE, a committee for school support was established at each level of the school, municipality, department and country[18], with the purpose of supporting students inside and outside the classroom so that they can complete primary education.

The committee at each level is convened twice a month to share issues and discuss solutions. For example, as needs in facility repair are identified at the school level, the municipal committee shares information and assigns priorities to them. In addition, the department committee examines and assigns priority to the needs identified from the several different municipal committees, and then reports to the national committee. Also, the national committee assigns priorities to competing budget items.

Box 3 Assistance towards the School Facility by Municipal Governments

Interviews were conducted at two municipal government offices of each of Rivas, Boaco and Chontales.

(i) Needs Assessment of Schools

All municipalities answer that they "adequately understands the local situations and needs," such as lack of classrooms and necessity of repair. Needs identification method depends on each municipality. Some receive a report from the Municipal Office of MOE, and others receive direct request from teachers or parents. Also, some municipalities visit schools at the beginning of the fiscal year to make investment plans for the schools.

Table Identification of School Needs by Municipalities

	Understands sufficiently.	Understands more or less.	Does not understand.	No answer.
Does the Municipality understand school needs related to facility maintenance and repair?	6	0	0	0

(ii) Budget Allocation to the Education Sector

It depends on each municipality. At municipalities which are headed by a mayor of

[17] In rural areas, depending on the school size, a group is composed of one "core school" and several "satellite schools" nearby. School principals are allocated only to core schools and then regularly visit the satellite schools to monitor their progress and and handle any issues that arise. The frequency of such monitoring visit varies, depending on the number and location of satellite schools. There is a concern as to whether or not the needs identification process for the satellite schools is equitable.

[18] The committee (Comité de la Batalla por el Sexto Grado) is organized at the school (community), municipality, department, national levels, where related stakeholders participate and discuss improvement of learning environment and helping students complete primary education. The committee discusses issues and reports the prioritized needs to the upper level committee. For example, at the school level, participants are the school principal, teachers, parent representatives, a member of the president's party (Sandinista) in charge of education, members of the students' council of the secondary school, young members of Sandinista, community leaders, etc.

[19] Approximately 250,000 to 590,000 yen, converted with the rate at the end of 2010, 1 cordoba = 3.67 Japanese yen.

Sandinista (governing party), it is recommended that 10% of the subsidy from the national treasury is allocated to the education sector. One of the six municipalities interviewed answered that it will follow this recommendation. Other municipalities say that "10% of the total budget will be to the education sector," "Allocation portion is fluid. In 2010, originally 2% was planned but in the end 10% was used for the education sector," or "the municipality has no budget but uses resources of FISE." The expenditure for the education sector in 2010 varied from 70,000 cordobas to 162,000 cordovas[19]. These were used for small-scale repair, salary for teachers, travel expenses (subsidies) for students living in remote areas.

(Source) Interviews with the Municipal Government of San Jorge and Potoci of Rivas, Camoapa and Santa Lucia of Boaco, Acoyapa and El Coral of Chontales.

(Note) According to Boaco Department Office of the MOE, some municipalities do not support the governing party plan to allocate 10% of the government subsidy to the education sector.

3.5.2 Technical Aspects of Operation and Maintenance

MOE started the Program for Identification of Needs on Infrastructure and Repair of Schools (Programa de Identificacion de Necesidades de Infraestructura y Reparaciones de Escuelas: PINRE) and has provided training to teachers and parents. Among the 40 schools visited, parents from one school in Rivas and one school in Chontales have received PINRE training, and said that "the training was useful." Two schools in Rivas have a PINRE manual. According to MOE, it has not expanded the program due to budget constraints. It is likely that more teachers and parents have received training, but that some of the teachers moved to another school or the parents' children graduated from the school, and therefore the number of the responses might be lower than the actual number.

According to the Vice President, MOE plans to distribute an O&M kit to each school for small-scale repairs, benefitting 30% to 40% of the schools in 2011,. At the schools visited, nobody was informed of the kit. Even without the kit, parents and teachers do O&M using their own repair tools.

3.5.3 Financial Aspects of Operation and Maintenance

(1) Budget of the Ministry of Education

The budget and expenditure of MOE and its Infrastructure Department are shown in Table 8. In FY 2011, the budget of the Infrastructure Department decreased dramatically from the previous year. Moreover, 135.7 million cordobas earmarked for O&M for school facilities under the "National Plan for Dignified Schools (Plan de Dignificación de Escuelas a Nivel Nacional)," exceed the actual sum for FY 2010. Furthermore, according to the Department, it is planned that 10% of the subsidy from the Central Government to the municipalities (155.7 million cordobas) can be allocated to O&M for school facilities. However, MOE estimates that the budget is insufficient to cover all the identified needs in the country.

Table 8 Budget and Expenditure of MOE (million cordobas)

	2007	2008	2009	2010	2011
Budget in total	3,851	4,683	5,267	5,196	n.a.
Budget of the Infrastructure Department	n.a.	n.a.	n.a.	n.a.	205
Expenditure in total	3,593	4,519	4,283	4,873	n.a.
Expenditure of the Infrastructure Department	534	401	454	315	n.a.

(Source) MOE.

The Department and Municipal Offices of MOE do not have funds for school repair but only report (though the committee system mentioned in 3.5.1 (2)) to MOE about the prioritized needs.

(2) Current O&M at the School Levels

After the system of Autonomous Schools was abolished, the schools do not manage budgets. Each time they need facility repairs, they ask for donations or apply to MOE or the Municipal Government. (MOE does not support the removal of waste from toilets). At some schools, the parents' associations asks parents for donations for repair (30-500 cordobas per year) or collect fees in the name of donation, and at other schools money (including donations) is not collected at the teachers' discretion; as such, O&M depends on each school. Also at some schools, parents provide manpower and materials such as keys and paint instead of paying in cash. In anyway event, there is a concern that small-scale schools may have difficulty collecting financial and material resources.

At the time of the BD, it was supposed that MOE would be responsible for repainting walls, fittings and blackboards and removing waste from the toilet tank. The fact is that, unbeknownst to the schools, MOE pays only for the construction of school buildings and fences and does not pay for repairs.

3.5.4 Current Status of Operation and Maintenance

(1) Current Status of the Facility

At the 41 schools visited, there are no problems which seriously hinder the class. Small problems common in more than 15 schools include: (i) locks (doors and cabinets), (ii) loss of or loose window panes, (iii) rust on window hinges, and (iv) paint removed from the blackboard. A few schools suffer from theft of food stored in the classroom or principal's room (with window bars broken)[20].

As for the toilets, part or all was not in use at five schools as described in 3.3.2. Regarding the use of the toilet, only one of the two basins was supposed to be used at one time while the other was covered and not used. When one tank was full of waste, the other could be used. In addition, waste needed to be dry for removal. However, the

[20] In urban areas such as Managua Department, thieves often target items that can be resold.

schools did not know the appropriate methods for use and removal.

With regard to the procured teaching materials, with the exception of one school, materials are stored at places where all teachers can freely access them. Small materials except globes or panels are stored in the box procured.

(2) Current Status of Operation and Management

The BD recommendations in regards to the constructed facilities were that the inside walls should be repainted every 10 years, the fittings should be repainted every five years, the blackboards should be repainted every two years, and the waste should be removed from the toilet tanks and cleaned every three years. The actual status is as follows (Table 9).

Table 9 Current Status of Facility Maintenance

	Conducted	Not yet conducted	Planned
Repaint outside walls (No regulation)	7 schools	33 schools	1 schools
Repaint inside walls (Once per 10 years)	8 schools	32 schools	1 schools
Repaint fittings (Once per 5 years)	1 schools	39 schools	0 schools
Repaint blackboards (Every two years)	**9** schools	**31** schools	**2** schools
Remove waste in the toilet (Once per three years)	**0** schools	**40** schools	**0** schools

(Source) Interview with principals and teachers of 40 schools of Rivas, Boaco and Chontales.
(Note) The sum of "conducted," "not yet conducted" and "planned" doesn't equal 40 because some schools already conducted maintenance but have plans to do more maintenance, and others have not conducted maintenance and do not yet have plans to do so.

At the time of the field survey in February 2011, which was three to four years after the Project completion, it was expected that schools had repainted the blackboards and removed waste from the toilet, however, only nine schools have repainted blackboards and no schools have removed waste from the toilets. As blackboards are not used in many schools, this can be one factor for not being repainted. No schools were aware of the maintenance schedule suggested by the BD.

At the school level, cleaning of the facilities and surrounding area are conducted as part of O&M. The frequency of cleaning and the assigning of roles for cleaning are decided at each school and all schools regularly (almost every day) clean the school. Students are now more conscious of O&M after the facilities were constructed (Table 7). Among the 40 visited schools, janitors are employed by MOE at six schools. In small suburban schools janitors are not assigned. Janitors clean the facility but do not repair it.

Summarizing the above, some problems have been observed in regards to structural and financial aspects but there are no problems which seriously hinder the class; therefore sustainability of the Project effect is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

In Nicaragua, deficient and decrepit school and classroom conditions have hindered children's enrollment, and MOE has implemented a program for improving school facilities. This Project's relevancy is high since it aims to improve the learning environment in target areas by constructing facilities for basic education in Rivas, Boaco and Chontales.

Although the Project was completed within the planned costs and timeframe, delays in the preparatory work (such as land registration), lead to slightly fewer classrooms being built than planned. Therefore the efficiency is fair. The learning environment is considered to have been improved based on the high appreciation expressed by school principals, teachers and students for improvements in the size of the classrooms, the use of daylight in the classrooms and the usage of desks and chairs. The effectiveness is high. O&M of the facility largely depend on the success of a new needs prioritization system and on the financial capacity of the schools and parents. Therefore the sustainability is fair.

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

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency'

- Among the current existing problems, those which can be dealt with by small-scale repair should be resolved immediately. It is recommended to give instructions to those schools on appropriate repair methods. In particular, it is necessary to disseminate information explaining the proper use of the vault toilets (latrines). When constructing and repairing the facility, it is necessary to set budget priorities in light of each school's needs in regards to the learning environment, hygienic environment, security, etc.
- It is very important to alleviate information and financial disparities among the schools and communities regarding facility repair and its application method.
- So as to maximize the effects of the Project, it is recommended to improve the learning environment (distribution of textbooks, adequate number of students in one classroom, etc.) in addition to addressing infrastructure factors such as facilities and equipment.

4.3 Lessons Learned

- It is indispensable to accurately estimate the number of the enrolled students and forecast any increases or decreases, in order to set Output targets (number of

necessary classrooms, etc.). It is necessary to request accurate data from the MOE of the partner country, and at the same time make sure that the reported number of enrolled students is accurate by sampling several schools if necessary.

- Regarding construction of vault toilets (latrines), the project does not necessarily construct the same toilets for all schools. Considering and discussing the site size and financial feasibility for O&M with the implementing agency or the partner county, the project should decide whether toilets should be fixed-type as provided in this Project or mobile-type which is the standard in the partner country.
- Regarding O&M of the facility and equipment, Japanese contractors or consultants should prepare manuals which precisely include the frequency, role, method and material procurement for O&M, and share them with the implementing agency and beneficiary schools. The contractors or consultants should make sure that the school teachers, parents and staff in charge in the implementing agency are informed about O&M methods when they hand over the facilities and equipment.

Annex 1

Planned and Actual Outputs

	Plan				Actual			
	Total	Phase 1		Phase 2	**Total**	Phase 1		Phase 2
		Rivas	Boaco	Chontales		Rivas	Boaco	Chontales
1. Outputs								
(1) Facility construction								
Beneficiary school	**74**	11	27	36	**61**	11	23	27
Classroom (large	**49**	8	21	20	**39**	8	17	14
Classroom (small	**12**	0	1	11	**10**	0	1	9
Classroom	**63**	15	18	30	**53**	15	16	22
Principal's room	**3**	1	1	1	**3**	1	1	1
Teachers' room	**8**	3	4	1	**8**	3	4	1
Complementary unit	**61**	8	23	30	**50**	8	19	23
Letrines	**176**	30	58	88	**80**	30	50	0
(2) Equipment								
Desk and chair for	**4,780**	920	1,585	2,275	**3,930**	920	1,345	1,665
Desk and chair for	**212**	41	76	95	**179**	41	66	72
Cabinet (without door)	**88**	18	36	34	**77**	18	32	27
Cabinet (with door)	**124**	23	40	61	**102**	23	34	45
(3) Material procurement								
Teaching materials	**76**	11	27	38	**61**	11	23	27
2. Perior								
Work period (month)	**38.0**	19.0		19.0	**34.5**	17.0		17.5
3. Costs								
Amount in foreign					**278.95**	143.13		135.83
Amount in local					**1,027.00**	539.93		487.08
Total (million yen)	**1,345.00**	704.00		641.00	**1,305.95**	683.05		622.90