

Ex-Post Project Evaluation 2014: Package II-4
(Antigua and Barbuda, Grenada, Nicaragua, Central America)

October 2015

JAPAN INTERNATIONAL COOPERATION AGENCY

GLOBAL GROUP 21 JAPAN, INC.

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Antigua and Barbuda

Ex-post Evaluation of Japanese Grant Aid Project

Project for Construction of Artisanal Fisheries Facilities in Barbuda

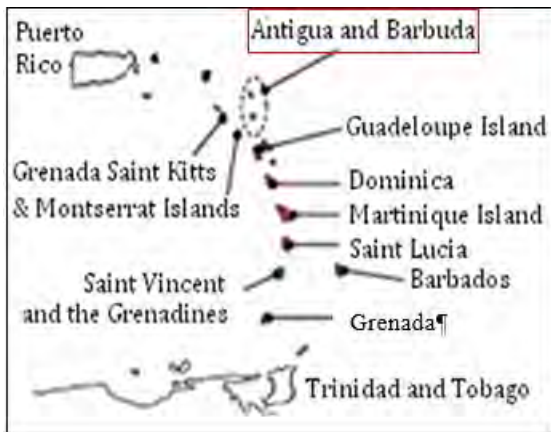
External Evaluators: Makiko Oleynikov and Kazuo Udagawa, IC Net Limited

0. Summary

This project was carried out in Barbuda Island, Antigua and Barbuda, to develop fisheries infrastructure, including a landing jetty, mooring wharf, slipway¹, and distribution facilities, such as ice making and water storage equipment. This was to improve the efficiency of its fishery sector and distribution of its marine products in a sanitary manner as an attempt to increase fishery production, thereby contributing to the development of its fishery industry by way of sustainable and effective use of its fishery resources. Both at the time of the planning and that of the ex-post evaluation, this project was highly consistent with the development policy of the country and priority areas in Japan's aid policy, and met the development needs the country had in the fisheries sector. Meanwhile, the project did not necessarily serve what local fishermen recognized as their needs, suggesting that it got started before building a firm consensus among the parties concerned. Therefore its relevance is fair. Although the project cost was within the plan, the project period exceeded the plan. Therefore, efficiency of the project is fair. The fishery facility of this project was underused, with only limited contribution made to efficiency of the fisheries sector, and utilization of the facility for landing fresh fish and/or shipping it off the island in a sanitary manner had yet to come to realization. In addition, only minor contributions were made to sustainable and effective use of fishery resources. Thus, effectiveness and impact of the project are low. In terms of operation and maintenance for this project, no specific problem has been found in technical aspects. However, the facility staffs were assigned after little consideration was given to the necessity and their competence, and there were serious problems in its operation and maintenance. In addition, some problems were observed in financial conditions of the project facility, and in maintenance of some of its equipment, therefore, sustainability of the project effects is low. In light of the above, this project is evaluated to be unsatisfactory.

¹ Slipway is a declining slope into the water from the ground on which boats are launched or removed.

1. Project Description



Project Location



The Fisheries Complex constructed under the Project in Barbuda Island Codrington area

1.1 Background

Antigua and Barbuda is an island country in the Lesser Antilles in the eastern Caribbean Sea. It consists mainly of the islands of Antigua (population: approximately 84,816²), Barbuda (population: approximately 1,625³), and the uninhabited Redonda. The country's economic structure is vulnerable for two main reasons: the national economy is readily affected by the fluctuations in the number of tourists in the country, as tourism is the nation's key industry; and the country is prone to hurricanes and other natural disasters.

The number of fishers is small in Antigua and Barbuda,⁴ and small-scale coastal fisheries are the norm. However, the vast coral sea area and the exclusive economic zone area that it enjoys point to much room for marine resources to be exploited. Queen conch⁵ is caught in large quantities in Antigua primarily for the domestic market, while lobster is abundantly fished in Barbuda, mainly for exports. Antigua and Barbuda depend on imports for about one-third of their fishery supplies because of the people's penchant for marine products and the resultant large consumption of them. In contrast, the country exports live lobsters to the neighboring French territories of Martinique, Guadelupe, and elsewhere.

Since 1997, Japan has implemented grant aid cooperation projects in fisheries for Antigua and Barbuda to support the country with the sustainable use of marine resources.⁶

² An estimate in the 2011 population and housing census for Antigua and Barbuda (by the Statistics Division, the Government of Antigua and Barbuda)

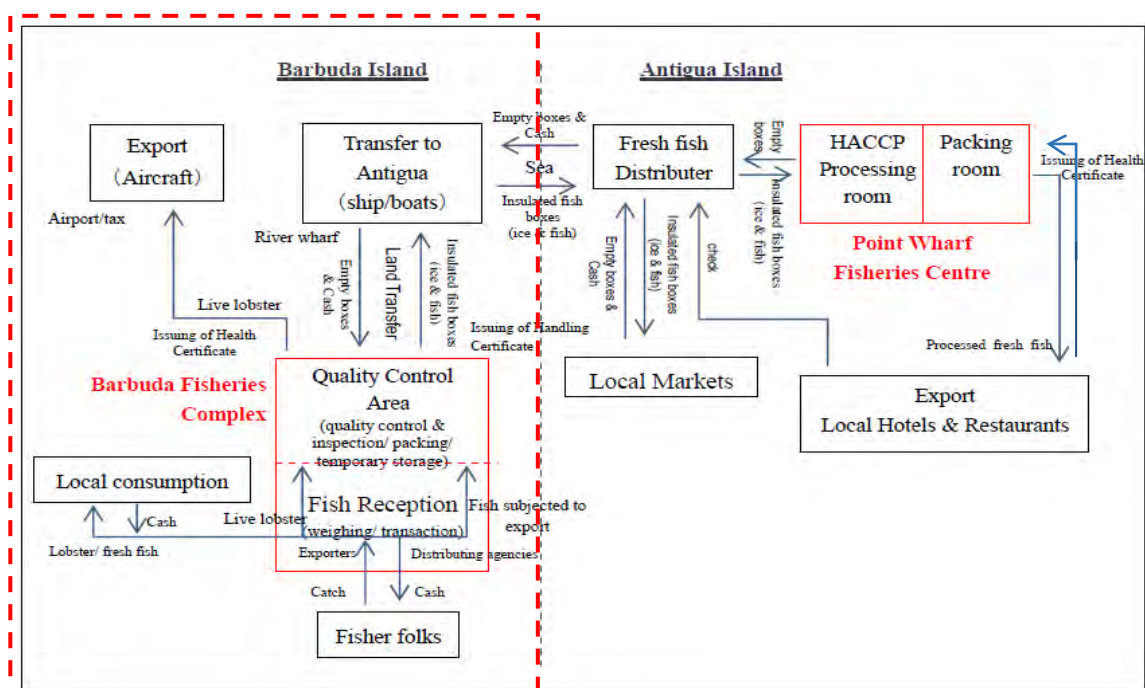
³ Ibid.

⁴ Some 900 active fishers and about 400 vessels are registered at the Fisheries Division of the Government of Antigua and Barbuda.

⁵ Queen conch, also known as pink conch or *Strombus Gigas*, is a species of large sea snail that resembles a trumpet shall and inhabits the coastal areas of the Gulf of Mexico and the entire Caribbean Sea including the West Indies.

⁶ In 1997, the project for the Construction of Fish Landing and Distributing Facilities in St. John's in Antigua and Barbuda was implemented. This was the first grant aid cooperation project by the Government of Japan in the country. This project improved the decrepit facilities for the landing, processing, distributing and selling of fish in the Market Wharf area in the capital city of St. John's, a hub for fishing activities in the country. The 1997 project was followed by the two-phased Project for Rehabilitation of

The Basic Design Study on the Project for Construction of Fisheries Development Center in Antigua and Barbuda, which was conducted in 2001 in response to a request from Antigua and Barbuda, identified two places--the Point Wharf area in Antigua and the Codrington area in Barbuda -- for the sites of the fisheries complex. This study confirmed the relevance of the plan to rehabilitate the fishing port functions and construct processing and testing facilities that conform to international sanitation standards in the Point Wharf area.⁷ It also confirmed the need to construct facilities in the Codrington area for improving the sanitation management of live lobsters for export and landing fresh fish to be shipped to Antigua Island. As shown in Figure 1, the Point Wharf facilities are designed to accept fresh fish landed at Codrington facilities.



Source: Preparatory survey report

(Note) The portion surrounded with the thick broken line is the scope of this project.

Figure 1: Relationship between the Project and the Point Wharf Facilities on Antigua Island (at the time of the planning)

Artisanal Fishery from 2000 to 2001, which constructed a fisheries complex for landing, processing, distributing and selling fish at two locations in the provinces. The subsequent request from the Government of Antigua and Barbuda for a fisheries complex at two more locations—the Point Wharf area on Antigua Island and the Codrington area on Barbuda Island—prompted JICA to conduct the Basic Design Study on the Project for Construction of Fisheries Development Center in Antigua and Barbuda in March 2001.

⁷ Exports of marine products to the territories of EU member states in the Caribbean need to meet the HACCP (Hazard Analysis Critical Control Points) requirements as stipulated by the EU. HACCP is a method for managing food safety developed by the U.S. in the 1960s. It is designed to forestall the shipment of defective products with continuous monitoring and recording at pre-identified critical points at all the processes ranging from receiving of raw materials to product manufacturing and shipment, where potential hazards can be effectively mitigated (prevented, eliminated, or reduced to an acceptable level), thereby allowing any abnormality, enabling defects to be prevented from being shipped.

It was decided that, to carry out the plan for constructing a fisheries complex at two locations as put forward in the Basic Design Study Report on the Project for the Construction of Fisheries Development Center in Antigua and Barbuda, it is appropriate to construct such a complex in the Point Wharf area first and, depending on the subsequent operational status of this complex, build a complex in the Codrington area because of limitations to the project funds, building materials, and construction period.

In 2006, the grant aid project entitled the “Project for Construction of Fisheries Center” was implemented, completing the Point Wharf Fisheries Center. Subsequently, the Japan International Cooperation Agency (JICA) conducted a preliminary study in August 2008 and a preparatory survey in May 2009, both for this project. Based on the grant agreement that was signed in June 2009 between Japan and Antigua and Barbuda, JICA implemented this project to construct a fisheries complex in Codrington on Barbuda Island.

1.2 Project Outline

The objectives of this project are to make fisheries more efficient, improve the sanitary distribution of catches, and increase fishery production in Antigua and Barbuda by developing fisheries infrastructure. This will include a fishery jetty, a mooring seawall, slipways, and distribution facilities including ice making storage equipment in the Codrington area on Barbuda Island, thereby contributing to the development of the fisheries industry in the country through sustainable use of fishery resources.

Grant Limit / Actual Grant Amount	1,328 million yen / 1,328 million yen
Exchange of Notes Date / Grant Agreement Date	June 2009 / June 2009
Implementing Agency	Fisheries Division of the Ministry of Agriculture, Lands, Marine Resources and Agro-Industries
Project Completion Date	August 2011
Main Contractor	Iwata Chizaki, Inc.
Main Consultants	Joint venture (JV) between System Science Consultants Inc. (Japan) and SENC 21 Co., Ltd (Japan)
Basic Design	July 2009
Detailed Design	—
Related Projects	<p>[Grant Aid Cooperation]</p> <ul style="list-style-type: none"> • “Project for Construction of Fisheries Center” (2003–2004) • “Project for Construction of Fish Landing and Distributing Facilities in St. John's in Antigua and Barbuda” (1997–1999) • “Project for Rehabilitation of Artisanal Fishery, Parham” (2000–2001) • “Project for Rehabilitation of Artisanal Fishery, Urlings” (2000–2001) <p>[Technical Cooperation]</p> <ul style="list-style-type: none"> • “Dispatch of Experts: Fishery Development Adviser” (1997) • “Dispatch of Experts: Fishery Development Adviser” (March 2002 – March 2004)

	<ul style="list-style-type: none"> • “Dispatch of Experts: Fishery Technician Specializing in Fishery Product Processing and Distribution” (August—December,2006; June 2007— November 2008) • “Dispatch of Experts: Fishery Technician Specializing in Fishery Product Processing and Distribution” (January 2010— January 2012) • “Caribbean Fisheries Co-Management Project” (2013–2018) <p>[Other Bilateral and Multilateral Donors]</p> <ul style="list-style-type: none"> • “Organizational Strengthening of Fisheries Administration, Construction of Codrington Fisheries Center, etc.” (Canada, 1989) • “CARICOM Fisheries Resource Assessment and Management Program” (Canadian International Development Agency and the Caribbean Community, 1991) • “Resource Management and Development Program” (Caribbean Regional Fisheries Mechanism, 2001) • “Technical Cooperation Program” (UN Food and Agriculture Organization (FAO), 2001) • “Technical Assistance Program” (Cuba, 2007)
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2. Outline of the Evaluation Study

2.1 External Evaluators

Makiko Oleynikov, IC Net Limited

Kazuo Udagawa, IC Net Limited

2.2 Duration of Evaluation Study

Duration of the Study: September 2014—July 2015

Duration of the Field Study: February 8—20, 2015; May 24—June 1, 2015

3. Results of the Evaluation (Overall Rating: D⁸)

3.1 Relevance (Rating: ②⁹)

3.1.1 Relevance to the Development Plan of Antigua and Barbuda

At the time of the planning of this project, in Antigua and Barbuda, fisheries were billed as a key industry that takes advantage of domestic resources and promotes national economic independence in the Manifesto 2004, which was formulated in 2004 as the national development policy and called for economic development through industry diversification. In addition, the Antigua and Barbuda Fisheries Development Plan 2006–2010 set out the goal of supporting the national economy with the sustainable use of resources. To achieve this goal, it called for the following: (i) developing fishery infrastructure for harvesting, distributing and selling marine products; (ii) increasing the

⁸ A: Highly satisfactory; B: Satisfactory; C: Partially satisfactory; D: Unsatisfactory

⁹ ③: High, ② Fair, ① Low

supply of animal protein by increasing catches; and (iii) improving the fishery capacity and revitalizing the activities of artisanal fishers.

At the time of the ex-post evaluation, the goal of supporting artisanal fisheries in ways to encourage the entrepreneurship of young people and increasing the number of fishers was sought among other goals of Manifesto 2014, the national development policy that the government of Antigua and Barbuda formulated in 2014. The country's Fisheries Development Strategy for 2011–2015 sets out a total of 14 measures, including making effective use of the underutilized marine resources, developing fishery infrastructure, and bolstering fishers' organizations. Therefore, this project was highly relevant to the country's development plan at the times of both the planning of this project and the ex-post evaluation.

3.1.2 Relevance to the Development Needs of Antigua and Barbuda

At the time of the planning of this project, the Codrington area on Barbuda Island, despite being a key fishery hub that accounts for 80% of the island's fishing boats, lacked both fishery infrastructure facilities such as landing and mooring facilities and slipways, and fishery auxiliary facilities such as fishing gear lockers, fishing gear sales outlets and workshops, making efficient operations difficult. A lack of facilities that allowed for proper sanitation management of live lobsters for export was raising concerns about exports to the European zone, which imposes strict sanitation standards.

It was recognized that there was much need for transporting fresh fish from Barbuda Island to the main island of Antigua, which was characterized both by great demand for high-grade fresh fish and by concerns about depleting fish resources around the island. Furthermore, it was predicted that the need for shipping fresh fish under sanitary control from Barbuda Island to Point Wharf on Antigua Island would be further increased after the Point Wharf fisheries complex began to export fresh fish to the European zone. However, fish resources remained underutilized because Barbuda Island lacked appropriate distribution facilities, making it difficult to preserve the freshness of catches. It was considered desirable to diversify fisheries that depended too much on lobster fishing with regard to sustainable use of resources. In short, there was much need for achieving efficient fisheries, sanitary distribution of catches, and fishery diversification that involves a shift from lobsters to fish at the time of the planning of this project.

At the time of the ex-post evaluation, there was a continued need for more efficient fisheries and sanitary distribution of catches for Barbuda Island. The need to diversify fresh fish catching and ship fresh fish to Antigua Island remained unaddressed even after the completion of this project. The main reason for this is that fishers of Barbuda Island have an insufficient understanding of both the Fisheries Division of the Ministry of Agriculture,

Lands, Marine Resources and Agro-Industries of Antigua and Barbuda (hereinafter referred to as “Fisheries Division”) and of the above-mentioned need that JICA predicted at the time of the planning of this project, as later explained in the subsection on project effectiveness.

Therefore, although the need to implement this project existed at the time of the ex-post evaluation in the context of promoting fisheries in Antigua and Barbuda, the need for fishery diversification that involves a shift to fresh fish catching has not been sufficiently shared by local fishers.

3.1.3 Relevance to Japan's ODA Policy

At the time of the planning of this project, fisheries, Japan’s assistance policy for Antigua and Barbuda¹⁰ stated that cooperative relations between the two countries, which share common interests in the sustainable use of marine life resources, are important for Japan, and the policy set the fisheries, fishing environment, disaster prevention, and poverty reduction as the priority sectors for Japan’s assistance for Antigua and Barbuda. In addition, the “New Framework for Japan-CARICOM Cooperation for the Twenty-first Century,” which was agreed on at the first Japan-CARICOM Ministerial-level Conference in 2000, identifies tourism, fisheries and agriculture as one of the seven priority sectors for Japan’s assistance policy for Antigua and Barbuda.¹¹ Therefore, this project is highly relevant to Japan’s ODA policy for Antigua and Barbuda at the time of it being planned.

3.1.4 Appropriateness of the Design and Approach of This Project

This project has yet to prove that it is highly effective; as described in 3.3 and 3.5, fresh fish catching has not been practiced as this project envisaged; consequently, they have not been shipped to Antigua Island or exported to the European zone. This project also faces a few major problems with its sustainability: excessive number of personnel, the employment of underqualified people, and the practical failure to collect fees from the users of the facilities. As major factors behind these problems, the following issues regarding the design and approach can be identified:

- Though a number of consultations were held during the preparation of the project, most of the local fishers have yet to fully understand the need to protect lobsters through fishery diversification. In fact, they are reluctant to embark on the full-fledged catch of fresh fish, which entails strict operational conditions and large investment in fishing gear, among other requirements; many fishers gain

¹⁰ As specified in the country-specific ODA data book of FY2009.

¹¹ The seven priority sectors are (i) good governance, (ii) poverty reduction, (iii) environment and disaster reduction, (iv) development of small and medium enterprises, (v) tourism, fisheries and agriculture, (vi) trade and investment promotion, and (vii) information and communication technology.

sufficient income from lobster fishing alone. As a result, they shy away from fresh fish catching that takes advantage of this project. In other words, the facilities are not being used as planned. When this project was being planned, the feelings of these fishers were not taken into account. It is safe to say that the feasibility of fresh fish catching was not sufficiently studied.

- The management of the facilities under this project was supposed to be undertaken by the fisheries office of the Barbuda Council under a technical cooperation scheme whereby technical staff at the Fisheries would be trained.¹² The problem is that the Council has yet to share the Fisheries Division's recognition of the purpose of and the background to this project. That includes a sense of urgency in the face of depleting resources and the critical nature of not meeting sanitation standards in the EU zone, as well as the need to collect fishery statistics and diversify fisheries¹³. Despite being part of the Government of Antigua and Barbuda, the Council is politically independent to the extent that it can make decisions and allocate the budget at its discretion. This makes it impossible for the Fisheries Division to intervene in the Council's personnel affairs and budget allocations. For these reasons, the Fisheries Division cannot interfere with the Council's personnel and budget spending, resulting in a lack of leadership on the part of the Fisheries Division has left much to be desired regarding facility management (see "3.5 Sustainability").

The basic concept of this project was defined in the basic design study report on the preceding grant aid project formally known as the Project for Construction of Fisheries Center in 2003–2004. However, despite the fact that there were [several](#) consultations with the local fishers, it was insufficient to gain their firm consent to diversify their fishing methods and the basic design study failed to take into account the autonomous nature of the Barbuda Council. It is reasonable to conclude that it was necessary to elucidate in detail the roles and responsibilities of all of the stakeholders particularly the scope of authority and responsibility of the Fisheries Division and the Council.

¹² Barbuda Island is the dependency governed by the Barbuda Council. Dependencies constitute local administrative units of Antigua and Barbuda. The Barbuda Local Government Act gives the Barbuda Council the right to manage fisheries resources within a three mile radius around Barbuda. It also allows the Council to collect all fees from fishing related activities. This would include all fees collected as a result of activities around the fisheries complex – sale of ice, rental fees, etc. Thus the island is given a high-level of autonomy.

¹³ According to an interview with the chairman of the Barbuda Council during the field study, who was the chairman of the Agriculture Committee who was in charge of the Fisheries facility for two years before assuming the Council Chairman position in March of 2015, he did not understand that an important objective of this project was to ship fresh fish under sanitary control outside the island; nor did he share concerns that the fishery facilities were underutilized.

This project was highly relevant both to the policy of Antigua and Barbuda at the times of its planning and the ex-post evaluation and to the development needs of the fishery sector. However, it is not necessarily relevant to the needs of local fishers. It could be said that this project was launched before a common recognition was adequately shared. This project was partly irrelevant to Antigua and Barbuda's development needs at the times of both appraisal and ex-post evaluation. Therefore its relevance is fair.

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

Table 1 shows the planned and actual outputs of this project. All the outputs on the part of the Japanese side have been produced as planned. Interviews with officials at the Fisheries Division and field inspections indicate no problems with the quality of the facilities and equipment, suggesting that the specifications are appropriate on the basis of the purpose of use.

The planned outputs on the part of Antigua and Barbuda include the following: gates and fences in and around the site, a power distribution line, a water distribution main, and a telephone trunk line to the site, office equipment, furniture, cleaning equipment, garbage containers, etc. within the site and planting. Of these planned outputs, beds and bedding in the accommodation rooms have not been provided. According to the head of the Fisheries Division, there was no prospect of this output being funded by government budget allocations at the time of the ex-post evaluation, although he had already requested such allocations.

Table 1: Planned and Actual Outputs

Planned	Actual
[Outputs by the Japanese side]	
<p>1. Civil works</p> <p>(1) Landing jetty: 3.5 m in width, 40 m in length (for catch landing and resupply for small fishing boats)</p> <p>(2) Mooring wharf: 3.0 m in width, 37 m in length (for mooring of small fishing boats)</p> <p>(3) Slipway: 4.5 m in width, 20 or 16 m in length (sloping tracks for pulling up small fishing boats for repairs)</p> <p>(4) Perimeter earth retaining wall: 0.9–1.9 m in height, approximately 340 m in length (protection against storm surges and wind waves from the lagoon side of the site)</p> <p>(5) On-site earth retaining wall: 1.6–1.9 m in height, approximately 220 m in length (protection of the buildings against storm surges)</p> <p>(6) Wastewater settling basin: 300 m² in area (waste water settling and purification)</p> <p>(7) On-site road and rainwater drainage channel</p>	As planned
<p>2. Building works</p> <p>(1) Administration and fish handling building: a two-story building with a floor area of 682 m² (including a space for handling fresh fish, an office room, a training room, an ice maker with a capacity of 1 ton per day, an ice house with a capacity of 2 tons, cold storage with an area of 4.8 m², and a machine room)</p> <p>(2) Fishermen support building: a one-floor structure with a floor area of 144 m² (including fishing gear lockers, a fishing gear sales outlet, and a fishing gear repair area)</p> <p>(3) Workshop: a one-floor structure with a floor area of 65m² (including a space for outboard engine repair and equipped with an emergency power generator)</p> <p>(4) Fishermen’s lavatory: a one-floor structure with a floor area of 52 m² (equipped with shower)</p> <p>(5) Wastewater treatment facility (including an aeration tank and contact processing tank)</p> <p>(6) Garbage disposal areas, building exterior, and exterior facilities</p>	As planned
<p>3. Main equipment</p> <p>(1) Fish handling equipment: an overhead crane, bin carts, platform scales and fish trays, catch sorting and inspection tables, fish pallets, insulated fish boxes, a trolley jack, and a high-pressure water floor washer</p> <p>(2) Testing and repair equipment: a water quality testing kit, repair tools, and a chain hoist</p> <p>(3) Fishermen training and administrative equipment: audio-visual equipment, meeting/class room desks, meeting/class room chairs, and a VHF marine radio</p>	As planned
[Outputs by the Antigua and Barbuda side]	
<p>(1) Gates and fences in and around the site</p> <p>(2) A power distribution line, a water distribution main, and a telephone trunk line to the site</p> <p>(3) Office equipment and furniture</p> <p>(4) Cleaning equipment, garbage containers, etc. within the site</p> <p>(5) Planting</p>	As planned except for furniture

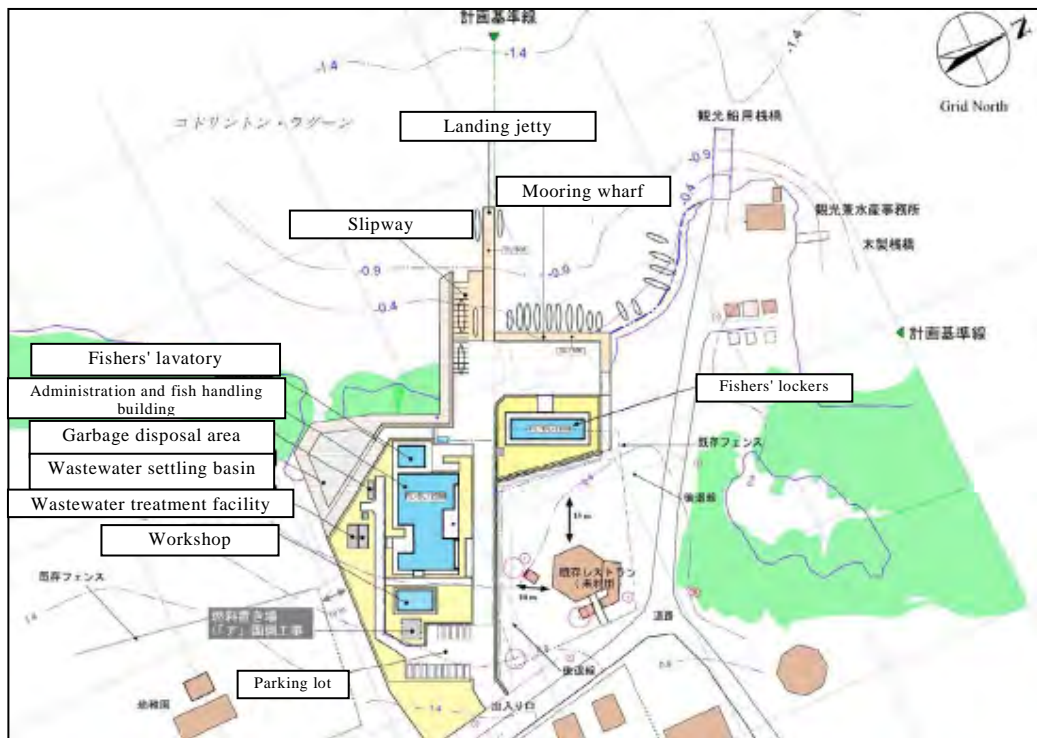
Source: Materials provided by JICA and the responses to the questionnaire by the Fisheries Division of the Government of Antigua and Barbuda



Entrance to the fish handling room of the fisheries facilities (at the time of the ex-post evaluation)



Weight measuring and individual inspection of lobsters (at the time of the ex-post evaluation)



Source: Materials provided by JICA

Figure 2: Layout Plan of the Fisheries Facilities

3.2.2 Project Inputs

3.2.2.1 Project Cost

The actual project cost was within the planned cost. While the planned total project cost was 1,340 million yen (1,328 million yen for the Japanese side and 12 million yen for the Antigua and Barbuda side), the actual cost was 1,286 million yen (1,279 million yen for the Japanese side and 7 million yen for the Antigua and Barbuda side), representing 96% of the planned cost. The actual cost on the part of the Japanese side was some 49 million yen lower than the planned figure, largely because of efficient competitive biddings. The actual

cost on the part of Antigua and Barbuda was also lower because beds and bedding for the accommodation facility have not been provided, as discussed earlier. It is estimated that the actual total project cost would have been within the planned cost even if the outputs on the part of Antigua and Barbuda had been produced as planned because the cost borne by the Antigua and Barbuda side was small.

Table 2: Comparison of the Planned and Actual Project Costs
Unit: million yen

	Planned	Actual
Japanese side	1,328	1,279
Antigua and Barbuda side	12	7
Total	1,340	1,286

Source: Materials provided by JICA and the Fisheries Division

3.2.2.2 Project Period

While the planned project period was 24 months, including the periods of the detailed design and bidding,¹⁴ the actual project period was 25 months from June 2009 to July 2011. The actual period was longer than planned, representing 104% of the planned period.¹⁵ As measured in days, the difference was only four days, with no major operational impact.

Although the project cost was within the plan, the project period exceeded the plan. Therefore, efficiency of the project is fair.

3.3 Effectiveness¹⁶ (Rating: ①)

3.3.1 Quantitative Effects (Operation and Effect Indicators)

Table 3 shows the planned and actual values of the operation and effect indicators. The effectiveness was evaluated by the use of the following operation indicators: preparation time for operation; landing time; volume of ice production; the number of sanitary certificates issued (additional indicator); the number of sanitization certificates issued (additional indicator); and the number of times of holding training for fishers (additional indicator). In addition, the volume of fresh fish transported sanitarily to Antigua Island and the export volume of live lobster (auxiliary indicator) were established as effect indicators.

¹⁴ Although the Ex-Ante Evaluation Table set the total period at 19 months, including the durations of the detailed design and bidding, the preparatory survey report set the total period at 24 months (including a work period of 19 months). The work supervision was conducted based on this 19-month period. The Fisheries Division also recognized that the work period was 19 months. It is thus reasonable to believe that the 19-month project period as stipulated in the Ex-Ante Evaluation Table actually indicated the work period only. Therefore, the external evaluators have concluded that the project period at the time of the planning of this project was 24 months.

¹⁵ The work completion date was July 6, 2011, meaning that the project lasted four days longer than the planned 24-month period that started on June 3, 2009, when the Exchange of Notes was signed.

¹⁶ Sub-rating for Effectiveness is to be put with consideration of Impact.

Table 3: Planned and Actual Values of Operation and Effect Indicators

	Baseline	Target	Actual	Actual
	2009	2013	2013	2014
	Baseline year	2 years after completion	2 years after completion	3 years after completion
Operation indicators				
1. Preparation time for operation	About 9 mins/time/boat	To shorten	—	5 of 7 fishers answered it was shortened
2. Landing time	About 19 mins/time/boat	To shorten	—	4 of 7 fishers answered it was shortened.
3. Volume of ice production (***)	0 ton/year	More than 106 tons/year	118.21 tons/year	34.34 tons/year
4. No. of health certificates issued (*)	More than 0 per year	More than 190 per year	47 per year	41 per year
5. No. of sanitization certificates issued (*)	More than 0 per year	More than 140 per year	0 per year	0 per year
6. No. of times of training for fishers (*)	1-3 times	6-8 times	8 times	10 times
Effect indicators				
7. Volume of fresh fish transported sanitarily to Antigua Island	0 ton/year	More than 19 tons/year	0 ton/year	0 ton/year
8. Export volume of live lobster (**)	44.9 tons/year (2007)	—	11.3 tons/year	11.4 tons/year

Sources: materials provided by JICA and Fisheries Division

(Notes)

- * Although these indicators are not included in the ex-ante evaluation table, some of the indicators presented at the time of the cooperation preparation survey were added as indicators for judging the effectiveness.
- ** This was added by the evaluators as an auxiliary indicator.
- *** This is an estimate based on the actual operating time and the equipment capacity.

Herein the status of use of each facility will be arranged and results analyzed will be described based on the operation and effect indicators concerning the efficiency of fisheries; the distribution of catches under sanitary conditions; the strengthening of fisheries administration; the introduction of other types of fisheries than lobster fishery; and the transport of fresh fish off the island. To measure the effect and impact of this project, a beneficiary survey¹⁷ was conducted to collect and analyze information, covering people engaged in fisheries on Antigua Island and Barbuda Island, fishers' associations, facilities workers other than fishers, retailers and wholesalers, exporters, and residents in the Codrington area.

¹⁷ Information was collected as follows: Of the 44 beneficiary fishing boats (among the boats covered by this project, those that have been registered as fishing boats at the Barbuda Fisheries Office at the time of the ex-post evaluation), the captains of ten boats were interviewed by the use of questionnaires; a group interview with fishers and owners of fishing boats, including those other than captains (32 people (31 men, 1 woman); one interview); interviews with leaders of fishers' associations on Barbuda Island (2 people; men only); an interview with a leader of a federation of fishers' associations on Antigua Island (1 person; man); individual and group interviews by type of job (10 people; 6 men, 4 women); interviews with business operators on Barbuda Island and Antigua Island by the use of questionnaires (3 people; men only); and interviews with residents in the Codrington area (21 people; 2 men, 19 women).

Table 4: Status of Use of Facilities (At the Time of the Field Survey)

Landing pier:	- Of the 35 fishing boats covered by this project at the time of the planning (44 boats at the time of the ex-post evaluation), only 7 to 9 boats use the pier (about 20% of the planned number). In addition, fishing boats whose base is in another district on the island have not used it. This is because fishers do not want to pay the charge for using the pier.
Mooring wharf:	- At the time of the field survey (in February), 80% of the fishing boats in the Codrington area were moored not on the wharf but on shores outside or far from the wharf. This is mainly because the wharf is dangerous between February and July due to strong seasonal winds or because fishers do not want to pay the mooring charge. The utilization rate of the wharf is about half of the planned rate.
Slipway:	- The slipway has not been used so much because, in rough weather, it is less time-consuming and costly for fishers to go to the uploading site by car and pull up their fishing boats than to take their boats and move them to the slipway. The utilization rate at the time of the field survey is about 30%. Because many fishers left their fishing boats along the slipway, gates were installed to restrict the utilization.
Control/handling building:	<ul style="list-style-type: none"> - It has been used three days a week when Cessna planes arrive to export lobster. Because no fresh fish is unloaded, the processing equipment has not been used for fresh fish. - Because of frequent blackouts, the ice machine and the refrigerator have been used irregularly. The generator has been installed in the building, and is used when there are blackouts. - Although the ice machine is not used so much to prevent trouble due to a change in electric voltage, trouble still occurs. The refrigerator installed for fresh fish has not been used because no fresh fish has been unloaded. - The training room has been used daily for arrangements by fisheries facilities staff. Eight to ten times a year, it is used for training that the Fisheries Division holds with NGOs concerning the conservation of resources and the environment. In addition, it is used for meetings of the Barbuda Council Agriculture Committee once or twice a month and for various public meetings.
Fisher's lockers:	- Except for the two sections used by the Fisheries Division, 21 among the 24 sections have been used in the fishers' lockers. However, charges are often in arrears. This is because the sections can be used if the charge is paid afterwards.
Workshop:	- Although the workshop has been used every day to put air into scuba tanks, it has not been used for the main purpose – repairing outboard engines. No repair equipment has been used because conditions for lending have not been established. The rental spaces for selling fishing tools have not been used because the rent is high and the demand is low.
Fishers' lavatory:	- It is used when the facilities are open (8:00 to 16:00).
Overhead crane:	- It is used about once a week to load or unload sea freight or equipment.

(1) Status of use of facilities

As shown in Table 4, it cannot be said that the facilities as a whole have been used fully. The utilization rates of the facilities for mooring fishing boats, preparing operation, landing fish, and repairing fishing boats are less than half of the planned rates. This is mainly because of the following: fishers do not want to pay charges for using facilities; some

fishing boats are not moored in the Codrington area in some seasons because of seasonal winds; and conditions for lending repair equipment have still not been established. Although the fishers' lockers have been used frequently, according to an interview with the Facility Director, charges are often in arrears. The facilities for handling goods and making ice have not been used so much because fresh fish is not unloaded, as described below. The training room has been used for the fisheries facilities staff's daily arrangements and training and for public meetings.

(2) Improvement of fishery efficiency

The preparation time for operation and the landing time were expected to be shortened by the use of the landing pier constructed by this project. With regards to "landing time" and "operation time," although quantitative data could not be gained as to how much the two indicators have been shortened, compared with the target value (to shorten), 4 of the 7 fishers using the pier answered that the preparation time for operation "shortened" and 5 of them answered that the landing time "shortened." The other fishers answered "no change." Therefore, it is fair to assume that the efficiency of fishery has improved to some extent by the use of the pier. However, the ratio of users of the pier is only 20% of the planned ratio (see Table 4), and the degree of achievement is less than 20% of all the fishing boats covered by this project (44 boats).

(3) Distribution of catches under sanitary control

In this project, catch was expected to be distributed under sanitary conditions by using ice and handling goods in a sanitary control area. The indicator "volume of ice production" was 118 tons in 2013 and 34 tons in 2014, compared to the target value of more than 106 tons/year. In 2014, ice was not produced for six months due to malfunctions. Although ice was planned to be used for fresh fish, they are hardly caught and the demand for ice is low. Ice is sold also for local people's household use. Although the refrigerator is used for fresh fish, it has not been used because there is no demand. When the Ministry of Agriculture's Chemicals and Food Technology Division examined the water in 2015, the Ministry confirmed that the quality of tap water was good.

The Fisheries Division issues health certificates when catches are exported under sanitary conditions and issues health certificates when fresh fish is transported to Antigua Island. Although more than 190 health certificates were planned to be issued per year, the actual number is 40 to 50 per year, less than 30% of the planned number. This is because the demand for the export of live lobster, which requires health certificates, decreased owing to the impact of hurricane damage on tourism in neighboring countries. In addition, with regards to the indicator "number of sanitization certificates issued," although more

than 140 sanitization certificates were planned to be issued for the transport of fresh fish off the island, the actual number is zero because no fresh fish have been transported.

Although the standards for export to the European bloc, in particular the neighboring French Caribbean countries of Martinique and Guadalupe, have become stricter, the export of lobster can be continued because facilities that meet the minimum requirements were constructed under this project. Therefore, it is fair to say that the export would have been impossible if this project had not been carried out.¹⁸ Health certificates have been issued for the facilities constructed under this project, and sanitary distribution of catches and management of some resources have been carried out.¹⁹ However, the achievement of the expected goals is limited.

Before this project was carried out, unloaded lobster were put under the scorching sun or transported after being packed simply, resulting frequently in sudden death.²⁰ Sometimes all lobsters were dead. After this project was carried out, it has been possible to pack them at an air-conditioned indoor workplace. As a result, most lobsters can be transported live, resulting in a decrease in the death rate.

In this way, this project has enabled the appropriate sanitary control of lobster and the continuation of export to the European bloc. With regard to fresh fish, however, there is no distribution of catches under sanitary conditions because of lack of landing. Therefore, the effect of this project is low concerning the distribution of catches under sanitary conditions.

(4) Transport of fresh fish off the island

This project planned that other types of fisheries than lobster fishery would be introduced to the fisheries in Barbuda Island. It was planned that fresh fish products under sanitary conditions would be transported to Antigua Island to export them to the European bloc, and subsequently, some of them would be exported to other markets.

Although this project's fisheries facilities mainly deal with lobster, there is no record about the volume of catches, and only the volume of exported lobster has been recorded.²¹ With regard to the indicator "volume of exported lobster," the volume of exported live lobster decreased from 30 tons/year in 2012 to 11 tons/year in 2014.²² This is mainly

¹⁸ Fresh fish cannot be exported until Antigua and Barbuda pass the European health authorities' inspection as to whether the country satisfies HACCP, the export standards in Europe. However, because lobster is live shellfish and its freshness must be guaranteed, it can be exported even before the inspection.

¹⁹ Lobsters that are smaller than the minimum size specified by the Fisheries Division's export standards or that are females in a breeding season are excluded.

²⁰ Lobsters sometimes die suddenly because of excessive pressure, suffocation, or exposure to tap water.

²¹ The volume of lobster consumed on the island is unknown.

²² Although conch shellfish had been caught and exported until 2012, it has not been exported through this project's facilities since 2013 because the EU's health control regulations became stricter.

because the demand for lobster from tourists to neighboring countries decreased.²³

According to interviews with such people as fishers, personnel in the Fisheries Division, and the Barbuda Council's officer in charge of fisheries, fresh fish is not unloaded by the use of this project's fisheries facilities mainly because many fishers are satisfied with the existing lobster fishery and hesitate to do coastal fisheries by reducing lobster fishery, which enables them to gain revenues without fail. Other reasons include the following: it is necessary to invest in fishing tools; the ice machine and the refrigerator often cannot be used because of unstable power supply; there is no appropriate transport means to Antigua Island; and there are no clear prospects for distribution channels and profits.²⁴

If lobster resource declines or if catches of lobster decrease as a result of fishery regulations, it might be necessary for the fishers to send fresh fish to Antigua Island and export to the European bloc to maintain their revenues from fisheries. Furthermore, wholesalers and exporters on Antigua Island are eager to deal with fresh fish from Barbuda Island, as there is demand in Antigua Island and the European bloc. Therefore, if the limitations on the ice machine, the refrigerator, and the transport disappear, and the fishers' perceptions change, there is a possibility to shift to fresh fish fishery in the future²⁵.

3.3.2 Qualitative Effects (Other Effects)

(1) Strengthening of fisheries administration, including the establishment of fisheries statistics

This project was expected to strengthen fisheries administration, including the establishment of fisheries statistics. Transactions between fishers and distributors at places for receiving goods have been recorded by handwriting. Since computers were introduced in 2014, records have been input and restored as electronic files. However, computerization of past data has been delayed.²⁶ According to interviews with the Facility Director and

²³ Other types of fisheries than lobster fisheries assumed for this project was single-day fishing trips outside of lagoons. It was planned to catch more than 19 tons per year through this project's fisheries facilities. Because no record on catches has been established, details are unknown. According to interviews with fishers, they catch fish for their own consumption and consumption on the island. In addition, an increasing number of fishers catch and sell fish when the lobster season is closed. Several of them bring their fresh fish using fishing boats or ferries to the fresh fish market held on weekends at Antigua Island. However, these fishermen spearfish. This is not suitable for transport or export because the fish is injured, devalued, and perishable. In addition, the fish is not kept under appropriate sanitary conditions. For example, scales are removed by the roadside.

²⁴ In Antigua and Barbuda, facilities in Point Wharf on Antigua Island and other facilities and equipment were constructed to satisfy HACCP sanitary standards. For the facilities to be judged as having satisfied them, it is necessary to pass the EU health authorities' inspections on both islands in the future. In addition, because a private company's ferry that had been assumed as the means for transporting fresh fish to Antigua Island sank and stopped operating, there was no appropriate transport means at the time of the ex-post evaluation.

²⁵ There is an example that when there is a market and the investment for the alternative fishing is minimum, fishers diversify their fishing, i.e. the conch fishing for export to the United States (See footnote 22).

²⁶ Computers were introduced in 2014. The records before that have been input little by little by a young technical officer of the fisheries facilities.

technical workers of the fisheries facilities, this project's staff members have been dispatched to three landing places outside of the Codrington area²⁷ upon a rotation system to ask fishers about the volume of unloaded fish.²⁸ However, data on transaction records are incomplete because of the following: it takes 20 to 30 minutes to go there; fishing boats enter ports at various times; cooperation has not been received from fishers; and the technical workers do not know how to collect data. Moreover, because the Fisheries Division's staff members visit Barbuda Island four to seven times a year, there are only limited opportunities for giving technical guidance to the local staff. Therefore, it is difficult even to manage fisheries administration appropriately. Compared with the situation before this project, when there were no fisheries facilities, it became possible to collect information, manage documents, and hold lectures for fishers continuously, showing some improvements. However, as described above, the effect of the strengthening of the fisheries administration is judged to be limited.

3.4 Impacts

3.4.1 Intended Impacts

Through the continuous effective use of fisheries resources, this project was supposed to contribute to the development of the fisheries industry in Antigua and Barbuda. Concretely, this project was supposed to contribute to a reduction in the pressure on the fishing of lobster, alleviation of the shortage of marine products on Antigua Island, promotion of appropriate management of fisheries resources, and development of small-scale artisanal fisheries on Barbuda Island through the improvement of fisheries technology, resources management, and safety management.

(1) A reduction in the pressure on the fishing of lobster

A shift from lobster fishery to other types of fisheries was expected to prevent excessive dependence on lobster resources and promote continuous effective use of resources. However, the transport of fresh fish to Antigua Island and its export to the European bloc have still not begun, and such a change has not been seen at the time of the ex-post evaluation.

(2) Alleviation of the shortage of marine products on Antigua Island

As described above, fresh fish has not been exported to Antigua Island through this project, and it cannot be confirmed that this project has contributed to the alleviation of the shortage of marine products.

²⁷ They refer to the unloading places in Coco Point, River Port, and Spanish Point.

²⁸ This refers to a survey for official unloading records to be submitted to the Fisheries Division.

(3) Promotion of appropriate management of fisheries resources

It was expected that the establishment of fisheries statistics would progress mainly at this project's facilities, and appropriate management of fisheries resources would be promoted by the use of the statistics. As described above, the establishment of fisheries statistics has hardly progressed, and such statistics have not been used for the management of fisheries resources. By contrast, because lobsters smaller than the specified minimum size and lobsters with eggs are excluded when inspection is conducted before export through this project's facilities, fishers began to strictly observe the prohibition of overfishing lobster. In this way, although the route is different from the planned one, a contribution to the sustainable use of lobster resources can be seen.

(4) Contribution to the development of small-scale artisanal fisheries

According to an interview with JICA's fisheries expert, although new type of fisheries technologies, such as floating fish reef, have been introduced on Antigua Island, the introduction of such technologies has still not begun on Barbuda Island. With regard to the management of resources, although the regulation of fisheries began with the support of an international NGO, it was confirmed as a result of a field survey that the regulation has no direct connection with this project.²⁹ With regard to safety management, according to interviews with the Facility Director, after VHF wireless equipment was installed, fishing boats that had engine failure or ran out of fuel were rescued three or four times a year.

Therefore, although this project seems to have contributed to the management of lobster resources and the safety management of fisheries, the effect of this project was not well confirmed.

3.4.2 Other Impacts

3.4.2.1 Impact on the Natural Environment

This project is an EIA project because it is accompanied by the construction of a port and wastewater treatment facilities. However, because the contents of the cooperation preparation survey report prepared by JICA are similar to those of an EIA report, the Development Management Office, which has jurisdiction over EIA, judged it unnecessary to submit an EIA report separately.

In this project's facilities, wastewater is produced from the processing of fresh fish and

²⁹ The Barbuda Council enacted the Fisheries Regulation Act based on the results of an ecosystem survey of coral reefs in 2013 with the technical cooperation of the Waite Foundation, an international NGO. The main contents of the Act are the prohibition of capturing scaridae and sea urchin, the prohibition of casting fishing nets within 65 feet of a coral reef, and the setting of two years' grace period until the prohibition of fishing within the lagoon in the Codrington area.

the toilets in the fishers support building. The facilities face a lagoon designated as a national park. Because of this, wastewater treatment facilities that satisfy the wastewater standards adopted by East Caribbean countries were constructed.

At the time of the defect inspection, because the transparency of the sedimentation basin is sufficiently high, it was judged that there was no possibility that waste and dirty water could flow into and pollute the lagoon. This situation remained the same when visual observation was made at the time of the ex-post evaluation. Because fresh fish is not processed, wastewater emissions are about a half of the planned emissions and the wastewater treatment facilities seem to have been working without any particular problem. Around the unloading place, fixed-point observation of water quality has been carried out twice a year. No marine pollution has been found so far.

Antigua and Barbuda were responsible for restoring the mangrove removed by this project. Although forestation was carried out after the completion of the facilities, it failed because goats ate the trees. Aside from this, a charity organization in Barbuda Island provides seedlings free of charge and local junior high school students are planting trees at the same place three times a year as an extra-curricular activity. Although it takes ten years to grow mangrove on a tideland, such forestation is expected to continue in the future.

No serious impact on the other natural circumstances has been found, such as accretion of sand.

3.4.2.2 Land Acquisition and Resettlement

It was confirmed from questionnaire answers and interviews with the Chief Fisheries Officer of the Fisheries Division that because the lot used for this project was public land and no resident lived there, there was neither resettlement nor land acquisition.

3.4.2.3 Other Impacts

Other positive impacts include an increase in the number of residents who use the street in front of the gate of this project's facilities and an increase in the number of customers of neighboring restaurants. Although a total of 1.3 billion yen was used for a project on a remote small island with a population of 1,625 where everyone is directly or indirectly dependent on fisheries which is one of the major industry of the Island, the direct beneficiaries were 70 fishers and 30 new employees only. The impact of this project for the other islanders does not seem to expand, except for occasional use of the training room for various public meetings. According to interviews, residents in the Codrington area and people engaged in fisheries hope for facilities that can be used for various other purposes, such as refuge from hurricanes.

No undesirable impact has been reported.

As described above, this project's facilities have not been used fully and have made limited contributions to the improvement of the efficiency of fisheries. The facilities have never been used for landing fresh fish or transporting fresh fish off the island. The establishment of fishery statistics hardly seems to strengthen the fisheries' administration. Contributions cannot be seen concerning a reduction in the pressure on the fishing of lobster or alleviation of the shortage of marine products on Antigua Island. In addition, there is only a small contribution to the development of small-scale artisanal fisheries on Barbuda Island through the improvement of fisheries technologies, resources management, and safety management.

This project has achieved its objectives at a limited level. Therefore, effectiveness and impact of the project are low.

3.5 Sustainability (Rating: ①)

3.5.1 Institutional Aspects of Operation and Maintenance

Under this project, the fisheries complex was to be operated directly by the Fisheries Division, in the same way as the other three complexes set up in the country. Specifically, under the Fisheries Division's Coordinator for Fisheries Complexes, officers of the Barbuda Fisheries Office (Fisheries Branch of the Agriculture Committee of the Barbuda Council) were intended to form an operational structure. The complex was to be assigned a facility director, a frontline manager of the fisheries facility, and eight or nine employees under him/her.

The facility director is appointed by the Barbuda Council. After two former directors were replaced for political reasons, the third director was in office at the time of the ex-post evaluation. The change of directors within a short interval resulted in lack of consistent management policy. In addition, many defects and omissions were found in the operation records for the tenure of the second director, from September 2013 to August 2014. Since being appointed in September 2014, the current facility director, a technical official, has been working to solve these problems.

At the time of the ex-post evaluation, as seen in Table 5, the fisheries facility was assigned triple the number of personnel originally planned. For the facility, all employees are selected by the Barbuda Council, which bears personnel expenses for them. An on-site inspection of their attendance revealed that there were some who had in fact failed to come to work, or had come but neglected to work, suggesting low morale. With no tool for determining on-duty hours, such as time cards, the facility pays the whole amount of wage even for days on which they fail to come. As seen in the facts that employees are

transferred and replaced by someone newly hired every time power is handed over between parties, and that technical officials who have received training at the Fisheries Division and acquired experience there to play a key role are soon forced to leave, the facility fails to assign people to positions according to their competence.

What has been described above suggests that the fisheries facility constructed under this project, in practice, is exploited by the Barbuda Council as part of its employment promotion measures. Frequent changes of the facility director and key officials, together with assignment of personnel with little consideration given to their competence, hinder them from enhancing their capacity or accumulating skills with technical assistance provided by the Fisheries Division. Under such circumstances, it is unlikely that the facility is used in a manner that suits the purposes of the project. Concerned about that, the Fisheries Division repeatedly asked the Council to take action, but the Council has yet to show any clear intention of improving the situation. As seen above, much needs to be improved in the operation and maintenance arrangements for this project.

Table 5: Fisheries Office of the Barbuda Council: Personnel Plan and Actual Results

Position	Plan	Actual (2015)
Facility Director	1	1
Assistant Director & Accounting Officer	1	1
Office clerk	1	6
Caretaker staff	1	7
Janitorial staff	1	6
Technical official	3	7
Workers	1 - 2	3
Total	9 - 10	31

Source: Data provided by JICA; Barbuda Fisheries Office

3.5.2 Technical Aspects of Operation and Maintenance

During the construction period, this project was assigned a refrigeration engineer, an employee of the Barbuda Fisheries Office. He received guidance from Japanese engineers on how to operate the equipment. As manager, the engineer has since been in charge, with no replacement, continuing day-to-day inspection and maintenance of the equipment. The Fisheries Division has a senior engineering manager in charge of the four fisheries complexes in the country. When the fisheries facility of this project undergoes a regular inspection or needs repair, he visits the facility to deal with the work, and an established system is in place for that. As the senior engineering manager has long been in charge of technical affairs for maintenance of fisheries facilities provided by JICA, and took part in training seminars in Japan, there seems to be no problem with his/her technical competence. Employees of the project facility are provided with sufficient on the job training (OJT) by

senior engineers based in Antigua Island on an as-needed basis. Manuals are kept by the refrigeration engineer mentioned above, and used by engineers of the project facility for maintenance and repair. These facts suggest that there is, and will be, no specific problem in the technical aspects of operation and maintenance of the facility and equipment, as long as the current on-site engineering managers continue to be in service.

3.5.3 Financial Aspects of Operation and Maintenance

When the plan was formed, it was supposed that electricity charges and expenses for personnel employed by the Barbuda Council for the facility would be paid by the Council, and that the other operating expenses would be shouldered by the Fisheries Division. However, interviews with the Agency and the Council have revealed the latter bears all expenses for the facility. It was also assumed that use fees and other revenues for the facility would go to the Agency, but it has turned out they are received by the Council as its income. That is, under the current financial arrangements, the fisheries facility is operated and maintained fully under the responsibility of the Council³⁰.

Table 6 shows budget spending of the Agriculture Committee of the Barbuda Council, and its Agriculture Office³¹, and Fisheries Office between 2011 and 2014. Since 2012, when this project was completed and came into full-scale operation, budget spending for the Barbuda Fisheries Office had been increasing. However, the Council has seen its financial resources squeezed in recent years with decreased income after the discontinuation of sand mining, and increased spending for hiring new public employees as part of its employment promotion measures, resulting in several-month delays in salary payment. This demonstrates that the organization faces serious challenges to address in financial aspects³².

The fisheries facility keeps accounting records in the form of paper-based ledgers and receipts, but it has no computer to input and aggregate them, and income and spending data summarized by year and/or item were unavailable. Table 7 shows income of the facility in 2012 and 2013 which the external evaluators calculated by themselves using the accounting

³⁰ Asked about what had caused the differences, the Chief Fisheries Officer who had been in charge since the preparation phase of this project until the time of the ex-post evaluation answered that the current financial arrangements had been in line with a consensus between the Fisheries Division and the Barbuda Council. She also said that she did not know why the scheme described above had been included in the cooperation preparation survey report.

³¹ In the administrative hierarchy, the Agriculture Office stands at the same level as the Fisheries Office, equivalent to the Fisheries Agency of Japan, and the two constitute the Agriculture Committee, comparable to the Ministry of Agriculture, Forestry and Fisheries of Japan.

³² The Barbuda Council is funded mainly with subsidies granted by the State. In addition, the Council has revenues such as license fees from sand mining, a major industry in the island, and tourism. However, the income has been decreasing since 2012, when sand mining was suspended because of depletion of resources, and tourism heavily suffered from hurricanes which left tourist facilities damaged. Neighboring countries have also seen their tourism sector severely hit, with decreased income from export of live lobsters.

records available³³. Most of the actual spending is recorded in written or printed form, such as receipts, which made calculation difficult to perform for both years.

Table 6: Agriculture Committee of the Barbuda Council: Budget Spending

	Actual			Forecast ³⁴
	2011	2012	2013	2014
Agriculture Committee, Barbuda Council	1,785,540	2,143,780	2,034,290	3,678,160
(1) Barbuda Agriculture Office	1,358,770	1,340,730	1,366,040	2,623,620
(2) Barbuda Fisheries Office	426,780	803,050	668,260	1,054,540

Source: Interview with the Antigua Council

Table 7: Fisheries Branch of the Barbuda Council:
Annual Income Plan and Actual Income

Item	Planned	Actual	
		2012	2013
Sale of ice for fishing	20,404	9,779	4,595
Sale of ice for fresh fish distribution	9,374		
Rent from lockers	14,400	1,505	2,600
Mooring charge	6,720	290	50
Slipway fee	1,440	0	0
Workshop lease	7,200	0	0
Lease charge from fishing gear sales floor	10,000	0	0
Health certificate issuance fee	50,000	14,032	27,479
Handling certificate issuance fees	9,500		
Others (oxygen cylinder)	—	11,810	11,810
Meeting room fee	—	0	0
Ice box use fee	—	40	40
Total (% of plan)	129,038	37,456 (29%)	46,574 (36%)

Source: (Planned) Data provided by JICA; (Actual) Calculated based on data provided by the Fisheries Division

The Barbuda Fisheries Office, which manages the fisheries facility, was forecast to spend an annual total of 394,000 EC dollars; personnel expenses of 251,000 EC dollars, electricity charges of 109,000 EC dollars, and the remaining 34,000 EC dollars for other operation and maintenance expenses³⁵. Under the plan, the personnel expenses and electricity charges would be appropriated from the Barbuda Council's budget, and the

³³ An interview with the director of the fisheries facility and inspection of books performed by the evaluators have demonstrated that there are many omissions in ledgers for the period between September 2013 and August 2014, the tenure of the second facility director, suggesting the possibility of less income having been recorded than was actually obtained. The facility income for 2014 is not indicated here because of likely under-reporting.

³⁴ The 2014 forecast is an estimate due to the fact that it has not been calculated yet.

³⁵ The other operation and maintenance expenses include those for repair, purchase of spare parts, office supplies, water-purification tanks, and water treatment-related equipment.

remaining operation and maintenance expenses would be fully paid for by the income generated by the fisheries facility (annual 129,038 EC dollars under the plan).

Actual income recorded as obtained by the fishery facility in 2012 and 2013 stands around only 30% of the plan, though it is large enough to cover “other operation and maintenance expenses.” With little deterioration seen in the facility and equipment because of low utilization, at least the field visit found no obvious lack of maintenance for the facility resulting from shortage of financial resources.

In the basic design, the income and expenditure plan mentioned fees from issuance of health and handling certificates as a main source of income. However, the low number of certificates being issued resulted in much less income than planned. Income from sales of ice also ended up being far smaller than planned, though the reason is unclear³⁶. Facility use fees, another important source of income, produced only a small amount of income as facility utilization was low, and there was trouble collecting fees from fishermen for their lockers despite their high rate of utilization³⁷. Meanwhile, the refilling of cylinders with air for scuba divers fishing lobsters turned out to be a good source of income, generating unexpected revenues.

As seen above, this project experienced no serious shortage of financial resources that might hinder maintenance of the fisheries facility, though several challenges have been found, such as lack of appropriate accounting management, and a smaller collection of charges for facility use and rents for lockers used by fishermen than planned. This leads the evaluators to conclude that the project has problems in operation and maintenance in financial aspects.

3.5.4 Current Status of Operation and Maintenance

The field study has found the landing pier, seawalls, slipways, and other facilities are well maintained. The lavatory and the administrative and fishermen assistance buildings are cleaned up daily. Lockers for fishermen, despite being in regular use, are kept in good condition, with little damage seen on them. The audiovisual equipment is used effectively, and is provided with good maintenance.

The ice-making machine experienced two breakdowns of its compressor in 2014, and was shut down for some six months in total before each was fixed. When continued fluctuations in voltage, a major potential cause of trouble, are observed, the machine is

³⁶ In 2013, for instance, the unit sales price of ice stood at around 0.5 EC dollars per kilogram, higher than planned, at 0.3 EC dollars, while the output, estimated based on operating hours, turned out to be a little larger than planned (Table 3), though sales income on the record accounted for only 15% of the plan, suggesting absence of appropriate recording and accounting.

³⁷ For a period before commencing this project, the Barbuda Council made election pledges to make the facility available for free of charge, which made it common for fishermen to refuse to pay. Despite the public commitment made by the previous administration, the Director of the facility and the Chair of the Agriculture Committee of the Council recognize the importance of collecting charges.

brought to a halt. When the field study was conducted in May 2015, both of its two cooling fans were broken, forcing the ice maker to halt operations until replacement parts were obtained. According to a senior engineer of the Fisheries Division, replacements are procured by the Barbuda Council, with support provided by the Division, which offers the Council information needed in adopting some equipment and examining suppliers, on an as-needed basis. Thus he insisted there is no problem seen in the procurement mechanism for spare parts.

As shown above, the fisheries facility of this project, despite some problems found in maintenance of the ice-making machine, is maintained in generally good condition with regard to the rest of its equipment.

In light of the above, major problems have been observed with regard to the maintenance scheme for the fisheries facility of this project. No specific problems can be seen in technical aspects, either maintenance technique or engineering personnel, but there are some challenges to address in financial aspects and in operation and maintenance of some equipment. Therefore sustainability of the project effects is low.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project was carried out in Barbuda Island, Antigua and Barbuda, to develop fisheries infrastructure, including a landing jetty, mooring wharf, slipway, and distribution facilities, such as ice making and water storage equipment. This was to improve the efficiency of its fishery sector and distribution of its marine products in a sanitary manner as an attempt to increase fishery production, thereby contributing to the development of its fishery industry by way of sustainable and effective use of its fishery resources. Both at the time of the planning and that of the ex-post evaluation, this project was highly consistent with the development policy of the country and priority areas in Japan's aid policy, and met the development needs the country had in the fisheries sector. Meanwhile, the project did not necessarily serve what local fishermen recognized as their needs, suggesting that it got started before building a firm consensus among the parties concerned. Therefore its relevance is fair. Although the project cost was within the plan, the project period exceeded the plan. Therefore, efficiency of the project is fair. The fishery facility of this project was underused, with only limited contribution made to efficiency of the fisheries sector, and utilization of the facility for landing fresh fish and/or shipping it off the island in a sanitary manner had yet to come to realization. In addition, only minor contributions were made to sustainable and effective use of fishery resources. Thus, effectiveness and impact of the

project are low. In terms of operation and maintenance for this project, no specific problem has been found in technical aspects. However, the facility staffs were assigned after little consideration was given to the necessity and their competence, and there were serious problems in its operation and maintenance. In addition, some problems were observed in financial conditions of the project facility, and in maintenance of some of its equipment, therefore, sustainability of the project effects is low. In light of the above, this project is evaluated to be unsatisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Implementing Agency

While constructed for distribution of fresh fish to promote the fisheries industry of Antigua and Barbuda, the fisheries facility of this project is not fully used for that purpose. The fundamental cause could be the lack of mutual understanding of the issues in Barbuda's fisheries sector, the necessity of the project, and operation and usage of the fisheries facility among the stakeholders. For instance, it was found that the sense of urgency regarding export of fresh fish to the EU zone as well as ideas about sustainable use of fishery resources (such as lobsters) felt by Fisheries Division of the Antigua and Barbuda government has not been fully recognized by the Barbuda Council and fishermen there. Another factor is the fact that the Fisheries Division has not necessarily been able to function effectively enough to instruct the Council to make good use of the facility.

In the light of above, under the guidance of the central government, the Fisheries Division and the Council should quickly invite stakeholders to sort out challenges they should address for the fisheries sector of Barbuda from a broad standpoint, and re-formulate plan to use the project facility in an effective manner and work together to solve the challenges. Then the Fisheries Division and the Agriculture Committee of the Council, carefully considering what they will be able to carry out with a limited budget, should formulate an action plan that specifies people in charge, budgets, priorities, and timetables by July, when the budget is compiled for the next fiscal year. It is necessary to encourage the Fisheries Division and the Council to establish a cooperative relationship in pursuit of common objectives, examining a possibility of greater authority given to the Barbuda Branch Office of the Fisheries Division for management of the fisheries facility of this project, including personnel affairs. By October, when the next-year budget comes into effect, the Division should also develop a system that enables it to work in a more responsible manner. No government budget has been authorized for beds and bedding to be used in the accommodations of the facility, though the Chief Fisheries Officer of the Division has filed applications repeatedly. The government should act more quickly to authorize the appropriation.

4.2.2 Recommendations to JICA

To support the implementing agency carry out recommendations stated above, it would be worth considering whether JICA should conduct a technical assistance project as a follow-up action by dispatching a combination of short-term technical experts in the field of organization enhancement and governance, distribution, and others. Specifically, JICA may dispatch short-term experts as part of the Caribbean Fisheries Co-Management Project, a technical assistance project now underway³⁸.

4.3 Lessons Learned

(1) Common understanding between parties concerned about operation and use of the facility, and a system for their cooperation

The project was perceived in different ways by the Fisheries Division, the Barbuda Council and the fishermen, and the Council had difficulty in operating the facility in an appropriate manner. These are two fundamental factors that hindered the facility from being used effectively and the project from producing results. When a project has different entities as an implementing agency, operator of facilities, and user, it is important to make a start on it only after these parties have reached a common understanding of what the project is for and why it is necessary, and have achieved a consensus about a system of cooperation for appropriate operation and use of the facility. When an entity highly independent of an implementing agency, like the Council for this project, is engaged in management of a facility, it is especially important that detailed assessment be conducted at the time of planning to discern whether any written agreement or other mechanism is available to ensure appropriate operation of the facility in a manner that meets the purposes of the project. This will allow JICA to determine whether the project is feasible. Also, if JICA considers at the time of planning that an implementing agency is prevented by political instability from serving appropriately to fulfill administrative functions, it should reconsider the plan in its entirety.

(2) Provision of spare parts for maintenance after construction

For this project, after the compressors failed, it took three months to obtain necessary parts, leaving the ice-making machine operations suspended during the period. Unstable electric voltage supplied by a power plant operating in Barbuda Island, may cause repeated failures of the compressors and other equipment in the facility. A generator provided as

³⁸ At the time of the ex-post evaluation, two long-term dispatch experts were working for six Caribbean states (Antigua and Barbuda, Dominica, Saint Lucia, Saint Vincent and the Grenadines, Saint Kitts and Nevis, and Grenada) to introduce to the countries the fishing of large-size pelagic fish using floating fish reefs for promoting organization of fishermen. Given their current work volume, it appears that it would be difficult for them to engage in this project.

part of this project has been brought into operation only in emergency because of operating costs. As seen here, repairs after construction may cost a recipient country much, thus offsetting benefits produced by a project. Therefore, with regards to mechanical equipment and materials that JICA provides to recipient countries, it should take into consideration that island countries have a higher concentration of salt and minerals in groundwater than others, and offer a sufficient number of spare parts for components such as compressors for ice-making machines and refrigerators, which are equipment that may fail especially frequently. It is desirable to provide enough parts to last for around six years after completion of a facility, depending on their statutory durable life.

(3) Facility planning that allows local people to make effective use of a facility

This project was carried out on Barbuda Island, an isolated island with a population of 1,625, where everyone is directly or indirectly dependent on fisheries, less than 100 fishermen benefit directly from the construction of the facility. However, a training room in the fisheries facility constructed for the project has been used for various public meetings, which indicates a growing range of beneficiaries beyond fishermen. Equipped with a power generator, strong buildings may be used as shelter and/or storehouse for disasters, granted that it meets the requirements for use as such. Communities of small-scale fishermen, prone to hurricanes and other natural disasters, generally have some vulnerability in socio-economic infrastructure, which makes it natural for local people to hope, when any facility is built, they will make the most of it for social and economic development of their community. Efforts to spread effects of a project over various areas, beyond the fisheries sector, should add to its impact on development. Therefore, before carrying out a project to construct a facility with a generator and/or a meeting room, a study should be performed to examine whether it should be designed to be available to local people for more than one purpose. Specifically, the Japanese side may well establish a common understanding that while any fisheries grand aid project should have some facility related directly to fisheries business as its central element, it may also have others that meet needs of the local community, and the understanding should be communicated to a recipient country. In addition, at the time of planning, it would be worth considering, after holding interviews with local governments, residents, and other stakeholders, whether any related facilities helpful for them, such as large-size rainwater tanks and filtering equipment, and food storage and/or radio communication facilities as a preparation for disasters, could be included in the range of the project to add more value to the project facility, promote the use of the facility, and help boost a project's development impact.

Grenada

Ex-Post Evaluation of Japanese Grant Aid Project

“Project for Improvement of the Traditional Fishing Community Infrastructure at Gouyave”

External Evaluators: Makiko Oleynikov and Kazuo Udagawa, IC Net Limited

0. Summary

This project aims at constructing a new jetty and improving the existing fisheries center and fisheries facilities and thus expanding the center’s functionality in Gouyave, the St. John parish of Grenada, increasing the fish distribution and strengthening the safety of fishing vessels, thereby contributing to the increase in food self-sufficiency and in fishermen’s income and job opportunities. This project is consistent with the country’s development policy at the national level and the Japan’s key areas of assistance in its aid policy. It is also in line with the development policy of the Ministry of Agriculture, Lands, Forestry, Fisheries & the Environment (MALFFE) and the development needs of fisheries sector. Therefore its relevance is high. Although the project period was within the plan, the project cost exceeded the plan. Therefore, efficiency of the project is fair. After the project implementation, there was a reduction in marine perils thanks to the radio communications antenna, and also a reduction of post-harvest loss¹ and ice shortage at the New Fisheries Center, thus increasing the working time and the annual handling volume of fish. This resulted in an increase in the number of fishermen and fishing boats , as well as an increase in employment opportunities. Therefore, effectiveness and impact of the project are high. Though no problems have been observed in the institutional and technical aspects of the operation and management, some minor problems have been observed in terms of the financial aspects of it. The income from receiving fish, bait storage, cold storage facilities and freezer have exceeded the planned income, while the sales of fuel, the supposed main source of the center’s income, had not commenced at the time of the ex-post evaluation, leaving the facility without a stable revenue. Therefore sustainability of the project effects is fair. In light of the above, this project is evaluated to be satisfactory.

¹ A loss after the landing of fish.

1. Project Description



Project Location



New Fisheries Center after Rehabilitation

1.1 Background

Grenada belongs to the Antilles Islands of Caribbean, home to a population of 110,000², with a territorial area of 334 km² (about half of Sado Island) and many volcanoes³. Alongside wheat, spices such as nutmegs, fish is one of its main exports. The import and export value of fish is almost the same. The government of Grenada has paid much attention to its rich marine resources, and from the late 1980s has utilized it effectively and in a sustainable manner to improve people's nutrition, increase food self-sufficiency, promote exports, as well as increase job opportunities and fishermen's income. From 1989 to 2002, the Japanese government carried out four grant aid projects to support Grenada's development of the fishing industry. However, all fisheries facilities were damaged heavily by the hurricane⁴ of 2004.

The village of Gouyave of St. John parish in Grenada Island has been a traditional fishing community for over 300 years, and it is the largest traditional fishing village in the country. Among the 45 landing sites in the country, there are seven managed⁵ by the Fisheries Division of the MALFFE. Gouyave ranks first in these landing sites on the west coast, with 15% of the national fish catches. However, due to the 2004 hurricane, the facility in Gouyave was heavily damaged as those in other areas, and was suffering from the lack of ice-making machines, poor location of the fish market and difficulties in the berthing of small fishing boats.

According to the basic design study conducted by JICA (2008), the fishing industry in Gouyave had shifted from coastal fishery to pelagic fishing, but the existing facilities had

² Grenada Statistics Department (2007).

³ Grenada is comprised of the island of Grenada with its six parishes, and its dependencies of Carriacou and Petite Martinique which are all part of the Grenadines archipelago. Grenada is located in the southernmost part of this archipelago.

⁴ Hurricane Ivan of September, 2004, had the largest force of all of the tropical cyclones in recent years. It had hit Grenada leaving 39 people dead and damaging over 90% of the houses.

⁵ Ice-making machines, sales booths and processing areas are furnished in Grenada's main landing sites.

not been renovated to accommodate this shift. In addition, there were no wireless facilities to support the offshore fishing boats important to ensure their safety. The lack of freezer facility had caused 10% loss of fish catches. It was extremely urgent to improve the fisheries facilities in Gouyave. In response to those conditions, this project was implemented to construct a new jetty and related facilities, as well as renovate the existing fisheries center.

1.2 Project Description

This project aims at constructing a new jetty and improving the existing fisheries center and fisheries facilities and thus expanding the center's functionality in Gouyave, the St. John parish of Grenada, increasing the fish distribution and strengthening the safety of fishing vessels, thereby contributing to the increase in food self-sufficiency and in fishermen's income and job opportunities.



Figure 1: Location of Fisheries Center and Antenna Tower of the Project (Grenada)

Source: Materials provided by JICA

Grant Limit / Actual Grant Amount	1,170 million yen/ 1,168 million yen
Exchange of Notes Date (/Grant Agreement Date)	December, 2009/ December, 2009
Implementing Agency	Fisheries Division of Ministry of Agriculture, Lands, Forestry, Fisheries & the Environment
Project Completion Date	October, 2012
Main Contractor(s)	TOA Corporation
Main Consultant(s)	ECHO Electric Co., Ltd.
Basic Design	August, 2009
Detailed Design	-
Related Projects	<p>【 Technical Assistance: Dispatch of Experts 】</p> <ul style="list-style-type: none"> • “Fisheries Development” (1990) • “Fisheries Technical Guidance”(1990) • “Management and Distribution of Fish” (1995) • “Aquatic Resources and Fisheries Technology” (2000) • “Treatment and Distribution of Fisheries Products” (2006) <p>【 Grant Aid 】</p> <ul style="list-style-type: none"> • “Coastal Fisheries Development Project” (1989) • “St. George's Artisanal Fisheries Complex Project” (1994) • “Construction of Melville Street Fish Market” (1999) • “Project For Improvement of Fish Marketing For Grenville” (2002) <p>【 Projects by Other Institutions 】</p> <ul style="list-style-type: none"> • “Small-Scale Restoration Work” (United States Agency for International Development and Canadian International Development Agency, 2004) • “Grant Aid and Equipment Assistance” (United Nations Food and Agriculture Organization, United States Agency for International Development and Canadian International Development Agency, 2004)

2. Summary of the Survey

2.1 External Evaluator

Makiko Oleynikov (IC Net Limited)

Kazuo Udagawa (IC Net Limited)

2.2 Duration of the Evaluation Study

Duration of the Survey: November, 2014—October, 2015

Duration of the Field Survey: February 20—March 3, 2015 and June 1—4, 2015

3. Results of the Evaluation (Overall Rating: B⁶)

3.1 Relevance (Rating: ③⁷)

3.1.1 Relevance to the Development Plan of Grenada

The National Strategic Development Plan of Grenada (2007) sets fish as an important part of the primary industry of the country. The fisheries sector is to be developed in order to increase people's income, food self-sufficiency, foreign trade income as well as employment rate. In addition, the Fishery Development and Management Plan published in 2002 stated "to promote the construction of fisheries facilities that is both comprehensive and appropriate, and to develop human resources."

The country's "Growth and Poverty Reduction Strategy (2014 – 2018)" at the time of the ex-post evaluation, indicates that two thirds of the nation's population is impoverished, and among them, more than half of them engage in agriculture, fishery and infrastructure construction. Thus fisheries sector was very important to generate job opportunities. On the other hand, the "Grenada National Strategic Development Plan Updated (2012 – 2017)" showed that fish had surpassed nutmeg⁸, and has become one of the country's main exports. As such, fishery along with tourism were the most important sectors for economic growth and poverty reduction. In addition, the MALFFE "Corporate Plan (2015 – 2017)" in accordance with Grenada's new economic target stipulates that guarantying fish quality, protecting and managing fishery resources, prohibiting illegal, unreported, and unregulated fishing, strengthening fishermen's association, building fishermen's capacity should be given priority so as to increase job opportunities, earn foreign currency through fish exportation, reduce poverty and ensure food security.

In sum, this project that aims at promoting traditional fishing is highly relevant to country's development policy both at the time of the planning and the ex-post evaluation.

3.1.2 Relevance to the Development Needs of Grenada

According to the plan, there was a great need to improve the fisheries center in Gouyave because of the damage to the jetty by hurricanes and because of aging to the facility. Although measures to prevent marine accidents were undertaken according to the "Fisheries (Fishing Vessels Safety) Regulations (1990)", the fishing boats in the Gouyave area mostly worked beyond the VHF wireless communication range. 16 accidents had occurred in five years caused by loss of contact in these areas. Therefore, there was a great need to construct a wireless facility and furnish equipment.

⁶ A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

⁷ ③: High, ②: Fair, ①: Low

⁸ As of 2004, the export volume of nutmegs of Grenada ranked second in the world. The hurricanes in September, 2004 and 2005 severely damaged these trees (80%), causing its export to decrease by 70% from the year before. From 2004 to 2009, the proportion of fish products exported increased from 18.9% to 44.6%, while that of nutmegs decreased from 61.0% to 29.7%.

After rehabilitation, the Gouyave Fisheries Center ranks third in terms of volume in the landing sites in Grenada. It is expected that fresh tunas caught there will be exported to the United States as well as be distributed to the domestic market as a superior quality animal protein. The export of fish requires sufficient ice and hygienic processing, so these facilities should be fully utilized to ensure profits to the fishermen⁹. The stable supply of ice keeps the fish fresh, thus allowing longer fishing hours at sea. It is particularly important to ensure the safety of vessels which have been equipped with VHF wireless communication devices. This project has been highly relevant to the country's development needs from the time of the planning and to the ex-post evaluation.

3.1.3 Relevance to Japan's ODA Policy

According to Japan's aid policy¹⁰, Japan shares common interests in the sustainable use of marine biological resources and Grenada's cooperative relationship is very important to Japan. Japan has been providing assistance mainly through technical cooperation, grant aid for fishery, and grant aid for grassroots human security projects. Since 1989, Japan has implemented four grant aid projects and dispatched experts to Grenada's fishery sector. This project serves as an extension to the previous line of assistance. This project has been highly relevant to Japan's ODA policy.

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

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

Table 1 shows Japan's plan and its actual implementation of the project. Everything was carried out as planned, except for the expansion of the bait room. With the popularization of beach seine fishing and pelagic fishing there is a higher demand for storage of baits. So the expansion of bait storage is an appropriate modification to the plan. No quality issues of the facility have been observed either through interviews with the Fisheries Division and the site visit. The design of the facility is appropriate for the usages and objectives planned.

⁹ Refers to fishermen and exporters.

¹⁰ Japan's ODA Data by Country (2009).

Table 1: Planned and Actual Outputs

Plan	Actual
1. Jetty: (1) Foundation and structure: steel pipe pile (coated for anti-corrosion); berth: 45m x 9.0m; access: 38m x 4.88m	As planned
2. Outside structure and others: (1) Landfill project (900m ²) (2) Revetment and retaining wall (100m) (3) Park and passageway (4) Demolition of exiting jetty	As planned
3. New Fisheries Center Building: One building (two floors for one part); structure: RC structure (total usable area of 1,110.52m ²) Facilities: (1) Ice-making machine (4 tons/day) (2) Ice storage(10 tons) (3) Freezers (quick-freezer: 17m ³ ; freezing vault 87m ³ ; slow freezing vault: 117m ³) (4) Cold storage 38m ³ (5) Bait storage 43m ³ ; vending machine: 10 sets (sink for washing fish attached), demolition of some parts in fisheries center	1~4 As planned 5. Expansion of bait storage (from 43m ³ to 58m ³ ; 15 m ³ added)
4. Workshop Building: one building; structure: RC Structure (an usable area of 27.04m ²), Demolition of part of existing fisheries center building	As planned
5. Building: four buildings; Structure: RC Structure (an usable area of 34.44m ²)	As planned
6. Waste water treatment Facility: one set; structure: purification tank (volume of sewage: 5.93m ³ ; BOD concentration : 20mg/L)	As planned
7. Specialized Communication Facilities: (1) Antenna tower: one (height: 55.0m) (2) two Repeater sheds (office building, generator, warehouse building) RC structure (one generator)	As planned
8. Equipment: (1) Forklift: one (carrying capacity of 1 ton) (2) Truck with the crane: one (vehicle weight of two tons and elevating capacity of 1 ton)	As planned

Source: Materials provided by JICA and answers provided by the Fisheries Division of Grenada



Freezer in the New Fisheries Center (at the time of the Ex-Post Evaluation)



Antenna Tower at Grand Etang (at the time of the Ex-Post Evaluation)

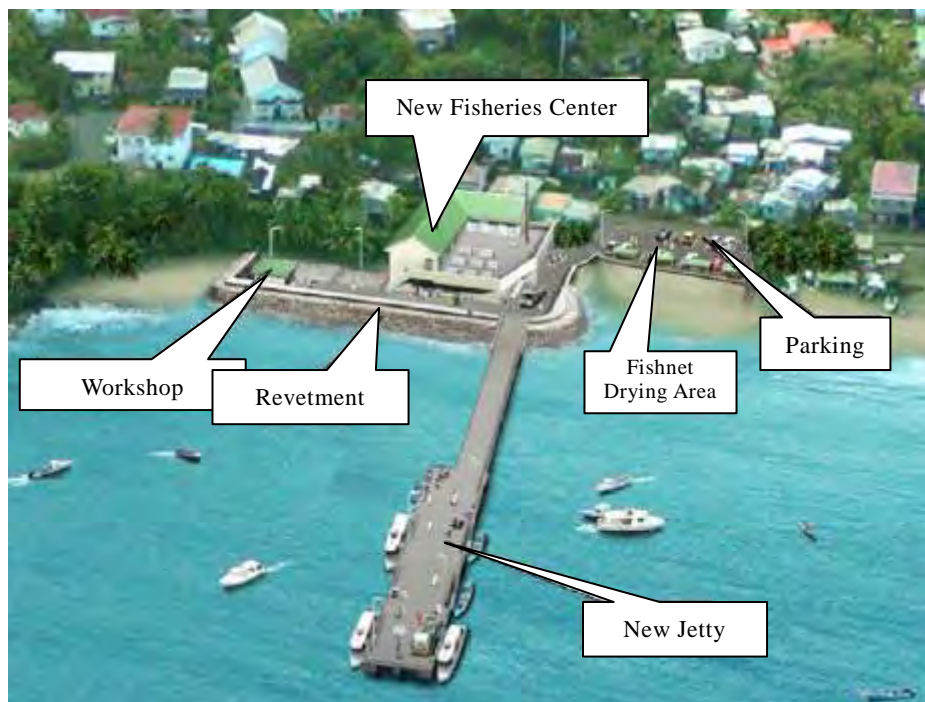


Figure 2: Diagram of the New Fisheries Center

Source: Materials provided by JICA

3.2.2 Project Inputs

3.2.2.1 Project Cost

Table 2 depicts the planned and actual cost of the project. The total planned project cost was 1,181 million yen (with 1,169 million yen undertaken by Japan and 12million yen by

Grenada). The actual cost was 1,188 million yen (with 1,169 million yen undertaken by Japan and 19million yen by Grenada), which slightly exceeded the planned cost (101% of the planned cost). The main reason for this increase was due to the fact that the Grenada government decided to construct a fortified fuel tank as opposed to the one in the basic design study, as the facility was near the shore and had to be protected against hurricanes. This facility was an obligation shouldered by the Grenada government. This modification increased the actual value to three times that of the planned value.

Table 2: Planned and Actual Project Cost

	Planned	Actual
Japan	1,169 million yen	1,169 million yen
Grenada	12 million yen	19 million yen
Total	1,181 million yen	1,188 million yen

Source: Materials provided by JICA and answers to the questionnaire provided by the Fisheries Division

3.2.2.2 Project Period

The project was planned to be completed within 23 months, from January, 2010 to November, 2011 which included the time for detailed design and bidding. The actual duration of this project is from December 22, 2009 to November 21, 2011(23 months in total). The project period was as planned.

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

3.3 Effectiveness¹¹ (Rating: ③)

3.3.1 Quantitative Effects (Operation and Effect Indicators)

Table 3 depicts the planned and actual results of the operation and effect indicators. The operation indicator of the project is “Level of Ice Output” and effect indicators are “Postharvest Loss,” “Annual Handling Capacity,” and “Distance of Radio Wave.”

¹¹ Sub-rating for Effectiveness is to be put with consideration of Impact.

Table 3: Target and Actual Value of Operation and Effect Indicators

Indicator	Baseline 2007 Baseline	Target 2014 3 Years After Completion	Actual		
			2012, 1 Year After Completion	2013 2 Years After Completion	2014 3 Years After Completion
Operation Indicator					
1.ice production capacity (annual average production capacity)	1.1 tons/day	4.0 tons/day	4.0 tons/day	3.4 tons/day	2.0 tons/day
Effect Indicator					
2. postharvest loss	61,977 lbs/year	Decreases	0 lbs/year	0 lbs/year	0 lbs/year
3. annual handling capacity	428,782 lbs/year	Increases	517,155 lbs/year	488,523 lbs/year	488,580 lbs/year
4. distance of radio wave reached at offshore	0 mile	90 miles	100 miles	100 miles	100 miles

Source: Materials provided by JICA and the Fisheries Division

*1lbs (pound) = about 0.45kg, 1 mile = about 1,609.34m

(1) Solutions to the Ice Shortage

Before the implementation of this project, the existing fisheries center needed to buy ice from other landing sites 20km away, because the ice machine was damaged by the hurricanes and the ice-making ability had deteriorated. The operational duration of five middle-sized fishing boats in Gouyave is three to four days, but fishermen had to give up working because of the ice shortage, thus negatively impacting the fish caught in the region. In order to provide sufficient ice even in the peak season, the ice-making machines with a daily production of four tons with the storage of ten tons maximum were constructed. These prevented non-fishing days due to ice shortage. In addition, the New Fisheries Center is only about a 45-minute drive to nearby landing site, and had the capacity to provide ice in surplus for landing sites where the machines are broken.

Two years after of the completion of the New Fisheries Center, one of the two ice machines broke¹² as its lubricating oil burned up in October, 2013, where with its daily output decreased to two tons per day. When the ex-post evaluation was carried out in May, 2015, it was not repaired yet and its daily output remained at the two tons. Since the ice machine breakage, some fishermen in Gouyave during the peak season have had to buy ice from the head office of the fish export company, or from Spice Isle or at Southern Fishermen's Association, both 10km away from the other landing sites. In an interview with the fishermen from the Waltham landing site in the west of Grenada, the fishermen said that even though it takes time, the purchase of ice at the Gouyave Fisheries Center did not affect their fishing. The broken ice machine will be replaced through a grant aid project on provision of equipment from the Japanese people. At the beginning of 2016, its

¹² It has been confirmed that the machine breakdown did not result from human error, but rather from the machine itself.

full ice-making capacity will be restored to four tons per day¹³. Therefore, the target value of the project has been mostly achieved.

(2) Decrease in Postharvest Loss

Before this project, there were no specialized cold storage facilities and freezers for fishes. With the limited ice-making ability, over 10% of fish catches would be wasted. Even more would be wasted in the peak season, so fishermen had to control the number of times they went fishing.

After the implementation of this project, the remaining fish due to good harvest or poor sales could be frozen or put into cold preservation, thus reducing waste and decreasing the postharvest loss down to zero. Therefore, the objective of zero post-harvest loss was fully achieved.

(3) Improvement in Annual Fish Handling Capacity

As for the annual fish handling capacity, prior to the project, the lack of ice-making facilities in Gouyave caused great postharvest loss, leading to stagnated landing and shipment of products during peak season. It also frequently decreased the freshness of fish.

The annual fish catch in Gouyave was 430,000 lbs. before the project (2007), while the number continued to increase between 490,000 to 520,000 lbs. within three years (2012 to 2014) after the project completed. The average annual fish catch was 500,000 lbs., a 16% increase compared with that of 2007. According to the beneficiary survey¹⁴, 20% of the fishermen increased their daily work hours, while another 20% increased their annual work days after the project. Therefore, the establishment of distribution and ice-making reduced the limit of landing, shipment and fishing times as well as postharvest loss. The objective of improving annual handling ability was achieved.

¹³ The Fisheries Division did not receive the budget to repair the compressor from the MALFFE, so it solicited assistance from the Japanese government. In September, 2014, exchange of notes were signed on a project for improvement of fishery equipment and machinery for a total of 4.84 million yen. The equipment and machinery will be provided at the beginning of 2016 after they are procured.

¹⁴ The respondents of the questionnaire are those who use the facilities. Questionnaires were randomly given to captains and crew (1 woman among 75) to half of all the fishing vessels (151 in total) that benefitted from the project. In addition, the questionnaire was also given to non-fishermen, salesmen, staff at the Fisheries Center, vendors and wholesalers (5 women among 9), as well as an exporter (1), a representative in fishermen's association (1 male) and customers (15 women among 21).

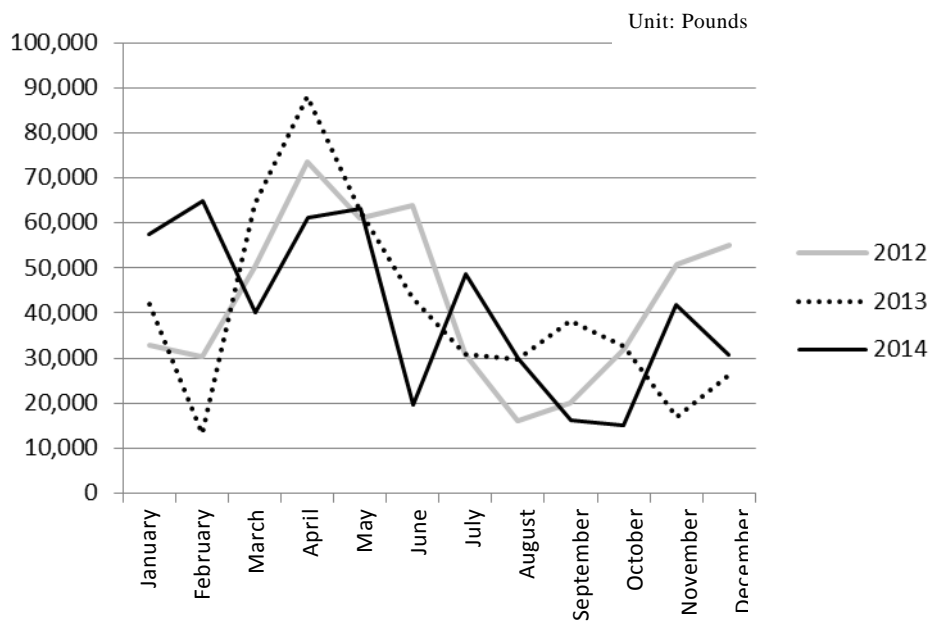


Figure 3: Volume of Fish caught in Gouyave

Source: Created by evaluators from the data provided by the Fisheries Division

The volume of fish landed at Gouyave is shown in Figure 3. As fishing is affected by the sea conditions, the peak season of fishing varies from year to year and the annual fish catch is not always the same. For example, the number of the flying fish captured by beach seine in the west declined sharply in June, while that of red horse mackerel and sliver horse mackerel decreased from September to October in 2014, causing a decrease in bait caught. Moreover, the shortage of baits led to the decrease of fishing activity in Gouyave where many fishermen fish in small boats can use only unfrozen baits. Thus, the landing volume of Gouyave was affected.

(4) Improvement of Fishing Safety on the Sea

Before the project implementation, the radio waves from the northeast of Grenada could not be transmitted to the sea to the west of the island due to its terrain. Ships on the sea could neither be monitored by the Fisheries Center nor could receive emergency signals from the fishermen, which made it challenging to ensure vessel safety. The project plan stated that from 2002 to 2007, out of the 16 sea accidents among the 30 accidents that had occurred were caused from the loss of communication during emergencies.

The new antenna was built in south Grenada, whose wave could transmit up to 100 miles, ten miles more than had been planned. Therefore, the numbers of sea accidents were 12 (2012), two (2013) and one (2014). The number has decreased greatly. The radio allowed the authorities to save all the fishermen on a sinking boat 20 miles away from the

shore. According to the Fisheries Division and fishermen, the extensive application of VHF communication prevents accidents such as driftage from happening. As such, the fishermen and the Division speak highly of the capability of the antenna facility provided by this project. Moreover, this antenna is not limited to Gouyave, but covers all of the west of Grenada, thus improving the fishing safety for the entire island. Besides, it is required that all fishing boats in Grenada be equipped with VHF equipment.

Therefore, the objective of improving fishing safety at sea has been fully achieved.

3.3.2 Qualitative Effects

Apart from the quantitative effects mentioned above, the following planned direct effects of the project have been observed.

- **Berthing efficiency:** Before the project implementation, the obsolete and damaged jetty and facility in Gouyave could not guarantee safe berthing. Fishermen would sustain injuries when the ships were pulled towards the jetty by waves. The jetty was rebuilt in this project to prevent these accidents and to ensure efficient mooring. More than half of the fishermen said that the time of berthing also was reduced.
- **Maintaining fish freshness and sanitary selling conditions:** Before the Project, the sale booths in the old fisheries center were disorderly and unsystematic, with fishes sold in ice boxes. After the project, however, the booths were divided better to ensure ice placement and product display. The ice was sold to the vendors before the project, while after project completion it was free as the Fisheries Division subsidized it. Therefore, they are able to keep fish fresh and booths hygienic.
- **Usage of the fish market:** According the Fisheries Division, 1,600 customers visit the market every year, almost the same as planned value of 1,600 to 1,900. Before the project, many visitors did not want to purchase at the Old Fish Market; there were also many times when the merchandise were stolen. After the new market was built, the market was tucked 20 meters away from the street, so fewer customers would come here by foot. There were also fewer stolen goods. On the other hand, more customers have been visiting the market by car, as was observed at the time ex-post evaluation. It can be said the market continues to be utilized.
- **Increase in fish species handled:** After the implementation of the project, it became more convenient to operate larger boats and process larger fish. In

addition, refrigeration, cold storage and processing equipment increased the species of fish processed, whether they were fresh or frozen. The processing of tunas for export and fishes (such as tuna and sailfish) for domestic market also increased.

- Effective processing of fish: After the implementation of the project, the cutting and weighing of larger fresh fishes in the processing area have become more efficient. In addition, according to the company that is renting the processing room, the processing area expanded by more than three times than before and processing fish for exports such packaging has become efficient.
- Increase in frequency and participation in fishermen's training sessions: In 2012, the Fisheries Division held a training session¹⁵ for fishermen in which 18 people participated. After the construction, six seminars were held in 2013 with a total of 329 participants. From the interview with the implementing agency, after the training, there was an increase in bank loan applications filed by the captains to invest in bait boxes and ships made from lighter material such as fiberglass. Moreover, there has been a push for fishermen to replace using single-sheet-papers, the main method for bookkeeping, with notebooks at landing sites. There has been a positive impact observed in training sessions to the project effect. However, the training sessions were not being held at the time of ex-post evaluation, because after 2014, the government had stopping approving training budgets due to its fiscal deterioration.

The beneficiary survey shows fishermen, residents and users are highly satisfied with the use of this facility. In addition, 3/4 of the fishermen commented that the services such as ice sales, freezers and parking lot in the New Fisheries Center have improved. Almost all fishermen (96%) were fully satisfied with the facilities in New Fisheries Center. Regarding each facility, 53 among 75 fishermen were pleased with ice supply and cold storage facility, while half are satisfied with the jetty. However, some pointed out that the jetty is too high and the stairs from the jetty to fishing boats are too narrow, making it not convenient for the landing of large-sized fishes. In addition, all 20 local residents who were part of the beneficiary survey were satisfied with the ice sales of New Fisheries Center.

There has been no post-harvest loss after the problem of ice shortage in Gouyave was resolved and there was an improvement in the annual handling ability. Moreover, the

¹⁵ As the lecturer, the Center Manager delivered the training entitled "Basics of Accounting for Fishermen."

installation of fisheries communication facilities ensured a communication method for fishing boats offshore, thus reducing sea perils and improving operational safety. This project also has had a positive impact on the preserving the freshness of fish, hygienic sales and efficient berthing. Therefore, efficiency of the project is high.

3.4 Impact

3.4.1 Impact of the Project

This project is intended to increase fishermen's income, food self-sufficiency, and job opportunities. After the evaluation, the impact of this project is as follows.

(1) Increase in Fishermen's Income

According to the data about people's income increase in the fish market provided by the Fisheries Division, the export of a privately owned fisheries company who rents the processing room from the fisheries center has increased from 144,000 pounds in 2012 to 230,000 pounds in 2013 and 2014¹⁶. The interview demonstrates its working efficiency has been improved, thus there is no need to hire more people to increase the export volume. So the income of employees also increased. However, there is no relevant information on the income increase of retailers and processing personnel in the market after the implementation of the project.

The beneficiary survey shows after the project, there was an increase in the fishermen's annual fishing days and their daily fish catches, thus enhancing their income as there have been no decline in the unit prices of fish. The survey also showed that 38 people among 75 (51%) said there were no changes to their income, 28 (37%) said their income increased, and only several of them thought their income decreased. Therefore, this project contributed to an increase in the income for a part of the fishermen.

(2) Increase in Food Self-sufficiency (protein supply for citizens)

From 2011 to 2014, the national per capita consumption of fish increased¹⁷ from 52.1 pounds (23.6kg) in 2011 to 57.9 pounds (26.3kg) in 2014. The project is thought to have contributed to the increase in the per capita consumption of fish, as the increase in fish export volume is lower than that of import, and the improvement of the fish handling ability in Gouyave increased the fish supply in the domestic market. Moreover, the survey for residents on the Fisheries Center reflect that there were no significant changes in quantity of fish consumed, although residents eat fish every day. However, the data mentioned above show that the overall consumption of fish has been increasing, so this

¹⁶ The export volume from 2014 and 2015 obtained from the analysis department of the Fisheries Division.

¹⁷ The national fisheries products, export and import volumes 2012 to 2014, obtained from the Fisheries Division and the Statistics Department of the Ministry of Finance.

project is considered to have had some level of positive impact.

(3) Increase in Job Opportunities

The data from the Fisheries Division (Table 4) show the number of fishing boats in Gouyave had increased from 162 in 2012 to 187 in 2014, and that of fishermen from 406 to 451. The improvement of facilities in this area makes the increase of fishing boats and income possible, so this project contributes to job opportunities to a certain degree.

Table 4: Comparison of Number of Fishing Boats and Fishermen Before and After the Project (Gouyave Area)

Unit: Fishing Boats (vessel) and Fishermen (person)

	Number of Fishing Boats			
	2011 Completion Year	2012 1 Year After Completion	2013 2 Years After Completion	2014 3 Years After Completion
Boats with Inboard Motor	9	10	12	13
Boats with Outboard Motor and cabin	12	14	16	18
Boats with Outboard Motor, without Cabin	120	126	129	142
Trawlers	12	12	14	14
Total	153	162	171	187
	Number of Fishermen			
	2011 Completion Year	2012 1 Year After Completion	2013 2 Years After Completion	2014 3 Years After Completion
Boats with Inboard Motor	36	40	48	52
Boats with Outboard Motor and Cabin	36	42	46	50
Boats with Outboard Motor, without Cabin	240	252	260	273
Trawlers	72	72	76	76
Total	384	406	430	451

Source: Provided by JICA and Fisheries Division.

3.4.2 Other Positive and Negative Impacts

3.4.2.1 Impact on Natural Environment

(1) Impact on Natural Environment

In order to carry out the project, the Fisheries Division, in accordance with the Environmental Impact Analysis in the basic design study for cooperation, drafted the Environmental Impact Evaluation Form and submitted it, together with documents such as the structural design drawing and detailed design drawing, to the Construction Planning Division of Ministry of Finance and had obtained the permission for development in March, 2010. Moreover, the questionnaires for the Fisheries Division show that there were no major issues such as dust and noise during the construction.

(2) Waste

Waste water, rubbish from processing fish are produced from the processing facilities and the market. As the waste water is discharged in the “coastal areas” and the all of these operations are classified as “processing of meat for consumption,” the waste water was planned to be treated adhering to the waste water standard set by the Ministry of Health, then be percolated into the ground.

Up to 2011, the waste water tests for fisheries facilities in Grenada were being carried out by the Grenada Produce Chemists Laboratory of the MALFFE. However, since 2012, there has been a lack of budget for personnel and reagents and equipment, hence, there have been no tests conducted on them the since 2012. In May, 2015, the National Water and Sewerage Authority (NAWASA)¹⁸ tested the discharge in response to the ex-post evaluation and found that E. Coli bacteria substantially exceeded the standard value (in Table 5). The NAWASA proposed a simple sterilization and disinfection method to solve this problem. The New Fisheries Center will implement this employ this sterilization process in late 2015. During 2015, the Inter-American Institute for Cooperation on Agriculture, the Organization of Eastern Caribbean States, the European Union and the Japanese Government will provide the drugs and equipment to the Grenada Produce Chemists Laboratory, as it faces a dearth of instruments for water testing. The waste water tests are expected to be conducted regularly after the provision.

Table 5: Waste Water Standards and Actual Values at the Time of the Ex-post Evaluation

Parameters	National Standard (Planned) 2008	Actual 2015
Temperature	Below 40C or 3C increase	No data
pH	6~9	7.9
BOD ₅ (mg/l)	<50	32.6
TSS(mg/l)	<150	8.34
HEM(mg/l)	<15	No data
NH ₃ -N(mg/l)	<10	3.8
E. Coli bacteria (count/100ml)	<400	162,000

Source: Water quality test report provided by the National Water and Sewage Authority of Grenada.

(Notes)

BOD₅: the amount of dissolved oxygen needed by aerobic biological organisms in a body of water to break down organic material present (Biochemical Oxygen Demand)

TSS: Solid suspended in the water after decomposition (Total Suspended Solids)

HEM: The indicator quantity such as oil in the water (Hexane Extraction Mass)

NH₃-N: The substance generated by the decomposition of protein, urea, uric acid and other organic nitrogen (Ammonia-nitrogen)

The waste generated in fish processing was planned to be processed into animal feed. Because it required working with a private company, this effort had been suspended at the

¹⁸ National Water and Sewage Authority of Grenada is subordinate to the Ministry of Communications, Works, Physical Development, Public Utilities & Information and Communications Technology, responsible for the maintenance, management and construction of water pipes and the management of water sources and quality.

time of ex-post evaluation. According to Manager of the New Fisheries Center, however, cooperation from the company was forthcoming, and implementation was expected in the latter half of 2015. The disposal of internal organs of the fresh fish was mainly done while at sea, where these and the waste produced by the New fish Center were dropped in the open sea 1-2 kilometers away from shore in order to cut down expenses. These are food for other animals in the food chain, thus not affecting the coastal environment.

3.4.2.2 Land Acquisition and Resettlement

In 2010, land acquisition of three households (371m²) was carried out. These families were resettled, where they received a total compensation of 15.63 million yen. The land acquisition and resettlement was implemented in accordance to the law of Grenada without any particular problems.

3.4.2.3 Other Positive and Negative Impacts

In order to revitalize the Gouyave area, restaurants in this area would cook fish using various recipes every Friday to host a street fair called “Fish Friday,” where foreign tourists from Europe, America and neighboring countries, as well as residents in Grenada, would visit. Restaurants purchase locally caught fish from the New Fisheries Center and serve them at their stalls. Besides this positive impact, there were no negative impacts reported.

This project has mostly achieved its objectives. Therefore effectiveness and impact of the project are high.

3.5 Sustainability (Rating: ②)

3.5.1 Institutional Aspects of Operation and Maintenance

There have been no significant changes from the planning phase regarding institutional aspects of the operation and maintenance of the MALFFE. The personnel allocation of the New Fisheries Center is shown in Table 6, and mostly as planned. Three vacancies were identified in the defect inspection report in August, 2012, and this problem was resolved before 2014 through personnel allocation. Employees work shifts in ice making, freezer maintenance and data processing from 6:00AM to the return of the last boat at midnight. The Center is being operated without delay every day.

Table 6: Planned and Actual Personnel Allocation of the New Fisheries Center

Position	Target (Planned)	Actual (2015)
Manager and the Extension Officer	1	1
Supervisor	1	1
Building Manager	1	1
Accountant	1	1
Cleaners	2	2
Data Clerk	1	1
Cold room attendant	2	2
Security	2	outsourced to a private company
Total	11	10

Source: Interviews with the Fisheries Division.

When the defect inspection was conducted, there was concern that the processing room would not be fully utilized. However, a private company had leased it where it is being utilized as a processing facility for export. The defect inspection further indicated that establishing a monitoring regime for the utilization of facilities, freshness of fish and users' opinions on equipment and the expanding the distribution were necessary. In terms of monitoring, recording of the occupancy time of boats at the jetty and drafting of guidelines for the sensory assessment of fish freshness have begun¹⁹ in an effort to strengthen monitoring.

On the other hand, no particular efforts have been made to the marketing of fish, and the Fisheries Division will pay more attention to this in the future. Regarding vendors, six of them²⁰ were planned to be transferred from the old market to the new one, in addition to two new vendors who were slated to work at the new market. However, at the time of ex-post evaluation only two vendors who once worked in the old market continued selling at the new booths. The number of visitors did not increase as it was tucked into an areas away from the roadside, and the two vendors had not started. Moreover, four of the six vendors from the old market have not begun their business in the new market because of geographic position or personal reasons. This problem is also related to the expansion of market, thus the retail system of the market needs to be strengthened.

The operation and maintenance of the antenna was outsourced to a private company. Daily maintenance records were kept, and repairs were carried out appropriately.

In conclusion, the project has no problem with the institutional aspect of operation and maintenance of the antenna, yet the project faces some problems with the institutional aspects of the Fisheries Center.

¹⁹ To assess the freshness of fish, sensory and chemical assessments are employed. The former method assesses the overall freshness by the appearance and smell of the fish.

²⁰ Vendors pay rent to the Fisheries Division to sell their products at the booths.

3.5.2 Technical Aspects of Operation and Maintenance

The operation and maintenance of all equipment, mainly the ice-making machines and cold storage vaults are the responsibility of a Fisheries Division senior cold storage technician who had received training in Japan. He supervises four technicians and workers in three fisheries centers of Grenada, possessing sufficient technical skills. The daily point inspection of machines is carried out by two workers of the New Fisheries Center to check the oil gauge of ice-making machines, waste water processing and record machine operation logs. The senior technician makes rounds to each center to review the operation logs once a week. The senior technician and the director of Fisheries Division each keep a copy of the maintenance manual. The technician also brings it to his rounds and makes full use of it.

The operation and maintenance of the antenna tower and repeater hut were outsourced to a private company after construction. The inspection records are saved. All other facilities are in good condition without having to repair, except for the repeater hut that had been repaired because it was struck by lightning.

In sum, the project has no problems with the technical aspects of the operation and maintenance of the facilities and equipment, nor of the staff.

3.5.3 Financial Aspects of Operation and Maintenance

The operating funds for the New Fisheries Center is paid by the Government budget allocated to the Fisheries Division. Its income will be deposited into the consolidated fund in accordance with public statute. When the expenses exceeds income, the loss is compensated by the budget of the Fisheries Division.

In addition, the overall budget of Ministry of Agriculture, Lands, Forestry, Fisheries & the Environment has been increasing every year since 2012²¹.

²¹ The annual MALFFE budgets were 23,569,561 ECD (2012), 31,975,102 ECD (2013), 28,800,111 ECD (2014) and 39,172,451 ECD (2015), accounting for 2.30%, 2.90%, 3.10% and 3.40% of national budget respectively.

Table 7: Planned and Actual Revenue and Expenses of New Fisheries Center

Items	Planned (EC dollars/year)	Actual			Planned Ratio
		2012 (EC dollars/year)	2013 (EC dollars/year)	2014 (EC dollars/year)	
Income					
1. Receiving of fish (fish dues)	31,621	18,039	24,894	47,115	149%
2. Ice sales	307,969	51,702	132,285	105,349	34%
3. Fuel sales (commission fee)	606,528	-	-	-	0%
4. Bait storage management	32,700	13,545	35,230	48,810	150%
5. Cold storage management	15,056				
6. Freezer management	13,264				
7. Vendor management	27,000	1,395	825	2,791	10%
8. Fish cleaners management	6,750	35	225	370	5%
9. Fish processing management	24,000	-	7,000	23,000	96%
10. Workshop management	6,000	-	-	-	0%
11. offices management	8,100	-	350	75	1%
Total	1,050,668	84,717	200,810	227,677	22%
Expenses					
1. Staff salary	128,700	106,935	122,375	144,462	112%
2. Electricity	657,861	114,492	252,727	207,439	32%
3. Water	0	0	0	0	-
4. Building repairs	22,653	21,182	14,000	12,750	56%
5. Office expenditure	4,050	4,175	5,270	5,275	130%
6. Ice-making and cold storage repairs	4,308	2,118	1,250	1,250	29%
Total	817,572	260,811	417,791	371,176	45%
Balance					
Annual Profits (Total Income –Total Expenses)	233,096	-164,185	-194,812	-143,499	-62%

Source: Materials furnished by JICA and data provided by the Fisheries Division.

Note: 1EC dollar = 0.37 US \$ (1 US dollar = 2.7EC dollars (fixed rate))

As shown in Table 7, expenses had exceeded the income during three years after the project completion. The fuel sales commission which would have been the largest source of income was supposed to be outsourced to the newly established Fishermen's Association of Gouyave²². However, due to delays in filing the paperwork, the association has yet to commence selling of fuel at the time of ex-post evaluation. During the field visit, the registration for the Fishermen's Association of Gouyave was completed and the outsourcing contract will be signed in September, 2015. According to Fisheries Division, the fuel sales, taking the fluctuation of crude oil price into consideration, will have a projected annual sales of 427,500EC dollars, which could solve the deficit the Center has been facing. In regards to the ice sales which was planned to be the second-largest income, the figure in 2014 only reached 1/3 of the planned value due to the fact that the broken machine's ice-making capacity was reduced to half and the Center donated ice to governments and non-profit organizations. Once the ice-making machine

²² In the original plan, the Fishermen's Association of Gouyave was expected to be found with the government of Grenada's assistance, with aims at enhancing the productivity of fishing and at improving the social and economic status of its fishermen.

restores its full capacity in 2016, its income is predicted to increase. In addition, the plan included income earned from renting a workshop which aimed to provide yearly boat inspections. However, even though it was supposed to be rented out to civil organizations and individuals, no contractors were identified. Thus the workshop had not been utilized nor generated any revenue at the time of ex-post evaluation. During the ex-post evaluation, the Fisheries Division had been in talks with the engineer of a private company, towards signing a rental contract in 2015. The government is promoting energy saving in order to improve its fiscal situation, and by unplugging equipment that is not being used, the Center has been able to reduce the largest source of expenses much less than the planned value.

In sum, although revenue from fish receiving and bait room, cold storage facilities and freezers exceeds its planned values, the fuel sale, the largest source of income, had not commenced, stable income could not be secured and the Center's deficit continues. The revenue deficit was planned to be compensated by the budget of the Fisheries Division, so there are some problems observed in the financial aspects of operation and maintenance.

3.5.4 Current Status of Operation and Maintenance

No other problems have been observed in the operation and maintenance of equipment, except for the broken ice-making machine, the forklift's battery outage and the chain breakage of the truck with crane. The daily cleaning and inspections in New Fisheries Center are also carried out appropriately by cleaners and technicians respectively.

As mentioned in the chapter on Effectiveness, the compressor of the ice-making machine broke and its ice-making capability was halved, but the Japanese government will provide grant aid, and it will be fully repaired in 2016. In addition, the forklift ran out of battery in 2013 and the chain of the truck with crane broke in 2014. They were not in operation as of May, 2015 at the time of ex-post evaluation field visit. However, the battery and chain have been procured by the New Fisheries Center, and the forklift and truck are estimated to be repaired in 2015. Therefore, it is estimated that the project effect will be achieved.

Some minor problems have been observed in terms of the institutional and financial aspects of operation and maintenance in this project. Therefore sustainability of the project effects is fair.

4. Conclusion, Recommendations and Lessons Learned

4.1 Conclusion

This project aims at constructing a new jetty and improving the existing fisheries center and fisheries facilities and thus expanding the center's functionality in Gouyave, St. John Parish of Grenada, increasing the fish distribution, strengthening the safety of fishing vessels thereby increasing fishermen's income and job opportunities, and increasing food self-sufficiency. This project is consistent with the country's development policy at the national level to the Japan's key areas of assistance in its aid policy. It is also in line with the development policy of the Ministry of Agriculture, Lands, Forestry, Fisheries & the Environment (MALFFE) and the development needs of fisheries sector. Therefore its relevance is high. Although the project period was within the plan, the project cost exceeded the plan. Therefore, efficiency of the project is fair. After the project implementation, there was a reduction in marine perils thanks to the radio communications antenna, and also a reduction of post-harvest loss and ice shortage at the New Fisheries Center, thus increasing the working time and the annual handling volume of fish. This resulted in an increase in the number of fishermen and fishing boats, as well as an increase in employment opportunities. Therefore, effectiveness and impact of the project are high. Though no problems have been observed in the institutional and technical aspects of the operation and management, some minor problems have been observed in terms of the financial aspects of it. The income from receiving fish, bait storage, cold storage facilities and freezer have exceeded the planned income, while the sales of fuel, the supposed main source of the center's income, had not commenced at the time of the ex-post evaluation, leaving the facility without a stable revenue. Therefore sustainability of the project effects is fair. In light of the above, this project is evaluated to be satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Implementing Agency

There has not been any no revenue generated through the fuel sales at the time of ex-post evaluation, even three years after the construction of the fuel tank, because it has taken a long time to file the paperwork for founding the Fishermen's Association of Gouyave. The Fisheries Division should first support the establishment of Fishermen's Association of Gouyave, then support the Association's signing of the commission-based sales agreement with the oil company that is distributing the fuel. In addition, the renting of workshop to organizations and individuals requires the permission of the MALFFE, which has taken time. The Fisheries Division should request the Government to expedite this application.

The waste water test, carried out by NAWASA in May, 2015, shows that the E. Coli bacteria in the effluent water of New Fisheries Center substantially exceeded the standard, while it was found that there were no readings for indicators such as oil in the water (HEM). Therefore, the Fisheries Division should establish the system of regular water quality testing as soon as possible, and carry out appropriate waste water disinfection.

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

None

Republic of Nicaragua

Ex-Post Evaluation of Japanese Grant Aid Project

“Project for the Rehabilitation and Equipment of the Scholastic Centers in the North Region of
Nicaragua”

External Evaluator: Hiromi Suzuki S., IC Net Limited

0. Summary

This project aimed to contribute to the improvement of enrollment rates and quality of education by upgrading the educational environment of primary and secondary schools through the development of school facilities and educational furniture in the five Departments of the Northern Region of Nicaragua.

The project is in line with Nicaragua’s development policies, development needs as well as Japan’s assistance policies both at the time of planning and ex-post evaluation, therefore its relevance is high. Project cost was as planned, however, project period exceeded the plan because it took time to deal with the geological conditions of the land and subsoil that were found once construction works had started, and therefore efficiency is fair. Operation and effect indicators almost met their targets: especially, the number of students that can study in a good learning environment even surpassed its target, and secondary school enrollment rates of all five Departments are improving. Although among the educational facilities that were developed, there were some quality-related problems such as the case where designs and plans of toilets and educational furniture (black boards) do not necessarily meet the needs of all users, on the whole, the expected effects and impacts have appeared, therefore its effectiveness and impact are high. On the other hand, in terms of operation and maintenance, although efforts are gradually being made to optimize internal procedures related to institutional organization and securing budget, there is still a budgetary deficit, and there is room for improvement in the technical aspect of maintenance as well. Judging from the maintenance status at the time of ex-post evaluation, in order to make sure that the project’s effects are realized in a sustainable way, it is desirable to further improve all institutional technical and financial aspects of operation and maintenance, therefore its sustainability is fair.

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

1. Project Description



Project Locations



El Bijagual School, Jinotega Department

1.1 Background¹

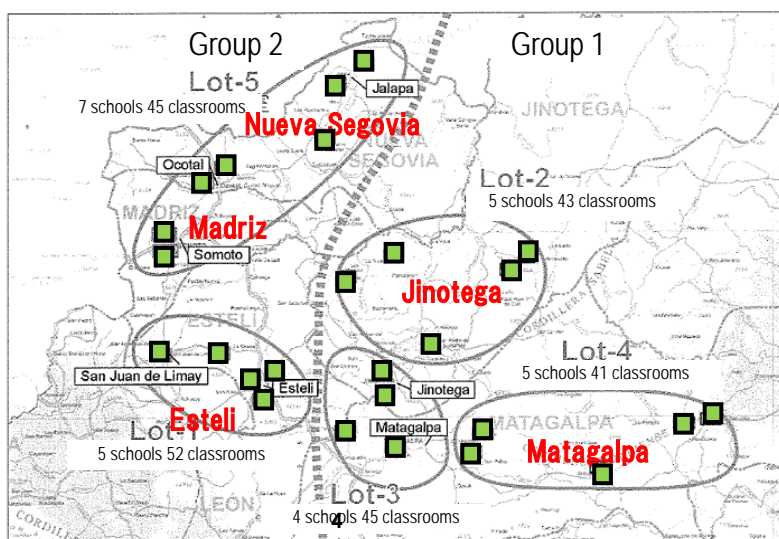
Since 1988 Nicaragua experienced an intense civil war that lasted about 10 years. In 2001, the Strengthened Growth and Poverty Reduction Strategy 2001-2005, SGPRS was formulated in order to rebuild the country socially and economically, and by accepting the World Bank and the International Monetary Fund's Structural Adjustment Program, the country was steadily working in the revitalization of the economy. By 2005, it formulated a national development plan which considered that education is the basis for socioeconomic development and that in order to improve the quality of education, it was important to both construct as well as repair educational facilities. It aimed to reach 90% in primary education's net enrollment rate by 2015, and developed 3,218 classrooms nationwide from 2004 to 2006. However, absolute lack of classrooms persisted, and on top of that, aging of existing classrooms were also a serious problem. In 2007, number of students per classroom was 58 in primary and secondary education, much higher than the 35 students per classroom officially set by the government of Nicaragua. Especially in the five Departments of the Northern Region (Matagalpa, Jinotega, Estelí, Madriz, Nueva Segovia), classes were conducted in shabby huts and houses; some schools even had to implement two or three shifts; and drop-out and repetition rates were also higher than the national average, all of which were obstacles to the improvement of the enrollment rate. It was under this situation¹ that the government of Nicaragua made a requested for Japan's Grant Aid for Community Empowerment² in order to improve 27 educational facilities located in the above mentioned five Departments that needed preferential countermeasures.

¹ Based on documents provided by JICA.

² The Grant Aid for Community Empowerment is a form of Japan's grant aid newly introduced in 2006. It aimed to significantly reduce costs and increase efficiency compared to the General Grant Aid by increasing competition in the procurement process through an active utilization of local companies in the elaboration of Detailed Designs, construction management, and civil construction.

1.2 Project Outline

The objective of this project is to contribute to the improvement of primary and secondary education enrollment rates and quality of education through the improvement of learning environments by developing school facilities and educational furniture in the five Departments (Matagalpa, Jinotega, Estelí, Madriz, and Nueva Segovia) that are located in the Northern Region of Nicaragua.



Source: Document provided by JICA.

Figure 1 Distribution of Educational Facilities of the Project

Grant Limit / Actual Grant Amount		1,016 million yen / 1,016 million yen
Exchange of Notes Date		August, 2008
Implementing Agency		Ministry of Education (Ministerio de Educación: MINED)
Project Completion Date		April, 2011
Companies engaged	Main Contractor(s)	Outline Design: Mohri, Architect & Associates, Inc. Procurement Management Agency: Japan International Cooperation System
	Consultant(s)	Phase 1: Arquitectos Ingenieros Asociados Phase 2: LJM Consultores S.A.
Basic Design		March, 2008
Detailed Design		June, 2009
Related Projects		【Technical Cooperation】

	<ul style="list-style-type: none"> • Project for Improvement on the Quality of Mathematics Teaching in Primary Education (PROMECEM) Phase 1-Phase 2 (2006-2015) • Japan Overseas Cooperation Volunteers (Primary School Teacher, Science and Mathematics Teacher, etc.) <p>【Grant Aid】</p> <ul style="list-style-type: none"> • First and Second Primary School Construction Plan (1995-2003) • Project for Rehabilitation of Basic Education Facilities in Managua, Phase 1 to 3 (2003-2007) • Project for Improvement of Basic Education Facilities in the Department of Rivas, Boaco and Chontales (2005-2008) • Grant Aid for Grassroots Human Security (2004-2006) <p>【Projects of other institutions】</p> <ul style="list-style-type: none"> • Inter-American Development Bank, KfW Development Bank, Swiss Agency for Development and Cooperation: Emergency Social Investment Fund (1991-2010) • Danish International Development Agency, Canadian Council for International Co-operation: Education Sector Assistance Program (2007-2012) • European Union: Assistance for the Education Sector (2004-2007), Education Sector Support Project (2002-2006) • Inter-American Development Bank: Basic Education Program (2004-2008), Regional Social Investment Program (2006-2009) • World Bank: First Basic Education Project (1999-2005)
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2. Outline of the Evaluation Study

2.1 External Evaluator

Hiromi Suzuki S., IC Net Limited

2.2 Duration of Evaluation Study

The ex-post evaluation of the project was conducted over the following period.

Duration of the Study: November 2014 to October 2015

Duration of the Field Study: 11 to 26 of February 2015, 24 to 30 of May 2015

3. Results of the Evaluation (Overall Rating: B³)

3.1 Relevance (Rating: ③⁴)

3.1.1 Relevance to the Development Plan of Nicaragua

The national development plan of Nicaragua at the time of project planning was the SGPRS formulated in 2001. The SGPRS had four pillars, and the second pillar, namely “investment in human capital and the poor” set three objectives of spreading basic education, improvement of the quality of education, and modernization of the education sector and promotion of decentralization of schools. It aimed to reach a primary education net enrollment rate of 90% and an illiteracy rate of 10% by 2015. In 2005, the National Development Plan 2005-2009 (Plan Nacional de Desarrollo, PND) was formulated in order to complement the first pillar of the SGPRS, namely “structural planning for a wide economic growth”, which placed education as an important factor to improve the country’s productivity and strengthen competitiveness. With regard to the education sector policy, the National Education Plan 2001-2005 (Plan Nacional de Educación, PNE) was formulated in 2001 which set five goals, such as to secure spreading of education and fairness; to secure quality of education and proper learning content; to improve quality and labor conditions of teachers, among others. In 2008, the Strategic Education Plan 2008-2011 (Plan Estratégico de Educación, PEE) was formulated which set a target of achieving a primary education net enrollment rate of 95% by 2011, and this project was considered as a part of the classrooms development plan which was to contribute to the achievement of such target.

The national development plan at the time of ex-post evaluation is the National Human Development Plan 2012-2016 (Plan Nacional de Desarrollo Humano, PNDH). It was formulated by the new regime inaugurated in 2007, and it is considered as a policy that substitutes the SGPRS and the PND. It places education as a basic human need, and aims to achieve universal basic education. It also aims to improve primary education enrollment and promotion rates of the poor and rural regions by implementing measures such as increasing the number of teachers and their quality, providing school meals, etc. Specifically, it sets a goal to achieve a primary education net enrollment rate of 97% by 2016, and to increase the proportion of teachers with official certification to 60% from the 10% recorded in 2009. In order for these goals to materialize, the Ministry of Education (hereinafter referred to as MINED) formulated the Strategic Education Plan 2011-2015 (Plan Estratégico de Educación PEE 2011-2015) which establishes the improvement of the quality of basic education together with the repair and expansion of basic school infrastructure as priority issues. Additionally, it points out that the increasing regional disparities between urban and rural areas are a problem, and mentions that one of the factors that inhibit the improvement of access to education is the lack of classrooms

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

⁴ ①: High, ②: Fair, ③: Low.

in rural areas as well as the big proportion of educational facilities that need to be rebuilt or repaired, and intends to continue working on the development of infrastructure for education.

The project is in line with the objectives of Nicaragua's government national development plans as well as education sector plans both at the time of project planning and the time of the ex-post evaluation. Especially, at the time of project planning, the project was considered as a part of the PEE 2008-2011 classroom development plan, thus consistency with the project is high.

3.1.2 Relevance to the Development Needs of Nicaragua

At the time of project planning, Nicaragua's primary education net enrollment rate was 86.4%, and the secondary education net enrollment rate was 43.7%, which were relatively high levels. However, the same rates of the five Departments in the Northern Region were 85.8% and 35.7% respectively, showing that the increase in enrollment rates was sluggish compared to the national averages and the development of proper educational facilities and educational environment where high quality education could be received was not enough. In order to achieve the target set in the SGPRS and the PND, namely "reach a primary education net enrollment rate of 90% by 2015" the government of Nicaragua developed 3,218 classrooms from 2004 to 2006. In addition, it moved forward the objective set in the PEE 2008-2011, namely to achieve a primary education net enrollment rate of 90% by 2015 to 2011, by planning the development of 4,938 classrooms from 2008 to 2010, thus the need for this project was high⁵.

According to the data available at the time of the ex-post evaluation, Nicaragua's primary education net enrollment rate in 2013 was 89.1%, and the secondary education net enrollment rate was 50.6%, improving slightly compared to the time of project planning. However, as of February 2015, the total number of educational facilities were 8,846 (29,833 total classrooms, 10% in urban areas, 90% in rural areas) from which 50% needed either to be reconstructed or needed significant repairs, and the proportion of schools with infrastructure such as water supply, sewerage and electricity etc., was only between 25% to 30%. With regard to educational furniture, there was a shortage of about 60,000 *pupitres* (tablet arm chairs) and 12,141 whiteboards. MINED aims to reconstruct, repair and maintain 8,846 schools (37,307 total

⁵ The selection criterion of the project's 26 schools was based on a request list prepared by the government of Nicaragua in which schools were listed by level of priority. Information on the detailed selection criteria was lost during Nicaragua's government regime change, as well as total reshuffle in the personnel of MINED, thus this information was difficult to obtain. However, based on documents provided by JICA, it can be assumed that the following five selection criteria were established: (1) to be an existing educational facility (i.e. it has to be either a repair, reconstruction or extension); (2) to be able to secure enough land based on the Outline Design and registration of land ownership has to be completed before the Exchange of Notes; (3) condition of the soil is more or less stable so that foundation work costs do not increase; (4) no other similar projects are conducted at the same time in the same region; (5) number of students per classroom surpasses by far the standard of 40 students per classroom set by MINED at that time.

classrooms) during the six years from 2015 to 2020, which indicates that in general terms, the need for development of educational facilities continues to be high⁶.

From the above, both at the time of project planning and ex-post evaluation the need for development of facilities related to primary and secondary education in Nicaragua is high, thus it can be recognized that the project is highly consistent with the development needs.

3.1.3 Relevance to Japan's ODA Policy⁷

The objectives of the Country Assistance Program for Nicaragua (formulated in 2002) were a "stable democracy" and "the promotion of a sustainable socioeconomic development", and it clearly stated that it would conduct grant aid and technical cooperation projects. It set six focus areas that included education and aimed to "conduct an assistance that contributes to the improvement of primary education enrollment rate as well as quality of education". The track record in assistance to the education sector includes the development of classrooms, toilets, teachers' offices and warehouses, provision of furniture, supplies and educational equipment, as well as the repair, reconstruction and expansion of classrooms with Grant Aid for Grassroots Human Security, thus the project is highly consistent with Japan's ODA Policy.

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

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

The project outputs on the Japanese side were the development of educational facilities (classrooms, principal and vice-principal offices, teachers' offices, auxiliary units⁸ and toilets), as well as procurement of educational furniture. The outputs on Nicaragua's side were the acquisition of land, access roads, development of water supply, sewerage and electricity infrastructure.

The comparisons between the plan and the actual output, as well as the reason for the changes are indicated below.

⁶ It aims to complete the development of water supply in 4,257 schools and sewerage in 5,380 schools by 2017, as well as electrification of 5,010 schools by 2019. (Source: Ministry of Education "National Educational Facility Infrastructure Development Plan Draft, 2016-2021).

⁷ Based on Japan Ministry of Foreign Affairs "Country Data Book" (2008-2012) and JICA "Republic of Nicaragua: Study Report of the Outline Design of the Plan for the Rehabilitation and Equipment of the Scholastic Centers in the Northern Region of Nicaragua" Study Report, 2008.

⁸ An auxiliary unit is a multipurpose facility that can be used as a library or a warehouse according to the requirements of the school.

3.2.1.1 Japan's Outputs

Educational Facilities: In the 26 schools⁹ of the five Departments, renovations, repairs, and extensions were conducted according to the Detailed Design, that is, 211 school classrooms, 13 principal's offices, two vice-principal offices, 17 teachers' offices, three auxiliary units, 104 pit latrines and 66 flush toilets were developed (see Annex 1 for details). Total construction area was 17,934.4m² of educational and administrative facilities, and 945.4m² of toilets.

Educational furniture: As indicated in Table 1, with the exception of *pupitres* which were added because of their high demand, the rest were procured almost according to plan.

Table 1 Educational Furniture: Plan and Actual

	Plan (Detailed Design)	Actual	Actual compared to plan
• <i>Pupitres</i> (tablet arm chairs)	7,385 units	12,212 units	165%
• Desks and chairs for teachers	293 sets	As planned	100%
• Cabinets	226 units	254 units	112%
• Shelves	54 units	56 units	104%
• Blackboards*	No information	422 units	—

Source: Plan and actual values are based on documents provided by JICA; however, interviews to the Implementing Agency were also taken into consideration for the actual values.

*: Information on both the plan and actual number of blackboards was not available. However, in the schools where field visits were conducted, there were two blackboards installed in each classroom. Since MINED's Construction Standards indicate the same, the actual number was estimated by multiplying the total number of classrooms, that is 211, by two, which results in a total of 422 units.

In relation to the Japan's outputs, in terms of quantity, there were no big changes from the Detailed Design, and it was conducted almost as planned.

3.2.1.2 Nicaragua's Outputs

Land acquisition, ground leveling, temporary fencing of construction sites, construction of parking lots for construction vehicles, and development of communication infrastructure, as well as securing infrastructure needed during construction such as electricity, water and sewerage were conducted almost according to plan. In reference to the development of infrastructure for educational facilities, as indicated in Table 2, with the exception of access roads in three schools, electricity in one school, and water supply in one school, all the rest was conducted as planned.

⁹ The Ruben Dario School in the Department of Matagalpa was excluded from the project as the nationalization process of the land where the school was planned to be constructed did not proceed as expected. Therefore, the total number of schools developed in this project was 26.

Table 2 Nicaragua's Output: Plan and Actual

Plan (Detailed Design)	Actual
Development of access roads	With the exception of three schools in Jinotega (i.e. Catorce de Septiembre, La Rica and El Bijagual Schools) the rest was conducted as planned.
Electricity: Drawing of electricity into the electric board of the site from an existing electric facility	With the exception of Matagalpa's San Andres de Boboqué School, all the rest were developed.
Water Supply: Installation of water pipes, drawing of water into the site from an existing facility	With the exception of Jinotega's Catorce de Septiembre School, all the rest were developed.
Sewerage: Connection to public sewerage	Among the schools in which flush toilets were constructed, at Instituto Nacional de Madriz School in Madriz, and Jose Santos Celaya School as well as San Isidro School in Matagalpa, it was not possible to get a connection to the public sewerage, thus a septic tank and an infiltration basin were additionally installed with Japan bearing the construction expenses.

Source: Plan information is based on documents provided by JICA, actuals are based on information provided by MINED.

3.2.2 Project Inputs

3.2.2.1 Project Cost

Since the Nicaragua portion of the planned project cost was uncertain, the evaluation was conducted based only on the amount of the Japan portion. This project was conducted using the procurement agency method, thus the total E/N amount has been disbursed to Nicaragua and there were no reversal of funds to Japan at the moment of project completion. Due to this, both the planned and actual amount of the project cost are 1,016 million yen which is the same as the E/N amount¹⁰.

Table 3 Project Cost: Plan and Actual

	Item	Planned Value in the Detailed Design* (million yen)	Actual (million yen)
Japan's Portion	Detailed Design, Construction Management, Construction Cost of Facilities, Attorney Cost	862.55	862.55
	Procurement Management Agency Cost	153.45	153.45
	Total	1,016.00	1,016.00
Nicaragua's Portion	Drawing in of electricity and connection; drawing in of water supply and sewerage and connection; dismantling cost of existing buildings, embankment, and ground levelling cost; access roads development cost; landscaping cost, bank commission charges, etc.	No information	98.40 Only total amount was available

Source: Plan and actual amounts for the Japan portion are based on documents provided by JICA. Actual amount of Nicaragua's portion is based on documents provided by MINED.

*: Conditions used in the Detailed Design estimation were as follows: (1) Time of estimation: July 2009; (2) there are no details on the breakdown of costs of Detailed Design, construction management and construction cost of facilities.

¹⁰ Problems related to financial, contractual and civil construction during procurement and construction were considered as items that needed special attention at the time of project planning, however, there were no major problems and thus project cost was not affected.

3.2.2.2 Project Period

The Detailed Design of this project was completed in June 2009, and construction was planned to be completed 18 months after that. In actual terms, it took 23 months from the Detailed Design to project completion¹¹, which was 128% compared to plan.

Table 4 Project Period: Plan and Actual

Process	Plan at the time of the Detailed Design	Actual
Exchange of Notes	June 2008	August 2008
Contract with Procurement Management Agency	July 2008	September 2008
Phase 1 (Lots 2,3 and 4, total of 15 sites)		
Selection of Consultant	July to September 2008 3 months	September to December 2008 4 months
Site Survey and Detailed Design	October 2008 – January 2009 4 months	December 2008 to June 2009 7 months
Bidding of Contactor	February to April 2009 3 months	June to August 2009 3 months
Civil Construction, Construction Supervision 1 st Batch	May 2009 to January 2010 9 months	October 2009 to April 2011 19 months*
Civil Construction, Construction Supervision 2 nd Batch	August 2009 to April 2010 9 months	
Phase 2 (Lots 1 and 5, total of 12 sites)		
Selection of Consultant	October to December 2008 3 months	September to December 2008 4 months
Site Survey and Detailed Design	January to April 2009 4 months	December 2008 to June 2009 7 months
Bidding of Contactor	May to July 2009 3 months	September to November 2009 3 months
Civil Construction, Construction Supervision 1 st Batch	August 2009 to April 2010 9 months	December 2009 to April 2011 17 months*
Civil Construction, Construction Supervision 2 nd Batch	November 2009 to July 2010 9 months	

Source: Both plan and actuals are based on documents provided by JICA.

*: Civil construction and construction supervision was conducted in two batches in both Phase 1 and 2. However, since the exact periods for each batch were not clear, the actual periods are the periods of both batches put together.

The details of the delay and their main reasons are as follows:

- a. Site survey and preparation of Detailed Design: There were delays of three months compared to plan in both Phase 1 and 2. The main reasons being that after site surveys were conducted, the following four changes had to be made from the Outline Design. (1) Changes in planned sites; (2) change in prototypes (because they would not fit into the premises, and/or there were steep slopes in the land); (3) toilets were added or cancelled, and/or specifications were changed (e.g. as connection to public sewage was impossible, septic tanks and infiltration

¹¹ April 29, 2011 is the completion date of the last lot.

basins were added, their arrangements were changed, etc.); (4) although it was planned to procure students' chairs and desks separately, it was found that these would not fit into the classroom space, thus in all schools, these were changed to *pupitres* (tablet arm chairs).

- b. Civil construction and construction supervision Phase 1: Although it was planned to be finished in June 2010, it was actually finished 11 months later, in April 2011 (duration of this process itself was delayed only by one month). The main reason for the construction period extension was that in some sites, measures had to be taken in order to deal with geological features that were found at the time of construction, which resulted in the following five changes from the Detailed Design. (1) Change in the level of the ground; (2) as it was found that the ground was soft, it was necessary to change the content of the foundation works (i.e. those sections with low soil quality had to be removed, compacted, replaced and filled it back with good quality soil); (3) expansive soil was found, thus the soil under the bottom base surface had to be replaced; (4) location and construction level of buildings and toilets had to be changed; (5) the structure of the concrete lid of the septic tank had to be strengthen and infiltration basins had to be added. These changes have also occurred in Phase 2, but there was only one month delay in Phase 2 compared to the planned completion date which was March 2011 (duration of this process itself was shortened by one month).

In this project, project period exceeded the planned period due to replacement of soil and changes in prototypes that were necessary in order to deal with the geological features that were found at the time of construction in some of the sites. However, with respect to land ownership rights and land registration, which were considered as factors that needed special attention at the time of project planning, procedures were completed in all the schools with the exception of Ruben Dario School in Matagalpa Department which had to be excluded from the project as it was decided that land expropriation would be impossible. There were no delays due to financial problems during procurement and construction periods as well.

Although the project cost was as planned, however, the project period exceeded the plan. Therefore, efficiency of the project is fair.

3.3 Effectiveness¹² (Rating: ③)

3.3.1 Quantitative Effects (Operation and Effect Indicators)

The project effects that were established at the time of project planning were “Increase in the number of students that can study in a proper environment¹³”, “number of students that are

¹² Sub-rating for Effectiveness is to be put with consideration of Impact.

¹³ “Proper environment” was defined as follows based on the information of the Outline Design: (1) School buildings: fulfill the Standard Construction Norms set by MINED; (2) toilets: to be able to use either fixed pit

taking classes in two shifts in rural are schools become zero”, and “number of secondary school students that are studying on weekends using the installations of a primary school becomes zero”. The results were as follows.

Table 5 Effect Indicators

Indicator	Plan		Actual (Achievement rate of target value)			
	Base Value 2007	Target value at the moment of project completion	2011 Project Completi on Year	2012	2013	2014
a. Increase in the number of students that can study in a proper environment in the 27 planned schools (number of students)	9,485 ¹	21,140 ²	24,037 (114%)	23,280 (110%)	22,931 (108%)	21,414 (101%)
b. Number of students that are taking classes in two shifts in the 11 schools that are classified as rural schools ³ from the planned schools (number of students)	2,566	0	4,332 (Not Achieved)	4,077 (Not Achieved)	4,029 (Not Achieved)	3,774 (Not Achieved)
c. Number of secondary school students from the planned schools that are taking classes on weekends using the installations of a primary school (number of students)	295	0	0 (100%)	0 (100%)	0 (100%)	0 (100%)

Source: Planned values are based on documents provided by JICA. Actual values are based on documents provided by MINED.

¹: Calculated based on the shift system that was in place at the moment of the project planning.

²: Calculated as two shifts in urban areas and one shift in rural areas.

³: Based on MINED’s classification. In this project, 11 schools were classified as belonging to “rural areas”.

a. “Increase in the number of students that can study in a proper environment in the 27 planned schools”: the target of this indicator to be achieved at the moment of project completion was 21,140 students. As of 2011, the actual number was 114% compared to the plan, thus achieving the target and even continuing to be over 100% after project completion. This is due to the fact that, after project completion, the number of students that go to these schools have increased. However, among the five Departments of the project, the population in Esteli is on a downward trend, and even in the other four Departments, population growth rate is decreasing every year since 2011, and due to this, the target achievement rate is also on a downward trend. All the educational facilities developed are being used almost completely, and the target number of students studying in improved schools has been met.

latrines or flush toilets; and (3) educational furniture: fulfill the Standard Specification set by MINED.



Classroom before improvement:

Walls are made of wood boards, roofs of tin, there is no electricity and there is only one window



Classroom developed by the project

However, from the point of view of the “quality” of a “proper learning environment”, as well as “a proper reflection of users’ needs”, the following two factors are affecting the realization of the project effects the most¹⁴.

(1) Pit latrines: In this project, 110 pit latrines were developed as part of the educational facilities. During the field study, it was found that the needs of children in lower grades of primary school were not reflected in the design of these latrines when the Detailed Design was prepared. All the pit latrines have a seat height of 52cm, and children lower grades of primary school need teachers’ assistance in order to secure their safety as they cannot use the latrines by themselves¹⁵. In addition, although the Outline Design indicated that wood was the material to be used for the pit latrine booth doors, the doors that were actually installed are of heavy steel which it is even difficult for adults to open and close. One accident in which the door was detached from its frame injuring a child

¹⁴ Other than these, low durability of classroom windows as well as their handles to open and close is another problem that is common to all schools. However, the windows that were used in this project are widely used in Nicaragua and it is not limited only to schools. In addition, there are no standards for windows in the Construction Norms of MINED, and taking into account the cost reduction, the use of these glass windows can be considered as an average measure.

¹⁵ When primary school lower grade students use them, because they cannot manage to sit in them alone, teachers have to interrupt the class in order to help them, or in some cases, children have to relieve themselves behind the school buildings. According to interviews conducted to principals and teachers during the field visits, the usage rate of pit latrines by primary school lower grade students is low. The problem regarding pit latrines could have been avoided at the moment of the Detailed Design by introducing a different modality, or by including a component in the project to make sure that the method of use would be widely known. Through interviews conducted during the field study to MINED, the Procurement Management Agency, local consultant companies, JICA and the beneficiaries, it was found that the common opinion was that each one of the entities, -that is, the local consultant companies that prepared the Detailed Design, the Procurement Management Agency who was giving guidance and checked the blueprints, and MINED who approved the blueprints- all of them in the respective process could have taken necessary measures to improve the latrines so they would be closed to the needs of the users. In addition, regarding the fact that maintenance was not being conducted thoroughly at the time of ex-post evaluation, it is necessary that each school put into practice the correct maintenance methods once all of them are familiarized with them thoughtfully (See footnote 17).

has been confirmed, thus it is difficult to say that users' safety and privacy are secured. However, because students in higher grades of primary school and students in secondary schools can use the latrines even with this height, out of the 110 booths constructed, 46 booths (42%) are being used, 30 booths (27%) are broken and cannot be used, and in relation to 34 booths (31%), as of June 2015, they were being replaced by flush toilets¹⁶.



External view of pit latrines (six booths. Doors have come off in three of them and cannot be used)



Pit latrines¹⁷

(2) In relation to blackboards, there are two in each classroom, and according to MINED's installation standards introduced in 2008, one has to be installed 60cm above the floor for primary school lower grade students, and the other one has to be installed 90cm above the floor for the rest of the students. However, installation height of all the blackboards of this project was set at 92cm above the floor at the time of the Detailed Design. But, after interviews to MINED, blackboards were being replaced with whiteboards even since before



Blackboards provided by the project and newly introduced whiteboards

¹⁶ At the time of ex-post evaluation, MINED was making efforts to replace pit latrines with flush toilets in those schools where sewerage has been developed. As of June 2015, 31% of the pit latrines of the project were being replaced by flush toilets.

¹⁷ There are two latrines per booth which should be alternated in their use: i.e. while one is being used, the other one has to be covered, and when the one that is being used is full, it has to be covered and the other one is used (Source: "Ex-Post Evaluation Report of the Project for Improvement of Basic Education Facilities in the Department of Rivas, Boaco and Chontales"). At the time of the ex-post evaluation, it was found that MINED as well as all the schools did not know about the correct methods of use and maintenance. According to the interviews, the Procurement Management Agency explained this verbally to each school's principal when the facilities were delivered, but since there were no documents such as manuals, and the information was not transmitted when there were personnel changes, in none of the schools there were teachers who understood the method of use. From now on, it is necessary to conduct repairs and provide guidance on the proper methods of use and maintenance.

project execution in order to prevent teacher's respiratory problems, and this replacement policy was conducted full-fledged since 2011. However, in this project, after internal reconsiderations within MINED, it was found that the proportion of students for whom it was hard to see the letters written in the whiteboards due to the reflection of light was high, becoming an obstacle to the progress of the class. Thus based on a request from MINED, blackboards were installed instead of whiteboards¹⁸. Due to this, almost all the blackboards installed by the project are not being used as such, but as bulletin boards, or as boards to display student's works.

b. "Number of students that are taking classes in two shifts in the 11 schools that are classified as rural schools": In the project's schools of the Departments of Jinotega, Matagalpa and Nueva Segovia, even at the time of the ex-post evaluation, there were schools that conduct two shifts and offer classes on Saturdays and Sundays, thus the target was not achieved. However, this fact is not necessarily negative, as it is the result of a concentration of students that desire to study in these newly-developed schools. Thus these schools made the decision to continue offering two shifts, which at the end has resulted in the improvement of enrollment rates. It is worth mentioning that in Nicaragua there are many students that have to work during the day to help the family, so elimination of the two-shift system is not necessarily good. Because of this, it is thought that there was a problem in setting this as an indicator, so it was decided not to give a negative evaluation even though the target was not achieved.

c. "Number of secondary school students from the planned schools that are taking classes on weekends using the installations of a primary school": This is a partial indicator specific to Matagalpa Department's Jairo Jose Suarez Secondary School. Before the project, this secondary school was offering classes on Saturdays and Sundays by using the installations of a primary school. After project execution, students are now able to take classes in



Newly-built Jairo Jose Suarez
Secondary School

the newly-built classrooms. It was found that these students either work on weekdays, or live very far so they can only come to school on weekends. Therefore, even in the newly-built classrooms, they continue taking classes on Saturdays or Sundays. However, on weekdays this school functions as standard secondary school, thus the newly-build classrooms are being used more effectively than expected.

¹⁸ Based on the Outline Design Survey Report.

3.3.2 Qualitative Effects (Other Effects)

In this ex-post evaluation, interviews to teachers and students during the field study as well as a beneficiary survey were conducted to a total of 100 persons including students, teachers and parents in order to assess the qualitative effects of the project (see Annex 2 for details). The main findings were that the satisfaction level of students with respect to classrooms, educational furniture and toilets were all high, which served as evidence that there were changes in students' easiness to learn, and that it has significantly affected their attitude towards learning and everyday life¹⁹. Teachers and parents satisfaction levels were also high in general terms, however, when compared to the satisfaction levels of classroom buildings and school furniture, satisfaction levels of toilets and development status of infrastructure were slightly low. Especially parents stated that "children are now much eager to go to school", "although during weekdays children have to do farm work, they look forward to the weekend to go to school", which are comments that recognize the fact that there were actual changes in the children's attitude towards learning and everyday life.

Infrastructure that was to be developed in the project's schools under the responsibility of Nicaragua (i.e. access roads to schools, supply of electricity to some schools, development of public sewerage in all rural area schools etc.) was decided and agreed in the Minutes of Discussion signed between the two countries. The actual development status of such infrastructure as well as the realization of their effects is as follows.

- a. Access roads to schools: in some rural schools access roads to schools are still not developed, but the reality is that nevertheless students go to school. Based on the interviews conducted during the field study, number of students that spend from one to two hours one way to go to school were by no means negligible. Among the teachers, there were cases that spend two hours one way between walking and travelling by bus. Although the fact that access roads are unpaved is not an obstacle to the realization of the project effects, paving these roads would shorten commuting time, ensure safety during commuting (e.g. problem of muddy rural roads during rainy season would be solved etc.), which would further promote students to go to schools. In addition, students will be able to use more time to study which would further increase project effectiveness, thus it is desirable to continue paving the roads.
- b. Electricity and water supply: As mentioned above, although development of infrastructure is advancing, there are a lot of power outages and water supply cut-offs, thus stable supply is

¹⁹ Especially when taking into consideration the poor environment in which students had to study until now, their joy of being able to study in the schools developed by the project seemed to be very strong. Even during the field study, in schools where there are still old classroom buildings next to the new buildings, the students who study in the new buildings developed by the project, mentioned that they feel "proud" to be able to study in these buildings.

not secured. With respect to water supply cut-offs, this limits the effectiveness of flush toilets' convenience and improvement of hyenic conditions, and electricity outages especially limit the project effect to the students who take classes in the afternoon shift in schools with two shift systems.

- c. Sewerage: Each local government is making efforts to urgently develop this infrastructure, and at the time of the field study, in two schools where pit latrines were constructed, these were being rebuilt into flush toilets as public sewerage was developed, making effective use of the existing infrastructure. By this measure, the latrines that were not used are expected to reborn as 34 new flush toilets, which increase the expectations of the realization of the effects of the project even more.

As can be seen, although there are some quality-related problems, it was confirmed that the aim of this project which was to improve the learning environment was achieved both quantitatively and qualitatively, thus the effectiveness of the project is high.

3.4 Impacts

3.4.1 Intended Impacts

The expected impact of the project was “to contribute to the improvement of the target region’s enrollment rate”. Data available was for the years 2011 to 2013, and it was found that according to them, primary education net enrollment ratio²⁰ is decreasing in all the Departments after project completion compared to 2009, as shown in Table 6, however, the rates are improving for secondary education in all Departments. One factor that has to be considered is that in Nicaragua, when calculating the net enrollment ratio, the “number of children in official age-group for a given level of education” is available as each school collects the actual number, however, accurate data on the “population in the corresponding age-group” does not exist. Instead, population estimations based on the 2005 population census are used. According to the said census, the “population in the corresponding age-group”, especially for primary education (children from 6 to 11 years old) is expected to show almost “no increase” from 2011 to 2015²¹, but the actual population in the age-group for primary education is rather decreasing year by year. As a result, both average primary education enrollment ratios at the national and departmental levels are on a downward trend. Since population estimates based on the 2005 population census have not been revised thus far, although doubts remain in using these

²⁰ Net enrollment ratio is calculated as the number of children enrolled in a certain level of education who belong to the age group that officially corresponds to that level of education divided by the total population of the same age group, multiplied by 100.

²¹ According to the 2005 population census, the national average population growth rate was estimated to be 1.3% in 2011 and 1.2% in 2014. The population growth rate estimates for the five Departments show a tendency that is almost the same as the national average.

estimates in the calculation of the enrollment ratio, since these are the official data that the government of Nicaragua has made public, it was decided to use these data for this ex-post evaluation²².

Table 6 Net Enrollment Ratios for Primary and Secondary Education in the Target Departments

		2009 (Before Project Completion)	2011 (Project Completion Year)	2012	2013
Primary Education	National Average	84.1%	93.6%	90.8%	89.1%
	Esteli	99.8%	97.5%	94.6%	93.0%
	Jinotega	82.5%	82.9%	77.0%	77.6%
	Matagalpa	88.6%	88.4%	84.4%	81.1%
	Nueva Segovia	88.7%	88.1%	83.7%	80.1%
	Madriz	87.9%	85.6%	81.2%	83.4%
Secondary Education	National Average	46.9%	46.4%	47.9%	50.6%
	Esteli	48.0%	58.3%	62.3%	68.0%
	Jinotega	22.6%	28.6%	28.8%	29.6%
	Matagalpa	31.3%	40.6%	43.3%	45.2%
	Nueva Segovia	31.5%	38.8%	40.4%	40.8%
	Madriz	35.8%	42.9%	44.2%	46.5%

Source: Based on documents provided by MINED.

Net intake rates²³ were also obtained as auxiliary indicators²⁴. As shown in Table 7, compared to the situation before project execution, the net intake rates are improving due to the fact that the schools are more prepared to accept students in official age-group for a given level of education. However, just the same as the net enrollment ratio, the net intake rates for

²² According to MINED's Statistical Division, as well as interviews to representative offices of the Ministry in each Department, the "number of students enrolled in a certain level of education who belong to the age group that officially corresponds to that level of education" is based on the health statistics kept by the Ministry of Health at the village level. Based on this information, teachers identify the households with children that belong to primary and secondary education age groups; visit these households if necessary in order to check whether children are enrolled or not; and convince the parents to send their children to school in the latter case. As can be seen, teachers are doing efforts to increase the number of children enrolled, therefore, it is possible to say that, although "number of students enrolled in a certain level of education who belong to the age group that officially corresponds to that level of education" is not absolutely equal to the "real number of population in a certain level of education who belong to the age group that officially corresponds to that level of education", at least it is more accurate compared to the estimate of the 2005 population census. And their opinion was that if population data based on the Ministry of Health would be allowed to be used in the enrollment ratio calculations, the result would be that the enrollment ratios would rather show a smooth upward trend.

²³ Net Intake Ratio is calculated as the number of students entering the first grade of a certain level of education, who belong to the age group that officially corresponds to that first level of education, divided by the total population of that age group, multiplied by 100.

²⁴ In this ex-post evaluation, an attempt was made to obtain data on indicators such as advancement rates, dropout rates, repetition rates etc., with the aim to assess the "quality of education" besides the "access to education". However, since there were no uniform data for the entire target Departments, impact evaluation was conducted based solely on the project's expected impact, which is the "improvement of enrollment rates".

primary education use the population estimates of the 2005 population census for the “population in the age-group for first grade”, thus the rates are either stagnant or on a downward trend. In this project, 20 primary schools and 17 secondary schools were developed, and the net intake ratio for secondary education, just as in the case of net enrollment ratio, is also improving in all the departments compared to the situation previous to the project, from which it can be concluded that in terms of secondary education’s “access to education”, certain impact is possible to recognize²⁵.

Table 7 Primary and Secondary Education Net Intake Ratios in the Target Departments

		2010 (Before Project Completion)	2011 (Project Completion Year)	2012	2013	2014
Primary Education	National Average	66.9%	73.4%	71.3%	73.5%	72.9%
	Esteli	80.7%	84.0%	85.3%	79.2%	78.8%
	Jinotega	54.3%	61.2%	54.8%	59.2%	59.4%
	Matagalpa	62.8%	69.0%	64.8%	67.9%	NA
	Nueva Segovia	65.7%	69.0%	64.4%	64.2%	NA
	Madriz	64.4%	70.0%	66.6%	77.9%	NA
Secondary Education	National Average	22.9%	24.7%	29.0%	30.5%	30.8%
	Esteli	34.5%	39.9%	46.6%	47.8%	49.4%
	Jinotega	11.5%	13.8%	15.2%	15.3%	14.9%
	Matagalpa	18.5%	21.0%	26.5%	25.6%	NA
	Nueva Segovia	20.2%	22.1%	28.3%	24.9%	NA
	Madriz	21.3%	21.2%	27.3%	31.5%	NA

Source: Based on documents provided by MINED.

From the above, the expected impact of the project, namely “to contribute to the improvement of enrollment ratio in the target region”, was not possible to quantitatively assess it for primary education due to the fact that the population data used to calculate the enrollment ratio significantly differs from the real population. However, for secondary education, it was possible to recognize that the enrollment rates are improving in all the Departments. In addition, based on the interviews to the principals and teachers of the target schools conducted during the field work, as well as from the free comments section of the beneficiary study, opinions such as “parents that were hesitant in sending their children to aged and deteriorated schools decided to send their children after school buildings were improved by the project”; or that “children

²⁵ Esteli’s indicators for both primary and secondary education were above the national average since before project execution. In the said department tourism has been a major industry, and in recent years, the tobacco industry is also growing, making it the Department with the highest economic growth among the five Departments. Along with that, resident’s living standards have improved which have resulted in a higher awareness regarding the importance of education (Based on interviews to MINED’s Statistical Division).

started to feel like going to school by themselves” were heard the most. Although it was not possible to accurately determine the causal relationship, it was possible to see that the project did contribute to improve the enrollment ratios to a certain extent.

3.4.2 Other Impacts

- a. **Impacts on the Natural Environment:** With respect to impacts on the natural environment, since the project consisted in rebuilding or extending existing schools in existing premises, or building new school facilities in additional premises, there were no big-scale ground preparations, and almost no trees were needed to be cut, thus there were no negative impacts to the natural environment.
- b. **Land Acquisition and Resettlement:** Since this project consisted in rebuilding or extending of existing schools, there were no resettlements caused by land acquisition. Even in Jairo Jose Suarez Secondary School which was the only newly-built school, a land that was not being used in any activity was utilized, thus there were no resettlements.
- c. **Unintended Positive/Negative Impacts**
 - **Gender considerations:** As a result of the interviews, in Nicaragua, especially in lower grades of primary school, almost no distinctions are made between male and female when using the toilets, so it is not necessary to separate toilets by gender, however, for higher grades of primary school as well as secondary school, it is necessary to give appropriate consideration in separating toilets according to gender. Since, toilets did not exist before the execution of the project, privacy especially for girl students was not secured. All the toilets developed by the project were separated for boys and girls, thus improvements were made from the hygienic and privacy point of views. However, regarding pit latrines, since all the students have to use the ones for which doors have not fallen, only these ones were able to be separated by gender.
 - **Role as shelters in case of natural disasters:** At the time of planning, the educational facilities that were developed by the project were expected to be used as shelters for local residents in case of natural disasters. At the time of ex-post evaluation, not only the schools of the project, but all schools were assigned to be used as shelters in case of natural disasters. Since no natural disasters that require residents to take shelter have occurred since the project completion up to the time of the ex-post evaluation, none of these schools have been used as shelters, and there are no specific precedents. All the schools of the project were constructed in line with the National Construction Norms that the Government of Nicaragua formulated in 2007, earthquake resistance has improved, and thus compared to the situation previous to the project an impact can be

recognized. However, with respect to Monseñor Jose del Carmen Suazo School²⁶, located in Madriz Department, where it was found that a fault passes through its premises after the project had started, urgent measures by the government of Nicaragua including improvement of earthquake resistance are desired.

- Coordination with other JICA projects: indirect effects were expected from JICA's technical cooperation project, namely the "Project for Improvement on the Quality of Mathematics Teaching in Primary Education" (1995-2003) and through coordination with Japan Overseas Cooperation Volunteers (in the field of primary education). Such effects were recognized in only one school (Monseñor Oscar Arnulfo Romero School in Esteli Department) out of 26 schools, thus coordination with other JICA projects was limited.
- Other positive impacts: Through the development of educational facilities by this project, adults that did not have an opportunity to receive education can now attend classes on Saturdays and Sundays. During the field study, especially in rural schools, cases of adults in their 50's and 60 who were taking classes on Saturdays and Sundays were seen. Through interviews to the principals of these schools, it was found that these cases are good influences to the young people, and their classmates tend to study harder.

This project has largely achieved its objectives. Therefore effectiveness and impact of the project are high.

3.5 Sustainability (Rating: ②)

3.5.1 Institutional Aspects of Operation and Maintenance

The operation and maintenance of the schools are as follows:

- a. Organization of MINED: The General Direction of School Infrastructure, which is directly under the Office of the Minister of Education, is in charge of the operation and maintenance of the infrastructure of educational facilities. They assess new infrastructure demands as well as repair and renovation needs in the infrastructure of educational facilities, and establishes construction norms and quality control. In March 2015, there was a major organizational

²⁶ In Monseñor Jose del Carmen Suazo School in the Department of Madriz, there is a fault passing through its premises, and as a result of the geological survey conducted by Nicaragua's National System for the Prevention, Mitigation and Attention to Disasters (Sistema Nacional para la Prevención, Mitigación y Atención de Desastres, SINAPRED), the entire zone was designated as a "high risk area" since 2011, so it is doubtful to think whether this school can serve as a shelter. The "Republic of Nicaragua: Study Report of the Outline Design of the Plan for the Rehabilitation and Equipment of the Scholastic Centers in the Northern Region of Nicaragua" (JICA, 2008) states that "in Nicaragua there are no construction regulations related to active faults when it comes to the construction of school facilities, and since active fault surveys were not required to be conducted, it was decided that there is no need to conduct a detailed active fault survey". At the time of project planning, it was judged that there would be no problems since the government of Nicaragua classified the area in question as a "moderate risk region" in the first place.

restructuring and under the General Direction of School Infrastructure, four Directions were established, namely, Direction of Educational Facilities and Equipment Norms, Direction of Operations, Direction of Pre-investments and Direction of Maintenance. At the time of ex-post evaluation, total number of personnel was 85; instruction and decision making procedures were clearly established, and information sharing between the central and departmental governments was improving.

- b. Organization of the Ministry of Education at the Department level: Just like at the time of project planning, MINED has “Departmental General Representative Offices” and “Municipal Educational Representative Offices”. A change that is worth mentioning is that, under the above-mentioned new structure, an “Infrastructure Department” was created within each Department’s General Representative Offices, and main coordinators have been assigned. With this measure, it has become possible to thoroughly assess the educational infrastructure needs as well as furniture and equipment and their respective maintenance needs at the Departmental and Municipality levels, and a system through which this information is directly communicated to the central government has been created.

Table 8 Organization of Operation and Maintenance at the Department and Municipality Levels

<p>Departmental General Representative Offices</p>	<ul style="list-style-type: none"> • Dispatches technical officials to Municipality Representative Offices and schools, where they follow-up projects and curriculums and distribute educational material to these offices. • Conducts administrative procedures on personnel reassignment, as well as trainings to school principals and teachers. <p style="text-align: center;">Infrastructure Department</p> <ul style="list-style-type: none"> • Assesses and records the infrastructure needs for furniture and equipment and their respective maintenance needs at the educational facilities in each department and municipality, and provide this information to the central government.
<p>Municipality Educational Representative Offices</p>	<ul style="list-style-type: none"> • Distributes educational material to schools. • Participates in the selection of school principals, and members of the association for school operation. • Sends information necessary for the operation and management of schools to MINED.

Source: Based on documents provided by JICA, the Implementing Agency and interviews.

c. Operation and Maintenance of Schools:

- **Operational Organization:** The majority of primary schools are managed by the school principal, a vice-principal, teachers and an Assistance Association for Schools (composed by teachers and Parents Association), in secondary schools, the structure is the same, but the Students Association is added. Especially in base schools or large-scale secondary

schools in urban areas, there are also secretaries, librarians, janitors, counselors, security guards, and inspectors. The Human Resources Direction which is directly under the Minister of Education is in charge of securing teachers. Currently in Nicaragua the rule is that the maximum number of students per teacher is 35. Among the 26 schools of the project, 15 schools met this rule, and only in six schools there were in average 40 students per teacher, which was slightly above the norm. As can be seen, number of teachers has been secured in most of the schools.

- Maintenance Organization: School maintenance is mainly divided into two. (1) Replenishment of consumables and small-scale repairs are conducted based on the principle of “shared responsibility”. The said principle states that “a schools is a property of the local community, thus teachers, students, parents and the whole community should cooperate in order to properly maintain it”. For example, replacement of fluorescent lights, blind glasses, toilet door locks and repainting are discussed between the school and the Parents Association, in a meeting which is held once a month, and the cost is covered either with the budget of the Parents Association, or parents provide the labor to do the repair, and in most of the cases, simple maintenance is conducted mainly by this means. Mainly students, teachers and parents do the cleaning of the school. (2) In mid or large scale maintenance cases, where specialized repair services are required, each school sends a request to MINED through its municipal and departmental representative offices. The contents of rehabilitation, repair and improvement requests collected from all over the country are checked and considered at MINED, and if deemed necessary, the Direction of Educational Facilities and Equipment Norms conducts an actual site survey to assess the maintenance needs, rank them by level of urgency and include it in the following year’s budget. The companies that will conduct the rehabilitation, repair and improvement works, are selected by MINED through public tender, and the companies go around the schools conducting the required rehabilitation, repair and improvement.



A scene of a Parent’s Association meeting in the beginning of the school year

As shown above, with respect to the institutional aspect of the operation and maintenance, organization and line of command are clear. Especially, a fact that can be evaluated positively is the improvement that was made compared to the time of project plan, which was that an Infrastructure Department was established in each Department’s Representative Office of

MINED. With this change, the maintenance needs of the educational infrastructure and facilities can now be assessed in detail, and be reflected in MINED’s rehabilitation, repair and improvement plan. In terms of securing teachers, there are no major problems in the number of teachers and their attendance rate in all the schools of the project. However, due to the fact that the “shared responsibility” principle was introduced, replenishment of consumables, and operation and maintenance is now done more and more based on each community’s cooperative framework, instead of only depending on MINED. With this, a certain level of ownership has been created in each community which has resulted in a higher sustainability. But the level of ownership differs among communities as each community’s situation (especially the economic situation) differs, which could probably result in a gap among schools in the future.

3.5.2 Technical Aspects of Operation and Maintenance

- a. **Technical Aspect of School Operation:** With the principal at the head of each school, the vice-principal and teachers operate the school. The technical level was evaluated based on the number of certificate holders and training systems. The certificates that are necessary as a teacher are as follows. For primary education, it is necessary to obtain the Certificate for Primary Education Teacher (MEP) after having finished five years at the Teacher’s Training School after concluding primary education, or three years after concluding three years of secondary education, or two years after concluding five years of secondary education. For secondary education, it is necessary to either obtain the Certificate for Secondary Education Teacher (PEM) after having finished three years at a university’s faculty of education, or to obtain the Bachelor’s Degree after five years of university education. In case the degree is from another faculty other than education, it is necessary to take the Teacher’s Education Program. If a teacher without certification wants to obtain it, MINED is offering intensive courses on Saturdays and Sundays as well as long holidays. With respect to the school of this project, it was confirmed that all teachers hold a certificate and there were no teachers without it.

Table 9 Technical Level of Teachers at the Project Schools

	University Graduates	MEP Holders	PEM Holders
Principal	16 schools	7 schools	3 schools
Vice-Principal	1 school	19 schools	6 schools
Teachers	Bachelor’s Degree and MEP: 5 schools Bachelor’s Degree and PEM: 8 schools	11 schools	2 schools

Source: Based on documents provided by MINED.

With respect to Teacher’s Training, some are offered, but the four indicated below are the ones regarded as the most important ones. All the teachers of the 26 schools of the project have participated in the Workshop for the Evaluation, Programming and Training of Education (Taller de Evaluación, Programación y Capacitación Educativa, TEPCE) but beside TEPCE, only few teachers have participated in other trainings. TEPCE is conducted the first Friday of every month, and because all teachers are obliged to participate, school is off on those days. In the future, it is necessary to work out and improve the contents of teacher’s training and their participation.

Table 10 Teachers Training: Contents and Frequency

Name of Training Course	Entity who provides the training	Frequency	Number of teachers who participated from the project schools in 2014
TEPCE	MINED	Once a month	All
Research on Theory of Education	MINED	One week during the first semester	17 teachers
Instruction of Phonetics, General Learning Methods, Analytic Methods	MINED	One week during the first semester	17 teachers
Workshop on Theory of Education	MINED	Once a month	30 teachers

Source: Based on documents provided by MINED.

- b. **Technical Aspect of Maintenance:** As mentioned earlier, cleaning and small repairs of educational furniture and facilities that do not require specialized services, are conducted by teachers, students, parents and the local community’s cooperation, but repairs done by parents are not necessarily technically sufficient. Therefore there are no specialized personnel in charge of maintenance in any of the schools. As for electrical works, water supply and sewerage related jobs, repairs of machinery such as computers, and large-scale repairs of buildings are conducted by specialized companies that are selected through competitive bidding conducted by MINED. Thus, in this respect, there are no major technical problems, but all the maintenance is corrective and hardly any preventive maintenance is done. MINED prepared the “Manual for the Preventive Maintenance of Schools” in 2008 which has been distributed to all local governments and schools. The Manual is directed not only to teachers, but to students, parents and local communities as well, and it defines what is maintenance, the objective of preventive maintenance, its methods, tools and frequency (daily, weekly, monthly, annually) of each school facility (classrooms, toilets, teacher’s offices, green spaces) as well as maintenance of each kind of school furniture, waste management, management of pit latrines²⁷, and disaster prevention

²⁷ See footnote 17 with respect to pit latrines.

management. However, after conducting a survey, it was found that there are a lot of schools that have not received the manual, or that have the manual but not everyone has been thoroughly informed about its contents. Although classrooms are relatively clean in general terms, it is necessary to improve the basic awareness of keep things tidy and in order²⁸. In addition, as mentioned below, constant lack of spare parts and tools to do the repairs is a common problem to all the schools of the project. The biggest problem is that maintenance is not done on a timely manner, and these problems are left out without being solved for a long time.

As can be seen, with respect to operation, it can be positively evaluated that all the teachers of the project's schools hold certificates. However, with respect to teachers training, it is desirable that trainings with more sustainable and complete contents are offered to far more teachers. As for the maintenance of facilities, a certain technical level has been secured for those school infrastructures that need specialized services because these are outsourced to external specialized companies. However, small scale repairs have to be conducted by each school teachers, parents and local communities, who cannot be said to have proper and sufficient knowledge regarding repairs, thus technical level is not necessarily secured. In addition, tools and spare parts are lacking. Also, although a maintenance manual does exist, it is not widely known to everyone and there are no maintenance records either. In the 15 schools where site visits were conducted, the main method of maintenance is corrective instead of preventive, and there is a need to change the way to approach maintenance from "fixing things because they are broken" to "maintain and used things carefully so that they do not get broken". On the whole, there is a need to continue improving the technical aspects of the project's operation and maintenance.

3.5.3 Financial Aspects of Operation and Maintenance

There is no fixed annual budget for the operation and maintenance assigned by school, rather, after assessing the needs of each school, an annual budget plan is made per maintenance item. Materials necessary for operation and maintenance are distributed in kind and corrective maintenance such as repairs are done by specialized companies selected through competitive bidding by MINED. These companies go from school to school conducting necessary repairs. Therefore schools do not receive any cash for their expenses. In addition, it is also prohibited for schools to collect cash for operation and maintenance expenses from students²⁹. For daily

²⁸ For example, everyday cleaning of classrooms are done in turns by students. According to the Manual for the Preventive Maintenance of Schools, cleaning should be done after class hours, but many cases that need to be improved were seen: there were cases where classes were interrupted by arbitrary decision of teachers to clean the classroom, or cases where during lunch time, some children were cleaning right beside students that were eating.

²⁹ In Nicaragua, decentralization and autonomy of local governments was promoted until 2006, under which budget

maintenance expenses, each school discusses with the Parents Association, and spare parts etc. are bought using the Parents Association's budget, and labor necessary for repairs is also provided by the parents. However, in some regions, parents' income is low or the sense of ownership of the community differs between communities, thus there is a limit to depending on the Parent's Association budget. As for maintenance issues related to facility infrastructure, educational furniture and equipment it was confirmed through interviews to both MINED and each school that "shortage of spare parts and tools necessary to do the repairs due to lack of budget" is a common problem to all schools, and the real situation is that there is a constant budgetary deficit compared to the nation-wide maintenance needs.

In Nicaragua, the budget for the next fiscal year is established based on the previous year's actual expenditure. According to MINED, the reason why there was a decrease in the budget for MINED as a percentage of the national budget from 2010 to 2013 is that against the requested budget, the actual expenditure was low, thus the following year's budget was cut. However, from 2015, a new policy will take effect and the budget is expected to increase.

Table 11 Ministry of Education Budget

(Unit: Million Cordoba, %)

Item	2010	2011	2012	2013	2014	2015
National Budget	25,262.76	29,941.94	37,611.12	45,288.44	52,081.47	55,309.41
MINED Budget	5,241.41	5,553.25	6,532.93	7,374.85	9,047.86	10,419.17
% of National Budget	(21%)	(19%)	(17%)	(16%)	(17%)	(19%)
1. Investment in Educational Infrastructure	365.46	205.20	193.32	422.21	760.03	708.46
% of MINED Budget	(7%)	(4%)	(3%)	(6%)	(8%)	(7%)
2. Maintenance Expenses	14.44	130.77	154.65	143.75	151.91	163.12
% of MINED Budget	(0.3%)	(2%)	(2%)	(2%)	(2%)	(2%)
3. Personnel Expenses (Staff and teachers)	3,600.80	4,001.57	4,593.33	5,070.32	6,167.59	7,080.45
% of MINED Budget	(69%)	(72%)	(70%)	(69%)	(68%)	(68%)

Source: Based on documents provided by MINED.

In the interviews conducted during the field survey, it was confirmed that there is a lack of budget to buy spare parts and conduct maintenance. Although the budget of the Parent's Association is covering part of it, the real situation is that the budget for operation and maintenance cannot catch up with the needs, and an improvement is desired. On the other hand,

for operation and maintenance of schools was directly distributed from MINED to each school, in proportion to each school's number of students. However, illegal dealings such as uncertainty in budget execution and inflating the number of students etc. were discovered, and the government of Nicaragua introduced the principle of free basic education in 2007, centralizing all budget management (based on PEE 2011-2015, p48). With this, schools were prohibited to directly receive donations from parents, and when repairs or fixing of school installations are needed, everything is done after discussions and consultations with the Parents Association.

separately from MINED’s budget, budget for mid-to-large scale infrastructure development has been secured by the government of each Department, based on Law No. 550. In addition, Law No. 850 (which came into effect on December 13, 2013), municipal governments have to assign at least 5% of their annual budget to development and maintenance of educational infrastructure. The fact that different budgets are now secured for the maintenance of educational facilities besides the central government budget, can be evaluated positively.

3.5.4 Current Status of Operation and Maintenance

Common issues that were seen in all schools regarding the status of operation and maintenance as well as those that have to be particularly improved in specific schools are indicated in Table 12.

Table 12 Maintenance Status of Educational Facilities and Furniture at the Time of Ex-Post Evaluation³⁰

Class room buildings
<p><u>Walls and floors:</u> There were small cracks in all the schools. However, with the exception of (1) below, the cracks in the rest of the sites are cracks that appear with normal use just as was indicated at the time of the defect inspection. (1) At Monseñor Carmen del Suazo School located in Madriz Department, where it was confirmed that there is a fault in its premises, big cracks which might possibly be caused by the fault, reappeared even after repairs were made post defect inspection, and urgent measures are necessary³¹. (2) In El Bijagual School located in Matagalpa Department, inundations above floor level occur in one of the buildings during rainy season (May to November), and at least once a week, the classrooms are inundated. Teachers and parents are taking measures such as sweeping out the water with mops and wipe with floor cloths. (3) At Ruben Dario School in Esteli Department, after the defect inspection, a recommendation was made to install a pump in order to lower the ground water level. The third classroom building is suffering from inundation above floor levels due to flow of ground water, as well as flows from a nearby river. Following the recommendations from the defect inspection, it is urgent that a pump is installed³².</p>
<p><u>Ceilings:</u> There were several leaks from the ceiling. Especially in Jose Dolores Estrada School and Catorce de Septiembre School, both in Jinotega Department, the problem is serious and urgent measures are needed.</p>
<p><u>Doors and windows:</u> There are almost no major problems with respect to doors, but with windows (glass blind windows) in all the schools the window frame clamps are loose, and either cannot be</p>

³⁰ The status of operation and maintenance at the time of ex-post evaluation was based on the check items and contents of the Defect Inspection Report.

³¹ According to interviews to the principal, after the fault was found, MINED considered the following three scenarios: (1) move the school; (2) close the school and distribute the students to nearby schools; and (3) strengthen the current infrastructure. It was concluded that for the first and second scenarios, there were budget limitations and problems to secure land, thus the third scenario was chosen. The construction of this project was conducted based on MINED’s decision, but it could have been possible for the government of Nicaragua to ask Japan for recommendations on possible methods to strengthen the structure’s earthquake resistance, under the assumption that the current facilities would continue to be used.

³² In regard to the two schools that are suffering from inundations above floor level, considering the characteristics of the land where they are located, i.e. they are either near a river or the level of underground water is high, it would have been best if the local consultants that made the Detailed Design had promptly advised on the possibility of an inundation and measures to be taken. As for the Grant Aid for Community Empowerment scheme, currently, Japanese consultants verify these matters at the time of the Detailed Design; therefore the accuracy of the Detailed Design has been improving.

<p>closed well enough or are broken altogether. Glass sheets have also either come off or have been broken due to strong winds causing a lot of damages. It is urgent that MINED takes measures such as to establish standards for windows that are safer and with less maintenance costs.</p>
<p><u>Corridors:</u> There are small cracks in the walls and floors of the corridors, and rain water leaks were also seen. Urgent measures are desired.</p>
<p>Toilets</p>
<p>Although flush toilets are being used, there are schools where pit latrines are not being used. During the field survey, it was found that in many cases, the booth doors are warped and have problems with the mounting, and locks, metal fixtures, door handles are damaged or lost. At Jairo Jose Suarez School in Matagalpa Department, ground water level rises during rainy season making latrines impossible to use.</p>
<p>Educational Furniture</p>
<p><u>Doors:</u> Almost all the locks of the cabinet doors are broken. Although valuables cannot be kept, the cabinets are in use.</p>
<p><u>Pupitres (tablet arm chairs):</u> At the moment of the defect inspection, there were already many with the surface laminate torn off and with graffiti, and even since then; the reason was that there are problems in how these were used. At the time of ex-post evaluation, <i>pupitres</i> in these conditions were especially seen in secondary schools. According to MINED, the useful life of <i>pupitres</i> is between five to seven years, and an improvement in students' awareness is needed.</p>
<p><u>Blackboards:</u> As MINED is introducing whiteboards, in almost all the schools the blackboards were not used as such. In the schools where they are being used as blackboards, there are problems with the quality of the coating which has already come off. In addition, since there are no teacher's platforms in which to stand on, when students in lower grades of primary school have to solve problems in front of the class using the blackboards, they either have to stand on <i>pupitres</i> or simple platforms, which represent problems for the students' convenience and safety.</p>
<p>Others</p>
<p><u>Electricity, Water Supply and Sewerage:</u> In some rural schools, electricity, water supply and sewerage have not been developed, or exterior construction of the outer fence has not been completed. However, local governments are gradually working on it. In schools without water supply, teachers and parents fetch and keep water in PET bottles so it can be used for hand washing. There is an urgent need to develop water supply and sewerage in order to improve the hygienic conditions.</p>
<p><u>Cleaning and Safety:</u> It is necessary to conduct thorough cleaning as in many cases garbage was seen scattered in the school premises (outside classrooms). In addition, there are other problems such as damages to the wire mesh of the fences, and in schools with basketball courts, outsiders have intruded into school premises and use the courts without permission. It is necessary to strengthen the security system in order to secure the safety of students.</p>

In conclusion, as a result of the field study, classrooms and furniture can be said to be providing a “proper environment for students to study” up to a certain point. However, in overall terms, it is necessary to continue improving maintenance of school facilities as a whole as well as to make sure that students' and community's awareness towards maintenance continues to improve. Thus in terms of status of operation and maintenance, there is room for improvement.

Some minor problems have been observed in terms of the project's institutional, technical, financial and current status aspects. Therefore sustainability of the project effects is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project aimed to contribute to the improvement of enrollment rates and quality of education by upgrading the educational environment of primary and secondary schools through the development of school facilities and educational furniture in the five Departments of the Northern Region of Nicaragua.

The project is in line with Nicaragua's development policies, development needs as well as Japan's assistance policies both at the time of project planning and ex-post evaluation, therefore its relevance is high. Project cost was as planned, however, project period exceeded the plan because it took time to deal with the geological conditions of the land and subsoil that were found once construction works had started, and therefore efficiency is fair. Operation and effect indicators almost met their targets: especially, the number of students that can study in a good learning environment even surpassed its target, and secondary school enrollment rates of all five Departments are improving. Although among the educational facilities that were developed, there were some quality-related problems such as the case where designs and plans of toilets and educational furniture (black boards) do not necessarily meet the needs of all users, on the whole, the expected effects and impacts have appeared, therefore its effectiveness and impact are high. On the other hand, in terms of operation and maintenance, although efforts are gradually being made to optimize internal procedures related to institutional organization and securing budget, there is still a budgetary deficit, and there is room for improvement in the technical aspect of maintenance as well. Judging from the maintenance status at the time of ex-post evaluation, in order to make sure that the project's effects are realized in a sustainable way, it is desirable to further improve all institutional, technical, financial and current status aspects of operation and maintenance, therefore its sustainability is fair.

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

4.2 Recommendations

4.2.1 Recommendations to the Implementing Agency

- MINED (at the central, departmental and municipal levels) who is the Implementing Agency is recommended to distribute the Preventive Maintenance Manual for Schools elaborated in 2008 to all the schools of the project, and make sure that its contents are thoroughly known and put into practice. It is also necessary to clearly define maintenance responsibilities of MINED and each community under the "shared responsibility" principle, and based on that, it is desired to strengthen the maintenance of all educational facilities and furniture developed and provided by the project from now on. At the time of the ex-post evaluation, there was no clear delineation, and there were even cases where teachers

themselves had to spend their own money to buy necessary educational material. This situation can be an obstacle for the sustainable realization of the project effects, thus it is desired that the respective areas of responsibility are made clear.

- It is requested that proper measures are taken to solve the problems mentioned in “3.5.4 Operation and Maintenance Status” that have been appearing in each of the classroom buildings, toilet buildings and classroom furniture (e.g. wall cracks, rainwater leakage from the ceiling, damage of metal fixtures and lack of locks of the cabinet doors, flaking of the *pupitre* laminated material etc.). Especially the following two problems need urgent measures:
 - a. With respect to pit latrines, if the method of use is thoroughly and widely known to all the users, their effect will be realized. It is urgent that measure such as preparing manuals on how to use and maintain these pit latrines, as well as conducting trainings in the communities, be taken. In the schools where sewerage infrastructure is being developed, there are some cases where pit latrines have already been converted into flush toilets. It is desired also that these cases which are potential improvement methods are considered and widely disseminated. With respect to the doors which are very heavy and difficult to open and close, it is urgent that measures are taken as even accidents have occurred. Thus, under the “Shared Responsibility” principle, it is necessary that schools discuss with parents and community members the replacement of these doors with ones made with materials that are more convenient to use and secure the safety of the users.
 - b. In the region where Monseñor Carmen del Suazo School is located in Madriz Department, a fault was found, and has been classified by SEDAPAL as a “high risk” region regarding the possibility of a major earthquake occurrence. In order to secure the safety of children, students, staff and teachers, it is urgently needed to consider specific measures that will be taken from now on, including specific measures such as strengthening and reinforcement of the school structure to say the least.

4.2.2 Recommendations to JICA

At the moment of the ex-post evaluation, the next phase of this project has started in the departments of Nueva Segovia and Madriz. Especially on the topic of pit latrines and school furniture, it is desired to act upon the Implementing Agency as well as consultants so that MINED’s construction standards are observed and people’s needs are reflected for sure in the designs.

4.3 Lessons Learned

Checking the needs of the users at the time of project planning

In this project, especially at the time of the Detailed Design, the height of the pit latrine seats did not reflect the needs of the children in lower grades of primary schools, which has limited the effect of the project to these children. In addition, although the “Number of students that are taking classes in two shifts in 11 of the schools of the project that are classified as rural schools” was set as an effectiveness indicator, in Nicaragua there are needs for two-shift schools in the rural areas, thus the said indicator cannot necessarily be said to have been a proper indicator. At the moment of project planning and design, while following the construction norms of the central government, it is desired to directly assess the user’s needs as much as possible through interviews with local office staff, teachers and parents of the project schools, as well as by conducting field studies in order to reflect these in the designs and setting of proper indicators at the time of project planning.

End

Annex 1 Output Content: Detailed Design and Actual

No	Department	Municipality	Name of School	No. of floors	No. of class rooms	Principal Office	Vice-Principal Office	Teacher's Room	Auxiliary Unit	Pit Latrines	Flush Toilets	Actual	
1	Estelí	Estelí	Monseñor Oscar Arnulfo Romero (P)	2	17	1	0	1	0	0	0	According to Detailed Design	
2R			Ruben Dario (PS)	1	11	1	0	1	0	10	0		
3		San Juan de Limay	Felicita Ponce de Rodriguez (P)	1	10	1	0	1	0	10	0		
4		Estelí	Reino de Suecia (S)	2	7	1	0	1	0	0	6		
5			Maria Llanes Rodriguez (P)	1	7	1	1	1	0	0	6		
6R		Jinotega	Jinotega	Jose Dolores Estrada (PS)	2	11	0	0	1	0	10		0
7			El Cua	Ricardo Morales Aviles (P)	2	13	1	0	1	0	14		0
8R				Catorce de Septiembre (P)	2	7	0	0	0	1	6		0
9			Jinotega	Benjamin Zelendon (P)	2	10	0	0	0	0	0		10
10				Jose Dolores Rivera (PS)	1	9	0	0	0	0	0		10
11R			San Sebastian de Yalí	La Rica (Now Neli Beatriz Castillo, S)	1	8	1	0	1	0	10		0
12R		El Bijagual (Now Filemon Rivera, PS)		1	4	0	0	1	0	6	0		
13	Matagalpa	Matagalpa	Ruben Dario	Excluded from the project due to difficulties in nationalization of the construction site land									
14		Matiguás	Jose Santos Celaya (PS)	1	6	1	0	1	0	0	6*	According to Detailed Design	
15R		San Isidro	San Isidro (P)	1	5	0	0	0	0	6	6*		
16		San Ramon	La Corona (PS)	2	7	0	0	1	0	6	0		
17R		Matagalpa	Quebrada Honda (PS)	1	6	0	0	1	0	6	0		
18R			Lesbia Lopez (PS)	1	10	1	0	1	0	0	0		
19R		Rio Blanco	San Andrés de Boboqué (PS)	1	9	1	0	1	0	10	0		
20R			Jairo Jose Suarez (PS)	1	9	1	1	1	0	10	0		
21		Jalapa		Efrain Salcedo (P)	1	6	0	0	0	1	0		0
22				Ruben Dario (P)	1	6	1	0	1	0	6		0
23	Nueva Segovia	Ocotol	Santa Ana (Now Nora Astorga, P)	1	5	1	0	0	0	6	0		Toilet Plan: Flush toilet Actual: Pit latrine
24R			Nacional de Segovia (S)	2	7	0	0	0	1	0	0		
25	Jalapa		Adilia Ilias (PS)	1	5	0	0	1	0	6	0	According to Detailed Design	
26	Madriz	Somoto	Monseñor José del Carmen Suazo (P)	1	4	0	0	0	0	0	0		
27			Instituto Nacional de Madriz (S)	2	12	0	0	0	0	0	10*		
TOTAL					211	13	2	17	3	110	60		

Source: Information regarding the Plan is based on documents provided by JICA. Actuals are based on information provided by the Implementing Agency.

R: Rural area (11 schools) / Shaded boxes: schools visited during the first field study (15 schools) / P: Primary School / S: Secondary School.

*: Although they are flush toilets, a septic tank and an infiltration basin were added because there was no connection to public sewerage.

Annex 2 Results of the Beneficiary Study

Survey period	February 16 and 17, 2015 (testing of questionnaire) , March 1 to 14, 2015
Area and number of samples	Somoto, Madriz Department; Ocotal, Nueva Segovia Department; Estelí, Estelí Department; El Bijagual, Jinotega Department; San Ramón La Corona, Matagalpa Department. Total schools: five (100 samples). Students: 10 students per Department (five Departments) =50 students; 5 teachers per Department=25 teachers; 5 parents per Department= 25 parents.
Sampling method	The following six factors were taken into consideration when selecting the five schools for the beneficiary study: (1) construction area; (2) project cost; (3) balance between urban and rural area; (4) balance between shifts (one, two, and weekends); (5) balance between one and two floor schools; (6) balance between type of toilets (pit latrines or flush toilets).
Characteristics of respondents	<ul style="list-style-type: none"> • Students: (1) Male-female ratio: 50%; (2) age distribution: 13 to 17 (68%), 18 to 22 (20%), 23 to 29 (12%); (3) morning shift: 60%, afternoon shift: 10%, weekends: 18%; (4) means of transportation: walking (76%), walking and bus (24%). Commuting time was one hour and a half maximum. 68% of students are taking classes in groups of “35 students per class” as established by MINED. 18% of students take classes in groups of 36 to 45 students per class, and 14% of students do so in groups of more than 46 students. • Teachers: (1) Male-female ratio: males 16%, females 84%. Average number of teaching years: 1 to 10 years (20%), 11 to 20 years (52%), more than 21 years (28%). All teachers hold certificates. Average number of students per teacher: less than 70 students (16%), 70 to 250 students (48%), more than 251 students (32%), no answer (4%). Means of transportation: walking (56%), bus and/or motorcycle (44%). • Parents: (1) Male-female ratio: male 36%, female 64%; (2) occupation: 6 males were agricultural workers (others: carpenter, accountant, teacher, one person each); 11 of the females were full time housewives (agricultural workers: 2 persons, others: 3 persons); (3) average household income: 14,000 to 35,000 cordobas (28%); 36,000 to 120,000 cordobas (48%), no answer (24%).
Survey results	
1. Satisfaction of school buildings	<ul style="list-style-type: none"> • Lighting: 97% of beneficiaries answered “Very good” or “Good”, 3% answered “Bad”, indicating that most of the beneficiaries are satisfied. • Interior illumination (electricity): 60% of beneficiaries answered “Very good” or “Good”, 40% answered “Bad” indicating that compared to lighting the satisfaction level is lower. Main reasons being that “although fluorescent lamps go out, they are not replaced” or “even when switches are turned on, some or even all fluorescent lamps do not function”, these are due to maintenance problems. Problems related to electricity do affect the students that study in the afternoon shift at two-shift system schools. • Ventilation and humidity: Satisfaction level was high as 88% answered “Very good” or “Good” and 12% answered “Bad”. The beneficiaries who answered “Bad” consider the main reason to be that “the glass of the ventilation blinds are broken and rain comes in”, “the handles of the blinds are broken so often and it cannot be opened or closed”. This situation was found in all the classrooms of all 15 schools where field surveys were conducted. At least some glasses are broken or the handles were broken. This is due mainly to the problem in the quality (durability) of the blinds and because maintenance is not enough. • Status of the floors and walls: Opinions were split into two: 55% said “Very good”, while 45% said “Bad”. In the latter case, the main reasons stated were “floors and walls have cracks” and “they are not flat”. With respect to walls, in the schools where defect inspections were conducted, these defects were repaired. However, they were not fundamental solutions, instead they were simple repairs where cracks were filled in with concrete, thus at the moment of the field survey, cracks in the same places had appeared. • General safety of the buildings (question made only to parents): Satisfaction levels with respect to safety were high, as 96% said “Very good” or “Good”, while only 4% said “Bad”. Those parents who answered “Bad” were limited to those whose children go to two-story schools, and they mentioned that “students climb up to the fences of the second floor which is dangerous”, which is more a problem related to the school’s safety management and students’ awareness.
2. Satisfaction of educational furniture	<ul style="list-style-type: none"> • <i>Pupitres</i> (tablet arm chairs): Students’ satisfaction levels with respect to size and convenience was high. 94% answered “Very good” or “Good”. With respect to stability of the chair 78% said that there are “No problems” or “Almost no problems”, while with respect to the stability of the tablet, 82% said that there are “No problems” or “Almost no problems”, showing that satisfaction in terms of overall stability was high. When asked if they are “always clean and well maintained”, 72% said “Very good” or “Good”, while 28% said “Bad”. The main reason for a relatively low satisfaction level compared to other aspects was that there are graffiti or the plates are torn off. Although these <i>pupitres</i> are useful and have almost no problems safety-wise when students used them to study, it was proven there are problems in the way these are used and maintained. The satisfaction level of <i>pupitres</i>’ maintenance status from the parents and teachers point of view was rather low, as 52% of parents and 36% of teachers answered “Bad”. • Desks and chairs for teachers (question made only to teachers and parents): 84% of teachers responded that they are “Very convenient” or “Convenient” while 92% of parents said the same and the satisfaction levels were high. With respect to safety, 72% of teachers answered “Very good” or “Good”, while 88% of parents did the same, which was relatively low. The main reason stated by the teachers was that they are not able to lock the drawers (whether because the lock is broken or keys were lost) thus valuables cannot be kept in them. • Blackboards: Teachers that responded “they are convenient for teachers” were 36%, while parents who did so were 48%. Teachers that responded that “they are convenient for students” were 36%, and 44% in the parent’s case, showing that satisfaction levels were lower compared to other educational furniture. The main reasons being that, in the first place, there are only few schools where blackboards are being used as such, and in those schools where blackboards are used as blackboards, the problem is that the height in which they were installed is too high for students of lower grades of primary school to use.

<p>3. Satisfaction of toilets and latrines</p> <ul style="list-style-type: none"> With respect to overall satisfaction of toilets and latrines (safety and hygiene), 58% of students responded that they are “Bad”. The main reasons being “doors are too heavy and are often detached”, “doors have no lock and cannot be closed, so there is no privacy”, “they smell” and “cannot be flushed because water supply is cut off”. With respect to the height of the toilet seat, due to the fact that the beneficiaries that were interviewed were secondary school students, 92% responded that they are “Very good” or “Good”, showing a high satisfaction level. However, the satisfaction level of teachers and parents who do know about the needs of all students was rather low, as 48% and 40% respectively answered “Bad”. The main reason being that students from lower grades of primary school cannot use them. With respect to hygiene, 80% of teachers and 74% of parents responded that it is “Very good” or “Good”, showing a high level of satisfaction. But, there were many parents who mentioned that “toilets need to be cleaned more often”.
<p>4. Satisfaction of basic infrastructure (electricity, water supply and sewerage)</p> <ul style="list-style-type: none"> In reference to electricity and sewerage, 48% of teachers and 44% of parents responded that they are “not satisfied”, and 36% of both teachers and parents gave the same answer for water supply. Although all schools have electricity and water supply, there are a lot of outages and cut-offs. The fact that a stable supply of these services are not secured was the main reason for the rather low level of satisfaction. With respect to sewerage, currently, the local governments are continuing to develop this infrastructure, thus improvements can be expected.

Source: Summary elaborated by the evaluator based on the results of the beneficiary study.

Central America

Ex-Post Evaluation of Japanese Technical Cooperation Project
The Project on Capacity Development for Disaster Risk Management
in Central America “BOSAI”

External evaluator: Hajime Sonoda, Global Group21 Japan, Inc.

0. Summary

The Project on Capacity Development for Disaster Risk Management in Central America (hereinafter referred to as “the Project”) was implemented with the objective of conducting local disaster management activities in six Central American countries (El Salvador, Costa Rica, Guatemala, Honduras, Nicaragua, Panama), thereby enhancing the disaster risk management capacity of the selected communities (hereinafter referred to as “target communities”) and the municipal authorities with jurisdiction (hereinafter referred to as “target municipalities”), and through the experience and knowledge acquired in this process, improving the capacity of the respective national disaster risk management agencies and the Executive Secretariat of the Center of Coordination for the Prevention of Natural Disaster in Central America (SE-CEPREDENAC) to promote local disaster management. Although the Project had some issues concerning planning and approach, its relevance is deemed to be high because it was highly relevant to policies, development policy and needs in Central America at the time of both planning and ex-post evaluation and it was consistent with the Government of Japan’s aid policies and plans in Central America. Capacity development for disaster risk management was achieved in the target municipal authorities, however, it was only partially realized in the target communities. Also, capacity development for implementing local disaster management was only partially achieved in the respective national disaster risk management agencies and SE-CEPREDENAC; moreover, because development of counterpart personnel in national disaster risk management agencies was not adequately realized in some of the countries, some of the Project objectives were not achieved. Moreover, considering that little progress was made in terms of sharing and utilizing local disaster management information, experience, techniques, etc. across national boundaries, the Project’s effectiveness and impact were moderate. The Project period was within the planned term, however, because the cost was higher than planned, the Project efficiency was moderate. While sustainability in terms of policies and systems is high, as the national agencies and municipalities and communities are faced with institutional, technical and financial constraints, the sustainability of effects generated by the Project is moderate. To sum up, the Project is judged to be partially satisfactory.

1. Project Description



Project Location



Sign for a tsunami evacuation route (Nicaragua)

1.1 Background

Central America experiences a variety of natural disasters, such as storm and wind, flood damage, sediment disasters, earthquakes, volcanic eruptions and so forth, and the human and economic costs of these disasters are a major impediment to the region's development. Accordingly, in 1993, six countries in Central America established CEPREDENAC under the auspices of the Central American Integration System (SICA) with the aim of building a disaster-resistant society¹. Following the occurrence of Hurricane Mitch, which caused extensive damage across Central America in 1998, the leaders of the six Central American nations announced the Guatemala Declaration (1999) renewing their resolve to build a disaster-resistant society, and CEPREDENAC took the initiative in compiling the 5-year Plan for Disaster Risk Management in Central America (2000~2004). In the subsequent 10-year Plan for Disaster Risk Management in Central America (2006~2015), capacity building for disaster risk management in communities, promotion of human resources development in the disaster risk management field, consideration to disaster risk management in development planning by local municipal authorities and so forth were identified as priority issues.

It was against such a background that the governments of Central American countries in 2005 requested the Government of Japan to provide technical assistance with emphasis on disaster risk management capacity building on the community and local levels. In response, the Government consigned JICA to implement a preparatory study in 2006, and following the signing of the Record of Discussions with the respective national disaster risk management agencies and the SE-CEPREDENAC, it commenced the Project as a five-year undertaking from May 2007².

¹ CEPREDENAC, a specialist agency under the jurisdiction of SICA, implements activities, projects and programs aimed at mitigating the risks of disasters that cause human and economic losses under the guidance of a representative conference composed of the directors of the respective national disaster risk management agencies. Its operations are financed by contributions from the member states and assistance from donors.

² The Project was planned to target six countries, however, because signing of the Record of Discussions with was

1.2 Project Outline

Overall goal	Information, knowledge, and methodologies on local disaster risk management in Central America are commonly utilized in different areas in the region.	
Project goal	Communities' and municipal authorities' capacity for disaster risk management is strengthened in the target areas, and the capacity of CEPREDENAC members for promoting local disaster risk management is strengthened.	
Output	Output 1	The mechanism for disaster risk management is strengthened in target communities in collaboration with municipal authorities
	Output 2	Knowledge of disaster risk management is promoted in target communities.
	Output 3	Disaster response and risk reduction goals, tools, and activities are included in municipal plans in the target areas.
	Output 4	Capacity for promoting local disaster risk management is enhanced in the respective national disaster risk management agencies and SE-CEPREDENAC.
	Output 5	Mechanism for disseminating information, experience and methodologies about local disaster risk management is established.
Grant from the Japanese side	495 million yen	
Period of cooperation	May 2007 ~ May 2012	
Implementation agency	Executive Secretariat of CEPREDENAC (SE-CEPREDENAC) Each country's disaster risk management agency: El Salvador, Director General for Civil Protection (Civil Protection) Costa Rica, Nacional Commission for Emergency (CNE) Guatemala, National Coordination for Disaster Reduction (CONRED) Honduras, Permanent Contingency Commission (COPECO) Nicaragua, National System for Disaster Prevention, Mitigation and Relief (SINAPRED) Panama, National System for Civil Protection (SINAPROC)	
Other cooperating agencies in the recipient country	El Salvador National Land Research Institute (SNET) Nicaragua Land Research Institute (INETER)	
Cooperating agency in Japan	Cabinet Office, Ministry of Land, Infrastructure and Transport, Asian Disaster Reduction Center, Disaster Reduction and Human Renovation Institution	
Related projects	Training in Japan "Disaster Risk Management Measures in Central America" (2007~, North America, Central and South America), Third country training in Mexico "Civilian Safety and Disaster Risk Management" (2007~2012, Argentina, Belize, Bolivia, Chile, Colombia, Costa Rica, Ecuador, El Salvador, others), Japan Overseas Cooperation Volunteers (Costa Rica, El Salvador, Panama, Honduras, Nicaragua)	

Note) Because the indicators and means for acquiring the data for the said indicators were not established in the Project Design Matrix (PDM) that was compiled at the time of the ex-ante evaluation, a new PDM containing this information was compiled at the time of the interim evaluation. In the ex-post evaluation here, evaluation is conducted based on the indicators established in the interim evaluation.

1.3 Outline of the Terminal Evaluation

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

Concerning the project purpose, i.e. "communities' and municipal authorities' capacity for disaster risk management is strengthened in the target areas, and the capacity of CEPREDENAC members

slower than with the other countries, the actual cooperation was commenced with five countries (omitting Nicaragua) in May 2007. Nicaragua was added to the target countries in December 2008.

for promoting local disaster risk management is strengthened” in the PDM, indicators were established based on evaluation sheet on three levels, i.e. communities, municipal authorities, and countries/Central America³. Regarding the target level of 80%, the achievement was 68% on the community level, and 90% on the level of municipal authorities. In terms of countries / Central America, three out of the six target disaster risk management agencies and SE-CEPREDENAC attained the target indicator. Even in the communities that didn’t attain the target level, considering the possibility that the target level could be achieved in the remaining term (six months) of the Project, it was deemed that the Project purpose was “mostly achieved.”

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

Concerning the overall goal, i.e. “information, knowledge, and methodologies on local disaster risk management in Central America are commonly utilized in different areas in the region”, although there were already a number of derivative cases, it was deemed that progress towards achievement was slow. In view of the Central American characteristic of having to deal with frequent personnel turnover due to changes of government, the issue of work continuity in government organizations was identified as a major stumbling block to achievement of the overall goal.

1.3.3 Recommendations at the time of the Terminal Evaluation

- The national disaster risk management agencies and SE-CEPREDENAC should establish goals for local disaster management activities and conduct continuous monitoring geared to their achievement.
- The training course in Japan on “disaster risk management measures in Central America” was highly effective and should be continued.
- In the future, third country training should be proposed, coordinated and administrated by the national disaster risk management agencies and JICA.
- The tools and methodologies that were prepared in the Project should be actively shared with and distributed to other agencies through a website, etc.
- The disaster risk management personnel of national and local municipal authorities should conduct ongoing support to ensure that the risk and resources maps and disaster risk management plans prepared by the communities are regularly updated⁴.

³ For the purposes of the Project, municipal authorities refer to the authorities that have direct jurisdiction over communities (equivalent to municipalities in Japan). These are usually called “municipalities” in Central America, however, they are called municipal authorities here. On the evaluation sheet, check items are set corresponding to the contents of the capacity development intended by the Project on each level (6 items for countries and CEPREDENAC, 10 items for municipal authorities, and 11 items for communities), and the degree of achievement of each item is scored according to three levels (0 points, 0.5 points, 1 point).

⁴ Risk and resources maps give a visual diagnosis of natural disaster risks and risk management resources

- Changes in the awareness and behavior of community inhabitants concerning disaster risk management should be monitored through appropriate methods, and the evaluation sheets need to be improved upon taking the Project experience into account.
- The national disaster risk management agencies should assign coordinators to take the place of the coordinators who were assigned by JICA in the Project

2. Outline of the Evaluation Study

2.1 External Evaluator

Hajime Sonoda (Global Group 21 Japan)

2.2 Duration of Evaluation Study

The ex-post evaluation study for the Project was conducted over the following period.

Duration of the Study: November 2014 ~ October 2015

Duration of the Field Survey: January 25~March 5, 2015, May 17~June 5, 2015

2.3 Constraints on the Evaluation

There were seven implementing agencies for the project, i.e. SE-CEPREDENAC and the disaster risk management agencies of the six target countries in Central America. Due to the confidential nature of some information concerned, it was not possible to obtain adequate information concerning budget makeup and trends, etc. of some of the disaster risk management agencies, making it difficult to conduct detailed analysis on financial aspect.

3. Results of the Evaluation (Overall Rating: C⁵)

3.1 Relevance (Rating: ③⁶)

3.1.1 Relevance to Development Plans of Central America

As mentioned in 1.1 Background, at the time of the ex-ante evaluation, the 10-year Plan for Disaster Risk Management in Central America (2006~2015) had been compiled and local disaster management, i.e. disaster risk management in municipal authorities on the level of communities and municipalities, was viewed as an important issue.

In June 2010, the Central American Integration System (SICA) approved the Central America

(telecommunications facilities, evacuation routes and centers, emergency relief facilities, etc.) in target areas. It should be noted that “a risk map” mentioned in the terminal evaluation report of the Project is same as “a risk and resources map” in this report.

⁵ A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

⁶ ③: High, ② Fair, ① Low

Integrated Disaster Risk Management Policy (PCGIR) and updated the abovementioned plan, and within this it earmarked local disaster management as a means of realizing the priority policy field of “land management and rule.” Therefore, by the time the Project was completed, it had become an important element of the said Policy. Moreover, within the comprehensive disaster risk management policies and systems being adopted by each country, for example, the National Plan for Civil Protection of El Salvador (2009), the National Plan for Comprehensive Risk Management of Panama, and the National Risk Management Plan of Costa Rica (2010~2015), the promotion of local disaster management had become an important and ongoing policy issue.

Accordingly, the Project had high relevance to development policies both at the time of the ex-ante evaluation and on completion of the Project.

3.1.2 Relevance to the Development Needs of Central America

As mentioned in 1.1 Background, at the time of the ex-ante evaluation, various kinds of natural disaster were greatly impeding development in Central America. Over the seven years between 2006~2012, Central America witnessed increased fatalities, affected persons and economic losses due to disasters⁷, and such damage accounted for between 22~40% of GDP depending on the country⁸. Moreover, Honduras, Nicaragua, and Guatemala are ranked as the first, fourth and ninth most vulnerable countries in the world to weather-related disasters⁹.

Thus, it can be seen that disaster risk management is an important issue for development in Central America, and the Project was highly relevant to the area’s development needs both at the time of ex-ante evaluation and completion.

3.1.3 Relevance to Japan’s ODA Policies

The Initiative for Disaster Reduction through ODA (January 2005), which indicates the Government of Japan’s cooperation policies in the field of disaster risk management describes such topics as: “enhancing the priority of disaster risk management,” “the importance of “soft” support (non-structural measures)”, “utilization of Japan’s experience, knowledge and technology” and so on. It also mentions assisting improved awareness about the importance of disaster risk management in developing nations through policy discussions, seminars and educational activities, the need to

⁷ According to the database of CRED (Center for Research on the Epidemiology of Disasters), which records major disasters all over the world, Central America had 526 fatalities and 2.25 million affected persons every year during this period. Looking at records from 1970 onwards according to this database, weather-related disasters was the most common form of damage in Central America accounting for 70%, and this was followed by earthquakes at 10% and eruptions at 5%. Also, biological disasters such as epidemics and pest outbreaks accounted for 9%.

⁸ Report on Natural Disaster Risk Vulnerability in Central America (February 2014)

⁹ Global Climate Risk Index 2015 (Germanwatch)

disseminate and establish disaster risk management, and the need to compile disaster prevention plans and strengthen organizational capacity in regional municipal authorities. In addition, the JICA country-based project implementation plans for each country mention improving disaster risk management awareness among local inhabitants, strengthening the local disaster management capacity, strengthening the disaster risk management setup of government and community organizations, strengthening the development plans based on the perspective of disaster risk management and so on. Accordingly, the Project had a high degree of relevance to Japan's ODA policies.

3.1.4 Appropriateness of Project Plan and Approach

The basic concept of the Project entailed identifying and systemizing model good practices for Central America within the experiences of tackling disaster risk management in the pilot sites (target municipalities and communities), and promoting the accumulation and sharing of information primarily among the national disaster risk management agencies and SE-CEPREDENAC. The following points can be mentioned regarding the Project approach in terms of realizing this concept.

- Because the criteria for selecting the target municipalities and communities were not clearly specified, the target areas and types of disasters were not appropriately narrowed down in some countries, making it difficult to obtain clear outputs. Also, no particular consideration was shown to avoiding extreme areas with a view to realizing dissemination within countries and to other countries in the region.
- The activities in the target municipalities and communities were not properly recorded. Also, activities for verifying and evaluating the acquired results were not included in the plans. As a result, the systematization of the various experiences and knowledge acquired in the municipalities and communities was inadequate, and this was one of the reasons why the dissemination of good practices did not proceed well.
- The basic concept of the Project to prepare models for future dissemination via the activities in pilot sites was not sufficiently demonstrated in the PDM and other documented plans. As a result, the municipalities and communities were selected without clarifying the selection criteria or specifying whether or not sites were pilot sites, and the focus was directed solely to activities for strengthening disaster risk management capacity at the selected sites.
- The PDM did not specify the importance of training core employees (counterparts) in

enhancing the capacity of national disaster risk management agencies to conduct local disaster management, and activities for this purpose were not sufficiently conducted.

As is described later, this had an impact on the Project's effectiveness, impact and sustainability. However, since there were other factors that greatly impacted the Project, for example, the low recognition about the need for disaster prevention in the municipalities and communities and the financial constraints and personnel turnover in the municipal authorities, it cannot be said that the abovementioned issues greatly harmed the Project's appropriateness.

Meanwhile, because the Project was a regional undertaking targeting six countries in Central America, its implementing agencies included the respective national disaster risk management agencies and the regional specialist agency of CEPREDENAC. One of the advantages of the Project being a regional undertaking was that, because the same experts could visit multiple countries and there was active involvement by the regional specialist agency, it was possible to stage frequent regional seminars, study tours and the like and thereby expedite information sharing between countries. Also, because the experts were in charge of multiple countries at the same time and were able to make repeated short-term visits at appropriate times, it was possible to efficiently utilize the input of experts¹⁰. Moreover, the involvement of CEPREDENAC, which is made up of representatives from the national disaster risk management agencies, was effective for ensuring smooth communications and coordination within the region and securing sustainability following completion of the Project.

On the other hand, being a regional project brought its own unique difficulties. First, the sheer number of related agencies meant that a lot of time and money were spent on coordination and procedural affairs. Also, although the same PDM was used to manage the Project activities in each country, because the activities and specific indicators of outputs were modified according to each country's situation, there were differences between countries. The counterparts had a shared recognition of such modifications, however, the adopted PDM was not intended to state different country-based goals and remained unchanged. As a result, disparities arose between the contents of the PDM and the conditions on the ground¹¹. Adoption of a common PDM

¹⁰ Since there are few Japanese experts in the field of disaster risk management who can function in Hispanic countries, the experts were consolidated into one country and there was difficulty in implementing the project activities in one country at a time.

¹¹ Differences in the types of disasters (earthquakes, volcanoes, tsunami, flooding, landslides, etc.) that are emphasized in each country, disaster risk management policies and plans, organizational setup for disaster risk management agencies, and local administrative systems were reflected in the activities in each country. For example, in Panama where municipalities have limited capacity, local offices of the national disaster management agency directly intervened to the target communities, and in Costa Rica, where municipalities also have limited capacity, the national agency intervened to the target communities in close collaboration with some of the target municipalities. In El Salvador, the Project activities were started with the focus on municipal authorities, and activities were weighted more towards schools rather than the communities. In Honduras, the national disaster risk management agency had extremely limited involvement.

meant that the differences in conditions between each country were overlooked and made it difficult for the differences in conditions and goals to be appropriately taken into account¹².

Summing up, the Project had high relevance to policies and the development policies and needs of Central America both at the time of the ex-ante evaluation and the ex-post evaluation. It was also relevant to the Government of Japan's ODA policies and plans in Central America. Concerning the appropriateness of project plans and approach, a number of issues could be pointed to, however, there were other major factors that also impacted the Project's effectiveness, impact and sustainability. Generally speaking, it is deemed that the Project's relevance is high.

3.2 Effectiveness and Impact¹³ (Rating: ②)

3.2.1 Effectiveness

In the Project, the plan was for 62 target communities selected in each country to compile local disaster management systems in collaboration with municipal authorities (Output 1, Output 2), to utilize those outputs so that the target municipal authorities could compile disaster risk management plans and disaster risk management action plans, and to introduce consideration of disaster risk management into the development plans of municipal authorities (Output 3), with a view to realizing the first part of the Project purpose, i.e. "communities' and municipal authorities' capacity for disaster risk management is strengthened in the target areas." Furthermore, it was planned for the respective national disaster risk management agencies and CEPREDENAC to organize and accumulate local disaster management promotion techniques based on these experiences (Output 4) and build systems for sharing these (Output 5), with a view to realizing the second part of the Project purpose, i.e. "the capacity of CEPREDENAC members for promoting local disaster risk management is strengthened."

Disaster risk management activities can be categorized according to timing (before, during and after disaster occurrence) and the implementing entity (national government, regional municipal authorities, communities, etc.)¹⁴. The Project focused on the communities, however,

¹² For example, in El Salvador, where effort was devoted to disaster risk management in schools, and Costa Rica, where techniques such as home visits and school disaster risk management were partially introduced, it was not possible to appropriately evaluate the obtained important outputs by means of the PDM objectively verifiable indicators alone. In the field surveys, some disaster management agencies said that it was "hard to understand why a common PDM is used despite the differing conditions and needs in each country."

¹³ When assessing effectiveness, rating is given upon also taking impact into account.

¹⁴ Activities before the occurrence of disasters include: preparation of risk and resources maps based on diagnosis of disaster risks and risk management resources; establishment and capacity building (equipment, materials, training, etc.) of disaster risk management organizations; preparation and update of emergency response plans; establishment of forecast and warning setups; implementation of disaster risk management training (evacuation and emergency response drills), preparation of evacuation shelters and routes; structural measures to protect embankments and slopes, etc.; land use regulations, etc. in consideration of disaster risk management, and so on. These pre-disaster activities are referred to as "disaster prevention and mitigation" in this ex-post evaluation, and

since it is important to collaborate with municipal authorities that have jurisdiction over communities when conducting disaster risk management in communities, “local disaster management” in the Project is defined as “initiatives for disaster prevention, emergency response, and recovery by communities and municipal authorities on the city, town and village levels.” In the Project, the respective national disaster risk management agencies and CEPREDENAC are regarded as supporters for promoting local disaster management.

The following sections summarize the activities and achievements of outputs on the respective levels of communities, municipal authorities, respective national disaster risk management agencies, and SE-CEPREDENAC, analyze the degree of achievement of the Project purpose, and review the factors that expedited the achievement of the outputs and the Project purpose¹⁵. Moreover, in the absence of performance of objectively verifiable indicators at the time of Project completion, here analysis was carried out based on performance at the time of the terminal evaluation¹⁶.

3.2.1.1 Attainment of the Outputs

(1) Outputs in the target communities

In the target communities, it was planned to strengthen the disaster risk management setup through advancing the preparation of disaster risk management organizations, risk and resources maps, warning systems and disaster risk management plans (emergency response plans) in collaboration with the regional municipal authorities (Output 1), and to improve disaster risk management knowledge through conducting disaster risk management education activities, evacuation drill, etc. (Output 2).

By the time of the terminal evaluation, disaster risk management organizations, risk and resources maps, warning systems and disaster risk management plans had been established and prepared in roughly 90% of the target communities. However, in some areas, due to weak financial and personnel setups of the municipal authorities or lack of interest from the municipal leaders, it was not possible to get the municipal authorities

are distinguished from disaster management/disaster risk management activities which include emergency responses during disasters and relief/recovery activities after disasters. Disaster prevention aims to prevent or mitigate damage by reducing vulnerability to disasters, but it also includes activities aimed at enhancing emergency responses during disasters and building preparedness for relief/recovery activities after disasters.

¹⁵ In the field surveys, interviews were conducted with SE-CEPREDENAC, disaster risk management agencies in each country, all target municipal authorities (22 municipal authorities), and approximately 60% of the target communities (35 communities). With respect to beneficiaries, interview surveys using questionnaires were conducted with 332 households in 22 communities in the six target countries. The number of sample households in each country was allocated according to the number of target communities, and the target households were randomly selected in each community.

¹⁶ It is possible that the degree of achievement was enhanced due to the activities conducted after the terminal evaluation, however, no concrete documented information for confirming this was obtained in the ex-post evaluation.

very involved, so interventions were made directly to the communities. Moreover, the recording and documentation of activities was hardly implemented at all even though this was included in the plan of activities¹⁷.

In the communities, workshops and seminars were staged mainly for members of the disaster risk management organizations. The said members ascertained hazardous spots and evacuation routes, etc. through preparing risk and resources maps, etc. and acquired knowledge about natural disasters, disaster risk management and emergency measures via the seminars and training. Furthermore, evacuation drills for other inhabitants apart from the members was implemented in 60% of the target communities.

According to the beneficiary survey, 40% of inhabitants knew about the Project, and 30% had experienced participation in the Project activities. Of the inhabitants who participated in the Project, 90% said that the experience had been extremely useful, mainly because it taught them how to prepare for disasters and how to respond when disasters occur. Of the inhabitants who knew about the Project, 85% responded that they were better prepared than before, which was more than those who didn't know about the Project of which only 55% responded the same, and this was another beneficial effect of the Project.

Roughly 70% of inhabitants had correct understanding of disaster risks and preparedness for disasters in the target communities (Table 1). The remaining inhabitants had correct understanding in part, however, 15% of inhabitants could not indicate the correct method of evacuation. Moreover, the members of disaster risk management community organizations displayed a roughly 20% higher correct response rate than ordinary inhabitants for all questions. There are many communities where risk and resources maps and disaster risk management plans are not widely informed to inhabitants, and not even half of the inhabitants directly obtain disaster risk management information from the disaster risk management organizations¹⁸, indicating there is room for improvement concerning methods for giving information to the general public.

¹⁷ According to the JICA experts, because so much energy was devoted to enhancing activities in each community towards the end of the Project, not enough time could be spent on compiling records and documents.

¹⁸ According to the beneficiary survey, 42% of inhabitants replied that they obtain disaster risk management information from community organizations and community leaders. Other sources of information were given as mass media (TV, radio, newspapers: 59%), schoolteachers (17%, of which 7% of respondents were children), and neighbors (16%).

Table 1 Knowledge concerning Disasters and Disaster Risk Management in Communities

(Unit: %)

	Overall			Organization members			Non-members		
	A	B	C	A	B	C	A	B	C
What kinds of disasters occur in communities?	72	24	4	83	15	2	66	28	6
Where is the most dangerous parts of communities?	71	24	5	86	12	2	66	27	7
How do you know about approaching disasters, and how do you prepare for them?	67	28	5	79	21	0	63	31	6
When and where do you evacuate?	64	22	14	82	17	1	60	26	14

Source: Beneficiary survey

(Note) The figures show the ratios of inhabitants who gave the (A) Correct response, (B) Partially correct response, and (C) Incorrect response to the indicated questions. The correctness of responses was determined by the surveyors who had the correct information.

In approximately 70% of the target communities, school disaster risk management was reinforced through the strengthening of school disaster risk management organizations composed of teachers and students, preparation of in-school risk and resources maps and emergency response plans, implementation of evacuation drill by teachers and students and so on. In El Salvador and Costa Rica, school disaster risk management is becoming extremely active in some cases. Having said that, the contribution of school disaster risk management to local disaster management is limited, with such efforts being almost totally confined to school premises and there being hardly any participation by parents or concrete cooperation with disaster risk management organizations.

On the other hand, according to the beneficiary survey, 85% of inhabitants responded that they discuss disaster risk management in their homes¹⁹. In view of this, if the disaster risk management education conducted in schools can be extended beyond schools to facilitate communication about disaster risk management in homes based on collaboration with disaster risk management organizations, it is possible that knowledge on local disaster management can be effectively conveyed to a broad section of the population.

Some schools were found to conduct disaster risk management education for lower grade children and for older children via special card games (“BOSAI Duck”) and seminars (“Frog Caravans”). The Frog Caravan is mainly intended to teach children about first aid they can perform in the event of earthquakes and fires, while the technique of learning through playing card games grabs the interest of children and is welcomed in many countries (see the Box).

Summing up the above, strengthening of the disaster risk management setup in communities and enhancement of disaster risk management knowledge were realized to a certain extent, however, the involvement of national and municipal authorities was

¹⁹ 52% of people responded that they discuss it regularly and 33% said they did sometimes.

limited in some communities. Also, the recording and documentation of activity processes wasn't adequately implemented, while there was room for improvement regarding the dissemination of information to ordinary citizens and collaboration with disaster risk management education in schools. Accordingly, it is deemed that the achievement of outputs in communities was moderate.

(2) Outputs in target municipal authorities

In the target municipal authorities, in addition to involvement in the above activities targeting communities, it was planned for personnel in charge of disaster risk management to participate in the training in Japan ("Disaster Management in Central America") and to pass information on to the employees of municipal authorities via seminars, etc., and for disaster risk management goals, measures and concrete activities to be included in the development plans of the target municipal authorities (Output 3).

In the target municipal authorities, workshops and seminars targeting personnel in charge of disaster risk management and members of disaster risk management committees were conducted. The personnel who took part in the training in Japan implemented seminars and other dissemination activities in the municipal authorities after they returned home. Thanks to the enthusiastic efforts of the returning trainees, many municipal authorities witnessed progress in terms of the organizing of disaster risk management, compilation of emergency plans, implementation of evacuation drill and so on. Although it was intended for personnel from all the target municipal authorities to take part in the training in Japan, due to reasons such as being too busy with regular work to obtain permission to go to the training in Japan, personnel participated in the training in Japan and conducted activities after returning home in only 10 out of 23 municipal authorities.

At the time of the terminal evaluation, disaster risk management goals, measures and concrete activities had been included in development plans in approximately 90% of the target municipal authorities, while emergency response plans for disasters were prepared during the Project period at roughly two-thirds of the municipalities. However, considering that less than half the target municipal authorities took part in the training in Japan and there were some communities where the municipal authorities did not take an active involvement, not all of these outputs could be said to have been the result of the Project. Accordingly, it is deemed that the achievement of outputs targeting the municipal authorities was moderate.

(3) Outputs in national disaster risk management agencies and SE-CEPREDENAC

In the respective national disaster risk management agencies and SE-CEPREDENAC,

through accumulating and utilizing the knowledge acquired in the activities in the target communities, it was planned to systemize and share useful techniques, tools and technologies for local disaster management (Output 4)²⁰. Moreover, with a view to realizing dissemination following completion of the Project, it was planned to construct a setup for widely disseminating the outputs of the Project and local disaster management information, experience, techniques, etc. via a network of the returning trainees, printed materials and so on (Output 5).

Over the course of the Project, three members from SE-CEPREDENAC and 54 members from the respective national disaster risk management agencies took part in the training in Japan or third country training. Although not all of these members were directly involved in the Project, many of the respective national disaster risk management agencies aired the opinion that these trainings were useful and contributed to improving knowledge and awareness concerning local disaster management in the said agencies.

Concerning teaching materials for promoting local disaster management, 12 types of teaching materials, manuals, etc. were prepared according to the contents of activities in each country (see the Box). Information concerning utilization of the techniques, tools and technologies was introduced to each country via workshops attended by representatives from each of the six target countries. However, these teaching materials were mainly prepared with the aim of initiating activities in the target communities; and they were not reflective of the lessons obtained upon verifying the eventual results of the activities. Moreover, because no practical guidelines were indicated for determining which techniques to combine and in what order according to characteristics of the community, disaster characteristics at the community, disaster risk management policies, plans and systems and local government systems in the target communities, it cannot be said that the materials were adequately systemized. In this way, although teaching materials were shared, there was still room for improvement concerning the contents and systemization.

Concerning the building of a dissemination system, the following activities were implemented: staging of annual conferences and networking of returning trainees, staging of a Central America regional disaster risk management conference for sharing information in line with field trips, and activities geared to sharing Project experiences

²⁰ Output 4 (Capacity for promoting local disaster risk management is enhanced in the respective national disaster risk management agencies and SE-CEPREDENAC) in the PDM overlaps with the second part of the Project purpose (...and the capacity of CEPREDENAC members for promoting local disaster risk management is strengthened), however, judging from the configured indicators, the actual content of Output 4 is deemed to be “useful techniques, tools and technologies for local disaster management are systemized and shared in these agencies.”

between countries. However, because the returning trainees did not take part in any organized exchanges after completion of the Project, it is deemed that a sustainable dissemination setup based on the returning trainees couldn't be constructed. According to the experts, it was unclear who would take responsibility for the management of the returning trainees' network, and this is deemed to be the reason behind. It was planned to prepare pamphlets for introducing effective cases and to distribute these to nearby municipalities and communities, however, preparation of pamphlets was only confirmed in Costa Rica, while there were no confirmed cases of pamphlets being distributed to nearby municipalities and communities. Accordingly, it is deemed that the dissemination setup was not adequately built.

Accordingly, it is deemed that the achievement of outputs targeting national disaster risk management agencies and SE-CEPREDENAC was medium.

BOX: Local Disaster Management Techniques Introduced in the Project

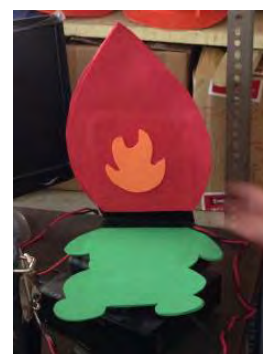
DIG (Disaster Imagination Game)

Inhabitants prepare risk and resources maps while analyzing disaster risks and resources for disaster risk management in communities, establishing disaster risk management organizations aimed at realizing the self-efforts of communities, preparing emergency response plans and reviewing necessary external assistance. (Photograph: risk and resources map in Honduras)



Frog Caravan

Based on the premise of rescuing a frog that has met with an earthquake or fire, children learn about disaster risk management while playing various games aimed at showing them various disaster risk management activities such as firefighting, rescue, first aid, storing supplies and so on. (This approach was conceived in Japan based on the experience of the Hanshin-Awaji Earthquake). (Photograph; A frog used in a firefighting game. When water hits the flame, the frog rises up. El Salvador).



BOSAI Duck

This method, in which large-sized picture cards based around a duck character are used, is intended to teach young children about natural disasters and disaster risk management.



Dyke and slope protection using old tires

Useful structures for disaster risk management are built by inhabitants using old tires and cement. (Photograph: used-tire dyke, Costa Rica)

Simple observation methods for early warning

Basic rain gauges, water level gauges, and monitoring of landslide risks based on simple methods. (Photograph: Basic rain gauge; Panama)



Other teaching materials, etc.

Manuals on making sandbags and implementing evacuation drill, manuals for implementing "disaster risk management schools," tsunami and volcano disaster learning materials.

Source: Prepared by the evaluator based on materials provided by JICA

3.2.1.2 Degree of Achievement of Project Goals

Three evaluation sheets – Evaluation Sheet 1, Evaluation Sheet 2, and Evaluation Sheet 3 – were prepared in order to measure the degree of achievement of Project purpose on the three levels of communities, municipal authorities, and respective national disaster risk management agencies and SE-CEPREDENAC, and objectively verifiable indicators were set based on the results²¹. As is shown in Table 2, at the time of the terminal evaluation, the goal “strengthening the disaster risk management capacity of the target municipal authorities” (Indicator ②) was achieved, however, “reduction of vulnerability to disasters in the target communities” (Indicator ①) and “improvement of knowledge and ownership about local disaster risk management of national disaster risk management agencies and SE-CEPREDENAC” (Indicator ③) were only partially achieved²². Table 3 shows the country-separate evaluation sheet mean scores (at the time of terminal evaluation), the numbers of target municipalities and communities, and the features of activities and outputs.

Table 2 Degree of Achievement of Project Purpose

Project Purpose	Communities’ and municipal authorities’ capacity for disaster risk management is strengthened in the target areas, and the capacity of CEPREDENAC members for promoting local disaster risk management is strengthened.	
Indicator	Performance	
① Reduction of vulnerability to disasters in the target communities (Target value: 80% of the target communities achieve at least 6 out of 11 points on Evaluation Sheet 1).	(Partially achieved) 68% of the target communities achieved 6 or more points out of the 11 indicated on Evaluation Sheet 1).	
② Strengthening the disaster risk management capacity of the target municipal authorities (Target value: 80% of the target communities achieve at least 6 out of 10 points on Evaluation Sheet 2).	(Achieved) 90% of the target communities achieved 6 or more points out of the 10 indicated on Evaluation Sheet 2.	
③ Improvement of knowledge and ownership about local disaster risk management of national disaster risk management agencies and SE-CEPREDENAC (Target value: They achieve at least 4 out of 6 points on Evaluation Sheet 3).	(Partially achieved) 3 out of 6 national disaster risk management agencies and SE-CEPREDENAC achieved 4 or more points out of the 6 indicated on Evaluation Sheet 3.	

Source: Materials provided by JICA

²¹ See footnote 3 concerning the evaluation sheets.

²² Because the actual performance regarding objectively verifiable indicators was not investigated using the evaluation sheets at the time of Project completion, the judgment here is based on performance at the time of terminal evaluation. Moreover, in the terminal evaluation, the communities that couldn’t attain the standard of indicator ① (6 points or more) were deemed to have the possibility of reaching this standard in the remaining period (6 months) of the Project, however, no such communities were found to reach this target in the remaining time.

Table 3 Evaluation Sheet Mean Scores, Numbers of Target Municipalities and Communities, and Features of Activities and Outputs by Countries

Country	Evaluation Sheet Mean Score			Numbers of target municipal authorities and communities; activities, and results
	Country (Out of 6)	Municipal authorities (Out of 10)	Communities (Out of 11)	
El Salvador	3.0	9.5	5.7	The targets comprising 5 municipal authorities and 17 communities were dispersed, and multiple types of disasters were targeted. Activities have mainly been conducted in the municipal authorities, but they have been delayed in the communities. The disaster risk management agency dispatches personnel all over the country to support the municipal authorities.
Nicaragua	6.0	9.5	8.8	Activities focusing on tsunami disaster were conducted in 1 municipal authority and 3 communities selected on the ground of a baseline survey. The disaster experience was relatively new, and the intensive, continuous activities produced results.
Guatemala	5.5	8.9	7.3	Volcanic disaster was targeted in 4 municipal authorities and 20 communities located around a volcano. The municipal authorities had little interest and required to be involved through the direct intervention of the central government. Due to the frequent occurrence of small-scale eruptions, the local villages have strong interest.
Costa Rica	5.5	8.6	6.0	The targets comprising 4 municipal authorities and 7 communities were dispersed, and multiple types of disasters were targeted. The anticipated organization did not progress in the municipal authorities and civilian groups, so unique methods such as conducting school education and making door to door visits were adopted.
Honduras	3.0	8.0	7.9	5 municipal authorities and 9 communities. Wind, flood damage and sediment disasters were targeted. The disaster risk management agency had little involvement and the municipal authorities were also fragile, however, outputs were achieved in numerous communities thanks to the efforts of the coordinators employed by JICA.
Panama	3.5	4.7	6.0	The targets comprising 3 municipal authorities and 6 communities were dispersed. Wind, flood damage and sediment disasters were targeted. Since the municipal authorities had very little involvement, the central government directly intervened in villages. Because remote municipalities and communities were included among the targets, the activities could not be conducted efficiently.

Source: Prepared by the evaluator based on materials provided by JICA and information obtained in the field surveys.

Judging from the findings of hearings at the target municipal authorities, target communities, respective national disaster risk management agencies, and SE-CEPRENAC, it is deemed that the following factors aided achievement of the outputs and Project purpose.

Selection of target municipal authorities and target communities

- The target areas and types of disasters are appropriately narrowed down (Guatemala, Nicaragua, etc.). It was easier to generate concrete results through making efficient inputs and having clear targets of activities.
- Municipalities and communities that have recently experienced major disasters are targeted. The more experience of disasters there is, the order of priority of disaster risk management is higher and it is easier to obtain the active involvement of the municipal authorities and inhabitants.
- The human and financial capacity of municipal authorities and capacity of existing civilian groups and leaders are high.
- The leaders of municipal authorities have a strong interest in disaster prevention. It is difficult to obtain active involvement in project activities when the local leaders are more interested in putting on a political performance through conducting emergency response measures only.

National disaster risk management policies and disaster risk management setup

- The national governments have clear policies for supporting the municipal authorities and communities, and the national disaster risk management agencies had concrete support structures. (El Salvador, Nicaragua, etc.)

Activities of counterparts and returning trainees

- The counterparts and returning trainees became established and took an active and direct involvement.

Construction of facilities based on participation of communities

- Inhabitants provide labor and take an active involvement in the construction of facilities such as embankments, slope protection, evacuation shelters, evacuation routes and so on. Being able to visibly see the results of their efforts, this further enhances the motivation of inhabitants.

In order to attain the project purpose, it was essential for core counterparts for advancing local disaster management to be trained in the respective national disaster risk management agencies, however, Evaluation Sheet 3, which was intended to adjudicate the capacity of the respective national disaster risk management agencies, included no items for directly assessing

this item²³.

In El Salvador and Guatemala, numerous counterparts are continuing to make use of the project experiences in their current activities, and it is thought that substantial technology transfer was realized and contributed to the development of human resources. On the other hand, in Honduras, where the national disaster risk management agency only had limited involvement in the Project, hardly any progress was made in the development of counterparts. In other countries, the development of counterparts did not proceed as planned for reasons such as the numbers of assigned counterparts were too small (Costa Rica, Nicaragua) or there was high turnover of counterparts during the Project (Panama). Thus, the development of counterparts on the whole was not adequate²⁴.

To sum up, the indicator for improvement in the disaster management capacity of target municipal authorities was achieved, however, concerning the reduction of vulnerability to natural disasters in the target communities and the improvement of knowledge and ownership about local disaster risk management of national disaster risk management agencies and SE-CEPREDENAC, the indicators were only partially achieved and development of counterparts in the national disaster risk management agencies was insufficient. Accordingly, part of the project purpose was not achieved.

3.2.2 Impacts

3.2.2.1 Achievement of the Overall Goal

Concerning the overall goal, following completion of the Project, the respective national disaster risk management agencies and SE-CEPREDENAC took the initiative in sharing and utilizing the local disaster management information, experience, methods, etc. gained through the Project within the target countries and also across national borders with the Central American region. Such dissemination was started while the Project was still in progress, however, as is shown in Table 4, since the end of the Project, dissemination has largely been confined to within each country and there has been hardly any cross-border dissemination.

In Nicaragua and Guatemala, the DIG and Frog Caravan techniques that were introduced in the Project have entirely or partially been deployed nationally by organizations. On the other hand, in El Salvador and Costa Rica, the national disaster risk management agencies have created new teaching materials on local disaster management, however, the involvement of counterparts was limited and similar opportunities couldn't be exploited. Additionally, there

²³ The establishment of returning trainees is praiseworthy, however, not all trainees become core members, and evaluation of their capacity has not been included. Moreover, not all the counterparts have received training.

²⁴ According to the JICA Experts, because efforts were focused on finishing activities in the target communities by the end of the Project, inputs to countries and municipal authorities were generally regarded as secondary, and efforts to foster counterparts were also inadequate.

have been cases where other donors' funds have been utilized for dissemination and cases where participants in the training in Japan that has continued following the end of the Project have promoted dissemination after returning home.

Meanwhile, concerning cross-border dissemination in Central America, although the regional exchange activities involving SE-CEPREDENAC are being actively conducted, there are few examples of the techniques of the Project being utilized in other countries. Concerning why, setups for conducting dissemination based around the returning trainees were not constructed, while the following reasons were revealed in the hearings with SE-CEPREDENAC and the respective national disaster risk management agencies.

- Although teaching materials and manuals have been shared, there are few practically useful resources for sorting and introducing local disaster management methodologies, for example, detailed records of successful case examples, analyses of factors behind successes, and guidelines for selection and effective combinations as well as implementation of activities according to conditions. The methods that need to be introduced need to be selected and combined in the proper order according to conditions in the target communities, and they cannot be used in the same way in all communities. It is thought that not enough thought went into examining what combinations of methodologies are applicable to which conditions and so on.
- In order to introduce a method that has worked well in one country to another country that has different conditions, simply sharing information is not enough; rather it is necessary to actually apply methods on the ground and adjust them through a process of trial and error. It is also important for experienced disaster risk management personnel from other countries to provide guidance on the ground. Thus, when introducing know-how that has been developed in other countries, it is necessary for the introducing country to spend time and money on trial implementation and investigation, and this was difficult to do within the scope of the Project.

Summing up, the sharing and utilization of local disaster management information, experience, methods, etc. was realized within countries, however, little progress was made in terms cross-border utilization. Reasons for this were that setups based around the returning trainees were not established, specific materials for conducting introduction were limited, and it took time and money to introduce know-how that was conceived in other countries. To sum up, the overall goal was achieved only partially²⁵.

²⁵ The national disaster risk management agencies in each country were of the opinion that the ongoing training in

Table 4 Degree of Achievement of the Overall Goal

Overall Goal	Information, knowledge, and methodologies on local disaster risk management in Central America are commonly utilized in different areas in the region.
Indicator	Performance (only cases following completion of the Project are stated)
Existence of practical examples of good utilization of the Project results in municipalities and communities in the Central American Region (No target value)	<p><Practical examples of common utilization in the region></p> <p>Frog Caravan activities were conducted in Panama with the cooperation of the Guatemalan disaster risk management agency, and funds from other donors were utilized to create manuals for the Central America region.</p> <p><Practical examples of common utilization in each country></p> <p><u>El Salvador</u>: Following completion of the Project, Frog Caravan and Disaster Duck activities were conducted in new schools in four out of five of the target municipal authorities.</p> <p><u>Nicaragua</u>: DIG, which was learned from Costa Rica during implementation of the Project, was utilized local disaster management guidelines and teaching materials that were independently created by the disaster risk management agency. The Frog Caravan is being implemented in the schools nationwide. Moreover, the experience of this Project was utilized in promoting local disaster management with respect to tsunami in other areas of the country. A certain municipal authority has printed and distributed earthquake disaster risk management pamphlets.</p> <p><u>Guatemala</u>: The disaster risk management agency intends to officially adopt and nationally deploy the Frog Caravan and Disaster Duck activities for schools and the approach to strengthening local disaster management that was adopted in DIG. It intends to make original modifications to the Frog Caravan in consultation with the Ministry of Education and adopt it as an official activity in schools.</p> <p><u>Costa Rica</u>: (None)</p> <p><u>Honduras</u>: The returning trainees have helped plan and implement Frog Caravans in different areas following the end of the Project. Other returning trainees have actively introduced the slope protection method using old tires, and this has also been adopted by other municipal authorities and schools.</p> <p><u>Panama</u>: The returning trainees have helped plan and implement Frog Caravans in Panama City.</p>

Source: Prepared by the evaluator based on the findings of hearings with SE-CEPRENAC and the respective national disaster risk management agencies.

3.2.2.2 Other Impacts

In the target municipalities and communities, it was anticipated that the continuation of the local disaster management that was supported by the Project would help mitigate damage. The following sections introduce specific examples of damage mitigation in communities upon

Japan and the five-year project in the six countries “created a certain impact in terms of the social approach to disaster risk management in Central America.” It is thought that the Project helped permeate the concept of disaster prevention. The local agencies also said that they “learned about the importance of not only emergency responses but also advancing disaster prevention in a joint effort by municipalities, communities and central government.”

sorting the ongoing situation of local disaster management activities. Finally, references are made concerning the environmental and social impacts and impacts on socio-economy.

(1) Situation regarding continuation of activities in target municipal authorities

Upon re-evaluating disaster management capacity as of the ex-post evaluation using the above evaluation sheet, as is shown in Table 5, activities were in decline in a quarter of the municipal authorities. Moreover, local disaster management activities were hardly continued at all in one-third of the municipal authorities.

Table 5 Situation regarding Continuation of Activities in Target Municipal Authorities

Disaster management capacity (terminal evaluation based on evaluation sheet→changes in the ex-post evaluation)			
Improved	No change	Deteriorated	Total *
3 (15%)	2 (10%)	15 (75%)	20 (100%)
Situation regarding continuation of activities (22municipal authorities)			
(Continuing) The returning trainees and disaster risk management agency employees are sustaining and expanding the assistance to communities and schools.			2 (9%)
(Partially continuing) Municipal authority employees or school employees who received domestic training have remained and continue some of the activities.			12 (55%)
(Not continuing) The municipal authorities took no involvement in the Project; or the municipal leaders and municipal authority employees who were involved in the Project have been transferred so nobody knows about the Project now.			8 (36%)

Source: Analysis by the evaluator based on the findings of hearings with municipal authorities

(Note) * Analysis targeting only those municipal authorities where information was obtained

Following the end of the Project, six municipal authorities had updated risk and resources maps, 11 municipal authorities had updated their disaster risk management plans, and 11 municipal authorities had implemented disaster risk management drills. Such activities were conducted in those municipal authorities that have functioning disaster risk management organizations, however, in seven out of the 22 targeted municipal authorities, the municipal leaders showed little interest in disaster prevention and were only interested in emergency response measures after disasters have actually occurred²⁶.

(2) Situation regarding continuation of activities in target communities

Upon re-evaluating the reduction of vulnerability to disasters in the target communities at the time of the ex-post evaluation using the evaluation sheet, as is shown in Table 6, vulnerability had increased in roughly 70% of the target communities. The degree of

²⁶ The results of disaster prevention are not immediately apparent, however, because emergency response measures and direct material assistance to disaster-affected persons are immediately visible, some municipal leaders view such activities as good political PR.

continuation of activities in the target communities was judged to be as follows. Many communities were able to continue activities thanks to ongoing encouragement by the central government or municipal authorities, but not many communities realized independent activity. Activities are hardly continued at all in 15 out of 40 communities (38%).

None of the target communities updated risk and resources maps and disaster risk management plans following the end of the Project. Some communities took part in evacuation drill staged by municipal authorities or the central government, but no communities conducted their own independent evacuation drill. In communities that introduced early warnings and methods of advertising them, community organizations generally sustained them, however, maintenance of observation devices, wireless radios, loudspeakers, etc. was not implemented very much²⁷. In isolated communities, there are high needs for first aid measures for injured persons not only in disasters but also accidents, however, first aid kits and other supplies have almost entirely been used up without being replenished. Because there is constant turnover of members in many community organizations, there were many voices that called for the repeated implementation of training.

Table 6 Situation regarding Continuation of Activities in Target Communities

Vulnerability to natural disasters			
(Change between the terminal evaluation→ex-post evaluation based on evaluation sheet)			
Reduced	Unchanged	Increased	Total*
5 (16%)	5 (16%)	22 (69%)	32 (100%)
Situation regarding continuation of activities (40communities*)			
(Continuing) Community organizations have strong unity and generally sustain or further activities while receiving support from municipal authorities and central government in some cases.			15 (38%)
(Partially continuing) Some members partially continue activities while receiving support from municipal authorities and central government in some cases.			10 (25%)
(Not continuing) Activities are hardly continued at all due to decline and turnover in community organizations' membership and dissolution of organizations.			15 (38%)

Source: Analysis by the evaluator based on the findings of hearings with the communities.

(Note) * Analysis targeting only those communities where information was obtained

²⁷ The following kinds of cases were observed. Upstream observations of river water level are reported and used for evacuating downstream areas, however, some of the observation equipment is not working (Costa Rica). Landslide risk is notified to inhabitants based on data from basic rainfall gauges (El Salvador, Panama). Flood risks are notified to inhabitants based on observations by simple water level gauges (color-coded rocks and poles) (Honduras). Tsunami warnings are given to inhabitants by sirens. However, the sirens of this project were not maintained but had to be replaced with new sirens provided through Russian aid (Nicaragua). Residents living near volcanoes report on local conditions to the disaster risk management agency, which uses such reports for issuing warnings. Thus the communities become the providers of information (Guatemala). A simplified method is used to sense indications of landslides and inform inhabitants (Panama).

(3) Examples of damage mitigation in target communities

Following completion of the Project, the following actual examples of appropriate evacuation being conducted and damage of natural disasters being mitigated were confirmed in the target municipalities and communities.

- The village of El Hotel in Costa Rica has suffered flooding at intervals of every few years, and the flooding has led to fatalities in some cases. Through constructing a system for conveying upstream water level changes to the village and giving advance warnings of approaching floods, inhabitants have become able to move their household goods to higher ground and evacuate safely. This has helped to reduce economic damages. Moreover, inhabitants of the village provided labor in constructing a “training dike” using old tires, and this was extended under assistance from the municipal authorities following completion of the Project. The training dike cannot totally prevent flood infiltration, however, it has reportedly helped reduce flow velocity and delay flood arrival times.

- A number of villages situated around the Fuego Volcano in Guatemala utilized the experience of the Project to evacuate safely when the volcano erupted in September 2013. The inhabitants conducted organized evacuation while looking after the vulnerable members of society. The 13-year old daughter of the community leader who accompanied her father when he visited Japan for training contacted the other members of the community organization in place of her mother who was out of the village at that time.

(4) Environmental and social impacts and other socioeconomic impacts

Slope protection works using old tires were conducted in a certain target community. Moreover, community organizations that supported the Project conduct soil preservation activities (tree planting, etc.) and periodic cleaning of channels in a number of communities. In such cases, it is thought that positive impacts were imparted on environmental preservation. This Project did not entail any relocation of inhabitants or expropriation of land.

Summing up, project implementation did not result in the total achievement of the Project purpose, i.e. “communities’ and municipal authorities’ capacity for disaster risk management is strengthened in the target areas, and the capacity of CEPREDENAC members for promoting local disaster risk management is strengthened.” Moreover, because not much progress was made regarding the overall goal, i.e. information, knowledge, and methodologies on local

disaster risk management in Central America are commonly utilized in different areas in the region, the effectiveness and impact are fair.

3.3 Efficiency (Rating: ②)

3.3.1 Inputs

Table 7 compares the Project inputs that were planned at the time of ex-ante evaluation with the actual inputs.

Table 7 Planned and Actual Inputs

Inputs	Planned	Actual (based on the terminal evaluation)
(1) Expert dispatches	Long-term experts: 2 Short-term experts: 15 (180 million yen)	Long-term experts: 3 Short-term experts: 17 (199 million yen)
(2) Acceptance of trainees	Training in Japan, third country training (Treated as “Outside of the Project” at the time of the ex-ante evaluation)	CP training: 4 persons (9 million yen) Training course in Japan “Disaster risk management measures in Central America”: 56 persons Third country training in Mexico “Civilian Safety and Disaster Risk Management: 30 persons
(3) Supply of equipment	Telecommunications equipment, measuring instruments, etc. (6 million yen)	Early warning system, vehicles, office equipment (25 million yen)
(4) Overseas project strengthening costs	(110 million yen)	(213 million yen)
(5) others	(79 million yen)	(20 million yen)
Japanese assistance (Note)	Total 375 million yen	Total 466 million yen
Inputs by the local governments	Assignment of counterparts Provision of office space, facilities and equipment Operating and current expenditures	Assignment of counterparts: 106 persons Provision of office space, facilities and equipment Partial payment of vehicle fuel costs, office supplies, travel expenses, workshop staging costs, etc.

Source: Prepared by the evaluator based on materials provided by JICA.

(Note) The Japanese assistance does not include the costs of the training in Japan and the third country training.

3.3.1.1 Input Elements

The experts toured the respective countries out of their base in El Salvador, and the respective national disaster risk management agencies on the whole rated their ability highly. Coordinators for complementing experts in their absence were assigned to SE-CEPREDENAC and some of the countries, however, there were reports that things could not be decided and progress was delayed when the experts were away. Moreover, the same issues that were voiced at the time of the terminal evaluation were also heard from the respective national disaster risk management agencies in the ex-post evaluation, for example, it was difficult to liaise and coordinate and there was a lack of clear division of duties between numerous officials, the short-term experts

didn't share their reports with the respective national disaster risk management agencies when they returned home, and there was little direct technology transfer from the experts to the disaster risk management agencies.

In some communities, civil engineering and construction works such as embankment and slope protect works using old tires, paving of drainage channels and evacuation routes, and construction of new evacuation facilities were carried out. Local inhabitants provided the labor for these works, and the fact that such recognizable structures were constructed based on the participation of community organizations contributed greatly to enhancing the motivation of inhabitants and growth of said organizations.

Numerous members from the respective national disaster risk management agencies, related agencies (meteorological agency, etc.), and target municipal authorities took part in the training in Japan and the third country training, and when these trainees returned home with newfound motivation, they displayed initiative and played a major part in promoting various activities. However, because the training in Japan was managed independently as a project of different scheme, some countries such as Costa Rica selected members from disaster risk management agencies who were not involved with the Project. The participants from the municipal authorities conducted vigorous activities at least while the Project was in progress.

3.3.1.2 Project Cost

The amount of aid was planned to be approximately 380 million yen, but in reality it amounted to 470 million yen (124%)²⁸. According to the experts, the main reason for the increase was the additional dispatch of experts and supply of equipment to the target communities in order to enhance the effect of the cooperation. It can also be said that the too much expansion of the activities due to an increase in number of target municipalities / communities from the maximum 5 locations per country (maximum 30 locations for the six countries) planned by the preparatory study to the actual 62 locations for the six countries (3 – 20 locations per country) had an impact²⁹.

²⁸ In the comparison of the amount of aid shown in Table 7, the costs of the training in Japan and third country training, which are important and effective inputs, are not included in the amount of aid. Normally, the cost efficiency should be judged upon comparing the planned and actual costs including the costs of training, however, this wasn't possible here due to the limited information available.

²⁹ According to the JICA Experts, whereas Japan intended to conduct model activities, it was persuaded by some of the national disaster risk management agencies wishing to build capacity in more communities to conduct activities in numerous areas where importance and needs were high and adequate activities had not been conducted until now. In the field survey (preliminary survey) that was conducted before the project plan was compiled, it was intended to limit the number of project sites to no more than five in each country, however, as a result of holding discussions with each country following the survey, it was decided to remove this limit and decide the number of sites according to the capacity of the implementing agencies. Meanwhile, from the viewpoint of effectiveness, since better outputs can be obtained by conducting intensive inputs upon limiting the target areas and types of disasters, it is thought that the targets should have been narrowed down upon setting appropriate selection criteria.

3.3.1.3 Period of Cooperation

The period of assistance in the Project was 60 months in planning and in reality. In the terminal evaluation, it was deemed that “judging from the current progress (as of the time of the terminal evaluation), the scheduled contents have been almost completed and there is a high possibility that the Project purpose will be achieved,” and concluded that the Project would finish according to schedule. In reality, however, as was analyzed under 3.2 Effectiveness, it was deemed that some of the outputs and project purpose were not fully achieved. Therefore, completion of the Project according to schedule does not necessarily signify that the Project was implemented efficiently.

To sum up, although the period of assistance was as scheduled, because the project purpose was partially not achieved and the project cost was higher than planned, the efficiency the Project is fair.

3.4 Sustainability (Rating: ②)

In the Project, disaster risk management capacity was strengthened in the target municipalities and communities, and the capacity for advancing local disaster management was bolstered in the respective national disaster risk management agencies and SE-CEPREDENAC. Here, the sustainability of these Project effects is analyzed in terms of policy and institutional aspects, technical and financial aspects while considering the situation regarding the continuation of activities in target municipalities and communities as described in 3.2.2.2 Other Impacts.

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

As was described in 3.1.1 Relevance to Development Plans of Central America, local disaster management has come to be viewed with importance in Central America and, as is shown in Table 8, efforts are being made to establish systems in each country. In this way, the sustainability of policies and systems related to local disaster management is high.

Table 8 Local Disaster Management Initiatives in Central American Countries

<p><u>El Salvador</u>: The national plan (2010~2014) mentions local disaster management and the formation of a culture for disaster risk management. Approximately 150 disaster risk management officers were assigned to assist municipal authorities around the country in 2010. Each disaster risk management officer is in charge of one or two municipal authorities. There is a plan to increase the number of disaster risk management officers so that one officer per municipal authority can be assigned. Also, teaching materials for local disaster management have been independently prepared.</p>
<p><u>Nicaragua</u>: The national plan (2012~2017) places emphasis on strengthening of disaster risk management in homes and communities. Since 2013, more than 20,000 facilitators have been trained in an effort to strengthen disaster risk management in homes and communities. Moreover, 130 hours of training have been provided to municipal employees with a view to establishing disaster risk management sections in all municipal authorities. New teaching materials have also been created. Also, nationwide evacuation drill has been implemented on numerous occasions.</p>
<p><u>Guatemala</u>: The disaster risk management policy touches on the formation of community organizations and disaster prevention and disaster risk management education. There are five regional offices throughout the country, and officers are assigned to each district. Disaster risk management coordinators have been appointed in each municipal authority. Following the Project, volcano sections have been newly established.</p>
<p><u>Costa Rica</u>: The disaster risk management agency has established a department and assigned human resources to support capacity building in selected municipalities and communities in risk areas. However, the human assignments to support communities were only started in 2015, and numbers are still small. In order to increase such personnel, it is necessary to change legislation that places limits on the number of personnel.</p>
<p><u>Honduras</u>: The training department of the disaster risk management agency conducts training according to the clear objective of strengthening disaster risk management organizations in municipal authorities and communities. The disaster risk management agency has seven regional offices throughout the country, and these have been stockpiling supplies and preparing for emergencies since 2011. The disaster risk management organizations in the capital have a high level of capacity.</p>
<p><u>Panama</u>: According to domestic legislation, the disaster risk management organizations of municipal authorities are supposed to support the disaster risk management organizations in communities, however, they are failing to do so. It is planned for the disaster risk management agency to conduct training for organizational strengthening in 35 selected municipal authorities that are vulnerable to natural disasters. The disaster risk management agency has numerous bases throughout the country and supervises many local volunteers.</p>

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

SE-CEPREDENAC has 25 employees comprising officials in charge of coordinating with the member nations and officials in charge of coordinating with donors on projects. Regular conferences of national representatives and regional workshops and seminars on disaster risk management-related topics are frequently staged, so the organizational setup seems to be established.

Table 8 explains the organizational setups for tackling local disaster management in each country. The development of organizational setups for supporting municipalities and communities has progressed further in each country since the end of the Project. There are also moves to strengthen the cooperation setups between central government and municipalities and communities in each country.

On the level of municipal authorities, at the time of the field survey, six out of 22 target municipal authorities had established disaster risk management sections and appointed full-time staff. In two of these municipal authorities, the sections were established following the start of the Project. Almost all other municipal authorities have continued to assign disaster risk management officers, however, because they also have other regular duties, they cannot devote much time to disaster prevention activities at normal times. Although it is somewhat inevitable that disaster risk management officers will have concurrent duties in small municipal authorities, such a situation is not adequate in terms of the setup for advancing local disaster management.

Community disaster risk management organizations continue to implement activities in roughly two-thirds of the target communities, however, organized activities have been suspended in a third of the communities due to the transfer of members or dissolution of organizations.

Summing up, sustainability from the institutional viewpoint is generally high in SE-CEPREDENAC and each country, but it isn't very high in the municipal authorities and communities.

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

SE-CEPREDENAC has staff in charge of coordinating with countries regarding technical issues in the areas of organizational strengthening, training and education, emergency response, science and technology, land use and so on.

In the respective national disaster risk management agencies, roughly 70% of the 61 Project counterparts continue to work in the organizations, however, the counterpart retention rate is low in some countries³⁰. On the other hand, the Training course on "Disaster Management in Central America" continues to be attended by a total of 10~20 members from the respective national disaster risk management agencies even following completion of the Project, and thus makes a contribution to sustaining and improving the technical level for disaster risk management.

In the municipal authorities, the rotation of municipal leaders and consequent rotation of employees hinder the sustainability of technologies. At six of the 22 target municipal authorities, none of the employees who were involved in the Project remain in their positions so the activities have stagnated. The turnover of personnel is not so pronounced in the community organizations, however, there has been turnover in the community organizations that are keeping the activities going, and there are numerous requests for similar training to be

³⁰ In El Salvador, the retention rate of municipal disaster risk management officers is high, while in Costa Rica, the retention rate is high among disaster risk management agency employees. In Nicaragua, two counterparts are assigned and they are both still employed in the disaster risk management agency. The retention rate is low in Guatemala, Honduras, and Panama (37%, 17%, and 27% respectively).

implemented again.

In this way, the technical sustainability is generally high in countries, but not very high in the municipal authorities and communities.

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

CEPRENAC and the respective national disaster risk management agencies have their own independent budgets to cover personnel expenses and administrative expenses. The size of budgets is generally the same or in a trend of gentle increase, however, many disaster risk management agencies are struggling to maintain basic infrastructure equipment such as vehicles and radios. Moreover, except for Nicaragua and El Salvador where policy backup is provided, donor assistance is relied on to finance a lot of local disaster management activities.

In many municipal authorities, disaster risk management, in particular disaster prevention, has a lower priority than other fields and its budget allocation is meager. Some countries have guidelines or rules to ensure that 3~5% of the budget of municipal authorities is put aside for disaster risk management, however, in reality, not many municipal authorities adopt such measures, and the reserved budgets tend to be also used for emergency responses. There is a pervasive attitude of depending on the central government when disasters occur. Therefore, except for around one-quarter of target municipal authorities which assign dedicated disaster risk management employees, hardly any budget is allocated to disaster prevention.

It is rare for community disaster risk management organizations to have their own funding³¹. Because the members of community organizations are unpaid volunteers, unless it is clearly indicated that disaster risk management initiatives lead to the real mitigation of damage, they cannot be expected to sustain activities without external assistance.

In municipal authorities and communities too, the existence of other priority fields apart from disaster risk management prevents the allocation of adequate resources for disaster risk management³². In this way, local disaster management is faced with financial constraints on the national, municipal and community levels, and its sustainability is not high.

To sum up, there are few problems in terms of policies and systems, however, central governments, municipalities and communities are faced with constraints in institutional, technical and financial terms. Considering that activities are hardly continued at all in approximately one-third of the target municipalities and communities, sustainability of the

³¹ Out of 29 communities that were visited, only one had its own source of funds.

³² In order to promote local disaster management in these circumstances, it is necessary to select municipalities and communities where priority should be given to disaster risk management in light of past damage and vulnerability, and to encourage appropriate awareness of the importance of disaster prevention among the municipal authorities and inhabitants.

project effects is fair.

4. Conclusion, Lessons Learned, and Recommendations

4.1 Conclusion

The Project was implemented with the objective of conducting local disaster management activities in six Central American countries, thereby enhancing the disaster risk management capacity of the target communities and the target municipalities, and through the experience and knowledge acquired in this process, improving the capacity of the respective national disaster risk management agencies and the SE-CEPREDENAC to promote local disaster management. Although the Project had some issues concerning planning and approach, its relevance is deemed to be high because it was highly relevant to policies, development policy and needs in Central America at the time of both planning and ex-post evaluation and it was consistent with the Government of Japan's aid policies and plans in Central America. Capacity development for disaster risk management was achieved in the target municipal authorities, however, it was only partially realized in the target communities. Also, capacity development for implementing local disaster management was only partially achieved in the respective national disaster risk management agencies and SE-CEPREDENAC; moreover, because development of counterpart personnel in national disaster risk management agencies was not adequately realized in some of the countries, some of the Project objectives were not achieved. Moreover, considering that little progress was made in terms of sharing and utilizing local disaster management information, experience, techniques, etc. beyond national boundaries, the Project's effectiveness and impact were moderate. The Project period was within the planned term, however, because the cost was higher than planned, the Project efficiency was moderate. While sustainability in terms of policies and systems is high, as the national agencies and municipalities and communities are faced with institutional, technical and financial constraints, the sustainability of effects generated by the Project is moderate. To sum up, the Project is judged to be partially satisfactory.

4.2 Recommendations

4.2.1 Recommendations for Respective National Disaster Risk Management Agencies

- As a part of the Phase 2 activities of the Project³³, the respective national disaster risk management agencies need to verify successful cases and good practices and analyze and document the factors that drive success concerning the various methods and tools for promoting the local disaster management that was introduced through the Project, and then seek to share those within each country and the Central American region.

³³ The Phase 2 of the Project is planned to be implemented from the second half of 2015 for five years.

- The respective national disaster risk management agencies need to recognize the necessity of repeatedly implementing training for the disaster risk management organizations in municipal authorities and communities that have high turnover of personnel, and strive to establish ongoing training systems and setups for continuously supporting the municipalities and communities upon securing the necessary funding.

4.2.2 Recommendations for JICA

- It is necessary to implement Phase 2 of the Project while paying attention to the following points.
 - Together with the respective national disaster risk management agencies, verify successful cases and good practices and analyze and document the factors that drive success concerning the various methods and tools for promoting the local disaster management that was introduced through the Project, and then seek to share those within the Central American region while making use of the function of CEPREDENAC. In this regard, it should be noted that, in order to introduce a method that has worked well in one country to another country that has different conditions, it is necessary to actually apply methods on the ground and adjust them through a process of trial and error, with receiving guidance on the ground from experienced disaster risk management personnel of well worked countries.
 - The implementation of disaster risk management education in schools in the long term helps foster a culture of disaster risk management and, through the participation of parents and communication in homes, creates a channel for providing disaster risk management information to entire communities. Moreover, generally speaking, turnover among school teachers is less common than among employees of municipal authorities. Therefore, in tackling disaster risk management education in schools, methods should be examined with a view to cooperating with ministries of education, etc. and actively utilizing it for local disaster management without limiting activities only to schools.
 - When actualizing activity plans in each country, fully take the following lessons learned in Phase 1 into account.

4.3 Lessons Learned

- Model building and planning of technical cooperation for dissemination: In planning of technical cooperation including capacity building of municipalities and communities, it

is necessary to specify a framework for building a model and establishing a national level system for disseminating that, taking care not to limit capacity building only to the target municipalities and communities. When selecting target municipalities and communities for such technical cooperation, it is necessary to define appropriate criteria for selection, for example, avoid remote areas and areas with socio-economically extreme circumstances in order to ensure efficiency of activities and enhance the universality of the model. Also, plans should include the evaluation and overview of the results of activities in the target areas and steps to formulate a model out of them.

- Select areas where the order of priority for disaster prevention is high: Since the order of priority of disaster prevention tends to be lower than other fields of socioeconomic development, it is necessary to select and conduct activities in municipalities and communities where the order of priority is as high as possible. It is desirable to give preference to areas that experience repeated disasters or have recent experience, areas that are vulnerable to natural disasters, and areas that do not have any other pressing development needs apart from disaster risk management.
- Hardware support for communities: Equipment supply and construction of civil engineering facilities, etc. as was conducted on a small scale in the Project have the potential for motivating communities and enhancing the efficiency and sustainability of organization building through bequeathing outputs that are visible. In order to conduct such support effectively, it is important to confirm the needs and resources of communities before providing the minimum necessary hardware support that the communities cannot do for themselves, and to implement such support with careful timing aimed at imparting motivation.
- Combination of technical cooperation projects and training: As was seen in the Project, in order to permeate new concepts such as disaster prevention and local disaster management, it is effective to combine a technical cooperation project with ongoing training in Japan. However, since classroom training alone is not enough to build practical capacity, it is important for returning trainees to acquire opportunities for practical training through working as counterparts in the project. Moreover, based on the JICA system, because the participants in training in Japan are selected by the government of the recipient country, in the case where such training is viewed as an essential input for project completion, it is important to reach a prior agreement about a mechanism for prioritizing the selection of members who will be involved in the project.

- PDM in regional cooperation: A common PDM of regional cooperation was adopted for all six countries targeted in the Project, however, in reality, activities were adjusted according to the conditions in each country and there were also differences between countries in terms of the inputs and achievements. It was difficult to manage activities based on a single PDM in multiple countries having different disaster risk management policies and institutional setup, local government systems, types of disasters (tsunami, earthquake, etc.), specific capacity building needs and so on. When planning regional cooperation, it is desirable to first carefully review the different conditions in each country, specifically examine the project goals and activities in each country, and where necessary state country-based indicators and activities within a common PDM.