

Ex-Post Project Evaluation 2015: Package I-8  
(Peru, Ecuador)

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JAPAN INTERNATIONAL COOPERATION AGENCY

GLOBAL GROUP 21 JAPAN, INC.

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Republic of Peru

FY 2015 Ex-Post Evaluation of Technical Cooperation Project

“Project for Institutional Reinforcement of Water Supply and Sanitation in the North Area of Peru”

External Evaluator: Hajime Sonoda

Global Group 21 Japan, Inc.

## 0. Summary

The “Project for Institutional Reinforcement of Water Supply and Sanitation in the North Area of Peru” (hereinafter referred to as “the Project”) was implemented for the purpose of improving the capacity of the Regional Direction of Housing and Sanitation (*Dirección Regional de Vivienda y Saneamiento*; hereinafter referred to as “DRVS”), selected municipal authorities and Sanitation Service Administration Committees (*Junta Administrativa de Servicios de Saneamiento*; hereinafter referred to as “JASS”) in the Piura and Lambayeque Regions in the north of Peru through pilot projects and training, thereby upholding improvement of the water supply and sanitation conditions in rural villages and small cities in these regions. The Government of Peru consistently emphasized the sanitation sector from the time of the ex-ante evaluation. Moreover, via the Project, DRVSs in the target regions for the first time acquired the capability to conduct appropriate guidance and support on operation and maintenance of water supply and sanitation services for municipal authorities and JASSs, while the regions have needed to conduct ongoing training for those municipal authorities and JASSs that have frequent turnover of personnel. Thus, the Project is highly consistent with policies and development needs in Peru. Moreover, it is consistent with the aid policy of Japan. Accordingly, relevancy of the Project is high. Through implementation of the Project, the capacity was strengthened on the regional level and among the municipal authorities and JASSs targeted by the pilot projects, so the project purpose was largely achieved. Concerning the overall goal, since water supply services were improved, and it was confirmed that contribution was made to reduce waterborne infectious diseases, intended impacts were generally realized as planned. Accordingly, the Project effectiveness and impact is high. Inputs on the Japanese side were appropriate, while the inputs on the Peruvian side were confronted by constraints in terms of human resources and budget. The project period was largely as planned. However, because project costs on the Japanese side exceeded budget, the project efficiency is fair. On the level of municipal authorities and JASSs, since there are frequent personnel changes and there have been partial technical and financial issues such as lack of means of transport (vehicles) and funds, the sustainability of the project effects is fair.

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

## 1. Project Description



Project Location



Water treatment facility improved by a pilot project (El Espinal, Lambayeque Region)

### 1.1 Background

The Government of Peru emphasized enhancement of the water and sanitation services as part of its poverty reduction strategy and formulated the National Plan for Sanitation in March, 2006, the primary objective of which was to reduce the population without access to safe water and sanitation facilities by half by 2015. According to the plan, the coverage of the water supply service in rural areas of Peru was as low as 62% compared to 81% in urban areas in 2004. The second Garcia Administration (2006-2011) publicly promised the implementation of this plan under the slogan of “Water for Everyone” and began to expand the water supply and sanitation facilities in small local cities and rural villages. Other action which started at that time included the modernization of the water related policies, clarification of the role of local authorities in water and sanitation sector, improvement of facility operation and maintenance, service quality, and the financial strength of service providers.

In Peru, 25 regions and approximately 1,800 municipalities are responsible for local government, but in legislative terms, the municipal authorities are responsible for providing water supply and sewerage services (see Figure 1). The municipal authorities are responsible for constructing and operating water supply and sanitation facilities in urban and rural areas. However, because many municipal authorities lack the finances to construct and maintain facilities, the wealthier Ministry of Housing, Construction and Sanitation (*Ministerio de Vivienda, Construcción y Saneamiento*, hereinafter referred to as “MVCS”) and regional governments conduct construction and maintenance in place of the municipal authorities.

Water supply service in urban areas is provided by either a water and sewer company which has a relevant contract with a single or multiple municipal authorities or directly by a municipal authority. Meanwhile, in rural areas, residents’ organizations, primarily Sanitation Service Administration Committees composed of representatives of local residents run the water supply and

sanitation facilities as service providers.<sup>1</sup> Municipal authorities have the role of directly supervising as well as assisting JASS while regional governments provide support for training and technical matters for municipal authorities via DRVS.<sup>2</sup>

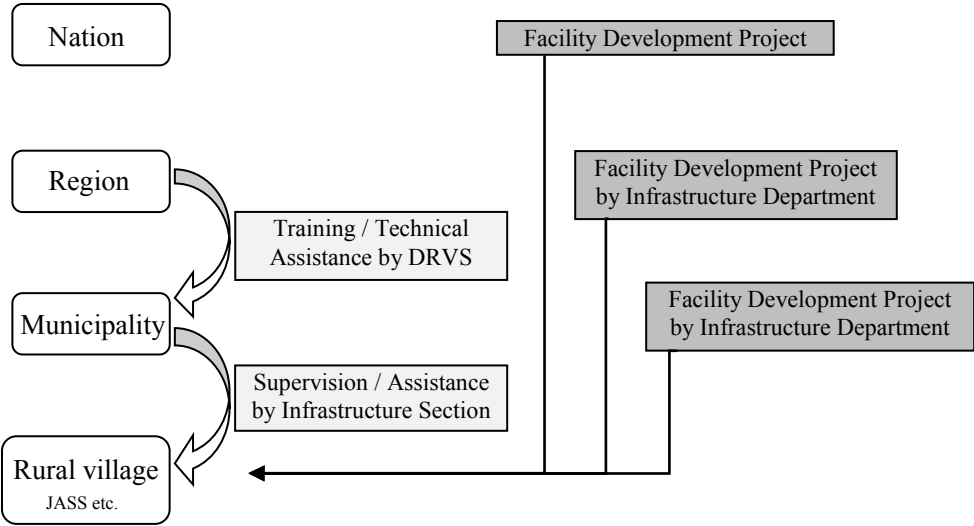


Figure 1. Institutional framework of provision of water and sanitation service in rural area of Peru

However, DRVSs of Piura and Lambayeque Regions were not able to provide appropriate guidance for municipal authorities around 2008, as DRVSs lacked the ability to fully identify the problems faced by the water supply and sanitation services supervised by the municipal authorities. On their part, many municipal authorities lacked the capacity to provide proper guidance or assistance for JASSs. As a result, many rural villages did not develop a proper understanding of the operation and maintenance of water supply and sanitation facilities, resulting in such problems as a lack of adequate services, non-collection of the service charge to ensure the proper operation and maintenance of the facilities and non-repair of broken-down facilities.

Under these circumstances, in June, 2009 in response to a request made by the Government of Peru, JICA commenced the implementation of a technical cooperation project “the Project for Institutional Reinforcement of Water supply and Sanitation in the North Area of Peru” in the Piura and Lambayeque Regions where the water supply coverage was low with a view to enhancing the capacity of various organizations involved in the water supply and sanitation services.

<sup>1</sup> A residents’ organization which handle water and sanitation service can establish corporate status by registering as “a Sanitation Service Administration Committee” with the relevant municipal authority. There are organizations which provide a similar service under the name of “water cooperative” or other names without such registration. In this report, all such organizations are referred to as JASS for simplicity and convenience.

<sup>2</sup> At the regional governments of Peru, there is a section which has a function decentralized from the Ministry of Housing, Construction and Sanitation. Most of them are named as “Regional Direction of Housing and Sanitation”, while its name differs from region to region; at the time of commencement of the Project, Piura Region had “Regional Direction of Housing, Construction and Sanitation”, while Lambayeque Region had “Regional Department of Housing and Sanitation”, which is called as “Executive Department of Housing and Sanitation” at the time of terminal evaluation. In this report, all such departments are referred to as DRVS for simplicity and convenience.

## 1.2 Project Outline

The Project was implemented for the purpose of improving the capacity of DRVSSs, selected municipal authorities and JASSs in the Piura and Lambayeque Regions in the north of Peru through pilot projects and training, while upholding improvement of the water supply and sanitation conditions in rural villages and small cities in these regions as the overall goal.<sup>3</sup>

Overall Goal		The water supply and sanitation conditions are improved in rural villages and small cities in the Piura and Lambayeque Regions
Project Purpose		The capacity to implement water supply and sanitation services in rural villages and small city authorities in the Piura and Lambayeque Regions is improved
Outputs	Output 1	The capacity and issues for rural village and small city authorities to implement water supply and sanitation services are identified in the Piura and Lambayeque Regions.
	Output 2	The capacity of DRVSSs in the Piura and Lambayeque Regions is strengthened to undertake the construction of water supply facilities and to supervise water supply and sanitation services in rural villages and small cities.
	Output 3	The capacity is strengthened for JASSs or municipal offices participated in pilot activities to operate and maintain water supply facilities and to educate people on sanitation.
	Output 4	A system is developed in the Piura and Lambayeque Regions to disseminate the contents of the manuals for operation and maintenance and for sanitation education to municipal offices and JASSs.
Total Cost (Japanese Side)		435 million yen
Period of Cooperation		June, 2009 to March, 2013
Implementing Agencies		Ministry of Housing, Construction and Sanitation (MVCS); Regional Governments of Piura and Lambayeque
Other Relevant Agencies/ Organizations		None
Supporting Agency/ Organization in Japan		Unico International Corporation; Earth System Science Co., Ltd.
Related Projects		None

## 1.3 Outline of the Terminal Evaluation

### 1.3.1 Achievement Status of Project Purpose at the Time of the Terminal Evaluation

While such guiding activities as training, monitoring and awareness-raising targeting municipal authorities had been continuing, an improved water supply service had not been achieved at some of the ten JASS sites targeted by the pilot projects. Because of this, it was considered that the project purpose had not been fully achieved.

<sup>3</sup> The rural villages and small cities targeted by the Project are administrative bodies where the water supply service is provided by a residents' organization, such as a JASS. Rural villages and small cities are characterized by a population size of up to 30,000 and are mostly located in rural areas. In this report, they are collectively referred to as "rural villages".

### **1.3.2 Achievement Status of Overall Goal at the Time of the Terminal Evaluation**

Although positive impacts of the pilot projects had been confirmed in relation to improvement of the water supply and sanitation conditions, there was no firm prospect of continuing budget as well as manpower allocation which was necessary to achieve the overall goal. As such, the impacts, including prospect for an achievement of the overall goal, were judged to be fair.

### **1.3.3 Recommendations at the Time of the Terminal Evaluation**

< Short-term recommendations up to the time of project completion >

- Strengthening the collaboration and coordination among stakeholders in the water sector among the Ministry of Housing, Construction and Sanitation (national level), DRVSs (regional level), municipal authorities and JASSs (village level).
- Formulation of a medium-term activity plan for DRVSs of Piura and Lambayeque to ensure the continuity of various activities initiated by the Project
- Setting specific target figures for the two regions related to the overall goal.

< Long-term recommendations for the post-project period >

- Implementation of the medium-term activity plan by governments of the target regions by securing of sufficient manpower and budget.
- Application of a usage-based tariff in the target regions as well as other regions by means of awareness-raising activities and the installation of water meters.
- Assistance by DRVSs for municipalities on the establishment of a division in charge of water supply and sanitation services
- Active use of the manuals developed under the Project by MVCS and DRVSs
- Improvement of the inter-donor coordination mechanism by MVCS and DRVSs
- Sharing of the good practices and lessons learned under the pilot projects among DRVSs, municipal authorities and JASSs for the purpose of capacity strengthening.

## **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: July, 2015-August, 2016

Duration of the Field Survey: November 1-27, 2015

March 28-30, 2016

### 3. Results of the Evaluation (Overall Rating: B<sup>4</sup>)

#### 3.1 Relevance (Rating: ③<sup>5</sup>)

##### 3.1.1 Relevance to the Development Plan of Peru

As already mentioned in 1.1 Background, the Government of Peru, at the time of the ex-ante evaluation in 2008, formulated the National Plan for Sanitation with the objective of reducing the population without access to safe water supply and sanitation facilities by half by 2015, and was actively trying to expand the water supply and sanitation services in small cities and rural villages. This plan called for improvement of the operation and maintenance of the facilities and qualitative improvement of the services, both of which matched the objectives of the Project.

The National Plan for Sanitation is still in force at the time of the ex-post evaluation, and the Humala Administration established in 2012 has upheld the expansion of the water supply and sanitation services for poor people and in poor areas as an important policy objective. Since 2009, MVCS has been introducing a number of ministerial ordinance in an attempt to strengthen the capacity of DRVSSs, municipalities, and JASSs, etc. by clarifying the roles of each organization for water supply and sanitation services. These activities also match the objectives of the Project.

As such, the Project was highly relevant to the development plans of Peru at the time of the ex-ante evaluation and also at the time of its completion in 2013.

##### 3.1.2 Relevance to the Development Needs of Peru

As already mentioned in 1.1 Background, at the time of ex-ante evaluation, none of the regional governments of Piura and Lambayeque and municipal authorities had the ability to provide adequate guidance or assistance for JASSs. This situation created problems such as a lack of adequate services, non-collection of the service charge to ensure the proper operation and maintenance of the facilities and the non-repair of broken-down facilities. While the coverage of the water supply service in the Piura and Lambayeque Regions in 2006 was 64.4% and 74.1% respectively<sup>6</sup> and many households in rural areas did not have access to safe water.

With the implementation of the Project, the ability of the targeted regional governments and some JASSs in those municipal authorities where the pilot project was implemented is believed to have been somewhat strengthened (refer to 3.2.1 Effectiveness). However, there are many municipalities and rural villages in these two regions which could not be featured in the Project. In these areas, it was necessary to enhance the capacity of the municipal authorities to assist JASSs and the capacity of JASSs to collect the service charge and to maintain the facilities. The coverage of the water supply service did improve to 82.5% in the Piura Region and 88.8% in the Lambayeque Region by 2013 even though the coverage in rural areas remained as low as around 60%.<sup>7</sup>

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<sup>4</sup> A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

<sup>5</sup> ①: Low; ②: Fair; ③: High

<sup>6</sup> Based on data published by the National Bureau of Statistics and Information. This coverage represents the percentage of households receiving water supply through an individual water tap or communal tap.

<sup>7</sup> According to data published by MVCS, the coverage of the water supply service in rural areas in 2013 was 66.3% in the Piura Region and 55.5% in the Lambayeque Region.



Based on the above, it is clear that the necessity for the Project was high at the time of both the ex-ante evaluation and project completion.

### 3.1.3 Relevance to Japan's ODA Policy

Japan's Country Assistance Program for Peru (August, 2000) identified four priority fields, i.e. "poverty reduction", "support for the social sector", "the development of economic infrastructure" and "environmental conservation". The "improvement of the water supply and sanitation services" falls under "poverty reduction" which is considered to be a matter of the highest priority. As such, the Project is considered to be one of the most important issues of the program. JICA's Project Implementation Policies for Peru which were revised in March, 2007 were based on the above-mentioned Country Assistance Program for Peru, and water supply and sanitation projects are relevant to the categories of "poverty reduction" and "support for the social sector". Moreover, the Project was upheld as a core project of "the Water Supply and Sanitation Sub-Program for the North Area" of "the Water Program for Peru".<sup>8</sup> As such, the Project is consistent with Japan's ODA policies.

Based on the above, the Project is highly relevant to Peru's development plans and the development needs of Peru, as well as Japan's ODA policies. Therefore, its relevance is high.



Rural water supply facility constructed by pilot projects (from left): well (Lynas, Piura Region) water reservoir (San Pablo, Piura Region) water meter box (San Pablo, Piura Region)

<sup>8</sup> The Water Program consists of three components, i.e. ① construction of water supply and sanitation facilities, ② strengthening of the operation and maintenance system and ③ capacity development of communities. The Project was the central piece of the second component to strengthen the operation and maintenance system.

## **3.2 Effectiveness and Impact<sup>9</sup> (Rating: ③)**

### **3.2.1 Effectiveness**

#### **3.2.1.1 Project Outputs and Process**

(1) Identification of issues concerning water supply and sanitation in rural villages (Output 1)

Various issues concerning water supply and sanitation in rural villages were identified through a survey featuring the conditions of the water supply and sanitation services for local residents and the state of the operation and maintenance of the water supply facilities in 48 rural villages that had been considered to have some problems related to water supply and sanitation in the two targeted regions (20 rural villages in Lambayeque Region and other 28 in Piura Region). Diagnosis of the organizational capacity and the results of various activities of DRVSs and municipal authorities confirmed a real need for capacity development. The above activities led to the introduction of effective approaches to achieve the purpose of the Project, including small and continuous financial incentives for board members of JASSs who basically receive no salary, the introduction of a usage-based tariff, and emphasis on a coordination and collaboration among stakeholders at the national, regional, municipal and village levels.

(2) Capacity building of regional, municipal and village-level stakeholders through pilot projects (Outputs 2 and 3)

Pilot projects were implemented in ten rural villages (five in each region) which were selected from the technical and socioeconomic viewpoints while avoiding duplicated selection with other similar projects.

In four of these ten rural villages, DRVSs played a central role in the construction of water supply facilities. Other activities implemented in all of these ten rural villages were the installation of water meters and the training of board members of newly established JASSs on technical and organizational management issues. In addition, sanitation education (education for water users) targeting all residents was conducted in collaboration with the health and education departments of each regional government. The themes of this sanitation education included essential matters for the proper utilization of rural water supply, such as the appropriate practices of hygiene, water saving and proper payment of the water charge. Training was also provided for municipal officers in charge of these pilot rural villages and a communication network was developed for smooth collaboration between the municipal authorities and JASSs. Prior to these activities, three manuals for the establishment and management of a JASS, operation and maintenance of water supply facilities and sanitation education were prepared and were actively used for the training and sanitation education. Apart from this, MVCS prepared a manual for the preparation and implementation of rural water supply facility construction projects as part of the Project by commissioning the work to a local consultant.

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<sup>9</sup> The effectiveness is rated in consideration of not only the effects but also the impacts.

According to DRVSS of the targeted regions, the counterpart personnel of the Project (officers of DRVSS) obtained comprehensive knowledge and experience regarding wide-ranging matters, including the preparation and implementation of water supply projects in rural areas, operation and maintenance of various facilities and sanitation education, for the first time through the pilot projects. It is said that the intensive involvement in a series of activities in the field was especially useful to improve their work performance in subsequent years. As all the principal counterpart personnel unanimously expressed such views, it is fair to assume that the capacity of DRVSS in the targeted regions was greatly enhanced.



(Left) Interview with a JASS in front of well / water reservoir (Mochumi, Lambayeque Region)  
(Right) Tools (part) given for a JASS (Eten, Lambayeque Region)

At the municipal level, those nominated front-line officers underwent the transfer of knowledge and skills through training as well as practical work by the Project. Although municipal authorities should play a central role in guidance for and monitoring of JASSs, the number of guidance sessions for JASSs by municipal officers had been insufficient due to the multiple assignment of these officers and also due to the significant constraints in terms of budget and means of transportation. This means that participation of the municipal authorities to the Project was not sufficient and capacity development at the district level still have some issues to address.

At the rural villages, results of capacity strengthening had been confirmed as each JASS in nine among ten communities was submitting monthly reports to the respective municipal authority by the time of project completion. Based on the interviews with DRVSS of the Piura and Lambayeque Regions and those board members of JASSs, it can be judged that the operation and maintenance skills, which was improved through technical training on operation and simple repairs of facility and provision of tools, and clarification of the operational rules based on the usage-based water charge to ensure the transparency of accounting have led to the appropriate management of facilities by JASSs with the gained trust of residents. Therefore, it is judged that capacity development has been succeeded in most of the pilot rural villages by the time of project completion. An improved water charge collection rate and an increase of the proportion of residents maintaining sanitary practices in daily life by the time of project completion were also reported for most of these

rural villages<sup>10</sup>. Based on the above, it is judged that sufficient capacity had been built at most of the target villages by the completion of the Project. In one rural community, however, the residents were very unhappy about the absence of an adequate water supply service for a long time due to the break-down of the well pump and the collection of the usage-based water charge lasted for only two months.<sup>11</sup>

(3) Development of a system to support JASSs by regional governments via municipal authorities (Output 4)

The authorities of each of the ten municipalities that cover the ten villages targeted by the pilot projects provided technical training for other rural villages which were in their jurisdiction but not the target of the pilot projects. An average of 70% of rural villages in these ten municipalities participated in this training. Meanwhile, DRVSs of the targeted regions conducted training related to the operation and maintenance of facilities and sanitation education for all the municipalities in their regions, 70% of the municipal authorities in the Piura Region and 90% in the Lambayeque Region participated in this training. Through this training, DRVSs of these regions established new useful communication channel with individual municipal authorities. These municipal authorities which participated in the training prepared a training plan for JASSs in their charge. Through these activities, sharing of the knowledge and experience obtained under the pilot projects and of the newly prepared manuals advanced in the two regions, consolidating the technical and informational basis for continual support for JASSs by the regional governments and municipal authorities. Furthermore, DRVSs in the two regions organized a seminar in the San Martin Region to introduce the positive outcomes of the Project.<sup>12</sup>

### 3.2.1.2 Achievement of Project Purpose

The purpose of the Project was that “the capacity to provide water supply and sanitation services in rural villages and small cities in the Piura and Lambayeque Regions is improved”. To be more precise, through the pilot projects, training and the preparation and dissemination of manuals on construction, operation and maintenance of various water and sanitation facilities, relevant training, technical assistance and sanitation education, it was expected that organizational capacity is enhanced at regional, municipal and rural village levels to attain sustainable operation and maintenance of water supply and sanitation facilities in rural villages and small cities.

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<sup>10</sup> Monitoring surveys were conducted in line with the pilot projects, at seven rural villages (five in Lambayeque Region and two in Piura Region) among the ten targeted villages, on such aspects as; punctual payment of water tariff, sanitary practices in daily life (handling of water in house, hand washing with soap, cleaning of toilet, etc.), occurrence of diarrheas, etc. As a result, improvement was confirmed at five to six villages during a period of six months on each item.

<sup>11</sup> The rural village in question was Malacasi in the Piura Region. This village had a water supply system which used a well as the water source but this system was not included in the scope of the water supply facility improvement through a pilot project.

<sup>12</sup> The participants of this seminar included some 40 people involved in rural water supply in the San Martin Region, representatives of DRVS of the Loreto and Amazonas Regions, representatives of the Inter-American Development Bank and officers of aid organizations of Switzerland and Germany.

Table 1 Degree of Achievement of the Project Purpose

Project Purpose	The capacity to provide water supply and sanitation services in rural villages and small cities in the Piura and Lambayeque Regions is improved. < Achieved in major part>
Indicators	Results
① DRVSs continue to provide guidance based on the manuals prepared under the Project to 25% of the municipal authorities in each region.	DRVSs established a communication channel to each municipal authority through the training in which more than 70% of the municipal authorities in each region participated, completing the preparations for continual technical guidance for the municipalities. (At the time of the ex-post evaluation, technical guidance was continuing for some 30% of the municipal authorities in the two regions.) <Achieved>
② An improved water supply service with an appropriate tariff is provided by JASS in at least ten of the targeted areas by the pilot projects.	A usage-based tariff was employed in nine of the ten pilot rural villages, resulting in an improved water supply service. In one rural community, the service deteriorated due to the break-down of the water supply facility and the usage-based tariff was withdrawn after two months in respect of the opinions of residents. < Mostly achieved >

(1) State of achievement of the indicators

As shown in Table 1, the degree of achievement is high for the two indicators for the project purpose. In connection with Indicator ①, DRVSs of the targeted regions were expected to become capable to continually provide technical guidance for the municipal authorities even after project completion by means of obtaining comprehensive knowledge and experience of water supply and sanitation services through the Project and establishing a communication channel with individual municipal authorities. In fact, the technical guidance provided by the regional DRVSs is found to be continuing at the time of the ex-post evaluation, achieving this indicator.

In the case of Indicator ②, even though the usage-based tariff ended after a short period of time in one of the ten pilot rural villages<sup>13</sup>, it continued at least until the time of project completion in the other nine rural villages. Moreover, several cases as described below were found through the field visit where water charge collection using a usage-based tariff with the installation of water meters led to an improved water supply service.

- Reduction of inadequate water consumption such as watering the garden and water use for irrigation made it possible for supplied water to reach those households located in areas at the far end of the water supply network and the volume of supplied water per household to increase.
- At those water supply facilities which used a well as the water source, the volume of pumped water was reduced, resulting in a decline of the electricity charge.

<sup>13</sup> See footnote 11.

- The water charge collection rate increased as it became easier to suspend water supply to those households in payment arrears in an effective manner. (Water supply can be suspended simply by opening the water meter box with a key. When there is no water meter, the service pipe in the ground must be physically disconnected. However, as people can get water from their neighbors, etc. without any additional charge even though water supply was suspended, the effect of such disconnection to prompt payment is not strong.)
- Based on the above, the financial performance of JASSs improved to the extent that they could afford proper maintenance and quick repair.

(2) State of achievement of the project purpose

At the time of the commencement of the Project, DRVSSs of Lambayeque and Piura were little involved in the water supply and sanitation services for rural villages, and there were few officers with knowledge or experience concerning these services. Through the implementation of the Project, however, the counterparts at DRVSSs obtained comprehensive knowledge and experience to the extent that they could act as main trainers for the training of staff members of municipal authorities and JASSs, and also for sanitary education for residents. As such, the overall capacity of DRVSSs of both regional governments is judged to have significantly improved. In the case of the municipal authorities, skills were transferred mainly featuring those subject municipalities of the pilot projects, while some issues were left unsolved in relation to manpower, budget and means of transportation. At the rural village level, sufficient capacity development was observed in most of the pilot rural villages. In consideration of the above as well as the fact that the level of achievement of the relevant indicators is high, it is appropriate to conclude that the Project largely achieved its purpose.

(3) Factors affecting the achievement of the project purpose

The promoting factors and obstacles relating to the achievement of the project purpose are listed below.

< Promoting factors >

- Accurate analysis of the identified problems made it possible to employ an effective approach to improve the operation and maintenance capability of JASSs, such as introduction of a usage-based tariff, introduction of incentives for board members of JASSs and strengthening of collaboration among the regional DRVSSs, municipal authorities and JASSs, etc.
- The careful as well as practical technical transfer through the pilot projects made it possible for DRVSSs to obtain broad knowledge and experience relating to water supply and sanitation services.

< Obstacles >

- In some municipalities, people capable of supporting JASSs were not properly deployed. It can be pointed out in general that mayors give priority to politically eye-catching projects such as improvement of city hall, public square, etc., and give less priority to water supply and sanitation-related projects in rural villages.
- In some rural villages, the support for operation and maintenance under the pilot projects was not coupled with the sufficient development of facilities which is what the residents wanted to see.

### **3.2.2 Impact**

The overall goal of the Project was improvement of the water supply and sanitation conditions in rural villages and small cities in the Piura and Lambayeque Regions. It was envisaged that that the Project would contribute to this overall goal mainly by means of improving the operation and maintenance of rural water supply facilities. For this reason, the municipal authorities which would be responsible for providing direct support for JASSs were expected to receive continual training and technical guidance from DRVSSs. On the other hand, the Project intended to strengthen the capacity of DRVSSs in preparing and implementing rural water supply projects through pilot projects so that such investment projects by regional governments would contribute to the achievement of the overall goal.

In the following sections, the maintenance of the attained outputs and the project purpose after the termination of the Project is clarified. Then, the state of achievement of the overall goal and the contribution of the Project to the overall goal are properly analyzed, followed by analysis of the impacts of the Project on matters other than the overall goal.

#### **3.2.2.1 Sustainment of Project Outputs and Achieved Project Purpose**

##### **(1) Rural Villages with Pilot Projects**

Of the ten rural villages in which the pilot projects were implemented, seven were visited by the evaluator for the ex-post evaluation and their situation (as of November, 2015) in relation to the Project is described here<sup>14</sup>. Even though there have been some difficulties due to a change of the board members of JASSs and the inadequate handing-over, etc., the positive effects of the improved water supply service have been maintained in five to six among seven rural villages.

- In five rural villages, board members of a JASS have been replaced and all of the personnel which underwent training in the Project have left. In two among these five rural villages, new board members have undergone training by the regional or municipal authorities or

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<sup>14</sup> The visited villages were carefully selected to avoid bias towards only successful cases or failed cases while referring to the ratings of DRVSSs in each region and giving consideration to achieving a balanced geographical distribution.

have received the transfer of detailed information and guidance by the ex-board members concerning the Project and its outcomes.

- In three rural villages, the manuals developed under the Project are still in use. While the maintenance tools given by the pilot projects continue to be used in all of the rural villages visited, the PC and printer is used by JASS in only two rural villages.
- In two rural villages, the usage-based water charge is no longer continued following a decision at a residents' assembly of JASS<sup>15</sup>. In contrast, other three rural villages have experienced an expansion of the service area after the project completion, acquiring new water users who pay a fixed charge because of the non-installation of a water meter.
- In five rural villages, it is reported that the pilot projects have resulted in improvement of the water supply service in terms of the expansion of the area where water reaches, improvement of water supply hours, water pressure and water quality. In three villages, it is considered that introduction of the usage-based water charge has led to an expansion of the area where water reaches and improvements in water supply hours and water pressure. According to the findings of the beneficiary survey conducted as a part of ex-post evaluation<sup>16</sup>, an average of 67% of the residents of these rural villages replied that the water supply service has improved even though the situation differs from one rural community to another. 72% replied that they are satisfied with the current water supply service (Table 2).
- In six rural villages, the water charge collection rate has improved. In five rural villages, suspension of the water supply to households in arrears is considered to have led to an improved collection rate. On the other hand, the residents of those rural villages where a usage-based tariff is not in place may obtain water from neighbors, and the effects of suspension may be limited.
- JASS in five rural villages have saved money which may be used for small-scale repair work.

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<sup>15</sup> There were some villages where residents are unhappy that appropriate water supply services cannot be provided due to extended breakdown of well pumps (see 3.2.1.1(2)) and where application of usage-based water tariff was abandoned in the face of strong opposition from some residents who had increased water tariff.

<sup>16</sup> As the beneficiary survey, interviews using questionnaires were implemented targeting 203 households (32-35 households in each village) randomly selected in six villages targeted by the pilot projects (two villages were targeted for facilities construction, and four received sanitation education and installation of meters only).



Table 2 Level of Satisfaction with the Water Supply Service and Improvement of the Water Supply Service in the Six Villages Covered by the Beneficiary Survey

	Average	Piura Region			Lambayeque Region		
		San Pablo	Lynas	Malacasi	El Espinal	Humedades	Santos Vera
Ratio of Residents Replying “Very Satisfied” or “Satisfied” (%)							
Overall	72	49	91	10	100	85	91
Water pressure	72	54	97	7	85	85	97
Water supply hours	59	38	59	0	94	65	91
Water quality	76	87	56	67	71	91	82
Tariff	70	49	91	33	91	56	94
Maintenance	72	46	94	27	85	88	91
Customer handling	70	51	94	20	88	74	91
Ratio of Residents Replying “Much improved” or “Improved” (%)							
Overall	67	54	97	3	17	82	88
Water pressure	47	27	79	10	38	68	56
Water supply hours	37	24	41	7	44	53	50
Water quality	32	19	68	3	12	38	50
Tariff	49	35	65	10	44	59	79
Maintenance	37	22	50	10	35	32	74
Customer handling	49	19	79	13	41	41	38

Source: Beneficiary Survey

## (2) MVCS

All of the staff personnel involved in the Project have left. The facility improvement manual prepared under the Project is no longer used. No follow-up activities with regional governments and sites of the pilot projects have been conducted since the project completion.

## (3) DRVSs

Of the counterparts working for DRVSs at the time of project completion, six officers (out of eight) at the Piura DRVS still work at the same office and two are in charge of water and sanitation. In the case of the Lambayeque DRVS, seven out of eight officers still work at the same office and three among them are in charge of water and sanitation.

### Training and technical assistances for municipal authorities

In the Piura Region, DRVS has made an agreement to provide training with individual municipal authorities and also provides technical assistance as required. In addition to the five municipal authorities with the pilot projects, DRVS concluded an agreement with nine municipal authorities in 2014 and 2015, and provided training for 21 and 30 municipalities in 2014 and 2015 respectively. While more than 60 municipal authorities in the Piura Region are in need of such assistances, DRVS cannot support all of them because of constraints in terms of the manpower, funding and means of transportation. For those municipal authorities with which an agreement has been made, DRVS provides seven to ten half-day training sessions featuring the establishment and management of a JASS, operation and maintenance of water supply facilities and sanitation

education. The counterparts for the Project act as lecturers for these training sessions. An engineer dispatched by another donor project (SABA Project) may act as a lecturer for technical matters<sup>17</sup>. Nearly half of the municipal authorities which have undergone such training have become capable of providing similar training for JASSs. In 2013 and 2015, a training and exchange meeting was held for all the municipal authorities and some JASSs where the participants shared good practices in the region.

Meanwhile, the Lambayeque DRVS conducted a three-day training session in 2014 and 2015 targeting all 30 municipal authorities in the region, and 25 and 27 municipalities participated in 2014 and 2015 respectively. This training session covered all relevant matters, ranging from facility construction and improvement, and the operation and maintenance of facilities to sanitation education. Lectures were given by the counterparts for the Project as well as by the officers in the health sector and engineers working for the SABA Project. Field training was also included. The teaching materials, etc. were prepared by individual lecturers and were distributed in the form of a CD to each trainee on completion of the training. The manuals developed and printed under the Project were also distributed as long as they were in stock. Many of the municipal authorities which participated in the training are now providing similar training for JASSs. At the time of ex-post evaluation, DRVS maintains regular contact with the relevant officers of some 20 municipal authorities and provides them with assistance.

#### Construction of water supply facilities

Water supply facilities were constructed under the pilot projects by DRVS as a part of the Project in Piura and Lambayeque Regions. However, DRVS is not implementing any projects for construction of water supply facilities after the Project, as the Department General of Infrastructure, instead of DRVS, is still conducting such projects as before. Therefore, DRVSs of the both regions have not implemented any construction work in the post-project period.<sup>18</sup> While, the Lambayeque DRVS is actually conducting the planning and design of some projects for water supply facilities and the Department General of Infrastructure is responsible for the implementation of construction works. Since the completion of the Project, seven projects have been implemented based on this division of work and some of the counterparts for the Project were involved in the planning and design stages of these projects.

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<sup>17</sup> Swiss Agency for Development and Cooperation implemented the Integrated Basic Sanitation Model Project (SABA Project) over almost 20 years from the latter part of the 1990s. In this project, engineers, etc. were dispatched to target regions to implement training for mainly municipal authorities with the objective of improving basic sanitary services in rural areas. In recent years, this agency has been working on dissemination of chlorine disinfection with the aim of securing safe water.

<sup>18</sup> According to the material provided by JICA, at the time of planning the Project, capacity development relating to facility construction was included in the scope of cooperation on the grounds that DRVSs which were only responsible for operation and maintenance would eventually become responsible for facility construction as well in line with the political intention of MVCS at the time. Thus, it was thought that regional governments would bring about such organizational change.

### Utilization of manuals

The facility development manual prepared by MVCS as part of the Project did not become an official manual approved by the Ministry, therefore it has been neither published nor distributed. At the regional and municipal levels, the manuals prepared by the Ministry of Economy and Finance and MVCS are widely used.

In regard to the three manuals (featuring “establishment and management of a JASS”, “operation and maintenance of water supply facilities” and “sanitation education”) used for the pilot projects and training under the Project, only manuals on sanitation education has been reprinted with partial revision in the Piura Region after the completed distribution of the initial stock. For the training provided by DRVSs after the completion of the Project, lecturers prepare their own teaching materials for distribution in digital copies to the trainees. The three manuals are used by the officers of DRVS as a reference material.

#### (4) Municipalities

Of the ten municipalities which cover the ten villages targeted by the pilot projects, six were visited by the evaluator for the purpose of ex-post evaluation. The situations of these six municipalities (as of November, 2015) are described below.

- Five municipalities have a municipal technical office responsible for guidance on rural water supply and sanitation. Of these, four have been newly created since the completion of the Project.
- Many officers deployed at the above office have concurrent job assignments. A person who participated in the training under the Project and still has the same position is found in only one municipality because of reshuffling after the election of a new mayor. No-one has any of the manuals prepared under the Project.
- Only half of the visited municipalities, i.e. three out of six, have participated in the training held by DRVS on how to provide guidance for JASSs.
- Four municipal authorities have a general idea of the present conditions of rural water supply and JASSs in their municipalities. Three municipal authorities within the four provide training for JASSs.

The evaluator visited additional four municipalities which were not featured in the pilot projects but were considered by DRVS as proactive municipalities in water and sanitation sector. It was confirmed that the respective municipal authorities dispatched their officers to the training organized by DRVSs and are thereby actively providing training and technical guidance for JASSs. The training for JASSs uses teaching materials personally prepared by the officer in charge. In two municipalities, the availability of the manuals prepared under the Project was confirmed but these

manuals are not necessarily used directly in the training while they are used as reference materials for municipal officers.

In general, the training organized by a municipal authority for JASSs is conducted at a convenient site for the participating JASS members based on the distance from a rural community to the site, means of transportation owned by the municipal authorities, necessity for such training and other factors. The site may be the municipal office to invite all the JASSs, or other convenient locations for some JASSs, or may be in each rural community. Of the total ten visited municipalities, all of the seven municipalities which had received training by DRVSSs provide training for JASSs. The remaining three municipalities did not receive any DRVSSs training and do not provide training for JASSs.

When either the national government or a regional government constructs new water supply facilities, the establishment of a JASS and relevant training on its administration are conducted as part of the investment project. According to the interview with regional and municipal authorities, it is often the case that training is outsourced to the private sector, and municipal officers are not involved in the process. Some municipalities expressed their opinion that the involvement of the municipal authority from the initial stage of the process of establishing and providing training for a JASS would make the practice of consistent and continual guidance feasible.

#### (5) Factors affecting the sustainment of the project outputs and achieved project purpose

The promoting factors and obstacles relating to the sustainment of the project outputs and project purpose are listed below.

##### < Promoting factors >

- Following a government program designed for capacity development of local governments<sup>19</sup>, a technical office has been established in 2015 in those municipalities with a high level of poverty, and officers have been appointed to assist the operation and maintenance of rural water supply facilities. This program requires municipal authorities to diagnose the conditions of water supply facilities and the organizational structure and operation, etc. of JASSs in their own municipalities and also to provide training for some rural villages. Funding is conditional on the state of implementation of these activities. Because of this program, the level of awareness of the operation and maintenance of rural water supply facilities appears to have been increasing among municipal authorities.
- The technical assistance for DRVSSs is continuing under the SABA Project.
- The principal counterparts for the Project have kept their positions at DRVSSs and maintained their activities.

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<sup>19</sup> Incentive Plan to Improve Municipal Management and Modernization: this program entails granting subsidies to municipal authorities according to performance in order to enhance their administrative capacity. Targets for achieving performance are presented every six months, and subsidies are allocated according to the degree of achievement in each municipal authority.

< Obstacles >

- The personnel at municipal authorities and JASSs frequently change. In the case of municipal authorities, members of the municipal technical office often change every four years after the election of a new district head and the handing-over is frequently inadequate. In the case of JASSs, board members may be replaced every two years in the election and the handing-over is often inadequate. Because of this, there is a need for the repeated training of members of district technical offices and JASSs.
- DRVSs face constraints in terms of the means of transportation and budget while municipal authorities tend to face an additional constraint relating to manpower. DRVSs or most municipal authorities have only one vehicle for use for official duties.<sup>20</sup> Most officers deployed at municipal technical offices have concurrent job assignments.

### 3.2.2.2 Achievement of Overall Goal

As the level of achievement of the relevant indicators is high as shown in Table 3, it is inferred that the overall goal of “the water supply and sanitation conditions are improved in rural villages and small towns in the Piura and Lambayeque Regions” was achieved.

Table 3 Level of Achievement of the Overall Goal

Overall Goal	The water supply and sanitation conditions are improved in rural villages and small cities in the Piura and Lambayeque Regions. <Achieved>
Indicator	Results
① Increase of the number of rural villages and small cities with drinking water supply services that are adequate in quality and quantity	Although no data for this indicator has been obtained, it is inferred that this indicator has been achieved because of the implementation of many water supply facility construction projects <sup>21</sup> and continued assistance for the municipal authorities and JASSs. <Achieved>
② 5% increase of the coverage of rural water supply in each region by 2017	The coverage increased by 7.3% in the Piura Region and 5.3% in the Lambayeque Region in the three year period from 2012 to 2015. <Achieved> <Rural water supply coverage> 2012: Piura 77.3%, Lambayeque 82.8% 2015: Piura 84.6%, Lambayeque 88.1%
③ Decline of the incidence rates of water-borne diseases	No data for this indicator has been obtained. A decline of the frequency of the occurrence of diarrhea has been reported in some pilot rural villages. Because of the ongoing improvement of the water supply and sanitation services in other rural villages, it is inferred that this indicator has been <Achieved>.

Note: Although Indicator ② was not included in the PDM, it was introduced prior to project completion following a recommendation by the terminal evaluation report that target figures for the overall goal indicators should be determined. It must be noted that the rural water supply coverage is a percentage of households receiving water supply through an individual tap or communal tap in those municipalities other than urban municipalities (where a JASS in rural area does not exist) of each region and is calculated using data published by the National Bureau of Statistics and Information.

<sup>20</sup> The vehicles provided under the Project have been actively used as the only means of transportation for the Piura DRVS and the Lambayeque DVS.

<sup>21</sup> For example, new national, regional or municipal investment projects for the construction of water supply facilities were approved for some 360 rural villages in the Piura and Lambayeque Regions in 2014.

The Project is believed to have made the following contribution in relation to improvement of the water supply service (Indicators ① and ②) and decline of water-borne diseases (Indicator ③).

(1) Promotion of infrastructure development by regional governments

While, no positive contribution to the Piura DRVS is feasible as this organization is not involved in facility development, the Lambayeque DRVS has been involved in the planning and design of seven projects from the time of project completion to the time of the ex-post evaluation. Although the involvement of DRVS is limited to the preparatory stage due to the fact that the actual construction work is undertaken by the Department General of Infrastructure of Lambayeque Region, it is possible that the transfer of skills under the Project has promoted the construction of new facilities to a certain extent in terms of securing quality of planning, design and construction.

(2) Improvement of the operation and maintenance of rural water supply facilities

In both of the targeted regions, the Project has contributed to improvement of the water supply service through the provision of technical support for and training of municipal authorities / JASSs and continued sanitation education. There are rural villages in which the management of a JASS has improved even though these rural villages were not subjects of the pilot projects. It is safe to assume that the sustainability of the water supply service has increased in these rural villages. The usage-based tariff which resulted in a conspicuous improvement of the water supply service under the pilot projects has not yet been introduced in a vast majority of rural villages. However, awareness of the necessity for this has been growing among those involved in water supply at the regional, municipal and rural community levels. As the Project established concrete examples of the successful introduction of the usage-based tariff, there is a possibility of its accelerated introduction in the coming years.

(3) Contribution to a decrease of water-borne infectious diseases

In the rural villages targeted by the pilot projects, improved sanitation practices and a decline of the number of cases of diarrhea have been reported<sup>22</sup>, suggesting a possible contribution by the Project. In other rural villages, no concrete contribution by the Project has been confirmed. In the Project, it is thought that contribution has been made indirectly towards reducing waterborne infectious diseases through promoting sanitary education and improving water supply services in rural areas.

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<sup>22</sup> According to the results of the beneficiary survey, a decline of the frequency of the occurrence of diarrhea is observed in three out of four rural villages where comparison with the baseline survey results in the Project is possible. Based on response of the village population, 30% of the residents possess the sanitation manual prepared under the Project and 60% of residents have ever received information on sanitation from a JASS in the post-project period.

### **3.2.2.3 Other Impacts**

#### **(1) Socioeconomic and environmental impacts of the pilot projects**

In four rural villages targeted by the pilot projects for the introduction of new water supply facilities, short-term employment opportunities for construction work were created and became a source of temporary income for local residents. The pilot projects did not require the resettlement of residents or the acquisition of land and no negative impacts on the natural environment have been reported.

#### **(2) Dissemination of the project outputs to other regions**

The results of the Project, i.e. knowledge and good practices acquired through the pilot projects and several manuals, have not yet been successfully disseminated to other regions except for a seminar held in the San Martin Region during the project period. Partly because of the replacement of officers in charge, MVCS is found to be little aware of the results of the Project and no work has been conducted by MVCS to examine the possible dissemination of them or to make government policies reflect them.

Summarizing the evaluation on effectiveness and impacts of the Project, with the implementation of the Project, the project purpose of “the capacity to implement water supply and sanitation services in rural villages and small cities in the Piura and Lambayeque Regions is improved” has been mostly achieved. The overall goal has also been mostly achieved as positive contribution of the Project to an improved water supply service and decrease of the number of cases of water-borne infectious diseases was confirmed. Based on the above, it is fair to say that the Project has largely achieved its objective. Therefore, the effectiveness and impact of the Project are high.

## **3.3 Efficiency (Rating: ②)**

### **3.3.1 Inputs**

The planned and actual inputs by the Japanese and Peruvian sides to the Project are outlined in the following table.

Table 4 Planned and Actual Input

Type of Input	Planned	Actual (at the time of project completion)
<b>Japanese Side</b>		
(1) Dispatch of experts	4 experts (overall supervision; water supply planning; O & M planning)	7 experts (77 person-month) (overall supervision; water supply planning; O & M planning; groundwater development; sanitation education planning; maintenance of water purification plants)
(2) Acceptance of trainees	Several per year	2 trainees
(3) Provision of equipment	Vehicles, etc.	Vehicles, PCs, printers, copiers and projectors, etc.
(4) Local subcontracting	Study in 2 regions; facility development at 3 sites in the pilot project in each of the 2 regions	Study in 2 regions; facility development at 2 sites in the pilot project in each of the 2 regions; introduction of water meters at 3 sites in each of the 2 regions
(5) Administration cost	(Planned cost is unknown)	58 million yen
Total funding by the Japanese side	Approx. 400 million yen	435 million yen
<b>Peruvian Side</b>		
(1) Assignment of counterparts	1 MVCS coordinator; at least 3 full-time coordinators in each region; specialist engineers	2 MVCS coordinators; regional coordinators (7 in the Piura Region and 6 in the Lambayeque Region)
(2) Other	Payment of the necessary costs, including those of the office for experts, furniture and stationary	Payment of the necessary costs, including those of the office for experts, furniture, stationary, manual for facility development and business trips (956,000 Soles)

Source: Material provided by JICA, Material prepared by the Project

### 3.3.1.1 Elements of Inputs

The pilot projects to construct new water supply facilities was originally planned to be implemented at six sites. However, the number of sites was later reduced to four because of the longer than expected preparatory period due to the delayed deployment of engineers in the Piura Region and the lengthy time required for adjustment with another ongoing projects in the Lambayeque Region. Instead, the number of pilot project sites not involving construction work was increased from four to six, making the total number of pilot projects ten as planned. Moreover, in consideration of the outcomes of the pilot projects at earlier stages and requests made by the targeted rural villages, the installation of water meters was added at those sites of the pilot projects not involving construction work.

According to the Japanese experts and Peruvian counterparts, the Japanese inputs were mostly as planned, and there were no problems relating to the timing and the quality as well as quantity of the inputs. In contrast, the planned Peruvian inputs faced the following difficulties which affected the planned activities of the Peruvian side.



- Shortage of specialized personnel (especially in the Piura Region) and budget allocation to implement the planned activities.
- Frequent replacement of the officers involved in the pilot projects at the national (MVCS), regional (DRVSs) and municipal levels due to a change of the administration and change of senior personnel following local elections.
- Low priority given by mayors to water supply projects, insufficient involvement of the municipal authorities due to the limited budget and manpower.
- Busy schedule experienced by the counterparts due to the SABA Project using DRVVs as the counterpart in both regions.

### **3.3.1.2 Project Cost**

The total project cost for the Japanese side was originally planned to be approximately 400 million yen. The actual cost of 435 million yen exceeded the planned cost (109% of the planned cost). As there wasn't a huge cost over-run and the details of the planned cost are unknown, it was impossible to determine the reasons for this cost over-run.

### **3.3.1.3 Period of Cooperation**

The planned project period was 48 months from April, 2009 to March, 2013. The actual project period from June, 2009 to March, 2013 (46 months: 96% of the planned period) was shorter than the planned period. The commencement of the Project was delayed by the delayed procedural clearance by the Peruvian side, resulting in a two months delay of the signing of the contract between JICA and supporting organizations in Japan. Nevertheless, the Project was completed by the originally planned completion date.

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

## **3.4 Sustainability (Rating: ②)**

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

As already mentioned in 3.1 Relevance, the water supply and sanitation sector is a priority sector for government policies at the time of the ex-post evaluation. In recent years, a series of new policies supporting water supply and sanitation in rural areas have been introduced, including the laying of in-house piping in rural area as part of public investment project, integrated construction of water supply facilities and sanitation facilities (improved toilets, etc.) and emphasis on chlorine disinfection. The year of 2015 showed the accelerated introduction of municipal technical offices assigned to support rural water supply at the municipal level as part of decentralization<sup>23</sup>, illustrating the growing emphasis on operation and maintenance. Based on the above, the institutional sustainability of the Project is judged to be high.

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<sup>23</sup> See 3.2.2.1 (5).

While the introduction of a usage-based tariff under the pilot projects achieved an important result, the installation of water meters is not usually incorporated in rural water supply projects implemented by MVCS.<sup>24</sup> Even though MVCS is responsible for the preparation of guidelines for water supply projects in Peru, it has not yet prepared guidelines which are relevant to the introduction of a usage-based tariff for the rural water supply service.

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

MVCS maintains a system of constructing rural water supply and sanitation facilities under the National Rural Water Program since the time of project completion to the time of the ex-post evaluation.

The Piura DRVS and the Lambayeque DRVS have two and three counterpart persons engaged in water supply and sanitation-related work respectively. While the specialist personnel at the Lambayeque DRVS are full-time regional government employees, those at the Piura DRVS are on a six month rolling contract.

While the Piura DRVS used to belong to the General Department of Social Development, it currently belongs to the General Department of Infrastructure. In the Lambayeque Region, DRVS which used to belong to the General Department of Social Development has become the Executive Department of Housing and Sanitation, which is an independent entity directly answerable to the regional governor. According to an explanation by the heads of DRVSs, the General Department of Infrastructure has long been responsible for the construction of facilities in the water supply and sanitation sector. However, both DRVSs have been aiming at acquiring the capability to conduct such construction work independently, and the recent organizational shake-ups are part of this process.<sup>25</sup>

At the municipal level, as mentioned before, there have been ongoing efforts to establish a municipal technical office and to deploy full-time staff members to support operation and maintenance in rural villages. In line with these efforts, the registration of JASSs to gain corporate status is in progress at the village level.

The situation described above suggests that the manpower strength of DRVSs has been generally maintained and that it is expected to be sustained to a certain extent. It is also fair to say that the project sustainability in terms of the organizational aspect at the municipal and village levels is becoming more solid.

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<sup>24</sup> In Peru, introduction of usage-based water tariff for water supply started from the urban areas, while, fixed rates are still common in rural areas. It has not been easy to introduce usage-based water tariff to rural areas because additional investment is required to install meters and it is necessary to establish strict charge levying systems to address the lower willingness to pay charges among rural residents compared to urban residents. In consequence, in one municipality, the installation of water meters was removed from the scope of a water supply project proposed on the instruction of MVCS.

<sup>25</sup> The Project commenced based on the assumption that a single regional department would provide integral support for both the construction of facilities (planning and implementation of an investment project) and operation and maintenance of the water supply and sanitation facilities. However, such organizational arrangement has not yet been realized in any region in Peru.

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

The principal counterpart staff members in the two regions have been kept in their posts. Although the manuals prepared under the Project are not frequently used, the technical competence developed under the Project is believed to be maintained at the regional level as long as staff members with suitable skills are kept in their posts.

Staff members of JASSs and municipal authorities are frequently replaced and the business handing-over is insufficient in many cases, making it difficult to sustain the technical competence at a reasonable level. Therefore, technical sustainability would be assured only when repeated training are given. However, the two regions and the municipalities cannot always keep such training because of the limited means of transportation and insufficient budget. In short, the sustainability of the technical aspect of the Project is not fully guaranteed at the municipal and village levels.

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

The budget of the Piura DRVS and Lambayeque DRVS for the water supply and sanitation sector is shown in the table below, and a slight increasing trend can be observed. In 2015, there was a major increase in both regions because MVCS allocated a temporary additional budget for training, awareness raising and chlorine disinfecting equipment supply, etc. in the rural sanitation sector.

Table 5 Budget Expenditure by DRVSs for Water and Sanitation Sector

(Unit: thousand Soles)

	Piura	Lambayeque
2010	154	69
2011	141	73
2012	166	77
2013	235	80
2014	191	94
2015	416	224

Source: DRVS of Lambayeque and Piura  
 Note: The above amounts do not include construction projects in water and sanitation sector.  
 1 Sol = around 34 Yen (average for 2010 - 2015)

At the regional and municipal levels, major constraints in terms of the means of transportation and budget have been obstructing efforts to provide training and technical support for lower level administrative organizations.<sup>26</sup> For 2015, there is supplementary budget allocation for regional governments and municipal authorities under a government program but this is only a temporary measure<sup>27</sup>. Some 70% of the rural villages targeted by the pilot projects have saved some

<sup>26</sup> Both the Piura DRVS and Lambayeque DRVS have only one vehicle each. Most municipal authorities also have only one vehicle each.

<sup>27</sup> In the regions, “Incentive Funds based on Social Achievements and Results” (*Fondo de Estímulo al Desempeño y Loro de Resultados Sociales*: FED) are implemented, while in the municipal authorities, the “Incentive Plan to Improve Municipal Management and Modernization” (*Programa de Incentivos a la Mejora de la Gestión Municipal*: PI) is implemented.

money. However, many JASSs are facing financial strain due to the non-payment of the water charge by residents whose willingness to pay is not particularly strong making rapid repairs of the facilities difficult and constraining operation and maintenance of the facility.<sup>28</sup> As such, the financial sustainability faces some problems.

In short, some minor problems have been observed in terms of the technical and financial aspects. Therefore, sustainability of the project effects is fair

## **4. Conclusions, Lessons Learned and Recommendations**

### **4.1 Conclusions**

The Project was implemented for the purpose of improving the capacity of DRVSs, selected municipal authorities and JASSs in the Piura and Lambayeque Regions in the north of Peru through pilot projects and training, thereby upholding improvement of the water supply and sanitation conditions in rural villages and small cities in these regions. The Government of Peru consistently emphasized the sanitation sector from the time of the ex-ante evaluation. Moreover, via the Project, DRVSs in the target regions for the first time acquired the capability to conduct appropriate guidance and support on operation and maintenance of water supply and sanitation services for municipal authorities and JASSs, while the regions have needed to conduct ongoing training for those municipal authorities and JASSs that have frequent turnover of personnel. Thus, the Project is highly consistent with policies and development needs in Peru. Moreover, it is consistent with the aid policy of Japan. Accordingly, relevancy of the Project is high. Through implementation of the Project, the capacity was strengthened on the regional level and among the municipal authorities and JASSs targeted by the pilot projects, so the project purpose was largely achieved. Concerning the overall goal, since water supply services were improved, and it was confirmed that contribution was made to reduce waterborne infectious diseases, intended impacts were generally realized as planned. Accordingly, the Project effectiveness and impact is high. Inputs on the Japanese side were appropriate, while the inputs on the Peruvian side were confronted by constraints in terms of human resources and budget. The project period was largely as planned. However, because project costs on the Japanese side exceeded budget, the project efficiency is fair. On the level of municipal authorities and JASSs, since there are frequent personnel changes and there have been partial technical and financial issues such as lack of means of transport (vehicles) and funds, the sustainability of the project effects is fair.

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

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<sup>28</sup> For example, as much as 40% of the rural community in Lambayeque shows delinquency rates of more than 10%.

## **4.2 Recommendations**

### **4.2.1 Recommendations to the Implementing Agency**

#### Ministry of Housing, Construction and Sanitation (MVCS)

- Important results of the pilot projects, particularly the introduction of a usage-based tariff, should be carefully examined and verified with a view to introducing it nation-wide in order to review the policies and guidelines used for rural water supply and sanitation service delivery.
- To facilitate more efficient implementation of support by municipal authorities for JASS after the construction of facilities, consideration should be given to methods for ensuring the continuity between the training via the consultants in the facilities construction projects and training / technical support by municipal authorities following the implementation of such projects.

#### Piura Region and Lambayeque Region

- The regional DRVSs can play an important role in supporting municipal authorities that have a high turnover of personnel. On the other hand, the Project's sustainability depends on continuous engagement of the key counterpart employees in the regional DRVSs. In consideration of the above points, the regions should take steps to ensure that the key counterpart employees continue to stay involved in the DRVS' sanitation duties.
- The manuals that were prepared in the Project should be fully utilized through, where necessary, revising, reprinting and distributing as electronic media.
- It is desirable for regional DRVSs to consolidate the good practices obtained through the pilot projects and disseminate them inside and outside of the regions.

### **4.2.2 Recommendations to JICA**

- JICA should consider the compilation of examples of good practices established in the Project, including the introduction of a usage-based tariff. JICA also should consider the provision of further assistance for the nationwide dissemination of such good practices via the Ministry of Housing, Construction and Sanitation.

## **4.3 Lessons Learned**

#### Introduction of a usage-based tariff for rural water supply

The introduction of a usage-based tariff for rural water supply can improve the quality and sustainability of the water supply service. For the effective introduction of such a tariff, it is important to select water supply systems using groundwater as the water supply source (this enables a reduction of the electricity cost), villages where water does not reach terminal areas due to the wasteful use of water (this improves the water supply service through a reduction of water consumption) and villages where the water charge collection rate is low

(this improves the overall water supply due to the termination of water supply to non-payers). Other necessary actions include the training of members of JASSs and enhancement of the willingness of users to pay by means of education. Moreover, as users find it difficult to accept a user-based tariff without receiving an adequate service, the introduction of a user-based tariff along with improvement of the water supply facilities is desirable.

#### Dissemination through the involvement of the central government

For any technical cooperation project designed to introduce a new approach in local areas, it is essential to secure the continued and actual involvement of the central government in order to increase the level of nationwide dissemination effects. The pilot projects for this Project clearly established that the introduction of a usage-based tariff could prove to be an effective means of improving the overall water supply in rural areas. However, the less than expected involvement of the Ministry of Housing, Construction and Sanitation due to the major negative impact of the replacement of counterpart officials meant that there was no ministry-wide momentum to examine the actual experiences under the Project to make government policies reflect such experiences.

#### Sufficient checking of the local readiness to accept technical cooperation

At the preparatory stage of technical cooperation, it is necessary to sufficiently check the local readiness and assignment of qualified counterpart personnel to accept cooperation by policy documents, consensus documents, etc. In the case of the Project, examination of the readiness in the Piura Region was insufficient and the commencement of various activities was delayed as a result.

#### Sufficient checking of the preconditions

At the time of formulation of the Project, it was considered that there would be organizational reform to make DRVSSs responsible for the implementation of rural water supply infrastructure projects based on the policy of the Ministry of Housing, Construction and Sanitation at the time. On this ground, the capacity development of the regional housing and sanitation authorities (DRVSSs) was conducted in relation to not only operation and maintenance but also improvement of the water supply facilities under the Project. In reality, this reform did not take place. When organizational reform is assumed to be a precondition for technical cooperation, careful examination and confirmation are essential due to the fact that organizational reform often takes a long time from its inception to its realisation.

Republic of Peru and Republic of Ecuador

FY 2015 Ex-Post Evaluation of Japanese Grant Aid Project  
“Project for Construction of the New International Bridge of Macará”

External evaluators: Hajime Sonoda, Takeshi Yoshida, Global Group 21 Japan, Inc.

## **0. Summary**

The Project for Construction of the New International Bridge of Macará (hereinafter referred to as “the Project”) was implemented in order to secure smooth and stable traffic by constructing a new bridge and approach roads downstream of the deteriorated Macará International Bridge in the border region between Ecuador and Peru, thereby contributing to the development of the border region. The border region has been jointly developed by the two countries: in the national plans of both countries, construction of the international trunk highway including the Project has consistently been regarded as an important issue. Considering also that there was a strong need to rebuild the bridge and this is also consistent with Japan’s aid policy, the Project has high relevancy. In the Project, the planned outputs were achieved. However, because the tender process repeatedly ended in failure due to escalation of material prices during the time taken for domestic procedures prior to the tender and also due to the remote distance of the Project site, it was necessary to conduct additional study and re-sign the Exchange of Notes. As a result, the period and the cost of the Project greatly exceeded the plan. Therefore, efficiency of the Project is low. Following completion of the Project, stable border traffic has been realized and large-size vehicles are able to safely cross the New International Bridge of Macará. It is possible to conclude that border crossing time has been shortened a little, however, it is anticipated that the time can be notably shortened when the bi-national border facilities which are currently under construction starts operation. Thanks to the bridge, traffic comprising mainly of small vehicles travelling short distances has doubled, and this has contributed to socioeconomic development in the border region. In addition, risk for inundation in the upstream areas at times of flooding has been reduced by sufficient flow section secured by the new bridge. Accordingly, the Project effectiveness and impact have been high. Both countries carry out appropriate operation and maintenance for the bridge with clear division of responsibilities, and since no major problems is identified in institutional setup, technical capacity and finances for operation and maintenance, the Project sustainability is high.

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

## 1. Project Description



Project Location



New International Bridge of Macará  
(A view from Peru to Ecuador)

### 1.1 Background

Ecuador and Peru were involved in repeated military clashes triggered by border disputes from the 19<sup>th</sup> century onwards, however, they arrived at a Peace Agreement in October 1998. As a result, the two countries established the Bilateral Border Development Committee in order to conduct development based on bilateral cooperation in the border region where the prolonged dispute had stunted development. The committee compiled a 10-year development plan and aimed at realizing integration and development of the border region. One of the four major policies in this is the vitalization of border transit and trade based on construction of transportation infrastructure including border facilities. Within this, it is planned to rebuild international bridges and construct new border facilities on four out of five of the routes that span the border. Macará International Bridge is located on the “third axis” that links city of Loja, the capital of Loja Province in Ecuador, and the city of Piura in Piura Region, Peru. This route is also regarded as a part of the Pan-American Highway<sup>1</sup>.

It was against such a background that JICA implemented “the Project Formulation Study (Border Region Development): Ecuador and Peru” in 1999. Within this, a project for construction of four bridges including Macará International Bridge on the border between the two countries was identified as a possible avenue of assistance. Based on the findings of the study, the governments of Ecuador and Peru issued a request to the Government of Japan for grant aid in August 1999 concerning the Project. After waiting for conclusion of border negotiation and an agreement of implementation setup for the Project among the two countries, JICA implemented the Preparatory Study in 2004 and a Basic Design Study in 2005, reaching

<sup>1</sup> The concept of a network of trunk roads connecting the countries of the Americas was first espoused as the Pan-American Highway in 1923, and trunk roads in each country today are being constructed and networked according to this concept. Major progress was achieved on realizing the concept in the 1940s and 1950s. The section linking Quito, the capital of Ecuador, to Piura in Peru is regarded as the main route of the Pan-American Highway, however, in reality more traffic uses the coastal route (Route 1 which is targeted by the Bilateral Border Development Committee).



the conclusion that reconstruction of Macará International Bridge was a valid proposition. After that, due to delay in the start of the Project because of time taken in making diplomatic adjustments between the two countries, the Implementation Review Study was needed in 2006. Then, the Exchange of Notes concerning Detailed Design was signed in 2007, paving the way for the start of the Project. Concerning the construction works of the Project, tender was conducted three times without success between 2008 - 2009. Accordingly, the second Implementation Review Study (2009) was carried out and the renewed Exchange of Notes (detailed design and construction works) was signed in March 2010, and the second Detailed Design and construction works were implemented after that.



Figure 1 Trunk road network of the border region and the location of Macará International Bridge

## 1.2 Project Outline

The objective of the Project is to secure smooth and stable traffic by constructing a new bridge and approach roads downstream of the deteriorated Macará International Bridge in the border region between Ecuador and Peru, thereby contributing to the development of the border region.

E/N Grant Limit G/A Grant Amount / Actual Grant Amount	E/N Grant Limit 2007 for detailed design: 19 million Yen (Ecuador), 19 million Yen (Peru) 2007 for construction 574 million Yen (Ecuador), 574 million Yen (Peru) 2010 for detailed design and construction 800 million Yen (Ecuador), 800 million Yen (Peru)  G/A Grant Amount / Actual Grant Amount 2010: 1,600 million Yen / 1,330 million Yen (665 million Yen for Ecuador, 665 million Yen for Peru)
Exchange of Notes Date/ Grant Agreement Date	Exchange of Notes 2007 for detailed design: January (Ecuador), March (Peru) 2007 for construction: June (Ecuador), December (Peru) 2010 for detailed design and construction: March (Ecuador, Peru) Grant Agreement 2010: March (Ecuador), April (Peru)
Implementing Agencies	Ministry of Transport and Public Works (Ecuador) Ministry of Transport and Communications (Peru)
Project Completion Date	November 2012
Main Constructor	Hazama Corporation
Main Consultant	Nippon Koei Co., Ltd.
Basic Design	April 2005 - February 2006, (Implementation Review Studies: October - December 2006, August - December 2009)
Detailed Design	July - December 2007, April - May 2010
Related Projects	Project Formulation Study (Border Region Development): Ecuador and Peru (1999)

## 2. Outline of the Evaluation Study

### 2.1 External Evaluators

Hajime Sonoda, Global Group 21 Japan  
Takeshi Yoshida, 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: July 2015 - August 2016  
Duration of the Field Survey: October 26, 2015  
November 2 - 21, 2015  
November 26, 2015  
April 3 - 5, 2016

### 2.3 Constraints during the Evaluation Study

The Basic Design Study for the Project was implemented in 2005, and the Implementation Review Study and Detailed Design were implemented in 2006, paving the way for the start of the

Project. However, due to failure of the tender for the construction works, it was necessary to conduct a second Implementation Review Study in 2009 and a new Detailed Design in 2010 before the works were commenced. The ex-post evaluation was conducted based on the plan that was compiled in the 2006 Implementation Review Study (Project Plan Sheet). Hereafter, “At the time of planning” refers to the planning as of 2006.

### **3. Results of the Evaluation (Overall Rating: B<sup>2</sup>)**

#### **3.1 Relevance (Rating: ③<sup>3</sup>)**

##### **3.1.1 Relevance to the Development Plan of Ecuador and Peru**

As was described in section 1.1 Background, at the time of planning, the Governments of Ecuador and Peru established the Bilateral Border Development Committee, which identified the construction of five road axes between the countries as one of the primary policies for developing the border region, and included the Project among these. It was originally scheduled for the Committee to conduct activities for 10 years from 2000 to 2009, however, its term was extended and an investment program was drawn up until 2016. The Committee’s policies and strategies have remained consistent since its creation up to the time of ex-post evaluation.

The transportation sector has consistently been viewed as an important sector within the development plans of Ecuador and Peru since the time of planning the Project to the time of ex-post evaluation. In Ecuador’s “National Plan for Good Living 2013-2017”, positioning the transportation sector with importance, the Ministry of Transport and Public Works (hereinafter referred to as “MTO”) aims to establish an integrated and efficient transport network for improvement of economic competitiveness and domestic integration, and the Project is identified with the trunk highway network within the “Strategic Transport Plan 2012-2037”. In “Plan Peru 2021” (2010), regional infrastructure investment for balanced development is regarded as a priority item, and the Ministry of Transport and Communications (hereinafter, referred to as “MTC”) has raised the goals of paving 85% of the country’s national highways by 2016 and keeping all paved highways in good condition.

Accordingly, construction of international trunk highways including the Project is regarded as important within the context of border region development as well as national development by Ecuador and Peru, and the Project has high relevance to development plans both at the time of planning and the time of the ex-post evaluation.

##### **3.1.2 Relevance to the Development Needs of Ecuador and Peru**

In 2005, when the Basic Design Study for the Project was implemented, some 40 years had elapsed since construction of Macará International Bridge. At that time, the bridge was

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<sup>2</sup> A: Highly satisfactory; B: Satisfactory; C: Partially satisfactory; D: Unsatisfactory

<sup>3</sup> ①: Low; ②: Fair; ③: High

badly deteriorated with serious defects such as exposed and cracked reinforcing bars and free lime in evidence, and a 20-ton limit was enforced on passing vehicles. Moreover, because Macará International Bridge reduced the water flow where it crossed the river, and flow was impeded at the upstream of the river producing backwater during flooding<sup>4</sup>, and this was washing away farmland and creating a risk of bridge collapse. In addition, both countries had established border crossing facilities (customs, immigration control offices, etc.) and conducted border control on both sides of the bridge, and congestion at the narrow approach roads was further exasperated by the presence of stalls and taxis waiting for customers on the road. There was thus a high necessity for the Project to rebuild Macará International Bridge at the time of planning.

The Project represents one out of five transportation axes stipulated by the Bilateral Border Development Committee, and it has the second largest traffic volume following the coastal route. Thus, the importance of the Project has been sustained up to the ex-post evaluation.

### **3.1.3 Relevance to Japan's ODA Policy**

At the time of planning, in Peru, JICA regarded assistance for economic vitalization in the area of economic and social infrastructure construction for sustainable development as one of its priority assistance fields. In Ecuador, addressing the poverty issue was regarded as a priority assistance field, and in that context, assistance was extended to the promotion of development and construction of basic infrastructure in local areas. Accordingly, the Project had a high degree of relevance to Japan's ODA policies in both countries at the time of planning.

Summing up, implementation of the Project has been highly relevant to the development plans and development needs of Ecuador and Peru, as well as Japan's ODA policy. Therefore its relevance is high.

## **3.2 Efficiency (Rating: ①)**

### **3.2.1 Project Outputs**

The outputs of the Project were indicated in Table 1, and all were implemented as planned. According to the engineers in both countries' implementing agencies, the Project design and construction quality were good.

Concerning the type of bridge, a PC 2-span continuous box girder bridge using the overhang erection method was proposed in the Basic Design Study and Implementation Review

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<sup>4</sup> Backwater refers to the phenomenon where river water is dammed, causing the water level to rise and reach back upstream.



Table 2 Project Cost – Planned vs. Actual

	Planned (2006)	Actual (2015*)	Actual/Planned
Project cost on the Japanese side	1,194 million yen	1,373 million yen	115%
Detailed design and implementation management	130 million yen	184 million yen	
Construction works	1,064 million yen	1,189 million yen	
Project cost on Ecuador / Peru side	109 million yen	217 million yen	199%
Total Project cost	1,303 million yen	1,590 million yen	122%

Source: Documents provided by JICA, and materials provided by MTOP and MTC

Note: \* The facilities by Japan were completed in 2012, while those by Ecuador / Peru were completed in 2015.

### 3.2.2.2 Project Period

Concerning the Project period, the facilities to be funded by the Japanese side (bridge and approach roads), including the Detailed Design and tender, were scheduled to be finished in 32 months<sup>6</sup>. The demolition of the old bridge was committed by the Peruvian side and construction of the river protection was committed by the Ecuadorian side and their works were scheduled to begin following completion of the bridge construction, however, no specific completion date was defined.

As shown below, the actual project period of the facilities to be constructed by the Japanese side was 68 months from signing of the exchange of notes (March 2007) to completion of the works (November 2012), significantly longer than planned (213% compared to the planned period).

April 2005 - February 2006	Basic Design Study
October - December 2006	Implementation Review Study (first)
March 2007	Exchange of Notes (detailed design)
July - December 2007	Detailed Design
December 2007	Exchange of Notes (construction works)
September 2008 - May 2009	Tender period (unsuccessful)
August - December 2009	Implementation Review Study (second)
March 19, 2010	Exchange of Notes (detailed design & construction works)
May 2010	Completion of Detailed Design
November 2012	Completion of construction works of the New Bridge (bridge opened on November 9)
June 2015	Completion of the related construction works by the recipient countries

<sup>6</sup> Based on the Implementation Review Study in 2006.

Following the Basic Design Study, because it took a long time for the Project to start due to the time spent on diplomatic adjustment between Ecuador and Peru, the Implementation Review Study was implemented in order to update the project cost estimation. In line with this, the Exchange of Notes was signed and the Detailed Design was implemented in March 2007. The tender geared to the contract for the construction works was started in 2008. However, in three tenders, either no bids were forthcoming or no contract was signed because bids exceeded the scheduled price. After that, the second Implementation Review Study was implemented in 2009; Exchange of Notes was signed again in March 2010, and the Detailed Design and construction works were implemented.

According to a Japanese consultant who assisted in the tender arrangement, the tenders were unsuccessful for the following reasons: the international prices of materials increased during the period from the Implementation Review Study to the tender for the construction contract, which was prolonged due to introduction of a new project approval system in Peru, and few contractors were based in the border region. In the construction works, however, although it took time to secure permission for the border crossing of construction machinery and people at the start of the works, this was not a major issue in the implementation of the works.

In summary, the project cost exceeded the planned amount and the project period was significantly longer than planned. Therefore, efficiency of the Project is low.



Vestige of the old bridge (Peruvian side)



The New Bridge (sight from Ecuadorian side)

### 3.3 Effectiveness<sup>7</sup>(Rating: ③)

The Project has the objective of rebuilding the Old Macará International Bridge (hereinafter, referred to as “the Old Bridge”) and thereby securing smooth and stable traffic in the border region between both countries. The New International Bridge of Macará (hereinafter, referred to as “the New Bridge”) that was constructed by the Project was opened to traffic in November 2012. As the bi-lateral border facilities on the Ecuadorian side that were planned to

<sup>7</sup> The rating for effectiveness is given upon taking impact into account.

house both countries' immigration inspection, customs, quarantine and police offices have not been completed<sup>8</sup>, both countries have established temporary offices installed in simple structures such as containers, adjacent to the bridge and conduct border procedures there<sup>9</sup>.

Based on a mutual agreement between the two countries, an area of approximately 40 kilometers on either side of the New Bridge including the cities of Macará on the Ecuadorian side and Suyo on the Peruvian side has been declared a free passage zone, where travelers do not need to conduct any immigration procedures at all if they have nothing to declare<sup>10</sup>. On both sides of the New Bridge, taxis from each country wait for passengers on each side of the road. On the Ecuadorian side, a cooperative association of taxi drivers operates a taxi stand. On the Peruvian side, there is no organized association or taxi stand, so taxi drivers wait for passengers without any particular order<sup>11</sup>.

The following paragraphs analyze the situation regarding manifestation of the quantitative and qualitative effects of the Project and evaluate its effectiveness.



Temporary border facilities (left: Peru, right: Ecuador)

<sup>8</sup> Border facilities are not included in the scope of the Project. However, they were planned to be constructed in tandem with the Project and go into service at the same time of the completion of the Project. Construction was under the responsibility of the National Transportation Agency (*Agencia Nacional de Tránsito*). However, due to the site being located in such a remote location, there were no bids from contractors, and it also became necessary to cancel the contract and sign a new one due to issues with the implementation and funding capacity of the first contractor. After that, delays occurred due to replacement of the minister in charge and resulting modification of the plan, poor weather conditions and so on. As a result, MTOP took charge of the construction in February 2015. However, because payments to contractors were delayed due to financial difficulties on the Ecuadorian side, the works have been suspended since August 2015. As of April 2016, the works are roughly 50% complete but there is no prospect of their completion.

<sup>9</sup> Because customs stops vehicles to implement freight checks as needed, one out of two traffic lanes is closed. However, because the traffic volume is light at around 2,000 vehicles per day, this does not lead to much congestion in particular.

<sup>10</sup> According to the traffic volume survey implemented in the ex-post evaluation (24 hours, November 2015), most of the vehicles passing over the New Bridge traveled over this range and did not need to take border crossing procedures. However, because there are some vehicles that try to pass without taking the necessary procedures, the customs officers on both sides sometimes stop vehicles and conduct freight inspections. Moreover, there are additional customs offices on the main road outside of the free pass zone, and they conduct monitoring and customs clearance procedures for vehicular freight.

<sup>11</sup> There are some passengers who take a taxi on the Peruvian side (or the Ecuadorian side) arriving at the New Bridge, walk over the bridge, and then take another taxi to their destination on the other side. According to interviews with taxi drivers, 70% of taxi passengers on the Peruvian side and almost 100% on the Ecuadorian side travel within the scope of Macará and Suyo.





Inspection by custom (left: Peru, right: Ecuador)



(Left) View at the border facilities under construction from the Peruvian side  
(Right) Slope protection work and illegal occupation by restaurants in Peru



Large-size vehicles stopping near the bridge for border procedures

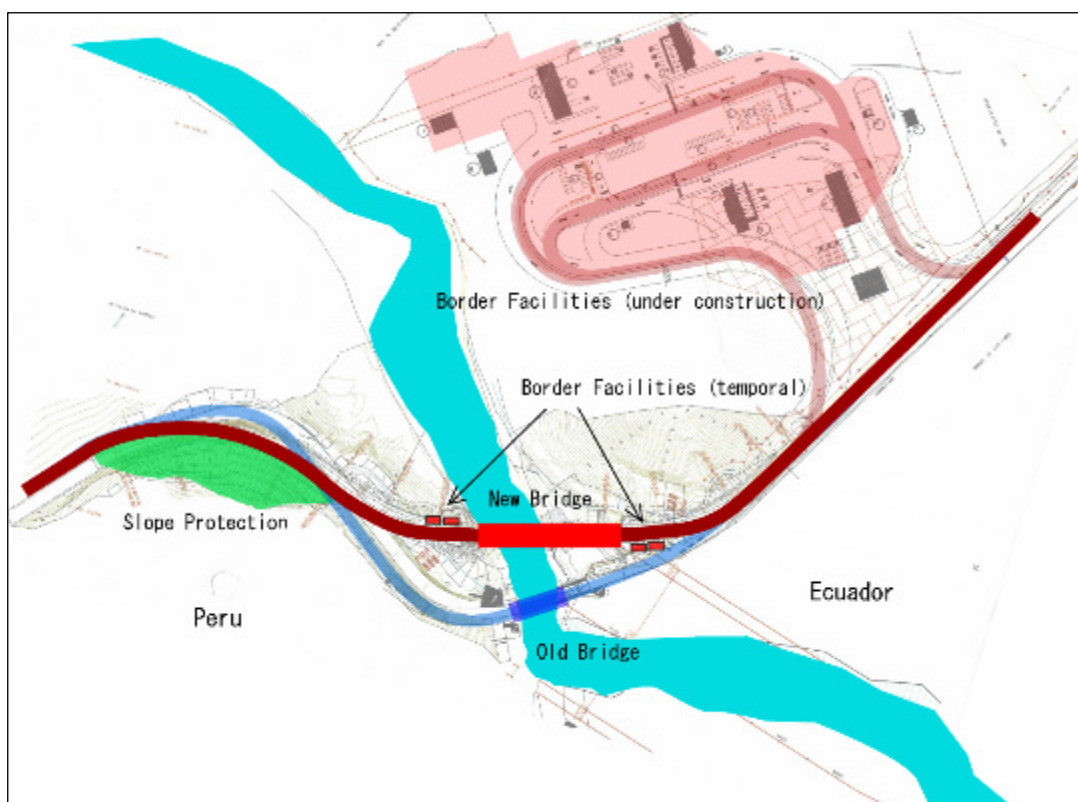


Figure 2 Map of the surrounding area of the Macará International Bridge

### 3.3.1 Quantitative Effects (Operational and Effect Indicators)

At the time of planning, two indicators were stipulated as quantitative effects of the Project: 1) the “weight restriction on vehicles crossing the bridge” is increased from 20 tons to 40 tons, and 2) the “traffic volume of large-size vehicles” (traffic volume of large-size buses and trucks, not including pickups) increases from 39 vehicles/day counted in 2004. In the ex-post evaluation, analysis was additionally conducted on the “number of days the border is closed per year” as an indicator of stable cross-border traffic, and “border crossing time (travel time to cross the border)” as an indicator of smooth cross-border traffic.

Concerning the traffic volume of large-size vehicles, traffic counting was carried out, and a supplemental analysis was carried out on changes in the value of imports and exports crossing the New Bridge. Also, a questionnaire survey of drivers and passengers crossing the New Bridge and group interviews with local residents were conducted to gauge the features of cross-border traffic<sup>12</sup>.

<sup>12</sup> Refer the box article.

Table 3 Operation and Effects Indicators

	Baseline	Target	Actual
	2006	2015	2015
	At the time of planning	3 years after completion	3 years after completion
Weight restriction on vehicles	20 tons	40 tons	40 tons
Number of days the border is closed	Unknown	Decreased	0 days/year
Traffic volume of large-size vehicles	39 vehicles/day (2004)	Increased	78 vehicles/day
Border crossing time (travel time to cross the border)	Unknown	Shortened	Possibility of shortening

Source: Materials provided by JICA, materials provided by implementing agencies, traffic survey, beneficiary survey, etc.

Note: Large-size vehicles indicate all large-size buses and trucks apart from pickup trucks.

(1) Weight restriction on vehicles passing over the bridge

The total permissible weight (weight of vehicle and freight) on the Old Bridge was limited to 20 tons due to deterioration of the bridge. However, in reality large-size vehicles weighing more than 30 tons used the bridge and the situation was dangerous.

The total permissible weight on the New Bridge is 40 tons. Judging from the types of large-size vehicles (trailers, etc.) and contents of their loads crossing over the bridge, it is surmised that no vehicles using the bridge exceed this weight limit. However, because the weight of trucks passing over the bridge is not measured, weight restriction is not actually practiced<sup>13</sup>.

(2) Number of days the border is closed

Since being opened to traffic in November 2012, apart from being closed for a few hours at a time when the two countries held joint events, the New Bridge hasn't been closed. Stable cross-border traffic is thus being achieved.

(3) Traffic volume passing over the bridge

Table 4 shows the results of the traffic volume survey. Compared to 2004, the total traffic volume has increased 2.4 times and the volume of large-size vehicles by 2.0 times. Whereas the volume of passenger vehicles has increased almost 3 times, the volume of freight vehicles (trucks and pickup trucks) declined from 193 vehicles/day in 2004 to 154 vehicles/day in 2015. On the other hand, a decrease in traffic volume of large buses can be seen. This is believed to be due to a decrease in trade using buses. As described

<sup>13</sup> Because a vehicle weight meter will be installed at the border facilities under construction, it will become possible to implement weight restrictions by, for example, imposing fines on vehicles over the limit and so on, when the said facilities are completed.

in the box below, almost all of the traffic that utilizes the New International Bridge of Macará is international traffic traveling short or medium distances.

Table 4 Traffic Volume by Vehicle Type on the New International Bridge of Macará

(Unit: vehicles/day)

	Passenger vehicle	Pickup truck	Mini bus	Large-size vehicles			Total	Large-size vehicles among these	
				Bus	Truck (2-axle)	Truck (3-axle)			Truck (4-axle)
2004	737	164	3	10	26	2	1	943	39
2015	2,086 (92%)	82 (4%)	11 (0.5%)	6	66	0	6	2,257 (100%)	78 (3.5%)
Rate of increase	283%	50%	367%	60%	254%	0%	600%	239%	200%

Source: Data for 2004 is based on actual measurements at the time of the preliminary survey (October 2004), while data for 2015 is based on measurements at the time of the ex-post evaluation (November 2015). In both cases, measurements were made over 24 hours on weekdays.

<Box: Characteristics of Cross-border Traffic at the New International Bridge of Macará >

In the ex-post evaluation, in tandem with the 24-hour traffic volume measurement survey (November 16 – 17, 2015), a questionnaire survey (beneficiary survey) was implemented targeting drivers (34 bus and truck drivers and 46 passenger vehicle drivers) and passengers of buses, taxis and cars (40 passengers) crossing over the New Bridge and taxi drivers waiting for customers at both ends of the bridge (10 drivers on each side). In addition, group interviews were conducted with residents living close to the bridge in the cities of Macará and Suyo on both sides of the bridge<sup>14</sup>. The major results are shown below.

- 92% of vehicles are passenger vehicles, but the ratio of buses and trucks is small.
- Almost all traffic that utilizes the New Bridge travels for short or medium distances. More than half of the trips are made within the free passage zone.

Origin and Destination	Drivers	Passengers
Free passage zone: Suyo - Macará (short distance)	74%	50%
Loja Province - Piura Region going beyond the free passage zone (medium distance)	21%	45%
Scope going beyond Loja Province - Piura Region (long distance)	5%	5%

- 80% of vehicles are Ecuadorian and most traffic is leaving Ecuador to Peru and coming back to Ecuador.

<sup>14</sup> Traffic volume was measured at the bridge end (on the Ecuador side). The questionnaire survey was conducted for 10 hours during the day, targeting all passing large-size vehicles and one out of every 20 other vehicles. The survey targeted drivers in trucks, drivers and passengers (one out of every five passengers) in buses, and drivers or passengers in passenger cars (passengers were selected from one out of every five cars). Ratios of female respondents were: 5% (vehicle drivers), 48% (passengers) and 0% (taxi drivers). Ratios of respondents of 41 years old or more were: 49% (vehicle drivers), 33% (passengers) and 55% (taxi drivers). Participants of the group interviews were 6 persons (including 4 females) in Macará and 61 persons (including 10 females) in Suyo.

- 50% of drivers and around 20% of passengers travel for commerce and work purposes, and other reasons for travel include tourism, shopping and family visits. Because prices in Peru are lower than in Ecuador, many people travel to Peru to go shopping (clothes, domestic electrical appliances, etc.) and eating, while Peruvians also travel to Ecuador to buy cheap medical supplies, farm materials and so on<sup>15</sup>.
- Traffic for education and medical purposes accounts for almost 10% of the total traffic volume. Hospitals on the Ecuadorian side (Macará) receive Peruvian patients based on a bilateral agreement. There are also students who commute to high school or university in the neighboring country.
- Out of truck cargoes, building materials account for 32%, farm and livestock materials for 29%, and 14% of the trucks have no cargo.

On the other hand, the value of exports from Ecuador to Peru is less than 10% of the exports in the opposite direction since 2012, and the value has been going down since 2008. It is thought that this is because the price competitiveness of Ecuadorian products declined gradually as a result of the country's hyperinflation in the 1990s which led to the currency switch to dollar (2000) and the subsequent price increase. The total amount of exports from Ecuador to Peru was 1,930 million dollars in 2013 and 1,774 million dollars in 2014, and the share crossing over the Macará International Bridge was just around 0.3% of this.

The total amount of exports and imports in both directions has been decreasing since reaching the peak in 2012. As mentioned above, the volume of large freight traffic has doubled since 2004, and it is inferred that such change has been greatly impacted by economic conditions and export/import policy in each country.

Table 5 Exports/Imports through the Macará International Bridge (value declared at customs)  
(Unit: 1,000 dollars)

	2008	2009	2010	2011	2012	2013	2014
Ecuador → Peru	3,520	2,005	1,235	1,077	703	504	525
Peru → Ecuador	4,405	7,487	7,247	8,826	10,150	4,624	6,908
Total	7,925	9,492	8,482	9,903	10,853	5,128	7,433

Source: Peru Customs

#### (4) Border crossing time

According to the beneficiary survey, almost 70% of drivers and passengers answered that border crossing time on the New Bridge was no different from that on the Old

<sup>15</sup> Based on the interviews with local population and custom officers, etc., while it did not surface through the questionnaire survey, it is said that organized gasoline smuggling is carried out under the guise of private travel because gasoline prices in Ecuador are half or less than what they are in Peru due to government subsidies.

Bridge. 20% of respondents said that the border crossing time decreased, more than those who said that it increased (10%), indicating that border crossing time on the whole have possibly become somewhat shorter. While, the beneficiary survey revealed that border crossing procedure on the Ecuadorian side takes longer than on the Peruvian side<sup>16</sup>.

On the other hand, according to customs officials and other related officials in both countries, border crossing procedures have become a little faster due to the mitigation of congestion realized by the New Bridge. On the Peruvian side, the border facilities was previously located in front of the Old Bridge, located between hills where the road was narrow and there were numerous stalls, and it was difficult to park there. Even vehicles traveling to Ecuador without requiring border crossing procedure were caught up in the congestion and lost time. However, following completion of the New Bridge, the road is wider than the Old Bridge and the vehicles parking to conduct procedures do not cause congestion any longer. On the Ecuadorian side, it was previously necessary to conduct freight inspections at the customs office in Macará City located roughly 2 kilometers from the bridge. However, following completion of the New Bridge, it became possible to conduct the same procedure in a temporary office that was established next to the bridge without visiting Macará City, thereby enabling processing time to be greatly shortened. Moreover, when the bi-lateral border facilities currently under construction apart from the Project is completed, the border crossing time is expected to be shortened even more as it will be possible to implement both countries' border crossing procedures in one place.

### **3.3.2 Qualitative Effects**

In the Project, in addition to the greater safety of bridge traffic due to increase in the weight restriction to 40 tons, other safety improvements have been realized as described below.

- No traffic accidents have been recorded since the New Bridge was completed. According to some drivers, it is now safer than before because the road alignment has been improved and visibility is better.
- On the approach to the Old Bridge on the Peruvian side, there was a steep cliff and there was a risk of landslide, however, now the approach road for the New Bridge has been moved to a different place away from the cliff. Instead, large-scale cutting work has been conducted and there is a steep slope, however, the slope is protected.

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<sup>16</sup> According to drivers who were interviewed in the beneficiary survey, the procedure for entering Peru is approximately 10 minutes on average, and that for entering Ecuador is 30 minutes on an average. Customs officials conduct procedures according to the respective policies in each country, and import procedures on the Ecuadorian side tend to be stricter due to the government's more protective policy.

- Because lights have been installed on the New Bridge, the local residents and passengers have commented that they now feel safer to cross the bridge at night.

### 3.4 Impacts

#### 3.4.1 Intended Impacts

In the Project, it was anticipated that the following contributions would be generated for development of the border region: i) strengthening and stabilization of transportation capacity on the international trunk highway, ii) alleviation of flooding upstream, iii) contribution to socio-economic development in the border region, and iv) contribution to promotion of friendly relations between the two countries.

- (1) Strengthening and stabilization of transportation capacity on the international trunk highway

Macará International Bridge is located on the Pan-American Highway, and as described in the analysis of effectiveness, the Project has boosted the bridge safety and made it possible to cross the border without experiencing closure after the project completion to date. Moreover, it is possible to conclude that border crossing time has been shortened, and there is an expectation that time will be shortened even more after the border facilities starts operating. Accordingly, it is expected that transportation capacity between Ecuador and Peru will be strengthened and stabilized as impact of the Project.

- (2) Alleviation of flooding upstream

Before the New Bridge was constructed, due to the narrow width of the river and insufficient flow around the pillars of the Old Bridge, the water level rose to the bridge girders and water overflowed and inundated paddies in upstream areas at the time of flooding. Following removal of the Old Bridge, the risk of such flooding has been mitigated and flooding hasn't actually occurred<sup>17</sup>.

- (3) Contribution to socio-economic development in the border region

The following impacts have been identified concerning the development of border region, rectification of regional disparities, expansion of markets, and stabilization of access to medical and education facilities as anticipated in the Project<sup>18</sup>.

- Before the New Bridge was constructed, the informal export of daily necessities,

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<sup>17</sup> The farmland that was inundated in the past has since recovered.

<sup>18</sup> Concerning the impact on border region development, interviews were conducted with Macará Chamber of Commerce and Industry and the Mayor of Suyo, while focus group interviews were conducted with residents of Macará and Suyo.

farm products and so on from the Peruvian side to the Ecuadorian side was prosperous, and the local residents were involved in this as “carriers”. Following construction of the New Bridge, however, such trade has reduced due to the tightening of customs control and tariffs by the Ecuadorian side<sup>19</sup>. Instead, there has been an increase in people traveling from the Ecuadorian side to the Peruvian side in order to buy cheap products. Moreover, because there has been a decrease in trade and travel by merchants using buses, the number of bus services operating between Loja and Piura is decreasing.

- Concerning education, since there is no high school in Suyo on the Peruvian side, there are some students who commute to high school in Macará in Ecuador. Conversely, there are Ecuadorian students who commute to junior high schools and higher education institutions on the Peruvian side. Concerning medical care, a general hospital has been constructed in Macará on the Ecuadorian side as a bilateral project, and residents on the Peruvian side also use this.
- As for commercial activities around the bridge, a bilateral agreement by the two countries prohibits setting-up of stores within 500 meters from the center of the bridge. However, in spite of this, on the Peruvian side, a number of stores and restaurants have been built and new buildings continue to be constructed. Also it should be noted that all the shops and stores located near the demolished old bridge have been closed, while, some of them were re-opened at the above mentioned prohibited zone in the Peruvian side. In order to exploit the commercial potential of the border region, the mayor of Macará on the Ecuadorian side has hatched a plan to create a park with shops and restaurants at an area close to the border facilities being built. The local government, residents and mayor are hoping that this will be designated as a free zone in which taxes are exempted, however, the MTOP and other central government offices are not supportive of this, believing that the unified criteria concerning border region shouldn't be changed.

(4) Contribution to promotion of friendly relations between the two countries

The Bilateral Border Development Committee aims to maintain peace through conducting social, economic and institutional development of the border region and giving the name “Bridge of Friendship” to the New Bridge. The citizens of both countries strongly wish for the continuation of peace following their bitter experiences

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<sup>19</sup> The tightening of customs controls was conducted separately from the Project, however, it is thought that the stricter enforcement of controls has been facilitated by the mitigation of congestion, introduction of lighting on the bridge, and installation of photographic monitoring equipment on the bridge by customs.



during the era of border dispute, and the New Bridge is widely recognized as a symbol of friendship between the two nations.

### **3.4.2 Other Impacts**

#### **(1) Impact on the natural environment**

The environmental impact study report received approval on each of the Ecuadorian and Peruvian sides in March 2005. In both studies, it was forecast that the impact of works will be short-term and minor, and appropriate steps were taken according to the environmental management plan during the works.

In the site surveys, no negative environmental impacts in particular were confirmed.

#### **(2) Land acquisition and resettlement**

On the Ecuadorian side, resettlement of three households were planned. In reality, only one household was resettled while there were seven other cases of land acquisition not entailing resettlement. On the Peruvian side, resettlement of 12 households were planned. In reality, only two households were resettled while there were 19 other cases of land acquisition not entailing resettlement<sup>20</sup>. In both countries, there were no problems in particular regarding resettlement and land acquisition.

#### **(3) Other impacts**

One of the reasons behind selection of the bridge type was the opportunity to obtain a new technical knowledge, i.e. the overhang erection method, and this proved successful because the implementing agencies in both countries gained the opportunity to learn this method. During the work implementation period, numerous opportunities were provided by the contractor and the consultant to explain the new method to visiting engineers from both countries. Following completion of the Project, bridge projects utilizing the same method have been implemented in both countries. Therefore, it can be said that the Project contributed to the improvement of technical capacity regarding bridge construction in both countries.

It is prohibited to construct buildings within 500 meters from the center of the bridge. However, one building has been constructed on the Ecuadorian side, while there are around 10 stores and restaurants on the Peruvian side. Until completion of the joint border facilities on the Ecuadorian side, border crossing procedures are being implemented in temporary facilities close to the approach roads in both countries. When

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<sup>20</sup> In Ecuador, \$361,728 was paid to eight persons according to the country's compensation standard by August 2008. In Peru, according to that country's compensation standard, 513,409 Nuevos Soles was paid to 19 landowners; also, payment of 123,126 Nuevos Soles to the two resettled households was completed by March 2012.

traffic volume is heavy in daytime, general vehicles waiting to undergo crossing procedure sometimes stop on the road shoulder near the bridge temporarily, and this is thought to be a contributing factor to the unlicensed operation of stores.

Summing up, this project has largely achieved its objectives. Therefore effectiveness and impact of the project are high.

### **3.5 Sustainability (Rating: ③)**

#### **3.5.1 Institutional Aspects of Operation and Maintenance**

Maintenance work on the approach road is outsourced by MTOP on the Ecuadorian side, and by PROVIAS NACIONAL (the road construction and maintenance body of MTC) on the Peruvian side. Bridge cleaning is carried out up to the center of the bridge by MTOP and PROVIAS NACIONAL respectively.

MTOP in Ecuador outsources “service level-based road maintenance”. The Project bridge and approach road are covered by an outsourcing contract that covers 189 kilometers of national highways during the period of December 2011 - January 2016. Since the performance of the contractor was good, it was scheduled to extend the contract for another year<sup>21</sup>. In the service level-based maintenance contract, road periodic repair works are normally implemented in the first and second year of the contract period, while only routine maintenance is conducted in the remaining period. MTOP supervises the contractor via a consultant employed through a separate contract and pays the contractor according to its performance. Maintenance criteria have been established concerning the motorway, road shoulder, side ditches, road signs and so on; reward is paid if 90% or more of the criteria are achieved, and penalty is charged if the achievement rate is less than 90%. Cleaning and other routine maintenance activities are contracted to four micro enterprises (*Micro Empresa*: small enterprises composed of local residents).

In Peru, PROVIAS NACIONAL outsources “service level-based road conservation”. Concerning the approach road in the Project, there is a contract for the period from April 2011 to April 2016. PROVIAS NACIONAL supervises the contractor via a consultant employed through a separate contract and pays according to performance. At the time of the ex-post evaluation, since the performance of the contractor was good, it was scheduled to extend the contract for another year and a half. This contract covers 400 kilometers of national highways and 117 bridges, and separate groups are responsible for roads and bridges. As is also the case in Ecuador, micro enterprises conduct routine maintenance activities. Under this contract, periodic repairs were conducted in 2011, and routine maintenance has been conducted ever since. As the

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<sup>21</sup> An extension of the contract was under preparation as of April, 2016.

Project approach road on the Peruvian side has slope protection with greening works, periodical watering is required for its maintenance. However, because periodical watering was not included among the work items of the maintenance contract that was concluded on the Peruvian side before completion of the Project, they have not been carried out. It will be necessary to wait for the next contract renewal scheduled for October 2017 in order to include this work.

Concerning the operation and maintenance of lights on the bridge, considering that voltage differs between the countries, Ecuador is responsible for lights lined in the upstream lane of the bridge, and Peru for lights lined on the downstream lane. On each side, the local power company in each country outsources the maintenance work.

Adjustments between the two countries concerning bridge operation and maintenance are conducted via bilateral development committee meetings that are periodically held. However, the field personnel of both countries' implementing agencies do not have a direct channel for making routine communications and coordination. Therefore, it takes time to share information and make decisions regarding problems on the ground among related agencies in each country as well as among the both countries.

### **3.5.2 Technical Aspects of Operation and Maintenance**

The implementing agencies in both countries (MTOPI, PROVIAS NACIONAL / MTC) conduct maintenance through their respective outsourcing contracts.

In the Project, the consultant compiled a maintenance guidebook for the bridge, which is used for reference, but is not directly applied. Apart from this, the Bilateral Border Development Committee compiled a maintenance manual targeting multiple international bridges in the border region in October 2013. The Ecuadorian side plans to conduct periodic bridge repairs based on this<sup>22</sup>.

As mentioned earlier, since the work performance of the contracted maintenance contractors in both countries have been good, there are no problems regarding technical matters.

### **3.5.3 Financial Aspects of Operation and Maintenance**

The following table shows trends in the respective budgets of MTOPI and PROVIAS NACIONAL (executed amounts in 2010-2014, budget amounts in 2015). As can be seen, the budgets are increasing.

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<sup>22</sup> Since the manual prepared by the Bilateral Border Development Committee targets all four bridges on the border, its contents are general. On the other hand, since the guidebook prepared by the consultant in the Project is specially intended for the New International Bridge of Macará, for example, it gives product drawings on the lights and guardrails, it is more practical.

Table 6 Budget Trends of MTOP (Ecuador) / PROVIAS NACIONAL (Peru)

	MTOP	PROVIAS NACIONAL (maintenance)
2010	1,020 million dollars	5,008 million Nuevos Soles (1,535 million Nuevos Soles)
2011	1,020 million dollars	5,544 million Nuevos Soles (1,877 million Nuevos Soles)
2012	1,273 million dollars	4,956 million Nuevos Soles (1,529 million Nuevos Soles)
2013	1,692 million dollars	6,124 million Nuevos Soles (1,456 million Nuevos Soles)
2014	1,398 million dollars	6,234 million Nuevos Soles (1,515 million Nuevos Soles)
2015	2,201 million dollars	6,450 million Nuevos Soles (1,732 million Nuevos Soles)

Source: MTOP, PROVIAS NACIONAL

Note: Only total amount for the institution is shown for MTOP, as the amount only for maintenance was not obtained.

The contract amount for maintenance of the road network including the Project in Ecuador and Peru is 19.3 million dollars (4 years, including road repairs) and 29.2 million dollars (5 years, including road repairs; some 82 million Nuevos Soles) respectively. According to MTOP and PROVIAS NACIONAL, there are no particular budget restrictions concerning the outsourcing of maintenance for the Project.

### 3.5.4 Current Status of Operation and Maintenance

According to the site inspection at the time of the ex-post evaluation, the bridge structure has no particular problem and is being generally used without any problem. The bridge is cleaned once a week, however, litter etc. can be seen scattered on the bridge and surrounding roads. There is still no need to conduct repainting of the balustrades or other periodic maintenance. The road surface signs and road studs that were originally scheduled for repair every two years are still in good condition<sup>23</sup>. Lights that are supposed to be maintained by the Peruvian side on the downstream lain of the bridge were not working at the time of the field visit on November, 2015. Being prompted by the evaluator, PROVIAS NACIONAL investigated the cause via the electric power company responsible for operation and maintenance, and the device for controlling lighting time was repaired. There are no major problems regarding the lights on the upstream side that are managed by the Ecuadorian side, except for the need to change one bulb. There were signs proclaiming “Welcome to Ecuador” and “Welcome to Peru” on both ends of the Old Bridge. After the construction of the New Bridge, similar sign was installed on the Ecuadorian side. While no such sign has been installed on the Peruvian side of the New Bridge, it is not affecting the effects of the Project.

The approach roads and highways leading to the bridge are generally maintained in good condition. However, as was mentioned earlier, because maintenance is not conducted on the green slope protection work on the Peruvian side, vegetation and soil have been eroded and

<sup>23</sup> Road studs are metal studs that are implanted into the road in order to enhance visibility at intersections and so on. They frequently are fitted with lights and reflective materials. They are also known as cat’s eyes.

the slope drainage ditch is partially damaged. Some of the buildings that have been constructed alongside the approach road on the Peruvian side have caused damage to the side ditch and slope<sup>24</sup>. However, these have not directly affected the Project effects and are considered to be minor issues.

Summing up, no major problems have been observed in the institutional, technical and financial aspects of the operation and maintenance system. Therefore, sustainability of the project effects is high.

## **4. Conclusion, Lessons Learned and Recommendations**

### **4.1 Conclusion**

The Project was implemented in order to secure smooth and stable traffic by constructing a new bridge and approach roads downstream of the deteriorated Macará International Bridge in the border region between Ecuador and Peru, thereby contributing to the development of the border region. The border region has been jointly developed by the two countries: in the national plans of both countries, construction of the international trunk highway including the Project has consistently been regarded as an important issue. Considering also that there was a strong need to rebuild the bridge and this is also consistent with Japan's aid policy, the Project has high relevancy. In the Project, the planned outputs were achieved. However, because the tender process repeatedly ended in failure due to escalation of material prices during the time taken for domestic procedures prior to the tender and also due to the remote distance of the Project site, it was necessary to conduct additional study and re-sign the Exchange of Notes. As a result, the period and the cost of the Project greatly exceeded the plan. Therefore, efficiency of the Project is low. Following completion of the Project, stable border traffic has been realized and large-size vehicles are able to safely cross the New International Bridge of Macará. It is possible to conclude that border crossing time has been shortened a little, however, it is anticipated that the time can be notably shortened when the bi-national border facilities which are currently under construction starts operation. Thanks to the bridge, traffic comprising mainly of small vehicles travelling short distances has doubled, and this has contributed to socioeconomic development in the border region. In addition, risk for inundation in the upstream areas at times of flooding has been reduced by sufficient flow section secured by the new bridge. Accordingly, the Project effectiveness and impact have been high. Both countries carry out appropriate operation and maintenance for the bridge with clear division of responsibilities, and since no major problems is identified in institutional setup, technical capacity and finances for operation and maintenance, the Project sustainability is high.

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<sup>24</sup> These are unofficial buildings that haven't obtained building permission from Suyo City. PROVIAS is demanding their eviction, however, the procedures for forced removal are likely to take a number of years.

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

## **4.2 Recommendations**

### **4.2.1 Recommendations to the Implementation Agencies**

- MTOP (Ecuador) needs to quickly complete the planned construction of the border facilities in order to further generate the effects and the impacts of the Project. Moreover, in conducting bridge maintenance, it is desirable that the guidebook developed in the Project be shared and utilized with the external contractor.
- PROVIAS NACIONAL (Peru) needs to promptly rehabilitate the slope protection work on the approach road and include slope protection maintenance in the operation and maintenance contract to be renewed with the contractor. Moreover, in order to remove the unofficial building close to the approach roads that cause damages to facilities and hinder traffic, it is necessary to examine appropriate measures including eviction based on law.
- Ecuador and Peru need to appropriately operate and maintain the New Bridge constructed by the Project in close collaboration between their respective officials. For prompt response and smooth information sharing regarding problems found on the site, establishing a working level committee composed of officials of MTOP, PROVIAS NACIONAL, border facilities (customs, police, quarantine, etc.), power company, and other related officials should be considered.
- Ecuador and Peru should take measures to fully utilize the tourism and commercial potential of the border region through discussion in the Bilateral Border Development Committee or similar bilateral forums. For example, establishing tourism information booth for both countries inside the border facilities, or building commercial facilities near the bridge as envisaged by the city of Macará can be good options.

### **4.2.2 Recommendations for JICA (None)**

## **4.3 Lessons Learned**

### Improvement of the border facilities and border crossing procedures in the international bridge project

Physical improvement achieved through an international bridge project will not lead to sufficient improvement in border traffic unless the border facilities containing immigration, customs, quarantine and police are improved and border crossing

procedures are rationalized in parallel. In the Project, delay in construction of the border facilities, that were not included in the Project scope, affected the realization of some Project effects, particularly on shortening of the border crossing time. Therefore, when planning an international bridge project, it is necessary to examine the necessity to improve the border facilities and border crossing procedures and make necessary arrangement to enhance the feasibility, including an option to cover such improvements within the project.

**0. Summary**

“Proyecto de Construcción de la Nueva Sede del Instituto Nacional de Rehabilitación Dra. Adriana Rebaza Flores” (hereinafter referred to as “the Project”) was implemented in order to transfer and strengthen the medical care function of the National Institute of Rehabilitation (hereinafter referred to as “INR”), by constructing a new hospital infrastructure in the Chorrillos District of Lima and providing medical equipment, thereby contributing to fulfilment of the needs required of INR to conduct advanced medical care, research and training of specialist personnel. At the time of both the ex-ante evaluation and ex-post evaluation, the Project was found to be highly consistent with the Government of Peru’s development policies for promoting the social and economic participation of disabled persons, and there was a strong need to strengthen the INR as a national specialist agency in the rehabilitation field. Moreover, since it was consistent with Japan’s aid policies at the time of the ex-ante evaluation, the Project has high relevancy. The Project cost taking into account changes in output was within the planned amount, however, because the Project period substantially exceeded the planned period due to delay in the construction of facilities on the Peru side, Project efficiency is fair. Since the relocation helped improve the INR’s location, and almost all of the main treatment facilities were constructed, the Project objectives of “relocating INR and strengthening treatment functions” were amply realized. Moreover, research and training for specialist staff have been boosted by the relocation. Accordingly, the Project effectiveness and impact have been high. It is necessary to monitor whether or not the necessary human resources will be secured for the facilities to be borne by the Peruvian side. In addition, since there are issues regarding allocation of budget for equipment operation and maintenance, the sustainability of the Project effects has been fair.

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

**1. Project Description**



Project Location



Main Entrance of the National Institute of Rehabilitation



## 1.1 Background

In Peru around 2007, 11% of the nation's households had at least one person with a disability.<sup>1</sup> As a social welfare policy designed to eliminate discrimination against people with disabilities, the Government of Peru formulated “the National Plan for Equality of Opportunities for People with Disabilities” (plan period: 2003 to 2007). In the health sector, the Ministry of Health was responsible for disabilities survey, certification of people with disabilities, rehabilitation, promotion of public awareness on the medical rehabilitation of people with disabilities, provision of adaptive equipment (orthoses)<sup>2</sup> and other works. Meanwhile, the Government of Peru declared that the decade from 2007 to 2016 to be the “Decade for People with Disabilities in Peru”, intensifying its national policies to facilitate equal opportunities for and broader social participation by people with disabilities.

In 2008, INR located in the Constitutional Province of Callao of the Lima Metropolitan Area was the supreme institution in the field of medical rehabilitation in Peru and provided medical care for more than 30,000 patients a year. At the same time, as a national specialist institution, it conducted wide-ranging research in the field of medical rehabilitation as well as the training of specialist doctors and therapists. INR has two general departments; General Department of Impaired Mental Function and the General Department of Impaired Physical Function, and in total eight departments for diagnosis and treatment<sup>3</sup>. The existing facilities of INR at the time were originally constructed in 1936 as a general hospital. While a series of renovation and expansion work to respond to the ever increasing demand, completely barrier-free facilities for medical rehabilitation could not be developed and the complicated layout of the consultation rooms and treatment rooms made it difficult to provide efficient medical services. However, As the existing buildings fully occupied the available land, no further expansion was feasible. Furthermore, The Constitutional Province of Callao in which INR was located had grown around a port over many years and the poor public safety in the area meant the occurrence of armed robberies, theft of wheelchairs from people with disabilities and other crimes.

Under these circumstances, the only fundamental solution to ensure the full performance of the expected role of INR was the relocation and new construction of the necessary facilities. It was against this background that the Government of Peru decided in 2004 to relocate INR to the Chorrillos District of Lima and made a request to the Government of Japan for the provision of grant aid to make this plan a reality.

In response, JICA dispatched a study team to Peru in 2005 to confirm the necessity of the proposed project. Following the completion of a preliminary study (pre-feasibility study) by the

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<sup>1</sup> 2007 National Census conducted by the National Bureau of Statistics and Information.

<sup>2</sup> Adaptive equipment (orthoses) is a general term for equipment, etc. which is fit to people with disabilities to supplement lost parts or functions of the body. To be more precise, it includes prosthetic limbs (prosthetic arms and prosthetic legs), braces, wheelchairs, walking sticks and hearing aids, etc.

<sup>3</sup> Under the General Department of Impaired Mental Function, there are Department of Learning, Department of Communication, Department of Psychomotor Development, and Department of Intelligence and Social Adaptation. Under the General Department of Impaired Physical Function, there are Department of Amputees, Burned and Postural Disorders, Department of Moving Organ and Pain, Department of Spinal Cord Injury and Department of Central Nerve Injury.

Peruvian side, JICA conducted the Basic Design Study from 2007 to 2008 and implemented the Project in the following years for completion in 2012.

## 1.2 Project Outline

In order to transfer and strengthen the medical care function of INR, by constructing a new hospital infrastructure in the Chorrillos District of Lima and providing medical equipment, thereby contributing to fulfilment of the needs required of INR to conduct advanced medical care, research and the training of specialist personnel.

E/N Grant Limit/Actual Grant Amount	2,015 million yen/2,015 million yen (total amount of detailed design and construction and procurement)
Exchange of Notes Date/Grant Agreement Date	Detailed Design: February, 2009/August, 2009 Construction: November, 2009/February, 2010
Implementing Agency	Ministry of Health
Project Completion Date	August, 2012 (Japanese side facility)
Main Contractors	Construction Work: Tokura Corporation and Konoike Construction, Co., Ltd (Consortium) Equipment Procurement: Mitsubishi Corporation
Main Consultant	Yokogawa Architects & Engineers, Inc. and INTEM Consulting, Inc. (Consortium)
Basic Design Study	June, 2007 to August, 2008
Detailed Design Study	October, 2009 to August, 2011
Related Projects	Dispatch of senior volunteers to INR (2013 onwards; physical therapist, IT engineer, interpreter, etc.)

## 2. Outline of the Evaluation Study

### 2.1 External Evaluator

Hajime Sonoda (Global Group 21 Japan, Inc.)

### 2.2 Duration of Evaluation Study

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

Duration of the Study : July, 2015 to August, 2016

Duration of the Field Survey: 21st to 31st October, 2015, 1st and 2nd December, 2015, and 21st to 22nd March, 2016

## 3. Results of Evaluation (Overall Rating: B<sup>4</sup>)

### 3.1 Relevance (Rating: ③<sup>5</sup>)

<sup>4</sup> A: Highly satisfactory; B: Satisfactory; C: Partially satisfactory; D: Unsatisfactory

<sup>5</sup> ①: Low; ②: Fair; ③: High

### **3.1.1 Relevance to Development Plan of Peru**

As already mentioned in 1.1 Background, at the time of the ex-ante evaluation (2008), the Government of Peru was strengthening its policies designed to facilitate equal opportunities for and broader social participation by people with disabilities through “the National Plan for Equality of Opportunities for People with Disabilities” and “the Decade for People with Disabilities in Peru”. The Ministry of Health was responsible for the health and medical care aspects of these initiatives.

One of the principal policies adopted by the Humala Administration which came into power in 2011 was “the elimination of social gaps”<sup>6</sup> and it expressed its full commitment to the promotion of the participation of people with disabilities in socioeconomic activities. The administration implemented the first special national survey on disabilities in 2012, and based on it, conducted a major revision of the Basic Act on Disabilities to reinforce the welfare policies for people with disabilities. As part of these policies, the Ministry of Health implemented various measures to assist people with disabilities, including revision of the technical criteria for the certification of people with disabilities and the notification of new criteria to doctors and other medical professionals, a nationwide campaign on the certification system and the introduction of community-based rehabilitation for the early detection of disabilities and provision of necessary medical services.

As such, the Project is highly relevant to the development policies of Peru at the time of both the ex-ante evaluation and ex-post evaluation.

### **3.1.2 Relevance to the Development Needs of Peru**

As already mentioned in 1.1 Background, at the time of the ex-ante evaluation, despite its status as the supreme institution for medical rehabilitation and relevant research and training, INR was facing problems in terms of its facilities and site conditions. The only fundamental solution for these problems was relocation and the construction of new facilities, making the Project highly necessary.

According to the first special national survey on disabilities conducted in 2012, Peru had 1.6 million people (equivalent to 5.2% of the entire population) with some kind of disability. This survey revealed the need for the expansion of the medical rehabilitation service. While 41% of people with disabilities required daily care by family members, etc. and ii) only 11% of people with disabilities were able to access the medical rehabilitation service due to the difficulty of visiting a medical institution or lack of health insurance. On the other hand, the site conditions and facilities of INR were improved by the implementation of the Project. However, the demand for the medical rehabilitation service has steadily increased with the progress of government policies aimed at people with disabilities, the expansion of health insurance schemes and other reasons, resulting in an increased number of medical consultations and treatment performed by INR. Meanwhile, as a national institute specialized in the field of medical rehabilitation, INR maintains the important role of leading the medical rehabilitation service in Peru through specialist studies and research work, constant improvement of medical techniques and medical standards, promotion of international cooperation and

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<sup>6</sup> General Government Policies and Their Operational Measures: 2012 – 2016 (announced in July, 2012)

continual education and training of specialist personnel. Thus, the importance of the Project is ascertained even at the time of the ex-post evaluation.

### 3.1.3 Relevance to Japan’s ODA Policy

Japan’s Country Assistance Program for Peru (August, 2000) identifies such priority fields as the elimination of poverty, support for the social sector, development of economic infrastructure and environmental conservation. In terms of support for the social sector, emphasis is placed on cooperation to provide vital equipment for health care facilities and to conduct the training of health care workers along with support for education. As the Project is part of the support for the social sector which is a priority for Japan’s ODA for Peru, it conformed to Japan’s ODA policies at the time of the ex-ante evaluation.

Based on the above, the Project is highly relevant to Peru’s development policies and the development needs of Peru as well as Japan’s ODA policies. Therefore, its relevance is high.

## 3.2 Efficiency (Rating: ②)

### 3.2.1 Project Outputs

INR was relocated to a publicly owned site (formerly used by the Ministry of Defense) located in the Chorrillos District of Lima, which is some 20km away from its original site in the Constitutional Province of Callao. Fig. 1 shows the location of INR before and after the relocation while Fig. 2 shows the facility layout after the relocation.



Figure 1 Location of INR before and after the relocation

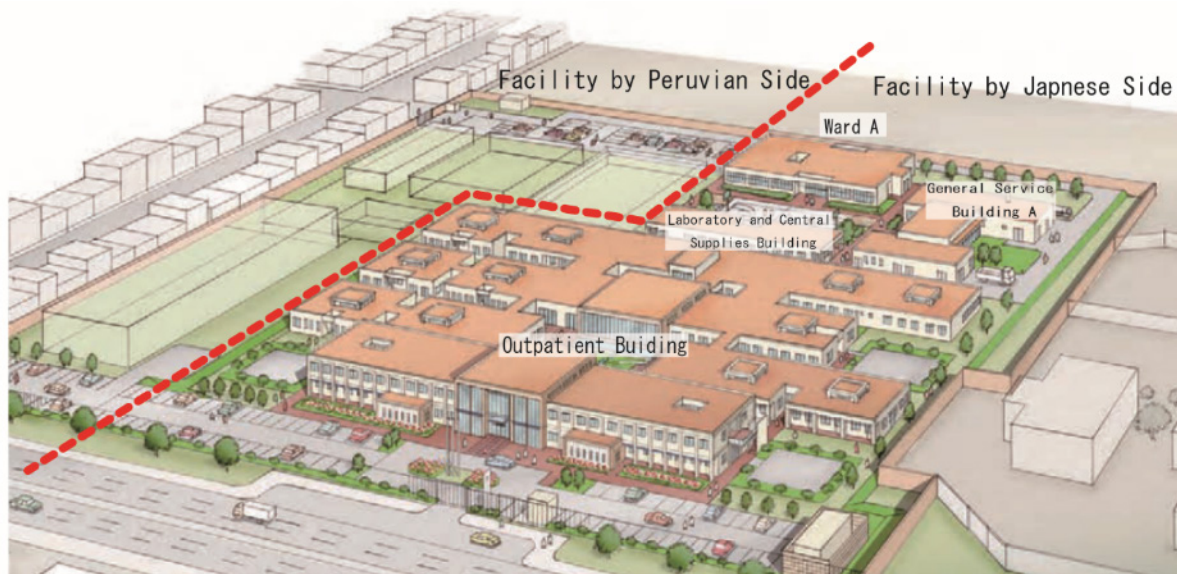


Figure 2 Facility layout of INR after the relocation

Table 1 shows the planned and actual outputs of the Project. The facilities for which the Japanese side was responsible were generally constructed as planned even though some changes were made in terms of the room layout and intended purpose of use of some rooms to accommodate imperatives discovered in the course of the detailed design.<sup>7</sup> In contrast, the floor area of the facilities for which the Peruvian side was responsible increased to 124% of the planned floor area because of the addition of a gait analysis chamber and others. Improvement of gait is important for rehabilitation of motor function and improvement of the quality of life, and appropriate gait analysis is required to realize such improvement. Therefore, a gait analysis chamber is necessary to carry out related research and medical care as a national institute. Therefore, its addition is considered to be relevant. Due to this, the planned total floor area of 18,087 m<sup>2</sup> increased to an actual floor area of 19,821 m<sup>2</sup> (110% of the planned total floor area). The equipment by the Japanese side was procured and provided as planned.

According to INR, the layout plan as well as the floor plan for the facilities to be constructed by the Japanese side were generally appropriate while the quality of the construction work was found to be excellent. The opinion has been expressed that the conditions of the consultation rooms, physical exercise room and other facilities have significantly improved. Meanwhile, therapists and other INR personnel pointed out the following shortcomings to the present evaluator.

- While the physiotherapy room has 20 treatment beds, its small room size is inconvenient for the provision of efficient treatment. Number of bed is insufficient as well. Both the ventilation and daylight are rather poor. The small single entrance makes it difficult to move patients in a wheelchair or on a stretcher in or out of the room at busy times. Emergency evacuation is likely to be difficult.

<sup>7</sup> These changes included an increase of the number of individual consultation rooms for social service, an additional X-ray photography room in the outpatient building, an increase of the number of shower rooms in wards and a change of a senior staff member's office to a meeting room.

Table 1 Comparison between the Planned and Actual Outputs

Planned Outputs	Actual Outputs
<p>★Facilities by Japanese side: 10,729 m<sup>2</sup></p> <ul style="list-style-type: none"> <li>- Outpatient building : 8,480 m<sup>2</sup></li> <li>- Laboratory and central supplies building : 435 m<sup>2</sup></li> <li>- General service building A (including canteen and laundry) : 888 m<sup>2</sup></li> <li>- Ward A (38 beds) : 926 m<sup>2</sup></li> </ul> <p>★Facilities by Peruvian side: 7,358 m<sup>2</sup></p> <ul style="list-style-type: none"> <li>- Administration and training building : 3,444 m<sup>2</sup></li> <li>- Ward B (38 beds) (including surgical center) : 1,989 m<sup>2</sup></li> <li>- Ward C (38 beds) : 925 m<sup>2</sup></li> <li>- Psychomotor treatment building : 240 m<sup>2</sup></li> <li>- General service building B : 541 m<sup>2</sup></li> <li>- Anatomy and pathology building : 219 m<sup>2</sup></li> </ul> <p>★Total : 18,087 m<sup>2</sup></p>	<p>★Facilities by Japanese side: 10,729 m<sup>2</sup></p> <p style="text-align: center;">Generally completed as planned</p> <p>★Facilities by Peruvian side: 9,092 m<sup>2</sup></p> <ul style="list-style-type: none"> <li>- Administration and training building : 3,734 m<sup>2</sup></li> <li>- Ward B : 2,343 m<sup>2</sup></li> <li>- Ward C (total 85 beds) : 1,073 m<sup>2</sup></li> <li>- Psychomotor treatment building* : 328 m<sup>2</sup></li> <li>- General service building B** : 647 m<sup>2</sup></li> <li>- Anatomy and pathology** : 216 m<sup>2</sup></li> <li>- Psychomotor treatment** : 334 m<sup>2</sup></li> <li>- Gait analysis chamber, etc. : 417 m<sup>2</sup></li> </ul> <p>★Total : 19,821 m<sup>2</sup></p>
<p>★Equipment to be provided by Japanese side</p> <ul style="list-style-type: none"> <li>- Treatment equipment: laser therapy apparatus, electric tilting tables, etc.</li> <li>- Diagnostic equipment: CT scanner, microscopes, spectrophotometers, etc.</li> <li>- Equipment to make orthoses: lathes, carving machinery, etc.</li> <li>- Ward equipment: bed sets, patient care lifts, etc.</li> <li>- Service equipment: washing machines and high pressure steam sterilizers</li> </ul>	<p>★Equipment to be provided by Japanese side</p> <p style="text-align: center;">As planned</p>

Source: Materials provided by JICA and INR

Notes: \* A chapel was added.

\*\* Facilities serving these functions were planned in separated buildings but realized in a single building.

- While family member(s) usually accompany a patient, there is not sufficient space to accommodate the family member(s) in the treatment room.<sup>8</sup>
- The treatment room for patients with learning disabilities is too small to accommodate a sufficient number of lockers and other types of furniture.
- In the case of the hydrophatic treatment facility, the long distance between the treatment equipment and the changing room makes the use of such equipment by people with disabilities inconvenient. The changing room, etc. lacks adequate handrails. The poor ventilation makes the area stuffy because of heat from the warm water.

<sup>8</sup> According to the results of the beneficiary survey (refer to next footnote), some 70% of the patients are accompanied by a family member(s).

- Both the canteen and the orthoses workshop are stuffy due to poor ventilation. The narrow entrance of the canteen makes its use by inpatients inconvenient.
- There are many long-term inpatients due to spinal cord damage but the hospital rooms lack sufficient space for them to keep their personal belongs (clothes and daily necessities). The outpatient consultation rooms where the doctors work are far away from the hospital rooms.



Physiotherapy Room



Hydropathic Treatment Room (treatment pool)



Psychomotor treatment room



Outdoor space utilized for treatment and storage due to shortage of space

According to the questionnaire survey to the medical staff of INR<sup>9</sup>, some 70% of the respondents affirmed improvement in reference to the outpatient consultation rooms and waiting rooms.

<sup>9</sup> As part of the ex-post evaluation, a beneficiary survey was conducted in the form of a questionnaire survey with patients of INR (Family members were interviewed when the patients themselves could not answer. Number of samples were distributed according to the number of patients in each specialty of INR.) as well as doctors and therapists working at INR. The number of effective replies was 108 for patients (of which 33 patients are continuously visiting INR since before the relocation), 16 for doctors and 24 for therapists. The patients were randomly selected from among outpatients

In contrast, however, only 33% affirmed improvement of the treatment rooms which is lower than the number of people indicating a worsening situation of these rooms (55%). In regard to the facility layout, 33% of the respondents said that the new layout was worse than before (Figure 3).

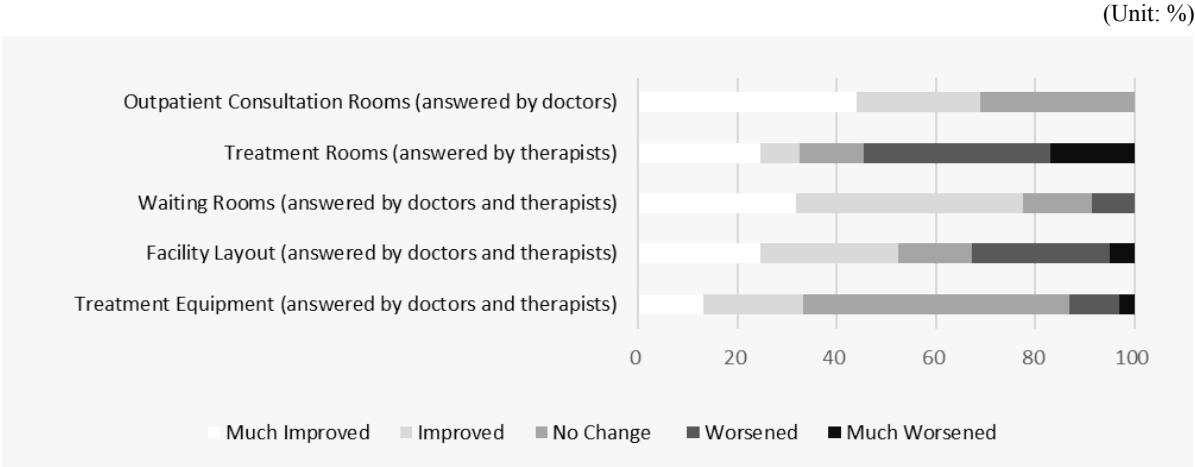


Figure 3 Evaluation of Facility Improvement Due to the Relocation by Doctors and Therapists

Source: Questionnaire survey with doctors and therapists as part of the beneficiary survey.

As described above, the building design of the Project appears to have not fully accommodated the needs of users. In the case of some facilities, the original intended purpose of use has been changed. Some examples of this are the introduction of treatment beds in the body temperature adjustment room for hydropathic treatment to compensate the insufficiency of physiotherapy room and the use of the magnetic treatment room for physiotherapy massages which should be made only at the physiotherapy room. A statutorily required study conducted by INR featuring the labor safety and environmental conditions found such shortcomings as insufficient ventilation and sunlight and noise caused by ventilation fans.

One possible reason for these shortcomings is the fact that only senior staff members of INR who were medical doctors were consulted in the course of the basic design and detailed design, neglecting any direct interviews with such frontline workers as therapists and nurses and consider their views in the planning. According to the Japanese consultant in charge of planning and design, the given design period was not long enough despite the complexity of the planned facilities, resulting in a lack of time to observe and establish the usage situation of the old facilities in detail and to obtain opinion of the users on the layout plan. As a result, it was necessary to refer to examples of similar facilities in Japan in the concrete planning and design process.

A Peruvian engineer who has knowledge on the building standards in Peru was employed as a member of the design team by the Japanese consultant in charge of the detailed design. However, it

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as well as inpatients of INR while the doctors and therapists were randomly selected at a rate of five doctors and five therapists from each department. The questionnaire survey was conducted in the form of a face to face interview survey.



was difficult to recruit an engineer with extensive knowledge on the building standards for hospitals which are under the jurisdiction of the Ministry of Health and rather complex, and some parts of the design failed to conform to such standards, necessitating their redesign or remodeling after their completion.

In the case of equipment, most of the equipment provided under the Project was to renew existing equipment. The only exception was the CT scanner which was newly provided to replace the work hitherto contracted out. According to INR, the selection of equipment was generally adequate. However, some of the machinery to make orthoses are not familiar brands in Peru and as their repair has been found to be difficult (see the section of Sustainability).

**3.2.2 Project Inputs**

**3.2.2.1 Project Cost**

The planned project cost was 2,015 million yen for the Japanese side and 1,636 million yen for the Peruvian side, totaling 3,651 million yen.<sup>10</sup> As shown in Table 2, the actual project cost consisting of the cost of the detailed design and project proper (construction, equipment procurement and project supervision costs) for the Japanese side was 1,936 million yen<sup>11</sup> and the actual cost for the Peruvian side was 1,955 million yen. The combined total of 3,891 million yen exceeded the planned overall project cost (107% of the planned cost). Meanwhile, as the output in terms of floor area reached 110% of the planned level (total of Japanese and Peruvian side buildings; planned 18,087m<sup>2</sup> versus actual 19,821m<sup>2</sup>), an average investment per floor area considered to be 97% of the planned level. Therefore, it can be concluded that the cost efficiency of the Project is high. It should be noted that, although the construction cost for the Peruvian side increased due to the need to conduct a second detailed design, increase of the floor area and extension of the construction period, the actual cost increased was kept at some 20% of the planned cost due to measures employed to suppress the project cost, including the use of equipment, furniture and fixture from the old facilities.

Table 2 Planned and Actual Project Costs

	Planned	Actual	Actual/Planned
Japanese side	2,015 million yen	1,936 million yen	96%
Peruvian side	1,636 million yen	1,955 million yen	119%
Total	3,651 million yen	3,891 million yen	107%

Sources: JICA, INR  
 Note: The actual project cost for the Peruvian side is the total cost estimated at the time of ex-post evaluation.

**3.2.2.2 Project Period**

Project period for the Japanese side facility was planned to be around 26 months including detailed design and procurement period. Construction of the Peruvian side facility was planned to be

<sup>10</sup> The planned project cost for the Japanese side was based on the grant limit specified in the E/N and G/A while the planned project cost for the Peruvian side was based on the basic design study.  
<sup>11</sup> For the Japanese portion of the project cost, the construction cost accounted for 1,533 million yen, the equipment procurement cost for 291 million yen and the detailed design and project supervision cost for 198 million yen.

completed together with the completion of the Japanese side facility. The actual project period of the Japanese side facility is shown below.

Grant aid agreement	31 August, 2009 (detailed design) 5 February, 2010 (construction and procurement)	
Detailed design	30 October, 2009 – 30 August, 2011	23 months
Tender and contract	15 June, 2010 – 20 December, 2010	7 months
Construction, installation of equipment	13 January, 2011 – 15 August, 2012	20 months
Project Period	31 August, 2009 – 15 August, 2012	36 months

In the case of the Japanese side facilities, the detailed design was completed in August, 2011 following the signing of the G/A relating to the detailed design in August, 2009. Construction and installation of equipment completed in August, 2012. The actual project period of 36 months exceeded the originally planned project period (138% of the originally planned project period). The principal reasons for the delayed completion were that; i) it took some two months for the Peruvian side to make the G/A legally effective, ii) after the public announcement of the tender for the main construction work, it became necessary to change the design due to a request made by the Peruvian side on the grounds of conforming to building laws and regulations, delaying the tender by nearly four months, iii) various procedures regarding permits and authorization and the local construction conditions lengthened the construction period by nearly two months, and iv) the procurement of some equipment was delayed by approximately two months.

In contrast, the construction work by the Peruvian side which commenced in January, 2013 after the completion of the facilities constructed by the Japanese side has not yet been completed as of April, 2016<sup>12</sup>. As a result, overall project period is more than 81 months (August, 2009 – April 2016), which is at least 312% of the planned period. The principal reasons for this delay are; i) the insufficient capability of the design company which was charged with the work, making subcontracting of the work necessary, ii) a series of revisions of the design under the instruction of the Ministry of Health and iii) delayed approval of the detailed design due to the replacement of the people in charge at the Ministry of Health. The lack of INR personnel who has sufficient experiences in supervising the detailed design work has aggravated this delay. Moreover, the construction work was temporarily halted after its commencement due to the discovery of shortcomings with the detailed design. Later, following inadequate construction work by the contractor, the contract with the consultant responsible for supervision of the work was cancelled on the grounds of negligence. Under the supervision of the newly appointed consultant, 90% of the planned construction work has been completed as of December, 2015.

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<sup>12</sup> INR intends to complete the construction at latest during 2016.

In short, the Project, including the facilities by the Peruvian side, is not completed at the time of the ex-post evaluation, considerably exceeding the planned project period.

According to interviews with INR and the Japanese consultant, the principal reason for the lengthy time required to solve the problems associated with project implementation is the lack of experience of a large-scale construction project on the part of INR which is a medical care institution. In particular, INR did not have sufficient knowledge on various permits and authorizations involved in construction work and on the available legal measures to deal with an insincere contractor. The second reason is that the Directorate General for Infrastructure and Medical Equipment of the Ministry of Health which had been assigned to assist the Project in relation to problems encountered in the course of project implementation was unable to perform such assignment at a certain time due to a shortage of human resources caused by organizational restructuring, etc. In addition, the specialist team created by INR in order to support implementation of the Project experienced frequent changes of personnel due to the changes of the general director of INR, and the Directorate General for Infrastructure and Medical Equipment needed to provide guidance repeatedly to the team.

Based on the above, while the project cost was within the plan considering the changes in output level, the project period significantly exceeded the plan due to the delays in construction of Japanese as well as Peruvian side facility. Therefore, efficiency of the project is fair.

### **3.3 Effectiveness<sup>13</sup> (Rating: ③)**

#### **3.3.1 Quantitative Effects (Operation and Effect Indicators)**

##### **(1) Provision of Medical Care Services at INR**

The purpose of the Project was to increase the capacity of INR's medical care function and the relevant indicator was an increase of the medical care service provided by individual departments of INR compared to the corresponding level in 2006. Table 3 shows the historical changes in terms of several parameters of such service of INR since 2006.

Following the completion of the construction work by the Japanese side in August, 2012, the medical care function of INR was transferred to the new facilities in the period from September to December, 2012. While the construction work by the Peruvian side was delayed, the administration, research and education departments of INR were relocated in the period from September to November, 2013 to rented offices located opposite INR's new premises.

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<sup>13</sup> The effectiveness is rated in consideration of not only the effects but also the impacts.

Table 3 Historical Data on Medical Care at INR

	2006	2011	2014	2015	2015/11	2015/06	2014	2015
	Baseline at planning	Before relocation	2 years after relocation	3 years after relocation (ex-post evaluation)	Ratio of increase	Ratio of increase	Planned level (real/plan)	Planned level (real/plan)
Number of Outpatients	12,629	21,160	21,802	20,194	95%	160%	16,945 (129%)	16,664 (121%)
Number of Consultations	25,499	39,382	42,541	38,657	98%	152%	35,221 (121%)	35,571 (109%)
Number of Treated Patients	10,916	19,907	25,063	25,804	130%	236%	19,473 (129%)	19,617 (132%)
Number of Treatments	187,884	274,148	341,246	358,967	131%	191%	362,874 (94%)	365,386 (98%)

Source: INR

Notes: The relocation of INR was completed in December, 2012.

Planned level (2014, 2015) is based on the demand forecast at the time of Basic Design Study.

Number of Outpatients: total number of patients who received consultation at least once during the year.

Number of Consultations: total number of consultations realized during the year.

Number of Treated Patients: total number of patients who received treatment at least once during the year.

Number of Treatments: total number of treatments realized during the year.

Following this relocation, INR lost most of its former patients. However, the steady acquisition of new patients meant that its performance in 2014 exceeded the pre-relocation level in 2011. Although the number of outpatients and the number of consultations were only slightly above their corresponding levels in 2011, the number of treated patients and the number of treatments were 26% and 24% higher than their pre-relocation levels respectively. Principal reasons for the increase of medical care services after the relocation are; i) elimination of constraints in terms of public safety and site access compared to its previous location, ii) increased medical care capacity of INR with the improved facility, and iii) prolonged hours of clinical service due to the improvement in security and extended hours in the late afternoon and evening.

On the other hand, the number of outpatient and number of consultations decreased slightly in 2015 compared to 2014. Reasons for this are considered to be as follows;

- Because INR enforced stricter admission criteria as part of its strengthening of the referral system, there were more cases of patients being counter-referred to other medical agencies<sup>14</sup>.
- From June 2015 onwards, the Comprehensive Health Insurance System (SIS; *Sistema Integral du Salud*) has been applicable at INR<sup>15</sup>, making it necessary to prepare additional documentation for admission of those who are insured. As a result, there have been situations where some patients could not be admitted immediately despite coming to the hospital.

<sup>14</sup> See 3.3.2 (2) Referral System.

<sup>15</sup> The Comprehensive Health Insurance, which provides free health care for low-income people, is under the jurisdiction of the Ministry of Health and has witnessed a nationwide increase in subscribers in recent years. Since its subscribers need to be referred by a low-level medical institution in order to receive treatment at a high-level institution, referral by a secondary medical care institution is required in order to receive treatment at INR. Moreover, according to INR, improvement of the facilities in line with the relocation was one of the factors behind the decision to start application of the Comprehensive Health Insurance. Negotiations have already started with private health insurance companies and it is predicted that application of health insurance schemes will grow in future.

The decrease in the number of patients due to strengthening of the referral system is deemed to be a desirable change because it means that patients who do not require treatment at INR have decreased. Moreover, the decrease arising from application of the Comprehensive Health Insurance is only temporary. This system, which allows low-income patients to receive treatment without using their own funding, will eventually lead to more patients in the long run.

Compared to 2006, which was upheld as the reference year at the time of the ex-ante evaluation, the number of outpatients and number of consultations increased by some 50 – 60% and the number of treated patients and number of treatments approximately doubled in 2015. Compared to the planned figures, the number of treatments in 2015 remained 98% of the planned figure, however, the numbers of outpatients, consultations and treated patients were greater than planned.

The inpatient ward is used by patients in the Spinal Cord Injury Rehabilitation Department, and although the number of beds increased from 32 to 38 following the relocation, the number of inpatients has stayed the same and the occupancy rate is around 80%. The main reason for this is that no additional nurses have been assigned to the ward. INR plans to increase the number of nurses, to start cochlear implantation in the facilities constructed by the Peruvian side, and utilize these together with the 85 beds included in the facilities constructed by the Peruvian side.

In this way, because the INR facilities that need to be constructed by the Peruvian side are not yet completed, some procedures cannot be commenced, and the shortage of nurses and so on, which means that the hospitalization facilities cannot be fully utilized and impose other constraints. However, the overall medical care provision has been increased more than planned thanks to the Project, because almost all the main treatment facilities have been constructed and relocated and the new location offers better conditions.

### **3.3.2 Qualitative Effects**

#### **(1) Change of the Service Area**

As a medical institution of the highest level in Peru, INR has the nationwide role of accepting patients in need of advanced medical care in the field of rehabilitation. According to the relocation plan for INR prepared by the Ministry of Health (the pre-feasibility study by Peruvian side), the service area of INR was the Lima Metropolitan Area that has one-third of Peru's population (Lima City and the Constitutional Province of Callao). In addition, it was assumed that 17% of patients of INR after its relocation would be referred to INR from other regions of Peru.

In reality, according to INR and based on the results of the beneficiary survey, the geographical expansion of INR's service area has been limited because of traffic congestion in the Lima Metropolitan Area and cost of transportation to and from INR. Prior to the relocation, some half of its patients came from the Constitutional Province of Callao and the service area was mainly the central and southern parts of the Constitutional Province of Callao. In contrast, after its relocation, 81% of patients visiting INR in 2014 came from Southern part of Lima (Chorrillos District in which INR is located and its surrounding area), 2% of patients came from the Constitutional Province of Callao and

5% was referred from other regions of Peru. Less than 2% of the patients in 2014 were former patients of INR before its relocation and most of them lives in Lima. The new site for INR enjoys relatively good public safety and its location along a trunk road offers better transport access.<sup>16</sup> According to doctors and therapists, more patients travel to INR from the distance compared to pre-relocation, suggesting that its service area has somewhat increased as a result of its relocation.

## (2) Strengthening of the Referral System<sup>17</sup>

Since INR is a high-level medical institution, roughly half of its newly received patients are referred from other medical institutions. As patients are received upon prioritizing them according to the treatment level, patient admission criteria have been established so that in the admission office, patients are accepted upon checking symptoms, past treatment history and existence of referral or not from another institution, or they are referred to a different institution<sup>18</sup>. Before the relocation, this decision was made by general physicians, however, due partly to the acute treatment needs, the criterion was loosely applied and some patients who didn't even require high-level treatment were accepted. However, following the relocation, specialist rehabilitation physicians have been assigned and the criteria have come to be applied more strictly, meaning that such patients are now rarely admitted<sup>19</sup>.

Moreover, according to INR, many of the patients who are referred from other medical institutions are inappropriate referrals who have not been properly evaluated by specialists. Concerning this, commencement of application of the Comprehensive Health Insurance System with stringent referrals in June 2015 has led to strengthening of the INR referral system.

In this way, following the relocation, INR has been able to focus on those patients who require high-level rehabilitation treatment. This has been underpinned by the relocation and strengthening of the treatment capacity and may be regarded as an indirect effect of the Project.

## (3) Improvement of the Medical Care Service

According to doctors, therapists, nurses and patients, the medical care service provided by INR has made the following improvements which are direct outcomes of the improved facilities by the Project.

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<sup>16</sup> The beneficiary survey found that 64% and 21% of patients arrive at INR by bus and taxi respectively. Patients with impaired motor function use taxis more frequently (32%). The travelling time to INR for 30% of patients is more than one hour.

<sup>17</sup> A referral system is designed to ensure the smooth reference and transportation of patients to appropriate medical institutions based on the type and severity of illness and medical care capability of individual institutions through close communication involving health centers, clinics, leading local hospitals, general hospitals and specialist hospitals. The reference and transportation of patients from lower medical institutions to higher medical institutions is called referral while the reverse movement of patients is called counter-referral. Proper functioning of the referral system can ensure adequate matching of the medical requirements of patients and the level of medical care offered by individual medical institutions. As a result, higher medical institutions can fulfil their potential to the fullest extent.

<sup>18</sup> Referrals to low-level medical institutions are classed as counter referrals.

<sup>19</sup> Following the relocation, a third of the newly arriving patients are judged not to require high-level treatment and are referred to other hospitals. However, patients who were coming to INR from before the strengthening of the referral system continue to be admitted following the relocation. At the time of the ex-post evaluation, INR was in the process of reviewing admission criteria.

- INR in the pre-relocation period was generally congested because of its limited floor size. The congestion has been eased since the relocation and it has become easier to maintain order.
- The secured seismic performance of the buildings has reduced the risk at the time of an emergency. The relocation to an area with better public order has reduced the risk to patients and staff members when travelling to INR.<sup>20</sup>
- Before the relocation, the consultation rooms were located far away from the treatment rooms in many departments, making it necessary to move equipment between them. With the new floor layout, such movement has become unnecessary, improving the efficiency of medical care.
- Before the relocation, the consultation rooms were often divided into two or three small units, making the maintenance of privacy difficult. The need for those patients having a consultation in the rear units to go through the front units to exit the consultation area created an awkward situation for both patients and doctors. This has now become a thing of the past at the new INR. The wider available space of the new consultation rooms makes it easier for trainee doctors to attend consultations with additional space, while movement of people was constrained before the relocation.
- The provision of a treatment pool in the hydrotherapy area has expanded the treatment menu. Because of group therapy in the pool, the development of a sense of friendship between patients is of great benefit for the essential mental care of people with disabilities.
- The exercise therapy room is now larger and brighter and patients are treated in a much better environment.
- The bathing of inpatients with disabilities used to involve a long waiting time as it is a lengthy process. The increase of the number of bathing units for hospitalized patients has much reduced the waiting time.

According to the beneficiary survey, half of the interviewed doctors and therapists replied that the service and results of medical care at INR have improved.<sup>21</sup>

The waiting time for a consultation appointment used to be as long as two months but this has been shortened in many departments since the relocation. While this is partly because of the improved

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<sup>20</sup> Prior to its relocation, INR was assessed to be a high risk in terms of “facility safety” and “safety of the surrounding area (including the social risk) in the risk management plan for 2011.

<sup>21</sup> This means that half of the interviewed doctors and therapists believe that no specific improvements have been made regarding the contents and results of treatment. This judgement appears to reflect such negative development of a recent lack of extra space because of an increased number of patients. None of the interviewed doctors and therapists replied that the contents and results of treatment had worsened in comparison to the pre-relocation period.

appointment system of INR<sup>22</sup>, the enhanced medical care capability and capacity due to the Project are also considered to be contributory factors.

Meanwhile, as described in 3.2.1 Project Outputs, some of the facilities constructed under the Project are not fully compatible with their intended use by users. In addition, there are certain restrictions in the use of the treatment pool and the CT Scanner, as described in the section of “Sustainability”. The delayed completion of the facilities to be constructed by the Peruvian side means a shortage of treatment rooms in the department dealing with impaired mental function, making it necessary to conduct some treatments outdoors. In addition, surgical center as well as additional beds for hospitalization are not yet realized. Also, the housing of some functions of the administration department and research and education department in small rented offices which are not on the new INR premises is inconvenient for these departments and their interaction with other departments.

(4) Degree of Patient Satisfaction

The beneficiary survey found a high level of general satisfaction with INR among patients and their family members (Figure 4). 49% of patients replied that they are “very satisfied” overall. Together with 45% of patients who are “satisfied”, in total 94% of patients are satisfied with INR. The level of satisfaction is high with the admission procedure, patient handling by doctors and therapists, medical consultation by doctors, treatment by therapists, treatment equipment and facilities in general. In contrast, the ratio of patients satisfied with the waiting time and medical care fee is relatively low.



Exercise therapy room



Treatment room for patients with learning disabilities

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<sup>22</sup> Before the relocation, only five weekdays of the last week of each month were available to arrange new appointments. This meant that many patients had to travel to INR simply to arrange an appointment. Since the relocation, however, new appointments can be arranged any day.



(Unit: %)

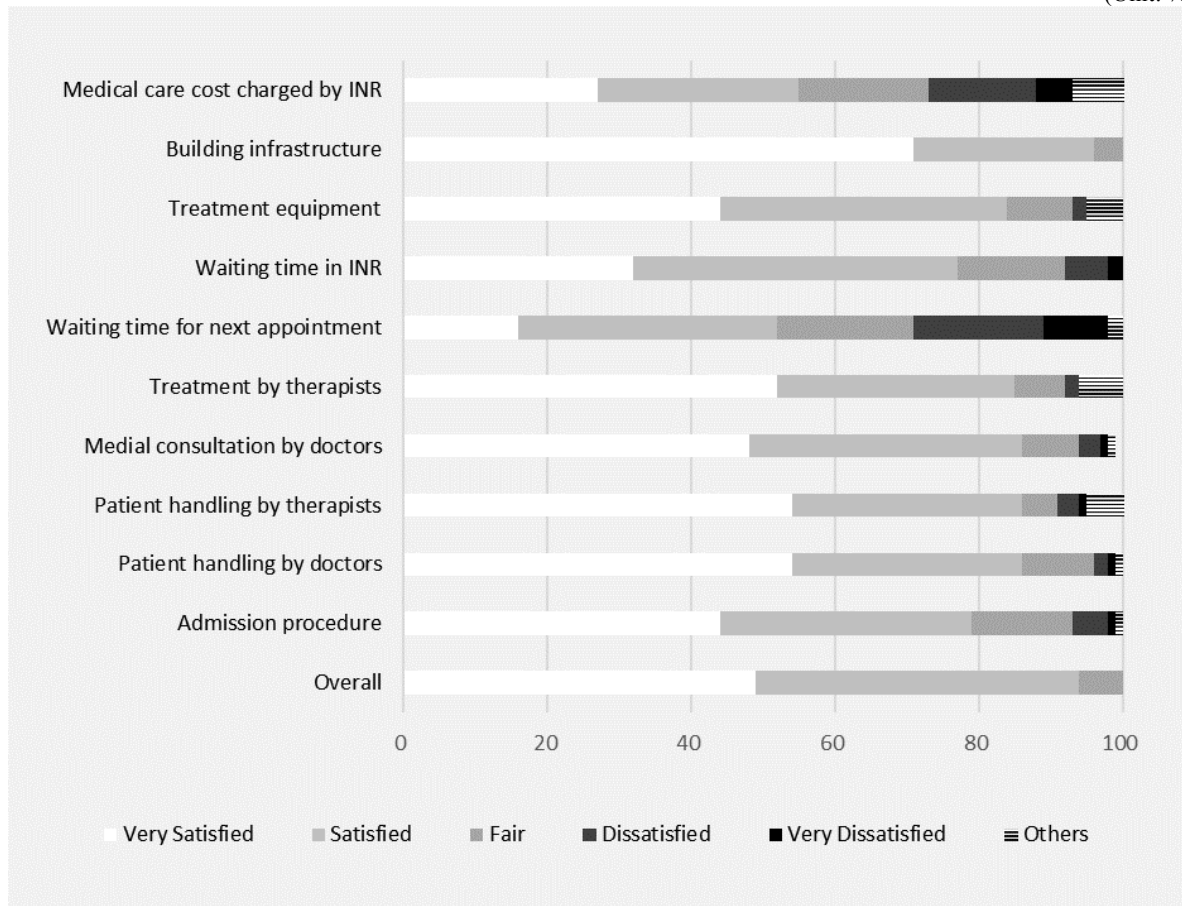


Figure 4 Patient Satisfaction with INR

Source: Questionnaire survey with patients and their families conducted as part of the beneficiary survey.

Note: 5-grade evaluation (“very satisfied”, “satisfied”, “fair”, “dissatisfied” and “very dissatisfied”) was conducted to study the level of their satisfaction with 108 patients and their families.

When INR patients who are receiving continual treatment at INR from the pre-relocation period were questioned about the overall changes before and after the relocation, 70% and 18% of them replied that the overall conditions of INR had “much improved” and “improved” respectively (Figure 5). A particularly favorable response was recorded for the improvement of facilities. In contrast, the improvement in terms of the handling of patients, quality of treatment and medical care cost was considered to be modest. The reasons for this are the growing congestion due to an increased number of patients and longer distance to travel for some of these patients. Many patients mentioned the better public safety around the new premises as reasons for their positive evaluation of the change of location.

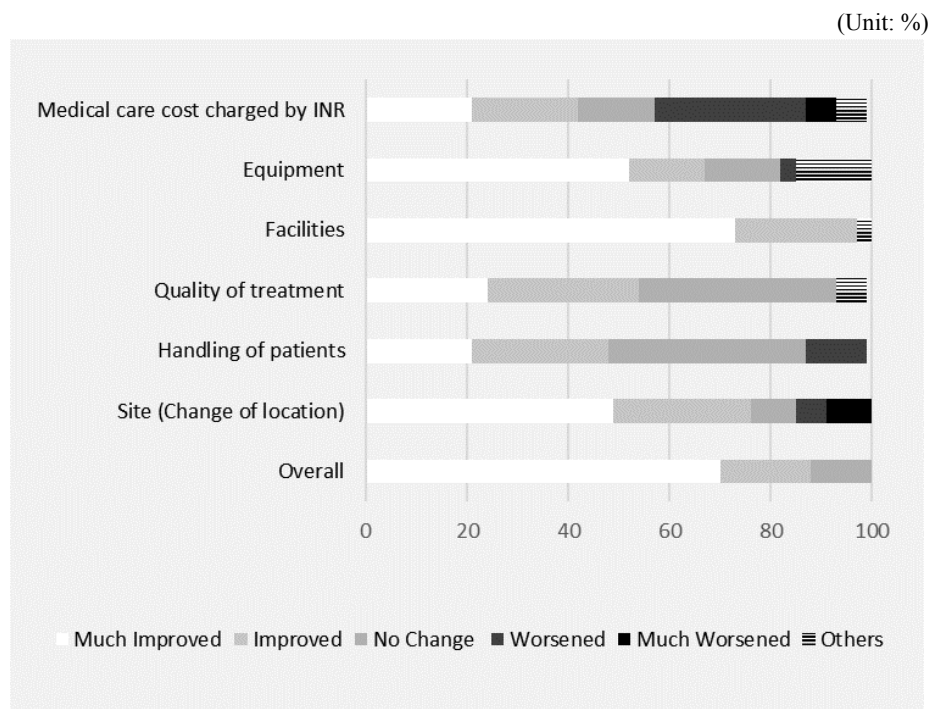


Figure 5 Changes Before and After the Relocation of INR

Source: Questionnaire survey with patients and their families conducted as part of the beneficiary survey.  
 Note: 5-grade evaluation (“much improved”, “improved”, “no change”, “worsened” and “much worsened”) was conducted to study the level of their satisfaction with 33 patients continuing to use INR before and after the relocation.

#### (5) Contribution by Senior Volunteers

After the relocation, several senior volunteers were dispatched by JICA since 2012 and cooperated to improve the medical services of INR in such area as; development of computerized medical record system, sports for disabled person and gait analysis, etc. Dispatch of senior volunteers continues at the time of ex-post evaluation making contributions to an improvement of medical care services of INR.

### 3.4 Impacts

#### 3.4.1 Intended Impacts

The Project was expected to contribute to improve INR’s capacity for research in rehabilitation area as well as human resource development of specialized medical personnel. The activities of INR in the post-relocation years are examined below in reference to these expectations in order to determine the extent of the positive contribution of the Project.

#### (1) Research

Doctors and therapists at INR are expected to spend some time on research activities when they are not engaged in consultations, treatment, etc. With the improved facilities and equipment after the relocation, INR was certified as “a research center” in September, 2015 by the National Institute of Health of Peru. As a result, INR is now permitted to conduct clinical trials. The scope of its research

activities has expanded since its relocation. The number of research works has increased from two or less a year before the relocation to eight in 2015. INR has a research agreement with the department of medicine of various universities for the purpose of joint research and has concluded a new agreement with 6 universities since its relocation in addition to the one university with which INR had an agreement before the relocation. INR conducted a training session on research methodology for INR staff members from December, 2015 to which academics from universities, etc. were invited as lecturers to energize INR’s research activities. INR also held a workshop targeting rehabilitation specialists working at universities and hospitals throughout the country to determine the extent of actual need for research work in the field of rehabilitation.

The facilities for which construction work is currently taking place by the Peruvian side include an office for the Research Department and Education, 300 seat lecture hall, library and three lecture rooms equipped with an AV system. In regard to the library, in order to improve the research environment, work is in progress to establish a network with other specialist libraries and to develop a database and regular subscription to specialist magazines.

On the other hand, the beneficiary survey with the doctors and therapists found such opinions that there is not much time to allocate to research because of the pressure to meet the consultation and treatment demand for an increased number of patients, that the overall research budget is insufficient and that training opportunities to learn advanced medical care practices are limited (Figure 6). As a result, only 21% of the interviewed doctors and therapists agreed with the statement that the research environment has improved (“much improved” or “improved”).

In short, it is fair to say that INR is gaining the capability worthy of a national research institution in a specialist field and that the Project has contributed to this in terms of facilities and equipment. However, some pending issues, such as the incomplete construction work by the Peruvian side, still need to secure an adequate budget and time for research and provision of advanced training opportunities.

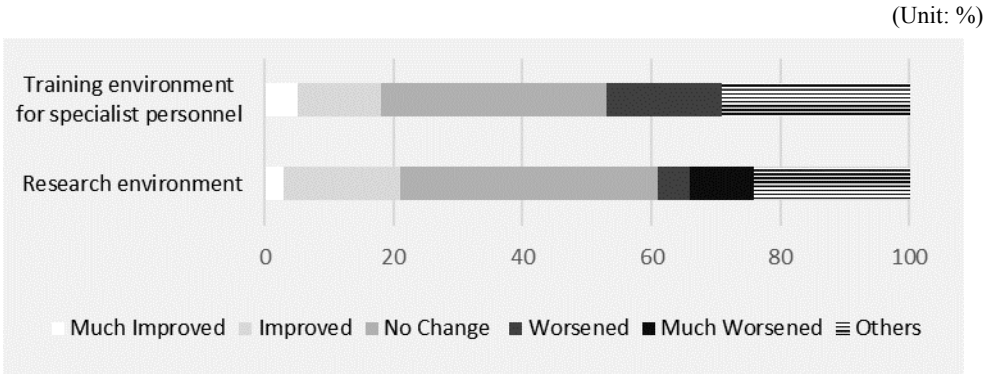


Figure 6 Change of the Training Environment for Research and Specialist Personnel

Source: Questionnaire survey with doctors and therapists conducted as part of the beneficiary survey.  
 Note: 5-grade evaluation (“much improved”, “improved”, “no change”, “worsened” and “much worsened”) was conducted with 16 doctors and 24 therapists working at INR both before and after the relocation to study their perception of changes about research and training environments at INR.

(2) Training of Specialist Personnel

INR accepts trainee doctors (medical intern) in the field of rehabilitation from partner universities. It also accepts trainee doctors on a short-term basis from other hospitals.<sup>23</sup> The number of trainee doctors in Peru who can be accepted by individual medical institutions is determined by the National Committee for Medical Intern based on the physical conditions of the facilities at the accepting institutions, availability of a financial source to pay the salaries of trainee doctors and other relevant matters. As a result of the substantial improvement of the facilities after the relocation, the number of trainee doctors accepted by INR has greatly increased (Figure 7).<sup>24</sup> According to some staff members of universities in Lima and trainee doctors working at INR, INR was the most popular medical institution for training in the field of rehabilitation even before its relocation because of its high level of specialty and it has gained further popularity since its relocation because of the improved physical environment associated with an area of good public safety.<sup>25</sup> However, reflecting the comments that this increase of the number of trainee doctors has led to congestion at the outpatient consultation rooms and also comments on the non-completion of the library, lecture rooms, etc., due to the non-completion of the infrastructure by Peruvian side, only 18% of the interviewed doctors and therapists agree that the training environment for specialist personnel has improved (Figure 6). It should be noted that INR also receives trainee therapists and their number has slowly increased to 42 therapists in 2016 (Figure 7).

In summary, the improved INR facilities as a result of the Project have contributed to a substantial increase of the number of trainee doctors accepted from other medical institutions. However, there are still some pending issues, partly because of the incomplete construction work by the Peruvian side.

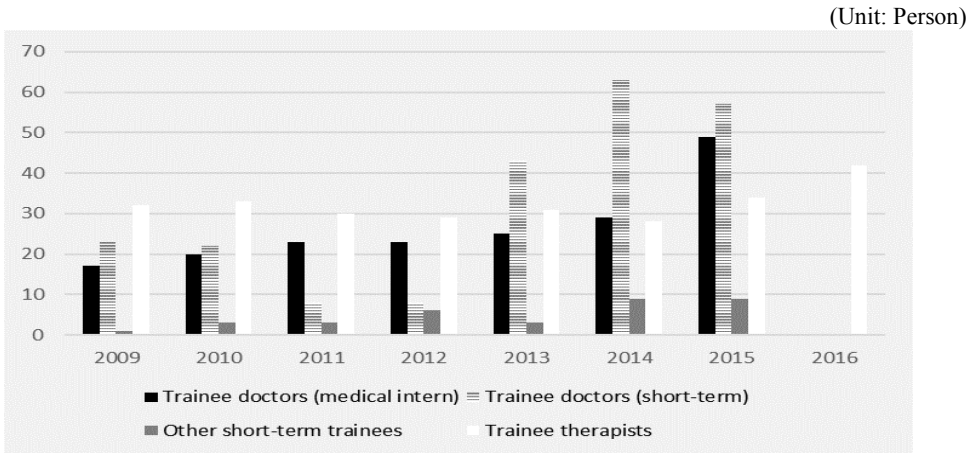


Figure 7 Change of Training Results of Specialists

Source: INR  
 Note: Number of trainee doctors (medical intern and short-term), other short-term trainees in 2016 is unknown.

<sup>23</sup> The acceptance period for trainee doctors (medical intern) is three years.  
<sup>24</sup> The background for this increase of trainee doctors is that the number of admissions to the medical departments of Peruvian universities began to substantially increase in recent years according to the enrollment capacity of relevant universities in order to solve the critical shortage of specialist doctors in Peru.  
<sup>25</sup> The destination for each trainee doctor for training is determined by the National Committee for Medical Intern based on his/her academic performance at university. There is a high degree of competition for popular institutions.

### 3.4.2 Other Impacts

#### (1) Utilization of Former INR Facilities

The use rights for the former INR facilities (buildings) located in the Constitutional Province of Callao were obtained by the Government of the Constitutional Province of Callao through an agreement with the Ministry of Health. These buildings were then rehabilitated at a cost of 8 million soles (approximately 300 million yen) and were reopened with new equipment in February, 2014 as a second tier hospital specializing in medical rehabilitation. Although the human resources of this hospital is rather small with only 10 doctors and some 40 therapists, it still manages to maintain a level of medical care equivalent to 50 – 60% of the level achieved by the pre-relocation INR.<sup>26</sup> Most of the patients are local residents of the Constitutional Province of Callao. While the percentage of patients who were former patients of INR is unknown, it is considered to be small on the grounds that the hospital does not offer a high level of medical care. The operation of this hospital is somewhat restricted due to the fact that parts of the old buildings have not been rehabilitated<sup>27</sup> and that the hospital closes at 17:30 pm because of the area's poor public safety. Nevertheless, the level of satisfaction on the part of its patients is high and the hospital is certainly performing an important function of meeting the local demand for medical rehabilitation in the Constitutional Province of Callao.

#### (2) Conditions around the New INR Site

The former INR was accompanied by a number of stores selling orthoses and other medical welfare items to meet the demand of patients. By the time of the ex-post evaluation, several orthoses stores had opened near the relocated INR.

There is space for vehicles to stop in front of the main gate of INR and several taxis always wait there for customers. There is also a bus stop serving patients and family members. However, it is necessary to cross a road for buses heading south. The pedestrian crossing in front of the main gate does not have traffic lights and it is necessary to be very careful when crossing the road. In fact, it is not easy for people with physical disabilities to cross this road.

#### (3) Other Social and Environmental Impacts

The project site is located in an environmental conservation area designated by a municipal ordinance of Lima. Because it is owned by the national government, the only applicable regulations are related to the building height and site layout, including the distance of the buildings from the boundary. Another requirement is to satisfy the standards set forth by the Fire Service Act so that a building permit can be obtained from the Chorrillos District Authority. This is work to be conducted by the

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<sup>26</sup> Actual data for the period from November, 2014 to October, 2015 is compared with INR data for 2011. Because this hospital does not offer high level medical care, the time spent with each patient is shorter than that at INR. As a result, the production level of medical care services may be relatively high as a smaller number of doctors and therapists handle a larger number of patients.

<sup>27</sup> As such, some facilities have not yet been handed over from INR.

Peruvian side. No formal building permit has been granted even though a temporary permit has been secured.<sup>28</sup>

The new site is owned by the national government and its use rights were acquired by the Ministry of Health. As such, the new acquisition of land or resettlement of inhabitants did not occur.

To summarize the effectiveness and impacts of the Project, the production of medical care services at INR has steadily increased since the relocation because of its relocation to an area with better public safety and better transport access and also because of a higher medical care capability due to improved facilities and equipment. As a result, the planned levels of production have been mostly surpassed. INR is playing the role of specialized medical institution of the highest level with strengthening of its referral function. INR's medical care service has been improved in many aspects and the level of satisfaction on the part of patients is high. Even though some of the planned facilities to be constructed by the Peruvian side have not yet been completed, the objective of the Project to relocate INR and to strengthen its medical care function has been fully achieved because of the improvement in its location and construction of most of the principal installations. Taking the opportunity of the relocation, research activities have been vitalized and the scale of the development of specialist personnel has been growing. Even though there are still some pending issues, achievement of the higher goal is in sight. One positive impact is the utilization of the former INR facilities for a new hospital specialized in rehabilitation.

Based on the above, it is fair to say that the Project has largely achieved its objective. Therefore, the effectiveness and impact of the Project are high.

### **3.5 Sustainability (Rating: ②)**

#### **3.5.1 Institutional Aspects of Operation and Maintenance**

The organizational structure of INR before the relocation has not changed since the relocation. As of 2015, the number of regular staff members and contract staff members is 366 and 205, totaling 571 of which 72 are doctors and 275 are therapists or nurses. The personnel strength has increased by 114 from 457 in 2007. In addition, there are some 100 workers employed by companies entrusted with providing security, cleaning and other services.

As far as medical care at INR is concerned, afternoon consultations and treatment were added in 2014 in response to the increased number of patients. The rapid increase of patients due to the admission of the insured of the Comprehensive Health Insurance System halfway through 2015 has created a necessity to increase therapists. Because of the relevant regulations set forth by the Ministry of Labor, no further increase of therapists in 2015 is allowed. According to the Human Resources

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<sup>28</sup> According to INR, there was a contractual dispute with the private company assigned for the planning and design of the facilities to be constructed by the Peruvian side. Because this company is uncooperative, the procedure to acquire an official permit has been stalled. In Peru, it is a common practice to construct and use buildings with a temporary permit while awaiting an official permit.

Department of INR, the recruitment of some 170 additional staff members is required to properly handle the situation of patient increase and the Department is hoping to recruit at least 20 to 30 staff members once the necessary budget has been secured. Further recruitment will be necessary when the facilities currently being constructed by the Peruvian side are completed.<sup>29</sup> However, the current priority is to complete these facilities and no concrete plan for further recruitment has been prepared. Once the facilities are completed, Ministry of Health and INR are going to increase the personnel of INR during 2016 with approval of the Ministry of Economy and Finance.

Maintenance of the facilities and equipment is the responsibility of the General Service Section of the General Administration Department. This section has 13 regular staff members 9 contracted staff members, and conducts maintenance work, including preventive maintenance work, while outsourcing cleaning, security, waste collection, canteen operation, etc. Although INR has its own preventive maintenance plan, the actual practice of preventive maintenance is insufficient to cover the entire range of equipment because of insufficient budgetary support. Only simple repairs are conducted in-house and it is necessary for any repair to be outsourced to have the relevant funding newly approved and allocated each time by the financial department of INR.

In conclusion, the situation described above suggests that it will be necessary to check whether or not the necessary personnel are properly recruited by INR after the completion of the facilities currently under construction by the Peruvian side.

### **3.5.2 Technical Aspects of Operation and Maintenance**

Most of the specialist staff members of INR before the relocation have moved to the new site. As these specialist staff members have access to a scholarship for short-term training in other countries and also training opportunities at partner universities, the standard of skills concerning medical care and treatment as well as research and education work is believed to be high.

The General Service Section in charge of the maintenance of the facilities and equipment has sufficient skills to conduct the preventive maintenance and simple repair of the facilities and equipment. No particular difficulty in technical aspect is seen as major repair and repair requiring specialist knowledge are outsourced, including studies which are deemed to be necessary for proper repair work.

### **3.5.3 Financial Aspects of Operation and Maintenance**

While INR earns some operational income, mainly from medical consultation and treatment, a grant by the Ministry of Health accounts for a very large portion of its income. The annual operational income has been around 6.5 million soles and the amount of the grant has substantially increased since 2011 (Table 4), because it includes investment in equipment, etc. for the construction work by the Peruvian side of the Project. The amount of expenditure, excluding equipment investment, has steadily

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<sup>29</sup> The Basic Design Study envisaged the recruitment of 350 staff members after the relocation.

increased at an annual rate of around 10% from 17 million Nuevo Soles in 2008 to 33 million soles in 2014. The overall balance of payments of INR has been in the black<sup>30</sup>.

Since the relocation in 2013, the amount of the maintenance and repair expenditure has sharply dropped because the facilities are still new and within guarantee period. The amount of expenditure for equipment maintenance and repair has also declined for the same reasons. According to the Finance Department of INR, budget applications to the Ministry of Health to cover the maintenance and repair cost of equipment have hardly been met in full, resulting in a major shortage of this type of funding<sup>31</sup>.

According to the General Service Section in charge of the maintenance of facilities and equipment, the shortage of funding for repair work is the most serious problem concerning equipment maintenance. Even though there is available budget to conduct the minimum preventive maintenance, funding for any repair must be secured each time such work is necessary through an approval by the financial department of INR, making swift repair difficult. For example, a request made in March, 2015 for repair of the CT scanner which was newly introduced under the Project took more than eight months to reach the stage of outsourcing of the repair work with funding approval.

As such, while the overall financial balance of INR has been in the black, insufficient budget allocation for the maintenance and repair of equipment, resulting in the inability of INR to swiftly provide the required funding, poses a problem which appears to be exacerbated by the lengthy procurement process.

Table 4 Historical Data on Income and Expenditure of INR

(Unit: thousand Nuevo Soles)

	2008	2009	2010	2011	2012	2013	2014
<b>Income</b>	<b>25,916</b>	<b>32,803</b>	<b>27,583</b>	<b>42,281</b>	<b>42,961</b>	<b>56,194</b>	<b>49,314</b>
Ministry of Health grant	19,519	25,335	18,822	35,378	36,969	51,217	43,651
Operational income	6,397	7,468	8,761	6,903	5,992	4,977	5,663
<b>Expenditures</b>	<b>19,234</b>	<b>25,126</b>	<b>22,675</b>	<b>26,482</b>	<b>40,655</b>	<b>46,309</b>	<b>44,580</b>
Personnel cost	10,166	10,563	10,634	11,997	14,263	14,582	18,768
Social security cost	1,119	1,154	1,135	1,403	1,759	1,456	2,791
Costs of lighting, heating, outsourcing etc.	5,524	6,811	9,148	9,126	9,808	10,346	11,047
Miscellaneous expenses	2	0	18	81	234	972	180
Investment on facilities and equipment	2,423	6,598	1,740	3,875	14,591	18,953	11,794
<b>Balance</b>	<b>6,682</b>	<b>7,677</b>	<b>4,908</b>	<b>15,799</b>	<b>2,306</b>	<b>9,885</b>	<b>4,734</b>
<b>Maintenance &amp; Repair Expenditure (as a part of Expenditures)</b>	<b>663</b>	<b>843</b>	<b>794</b>	<b>668</b>	<b>408</b>	<b>85</b>	<b>172</b>
Buildings	322	616	589	428	247	1	35
Equipment	341	227	205	240	161	84	137

Source: INR

<sup>30</sup> 1 Nuevo Sol = 33 Yen (average during 2008 - 2014)

<sup>31</sup> The Ministry of Health decides the amount of the grant to be allocated for the maintenance and repair of equipment based on their calculation regardless of the financial balance of a medical institution. Therefore, it can occur such a situation where the budget for maintenance and repair is not sufficient even though INR has a positive balance.



### 3.5.4 Current Status of Operation and Maintenance

The site visit at the time of the ex-post evaluation found that all of the building infrastructure of INR after its relocation are thoroughly clean and that the state of these facilities is generally good. The equipment is used carefully and most of the equipment is in use without any problems.<sup>32</sup> However, some maintenance issues are found with the following equipment and devices.

- CT scanner: Since its initial installation, the CT scanner has never been used for patients up to the time of the ex-post evaluation because the entire time has been spent for a series of remodeling of the CT scan room to conform to the standards set by the Ministry of Health, work to remove viruses from the computer software, replacement of the components and the time-consuming process of outsourcing the necessary work<sup>33</sup>.
- Some of the orthosis-making machines: At the time of delivery for installation, both the outsole stitching machine and sole stitching machine had no problems but failed to properly operate soon afterwards. The indemnity period was subsequently passed despite repeated negotiations with the Japanese provider regarding repair and, finally, no repair of the sole stitching machine was conducted.
- Demineralizer: The demineralizer to lower the hardness of municipal water is not used due to the high operational cost to purchase sodium chloride for its operation<sup>34</sup>.
- Water pipes: Corrosion has occurred in some water distribution pipes, leading to red-colored water. INR replaced some of the pipes, but it will be necessary to keep replacing them from now on too.

Based on the above, some minor problems have been observed in terms of the institutional and financial aspects. Therefore, the sustainability of the project effects is fair.

## 4. Conclusions, Lessons Learned and Recommendations

### 4.1 Conclusions

The Project was implemented in order to transfer and strengthen the medical care function of INR, by constructing a new hospital infrastructure in the Chorrillos District of Lima and providing medical equipment, thereby contributing to fulfilment of the needs required of INR to conduct advanced medical care, research and training of specialist personnel. At the time of both the ex-ante evaluation and ex-post evaluation, the Project was found to be highly consistent with the Government of Peru's development policies for promoting the social and economic participation of disabled persons,

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<sup>32</sup> According to INR, some 10 pieces of equipment are little used at the time of the ex-post evaluation out of some 200 provided pieces of equipment under the Project. Of these, seven are currently being repaired.

<sup>33</sup> As of March, 2016, the repair was already completed and trial operation was to be started soon.

<sup>34</sup> In the Project, a demineralizer targeting the entire building was introduced at the request of the INR side. In the ex-post evaluation, examination was conducted by the INR general services department on remodeling geared to supplying soft water only to the areas where it is especially needed, i.e. the boiler, kitchen, laundry room, in order to lower the operating costs.

and there was a strong need to strengthen the INR as a national specialist agency in the rehabilitation field. Moreover, since it was consistent with Japan's aid policies at the time of the ex-ante evaluation, the Project has high relevancy. The Project cost taking into account changes in output was within the planned amount, however, because the Project period substantially exceeded the planned period due to delay in the construction of facilities on the Peru side, Project efficiency is fair. Since the relocation helped improve the INR's location, and almost all of the main treatment facilities were constructed, the Project objectives of "relocating INR and strengthening treatment functions" were amply realized. Moreover, research and training for specialist staff have been boosted by the relocation. Accordingly, the Project effectiveness and impact have been high. It is necessary to monitor whether or not the necessary human resources will be secured for the facilities to be borne by the Peruvian side. In addition, since there are issues regarding allocation of budget for equipment operation and maintenance, the sustainability of the Project effects has been fair.

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

## **4.2 Recommendations**

### **4.2.1 Recommendations to the Implementing Agency**

- INR needs to promptly complete the facilities on the Peruvian side, finish transfer of INR and assign the necessary human resources. Moreover, the Ministry of Health needs to allocate without delay the necessary budget for conducting operation and maintenance in the Project including the facilities on the Peruvian side.
- INR needs to compile a preventive maintenance plan for the medical equipment, secure the necessary budget for preventive maintenance and repair, rationalize the procedures for promptly procuring services and goods for repair, and strive to organize information on the suppliers.
- INR needs to promptly resolve operation and maintenance issues concerning the CT scanner, demineralizers, etc. so that they can be appropriately operated and utilized.
- INR needs to promptly obtain building permission required for its operation at new buildings.

### **4.2.2 Recommendations to JICA**

None.

## **4.3 Lessons Learned**

### Formulation of plans that reflect the opinions of facilities users

In projects where it is necessary to design facilities, it is important to provide opportunities to hear the opinions of facilities users upon presenting a specific draft design of facilities, and to reflect them in the design. In the project, opinions were heard from some doctors who are INR officials in the basic

design and detailed design stages. However, because the therapists in charge of treatment didn't have a chance to express opinions on the draft design, some of the treatment facilities were not designed appropriately. Therefore, in the case of complex facilities such as a specialist hospital, it is necessary to secure enough design period to fully hear the opinions of users.