

**Ex-Post Project Evaluation 2016**  
**Package I-3 (Cambodia, Thailand, Laos)**

**November 2017**

**JAPAN INTERNATIONAL COOPERATION AGENCY**  
**INTEM Consulting Inc.**

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Kingdom of Thailand

FY2016 Ex-Post Evaluation of Technical Cooperation Project

“Project on a Comprehensive Flood Management Plan for the Chao Phraya River Basin”

External Evaluator: Satoshi Nagashima, INTEM Consulting, Inc.

## **0. Summary**

This Project was conducted to support recovery from the flood damage in the Chao Phraya River basin which occurred in Thailand during 2011 and to take emergency measures to prevent subsequent flooding. As a consequence, the aim was to carry out a flood management project and feasibility studies based on the “Master Plan for Chao Phraya River basin”<sup>1</sup> developed in the Project and to implement comprehensive disaster prevention and reconstruction in cooperation with Japan’s grant aid projects at the same time.

Implementation of the Project is fully consistent with the policy and the needs of flood management in Thailand, and Japan's aid policy. In addition, although the content of the Project was partially modified during the implementation period, the logic of the project design and the outcomes were not affected. Therefore, the relevance of the Project is high.

Through the implementation of the Project, the Project Purpose which was “to carry out the emergency measures for flood prevention in the Chao Phraya River basin” has been achieved. In addition to this, achievements have been confirmed for the Overall Goal including: (1) projects and feasibility studies have been implemented based on the priorities laid out in the Master Plan; and (2) disaster prevention and reconstruction grant aid projects have been conducted. Therefore, the effectiveness and the impact is high.

The Outputs of the Project had been achieved as planned. Regarding the required Inputs for generating results, although the project was completed within the planned timeframe, the project budget exceeded the predicted expenditure. Therefore, the efficiency is fair.

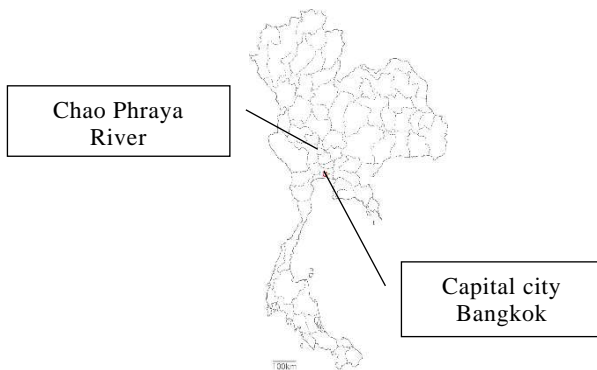
No problems were observed in regards to the policies and systems to manage flooding in Thailand or the organizational structures to sustain the results of the Project, and the technical and financial aspects of the implementing agencies. Therefore, the sustainability of the outcomes expressed by the Project is high.

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

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<sup>1</sup> “Master Plan for Chao Phraya River Basin” is used to describe the formal name but “the Master Plan” is used in the other part of the report.

## 1. Project Description



Project Location(s)



The target of the Project, Chao Phraya River

### 1.1 Background

The Chao Phraya River flowing through Thailand has a poor flow regime downstream, and flooding has occurred frequently even in the past. The sediment containing nutrients transported by this flooding is very important for Thailand's agriculture. Therefore, in Thailand, natural flooding measures to mitigate damage have historically been repeated during the rainy season. This has not prevented flooding completely but has directed flows of flooding intentionally from areas upstream towards the right bank of the Chao Phraya River Basin downstream, where the central part of Bangkok and industrial parks are not located. In Japan, "The Study on Integrated Plans for Flood Mitigation in Chao Phraya River Basin" was conducted between 1995 and 1999 and a master plan for flood management was prepared to support flood management effectively.

However, due to the intermittent heavy rain from July 2011 which had randomly occurred once in fifty years, flooding started in the downstream area earlier than expected. Therefore, it was impossible to carry out flood management activities such as discharging water from the filled reservoirs and dams. This caused a massive flood spreading to the affected areas of 61 prefectures nationwide and caused major flood damage to areas including the capital city of Bangkok and Ayutthaya, where there are industrial clusters, and there were risk of similar floods taking place after 2012. From such a point of view, it was necessary to protect Bangkok, Ayutthaya area and an industrial park located on the east bank of the Chao Phraya River where there were many Japanese automobile production and electronics manufacturing companies. From great appreciation to Thailand for the assistance received during the Tohoku Earthquake, and to carry out disaster prevention utilizing lessons learnt from Japan's past earthquakes, preparation for floods that might occur in the future was necessary. For this reason, by applying JICA's fast-track system<sup>2</sup>, technical cooperation was implemented with the "Project on a

<sup>2</sup> The fast-track system is a system of JICA which certifies highly urgent projects as a fast-track project. The

Comprehensive Flood Management Plan for the Chao Phraya River Basin” which was aimed at emergency restoration/refurbishment of damaged facilities, construction of new facilities and examination of measures based on medium-long term perspectives.

## 1.2 Project Outline

Overall Goal <sup>3</sup>		<u>Utilization goals of the proposed plan</u> Projects or Feasibility Studies (hereinafter referred to as “F/S”) are conducted based on the priorities of the revised “Master Plan for the Chao Phraya River Basin”. Disaster prevention and reconstruction grant aids are implemented and infrastructures are constructed.
Project Purpose		Emergency measures are carried out for flood prevention in the Chao Phraya River Basin.
Output(s)	Output 1	<u>Component 1: Development of “Master Plan for the Chao Phraya River Basin”</u> Comprehensive flood management plan in the Chao Phraya River Basin is developed based on scientific and engineering evidence.
	Output 2	<u>Component 2: Outline design of disaster prevention and reconstruction grant aids</u> Outline designs are carried out for projects which need short-term measures.
	Output 3	<u>Component 3: Establishment of an emergency flood information system and planning of long-term operable flood management system</u> A flood data analysis system is established for the 2012 flood season and an action plan is formulated to develop a flood management system.
Total cost (Japanese Side)		2,692 million yen
Period of Cooperation		December 2011 – October 2013
Implementing Agency		National Economic and Social Development Board (hereinafter

conventional system is flexibly operated, using a simplified implementation procedure and the organizations involved cooperatively work together.

<sup>3</sup> Since the Project was technical cooperation for development planning, the Overall Goal and Project Purpose were not set as in the case of ordinary technical cooperation. For this reason, it was interpreted that “utilization objective of the proposed plan” was the Overall Goal. The Project Purpose was set at the time of the ex-post evaluation by integrating all the outputs in order to secure the logic from the outputs to the impact.

	referred to as “NESDB”), Royal Irrigation Department (hereinafter referred to as “RID”, Department of Water Resources (hereinafter referred to as “DWR”)
Supporting Agency/ Organization in Japan	PASCO Corporation, Kokusai Kogyo Co., Ltd., Asia Air Survey Co., Ltd., CTI Engineering International Co., Ltd., Oriental Consultants Co., Ltd., Nippon Koei Co., Ltd., CTI Engineering Co., Ltd., Foundation of River and Basin Integrated Commutations, Public Works Research Institute, International Center for Water Hazard and Risk Management, University of Tokyo, Ministry of Land, Infrastructure, Transport and Tourism, Ministry of Economy, Trade and Industry, Japan Aerospace Exploration Agency
Related Projects	<p><b>【Technical Cooperation】</b></p> <p>The Study on Integrated Plan for Flood Mitigation in Chao Phraya River Basin (1995-1999)</p> <p>Flood management/Flood measures advisor/program coordination (dispatch of experts) (2012-2013)</p> <p>Integrated Study Project on Hydro-Meteorological Prediction and Adaptation to Climate Change in Thailand (IMPAC-T) (2009-2014)</p> <p>Follow up cooperation for Component 3 of “Project on a Comprehensive Flood Management Plan for the Chao Phraya River Basin” (2014-2015)</p> <p><b>【Grant Aid】</b></p> <p>The Flood Prevention Project of East Side of the Pasak River in Ayutthaya (2013)</p> <p>The Rehabilitation Project of the Outer Bangkok Ring Road (2013)</p> <p><b>【Other international organizations, aid organizations etc.】</b></p> <p>Dispatch of Emergency Rapid Assessment (Team) by ASEAN (2011)</p> <p>Dispatch of a team for Post Disaster Needs Assessment (PDNA) by World Bank and ADB (2011)</p> <p>JICA emergency aid (provision of goods, dispatch of expert team) (2011)</p>

## **2. Outline of the Evaluation Study**

### 2.1 External Evaluator

Satoshi Nagashima, INTEM Consulting, Inc.

### 2.2 Duration of Evaluation Study

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

Duration of the Study: July 2016 – December 2017

Duration of the Field Study: October 2, 2016 – October 15, 2016

January 9, 2017 – January 14, 2017

### 2.3 Constraints during the Evaluation Study

In the ordinary ex-post evaluation, comparison is made between ex-ante project evaluation and the situation at the time of ex-post evaluation in order to compare the plan with actual results. However, the Project is a fast track project with high urgency and detailed project contents were decided during implementation. Therefore, in the ex-post evaluation, the evaluation of efficiency was carried out based on the information of the project cost and the project period between the time of the consultant's contract for each component which can be confirmed within the plan retrospectively and according to the time of payment.

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

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

#### 3.1.1 Consistency with the Development Plan of Thailand

In response to the flood disaster in 2011, the Thailand government had tackled restoration and reconstruction for the flood damage and measures against floods<sup>6</sup> after 2012 such as launching Strategic Committee for Reconstruction and Future Development for reconstruction of the country and Strategic Committee for Water Resource Management (hereinafter referred to as “SCWRM”) for water resource management including measures against floods, etc. in November 2011 as an important issue of the nation.

According to interviews conducted at the implementing agencies, SCWRM did not exist at the time of the ex-post evaluation. The main body for measures against floods was handed over to the Single Command Authority (hereinafter referred to as “SCA”), which

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

<sup>5</sup> ③: High, ②: Fair, ①: Low

<sup>6</sup> In the current policies, the word of “flood management” is used. Therefore, in the ex-post evaluation, the words are separately used such as “measures against floods” for emergency restoration and reconstruction and “flood management” for measures with a long-term perspective.

was newly established in February 2012 by the former Yingluck regime, and this SCA also lost its function after the change of administration by the National Council for Peace and Order (hereinafter referred to as “NCPO”) in May 2014. At the time of the ex-post evaluation, under the current Prayuth regime that was established in 2014, it was a policy to conduct integrated water resource management by utilizing National Water Resources Committee (hereinafter referred to as “NWRC”), which was legislated for water resource management in 2007 but had not been utilized in the event of the emergency. The main objective was the implementation of *Strategic Plan on Thailand’s Water Resources Management* (hereinafter referred to as “SPTWRM” (2015 - 2036) enacted in 2015 for the purpose of the integrated water resource management such as drought, water quality, reforestation, etc. besides flood/disaster prevention. The new NWRC appointed by the NCPO has been based on the above, the organizational goal of the NWRC itself for the purpose of water resource management including flood management has not changed since the launch in 2007, and the development of policy was consistent even at the time of ex-post evaluation.

### 3.1.2 Consistency with the Development Needs of Thailand

A record-breaking heavy rain, which statistically occurs once in 50 years, had occurred in Thailand during the rainy season in 2011, and subsequent flood disaster was risked of occurring again after 2012. Therefore it was urgent to restore the damaged area in the short term and to formulate and implement a plan based on past recommendations in the mid- to long-term.

According to RID and DWR, which are the implementing agencies of the Project, serious flood damage of the same level has not occurred after 2011. Conversely, the damage of drought is greater in the past three years. Therefore measures against drought have been emphasized in the short term, and the priority of budget allocation for flood management is somewhat lower compared to 2011. Meanwhile, according to interview surveys conducted at the implementing agencies, drought and flooding have historically occurred in turn, and in January 2017, damage caused by unprecedented dry season flooding occurred in 12 prefectures in southern Thailand, and the implementing agencies continue activities for flood management. Therefore, there is no change in the perception that flood management is important in the medium-long term.



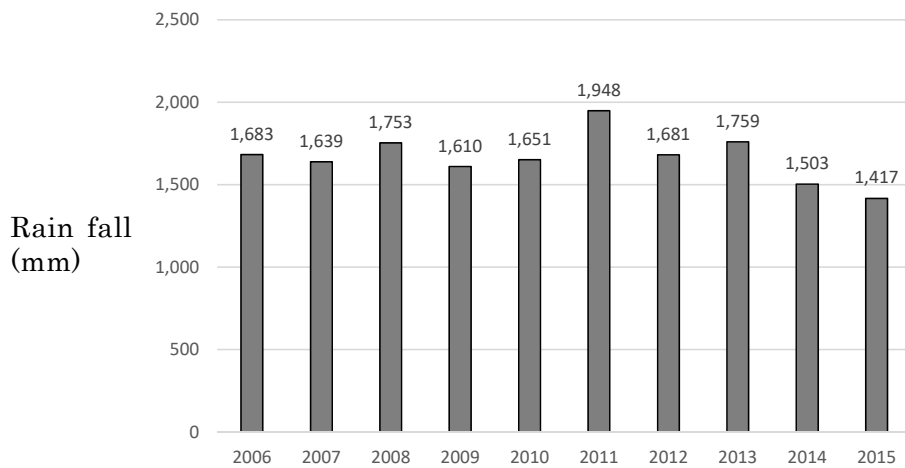


Figure 1 Average annual rain fall in Thailand in the last ten years (2006-2015)

Source: Material provided by RID

In addition, the Project was implemented utilizing the fast track system. Since the implementing agencies needed emergency assistance at the time of 2011, it was confirmed that JICA's response which was quicker than other donors was highly appreciated.

### 3.1.3 Consistency with Japan's ODA Policy

In response to flood damage in 2011 in Thailand, in October of the same year, a draft proposal of the Japanese Prime Minister was compiled. In the proposal, plans were given to conduct assistance for; (1) showing the great appreciation of Japan in respect to donations of more than two billion Japanese yen and many emergency supplies from Thailand when Japan was struck by the Tohoku Earthquake, (2) making international contributions to measures against disaster and towards disaster prevention based on lessons learned from the Tohoku Earthquake, (3) supporting Japanese companies which have expanded in Thailand, because it had the largest industrial cluster of Japanese companies in Southeast Asia. The industrial park in Ayutthaya where Japanese companies for automobile production and electronic manufacturing are located was damaged by the flood. This is also due to an anticipated global impact of these interrupted supply chains and predicted affect of damage to the center of Bangkok, and (4) eventually supporting the Thailand economy and ASEAN economy in general.

In line with the support plan, the Project was consistent with Japan's assistance policy of Thailand since the master plan based on lessons learned from Japan would be revised and at the same time, outline designs of the flood countermeasure facility would be also conducted to support Japanese companies expanding in Thailand.

#### 3.1.4 Appropriateness of the Project Plan and Approach

In the Project, the fast track system was utilized and it was started only two months after October 2011 when the flood became serious. Due to the urgency of the Project, the Project was started without carrying out a sufficient preliminary survey. For that reason, “Implementation of pilot projects for emergency restoration and improvement and emergency flood control measures” (hereinafter referred to as “old Component 3”) was changed to “Establishment of emergency flood information system and planning of long-term operable flood management system” (hereinafter referred to as “new Component 3”) after the start of the Project.

According to the contracted consultant, the objective of the old Component 3 was to implement emergency restoration/improvement, flood control measures and implementation of the pilot projects for industrial clusters and important areas such as Bangkok. However, in consultation with the Thailand side at the start of the survey of the Project in December 2011, Thailand had already prepared an emergency flood control project that was anticipated to be completed in time for the the flood period of 2012 and it was also found out that the part of the construction had been already started. The government of Thailand desired that the construction would be completed in 2013. If the Project implemented the construction work, it would be difficult to meet the demands of the Thailand side if normal bidding procedures were included in the design. Therefore, the old Component 3 was excluded from the Project.

On the other hand, according to interviews at the implementing agencies, there was no systematic, single database or alarm system in Thailand at the time of the flood damage. The water level data of rivers etc. which was reported by the ministries and agencies was not consistent or became old. Therefore, in the process of revising the Master Plan, the necessity became clear to improve the flood management and flood forecasting system, and the new Component 3 was added. Regarding the establishment of the flood forecasting system, it was also one of the recommendations of the revised Master Plan which was parallelly conducted in the Project. In addition, after the Project was completed, a goal expected to be achieved by the proposed plan is that “Floods are appropriately controlled in the upper, middle and downstream, and there is no unexpected flood damage if the same scale of rain as 2011 occurs”. The system established by the Project was also utilized in the flood that occurred in the Chao Phraya River in 2014 to mitigate the damage caused. It is recognized by related organizations that the system is one of the important tools for properly controlling flooding. Therefore, through establishing the system the possibility became high to also achieve higher objectives such as controlling the floods appropriately in the upper, middle and downstream and to avoid unexpected flood damage if the same scale of rain as 2011 occurs.

From the above, it was appropriate that the Component 3 was changed during the Project since there is no problem in the logic of the project design and the expressed outcomes due to the change of the Component 3 after the start of the Project.

Regarding the consistency of the Project with development policy, there is a policy to conduct the integrated water resource management including flood management by NWRC which was legislated in 2007, and there is no change in its purpose at the time of the completion of the Project. Regarding the consistency with development needs, there is no change in perception that flood management is still important in the medium to long term. The Project was consistent with Japan's Thailand assistance policy. In addition, although the project plan was partially changed during the Project, there was no change in the approach and the logic, and it was an appropriate modification.

For the reasons above, the Project was highly relevant to the country's development plan and development needs, as well as Japan's ODA policy. Therefore, the relevance is high.

### 3.2 Effectiveness and Impact<sup>7</sup> (Rating: ③)

#### 3.2.1 Effectiveness

##### 3.2.1.1 Achievement of Project Purpose

In order to implement emergency measures to prevent flooding in the Chao Phraya River Basin (Project Purpose), it was necessary to formulate the Master Plan based on scientific and engineering evidence and detailed data (Output 1). In addition, it was necessary to conduct outline design for the restoration/improvement of the facilities necessary for flood management as measures for emergency while the Master Plan would be formulated, (Output 2). Further, it was necessary to establish a flood management system to solve the problem to be able to carry out flood management appropriately in the Chao Phraya River Basin in anticipation of further floods of the same level as 2011 (Output 3). In the Project, emergency measures necessary for flood prevention in the Chao Phraya River Basin and medium-long term measures were appropriately implemented due to achievement of these outputs. From the above, the Project achieved the purpose.

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<sup>7</sup> Sub-rating for Effectiveness is to be put with consideration of Impact.

Table 1 Major outputs of the Project

Project Purpose	Emergency measures are carried out for flood prevention in Chao Phraya River Basin.	
Outputs	Indicator	Major achievements
Output 1: Component 1: Development of <i>Master Plan for the Chao Phraya River Basin</i>	Component 1-1: Preparation of detailed topographic map of the Chao Phraya River Basin by airborne laser measurement	The survey began in February 2012 and the detailed topographic map of the Chao Phraya River basin by airborne laser measurement was created. In August 2012, the final report on airborne laser measurement survey work was submitted.
	Component 1-2: Revision of “the Chao Phraya River Basin Master Plan”	The survey began in December 2011 and the <i>Chao Phraya River Basin Master Plan</i> was revised based on scientific and engineering evidence collected in the Project
Output 2: Component 2: Outline design of disaster prevention and reconstruction grant aids	Component 2-1: Outline design of grant aid for construction of flood gates (Han Tra, Kra Mang) in Ayutthaya district	In December 2011, a preparatory survey related to this matters was started and the outline design was completed in August 2012. As the output of the works, <i>Preparatory Survey Report on the Flood Prevention Project of East Side of the Pasak River in Ayutthaya (Detail Design)</i> was prepared.
	Component 2-2: Outline design of grant aid for rehabilitation (raising) in the outer Bangkok Ring Road (National Highway No.9)	In February 2012, a preparatory survey related to this matters was started and the outline design was completed in August 2012. As the output of the works, <i>Preparatory Survey Report on the Rehabilitation Project of the Outer Bangkok Ring Road</i> ” was created.
Output 3: (New Compornet 3) Establishment of emergency flood information system and planning of long-term operable flood management system		In July 2012, the survey related to this matters was started. Establishment of the flood management system of the Chao Phraya River and the planning of the flood management system that can be operated for a long term were carried out, and the final report was submitted in October 2013.



Photo 1 and 2 Flood management system supported by the Project (left) and the server (right)

### 3.2.2 Impact

According to interview surveys conducted at the implementing agencies at the time of the ex-post evaluation, detailed topographic maps conducted by airborne laser measurement as well as the Master Plan of Chao Phraya River Basin (Output 1 of the Project) are fully utilized by the implementing agencies and have led to flood management activities such as conducting F/S by RID. In addition, based on the outline

designs of the two grant aid projects, which are the outcomes of Output 2, the main projects (construction etc.) were carried out. Based on the above, the outcomes of the Project are contributing to achieve the Overall Goal, that is, the utilization goals of the proposed plan, (1) the projects are implemented or F/S is implemented based on the priority order of the revised Master Plan reconsidered, (2) disaster prevention and reconstruction grant aid is implemented, and it contributes to the development of these infrastructures. In addition, the flood management system, which is the outcome of Output 3, has contributed to mitigate subsequent flood damage.

### 3.2.2.1 Achievement of Overall Goal

The status of achievement of the set indicators for the Overall Goal of the Project is shown in Table 2 below.

Table 2 Achievement of Overall Goal

Overall Goal	Indicator	Actual								
Projects or F/S are conducted based on the priority of revised “Master Plan for the Chao Phraya River Basin”.  Disaster prevention and reconstruction grant aids are implemented and the infrastructures are constructed.	(1) (Corrected indicator) Thailand government takes measures to allocate budget to implement projects or F/S based on formulated “the Chao Phraya River Basin Master Plan” and on over 80% of the recommended priority projects	According to interview surveys at the implementing agencies, the responses on the indicator (1) were as follows. Among the five recommendations of the Master Plan, the projects has been implemented or F/S has already been implemented or are in progress excluding the outer-ring road diversion channel. Regarding the outline ring road diversion channel, RID has jointly submitted a request for implementation of F/S to JICA in July 2016 in collaboration with the Department of Highway (hereinafter referred to as “DOH”), and the survey has been started since January 2017. Thus, projects or F/S have been carried out or measures have been taken for the budget allocation by the implementing agencies for at least 80% of the recommendations. Therefore the indicator has been achieved.								
		<table border="1"> <thead> <tr> <th>Priority projects</th> <th>Status of implementation</th> </tr> </thead> <tbody> <tr> <td>Effective operation of existing dam</td> <td>The Electricity Generating Authority of Thailand (hereinafter referred to as "EGAT"), which manages the dam, has operated the dam in accordance with the recommendation<sup>8</sup> of the Master Plan since 2012. No additional budget is needed to implement this recommendation.</td> </tr> <tr> <td>Outer-ring road diversion channel</td> <td>In collaboration with the DOH, RID requested JICA to implement F/S of the outer-ring road and the diversion channel (in 2016). For this reason, the Thailand government has not allocated the budget.</td> </tr> <tr> <td>River improvement</td> <td>By RID, approximately 50 million baht was budgeted for the F/S of the renovation of the Tha Chin River and the Western Chao Phraya River, and approximately 50 million baht was secured for F/S on the improvement of the</td> </tr> </tbody> </table>	Priority projects	Status of implementation	Effective operation of existing dam	The Electricity Generating Authority of Thailand (hereinafter referred to as "EGAT"), which manages the dam, has operated the dam in accordance with the recommendation <sup>8</sup> of the Master Plan since 2012. No additional budget is needed to implement this recommendation.	Outer-ring road diversion channel	In collaboration with the DOH, RID requested JICA to implement F/S of the outer-ring road and the diversion channel (in 2016). For this reason, the Thailand government has not allocated the budget.	River improvement	By RID, approximately 50 million baht was budgeted for the F/S of the renovation of the Tha Chin River and the Western Chao Phraya River, and approximately 50 million baht was secured for F/S on the improvement of the
		Priority projects	Status of implementation							
		Effective operation of existing dam	The Electricity Generating Authority of Thailand (hereinafter referred to as "EGAT"), which manages the dam, has operated the dam in accordance with the recommendation <sup>8</sup> of the Master Plan since 2012. No additional budget is needed to implement this recommendation.							
		Outer-ring road diversion channel	In collaboration with the DOH, RID requested JICA to implement F/S of the outer-ring road and the diversion channel (in 2016). For this reason, the Thailand government has not allocated the budget.							
River improvement	By RID, approximately 50 million baht was budgeted for the F/S of the renovation of the Tha Chin River and the Western Chao Phraya River, and approximately 50 million baht was secured for F/S on the improvement of the									
Priority projects	Status of implementation									
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Outer-ring road diversion channel	In collaboration with the DOH, RID requested JICA to implement F/S of the outer-ring road and the diversion channel (in 2016). For this reason, the Thailand government has not allocated the budget.									
River improvement	By RID, approximately 50 million baht was budgeted for the F/S of the renovation of the Tha Chin River and the Western Chao Phraya River, and approximately 50 million baht was secured for F/S on the improvement of the									

<sup>8</sup> Recommendations in the Master Plan are: (1) to release the inflow amount according to the “target curve” of the suggested water storage volume and maintain the reservoir level, (2) to release the suggested maximum release amount (210 m<sup>3</sup>/s for Pumipon Dam, 190 m<sup>3</sup>/s for Sirikit Dam) during the flood season (from August to October). In addition, when the water storage volume falls below the “target curve”, the inflow amount is further stored, (3) to release based on the dry season water distribution plan during the dry season (from November to April), and so on.

			Eastern Chao Phraya River (in 2015).
		Ayutthaya bypass channel	By RID, about 60 million baht of budget for F/S on the project was secured (in 2012).
		Flood forecasting	The RID maintains and manages the flood management system established in the Component 3. There is no need for an additional budget for this.
	(2) (Corrected indicator) Project implementation or F/S will be implemented by the Thailand government for the formulated <i>Chao Phraya River Basin Master Plan</i> and over 60% of the recommended priority projects.	According to interview surveys at the implementing agencies, the responses on the indicator (2) were as follows. Thus, projects or F/S have been carried out for at least 80% of the recommendations. Therefore the indicator has been achieved.	
		Priority projects	Status of implementation
		Effective operation of existing dam	EGAT has been managing the dam in accordance with the recommendation of the Master Plan since 2012. The implementing agency of the Project (RID) itself is responsible for providing information on water demand, and it is not involved in the operation of the dam. However, it is possible to provide more detailed and accurate data than before by utilizing detailed topographic map and flood management system obtained through the outcome of the Project. Therefore, the cooperative relationship between RID and EGAT became closer than before the Project.
		Outer-ring road diversion channel	In collaboration with DOH, RID has requested JICA to implement the F/S of the outer-ring road and the diversion channel. Information collection and confirmation survey has started since January 2017.
		River improvement	By RID, the Tha Chin River improvement and the F/S of the canal network of the Western Chao Phraya River are underway (October 2015-March 2017 (planned)). In addition, the F/S on improvement of the eastern Chao Phraya River and the diversion channel are underway (October 2015-April 2017 (planned)).
		Ayutthaya bypass channel	F/S on this project has been implemented by RID (April 2012-October 2013). RID is applying a budget request for implementation for detail design in the fiscal year 2017.
		Flood forecasting	RID currently operates the flood management system developed by Component 3 of the Project and the public release site (floodinfo.rid.go.th) is also utilized. DWR also utilizes flood forecasting utilizing the model developed in the Project for policy decision. Data collected from twelve relevant departments and agencies including RID and DWR are shared by National Hydrology and Climate Data Center (hereinafter referred to as "NHC") in Hydro and Agro Informatics Institutes affiliated with Ministry of Science and Technology, and has been utilized for disaster information conducted by the Department of Disaster Prevention and Mitigation. In the past, NHC did not function sufficiently, but it became functional due to the impact of the Project. Regarding flood related information, the main source of information is RID, which enables

			more accurate information to be provided by the flood model and flood management system developed in the Project and it contributes to mitigate flood damage.																												
(3) (Additional indicator) Grant aid projects are implemented based on the contents of the outline design implemented in the Project.		Based on the outline design implemented in the Project, grant aid projects "The Flood Prevention Project of East Side of the Pasak River in Ayutthaya" and "The Rehabilitation Project of the Outer Bangkok Ring Road" were implemented, and it was completed in September 2015 and April 2015 respectively. Therefore, the indicator has been achieved.																													
(4) (Additional indicator) The stakeholders' satisfaction level of the proposed plans become four or more out of five levels for each Component 1 to 3.		A questionnaire survey <sup>9</sup> was conducted for staff involved in direct activities at the time of implementation of the Project. The results are as follows. For staff involved in direct activities, the satisfaction level of the quality of the proposed plan was more than four out of five levels for all components, and the indicator has been achieved.																													
			<table border="1"> <thead> <tr> <th></th> <th>Satisfaction level of the quality of the proposed plan (five levels<sup>10</sup>)</th> <th>Number of respondent</th> </tr> </thead> <tbody> <tr> <td>NESDB</td> <td>5</td> <td>1</td> </tr> <tr> <td rowspan="4">RID</td> <td>Component 1-1</td> <td>5</td> </tr> <tr> <td>Component 1-2</td> <td>5</td> </tr> <tr> <td>Component 2-1</td> <td>5</td> </tr> <tr> <td>New Component 3</td> <td>4</td> </tr> <tr> <td rowspan="3">DWR</td> <td>Component 1-2</td> <td>4</td> </tr> <tr> <td>New Component 3</td> <td>4~5</td> </tr> <tr> <td>Component 3</td> <td>3</td> </tr> <tr> <td>DOH</td> <td>Component 2-2</td> <td>5</td> </tr> <tr> <td></td> <td></td> <td>2</td> </tr> </tbody> </table>		Satisfaction level of the quality of the proposed plan (five levels <sup>10</sup> )	Number of respondent	NESDB	5	1	RID	Component 1-1	5	Component 1-2	5	Component 2-1	5	New Component 3	4	DWR	Component 1-2	4	New Component 3	4~5	Component 3	3	DOH	Component 2-2	5			2
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NESDB	5	1																													
RID	Component 1-1	5																													
	Component 1-2	5																													
	Component 2-1	5																													
	New Component 3	4																													
DWR	Component 1-2	4																													
	New Component 3	4~5																													
	Component 3	3																													
DOH	Component 2-2	5																													
		2																													

Note: Contents of each component are as Table 1.

From the above, the Overall Goal has been achieved.

### 3.2.2.2 Other Positive and Negative Impacts

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

It was confirmed from the implementing agencies that there was no impact on the natural environment through the activities of the Project.

#### (2) Resident relocation and land acquisition

It was confirmed from the implementing agencies that the Project did not include activities requiring resident relocation and land acquisition.

#### (3) Other indirect effects

In the Project, in terms of the goals expected to be achieved by the proposed plan after

<sup>9</sup> Survey was conducted based on questionnaires for staff of related organizations such as NESDB (one person), RID (eight persons), DWR (four persons), DOH (two persons), and all respondents provided the responses.

<sup>10</sup> Five levels represent very fair, fair, moderate, bad and very bad

the completion of the cooperation, two of these goals were “Floods are appropriately controlled in the upper, middle and downstream, and there is no unexpected flood damage if the same scale of rain as 2011 occurs” and “In the industrial cluster along the Chao Phraya River, comprehensive damage from rain of the same level as 2011 will be mitigated”.

As shown in Figure 1, Thailand has not had the same level or higher rainfall after 2011, and drought rather than flooding is a serious concern at the time of ex-post evaluation. Therefore, it is difficult to judge whether overall damages will be mitigated or not when rain of the same level as 2011 occurs. However, according to interviews conducted at the implementing agencies, the recommendations of the Master Plan are fully utilized. In addition, as a result of the outcomes, it was confirmed that mitigation of the damage was seen in the flood that had occurred in the Chao Phraya River during 2014. Therefore, it is deemed highly possible to achieve these goals for the future as well.

Through the implementation of the Project, the Project Purpose “Emergency measures are carried out for flood prevention in Chao Phraya River Basin” was completed . In addition to this, the achievement of the Overall Goal such as conducting projects or F/S base on the priority of the revised Master Plan has also been confirmed, as well as implementing disaster prevention and reconstruction grant aid projects. Therefore, the effectiveness and the impact of the Project are high.



### 3.3 Efficiency (Rating: ②)

#### 3.3.1 Inputs

In the Project, following inputs were carried out.

<b>Inputs</b>	<b>Plan (At the time of contract)</b>	<b>Actual (At the time of completion)</b>
(1) Experts	Sixty two (62) Short-Term	Eighty six (86) Short-Term
(2) Trainees received	Ten (10) persons	Ten (10) persons
(3) Equipment	No information on the plan	GPS, digital cameras, GIS, PCs, photo copy machines, CAD, server storage equipment, hard disk for data storage (However, the prices are unknown)
(4) Overseas project enhancing expense	No information on the plan	Approximately 28 million yen
Japanese Side Total Project Cost	Total 2,395 million yen	Total 2,692 million yen
Thailand Side Total Project Cost	No information on the plan	1. Assignment of counterparts Steering Committee 20 persons, counterparts 26 persons 2. Provision of land and facilities project office, electricity and water fare 3. Salary of counterparts

Source: Result of questionnaire survey

##### 3.3.1.1 Elements of Inputs

At the time of contract (planning), dispatch of 62 short-term experts were planned together with all the Components. However, at the time of completion of the Project, 86 short-term experts were dispatched. This was mainly due to the fact that the number of Japanese staff was increased since Japanese side implemented the outline design of the grant aid projects for Components 2-1 and 2-2 though it was originally expected to utilize local consultants in Thailand. Regarding the acceptance of trainees, it was as planned. With regard to equipment provision, overseas project enhancing expenses, and project costs borne by Thailand, there was no information at the time of planning. Therefore, it is difficult to compare between the plan and the actual results. For the project cost on the Japanese side, it is analyzed in the next section.

### 3.3.1.2 Project Cost

In this ex-post evaluation, it was decided to compare on JICA's overseas project enhancing expense and the amount and performance of consultant's contract. As a result, as shown in Table 3 below, the actual project cost was increased by 112% compared with planned project cost.

Table 3 Comparison of the project cost between the plan and the actual

Unit: million yen

	Plan (at the time of contract)	Actual	Result of comparison
Component 1-1	1,400	1,397	99%
Component 1-2	436	471	108%
Component 2-1 and 2-2	202	370	183%
Old Component 3	64	20	31%
New Component 3	265	406	153%
Sub-total	2,367	2,664	112%
Overseas project enhancing expenses <sup>11</sup>	28	28	-
Total	2,395	2,692	112%

Source: Questionnaire survey, material provided by JICA

The reasons for the difference between the plan (at the time of contract) and the actual result are as follows.

- (1) For Component 1, expenses increased due to recalculation of analysis data based on the maps created by airborne laser measurement and holding seminars.
- (2) With regard to Component 2, relatively simple river facility projects such as a levee were initially assumed, and it was a precondition to utilize local consultants for the detail design. However, as a result of the field survey and consultation with the Thailand side, the detailed design of the new flood gate project and the national highway raising project would be implemented in the Project, and the number of personnel was increased.
- (3) In the initial stage of new Component 3, formulation of an implementation plan for establishing a flood management system was proposed. However, a complete version of the flood management system was established as a result. For this reason, the

<sup>11</sup> For overseas project enhancing expenses, the same amount was added for the Plan and Actual and then compared.

period of implementation was extended for 8 months.<sup>12</sup>

From the above, the project cost was higher than planned. However, (1)-(3) were necessary inputs for the Project.

### 3.3.1.3 Project Period

In the ex-post evaluation, the actual implementation period was compared with the planned implementation period in the consultant's contract.

Table 4 Comparison of Project period between the plan and the actual

Plan (At the time of contract)	Actual	Result of comparison
December 2011 – October 2013	December 2011 – October 2013	100%

Source: Result of questionnaire survey

As explained in 3.3.1.2, the survey period was extended for eight months for the new Component 3 (until October 2013). However, as the entire project was planned to be completed by October 2013, the project period as a whole for the Project was completed in accordance with the initial contracted schedule.

From the above, the project period proceeded as planned.

As a result, 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: ③)

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

In order to sustain the effect expressed in the Project, flood management was continuously recognized as an important policy, and it was necessary for the implementing agencies to carry out activities for that.

According to interview surveys at the implementing agencies at the time of the ex-post evaluation, as described in the relevance section, there is a policy to conduct the integrated water management by utilizing NWRC. The secretariat of the NWRC is DWR. Procedures are in the process of being approved by the National Water Act by parliament so that the authority of the DWR will be strengthened. However, the timing of the enactment of the bill is undecided<sup>13</sup>.

<sup>12</sup> In the component, it was planned to prepare a basic plan of the flood management system at first, to organize the activities and construction period necessary for establishment of the system (by each implementing agency), and to develop the prototype of the system.

<sup>13</sup> According to the interview survey at the DWR in the first field survey, there was information that this bill

In addition, according to interviews conducted at the implementing agencies, SPTWRM which was formulated in 2015 aims not only to contribute to flood management but also to integrated water resource management. SPTWRM consists of (1) water management for domestic use, (2) building water security for the production sector (agriculture and industry), (3) flood management, (4) water quality management, (5) upstream forest rehabilitation and soil erosion prevention, and (6) administrative management, and the flood management is one of the important strategies.

Thus, at the time of the ex-post evaluation, policies and strategies for the integrated water resource management, including flood management by utilizing NWRC in the medium to long term, had been set up and the policy sustainability is secured.

#### 3.4.2 Organizational Aspects for the Sustainability of Project Effects

In order to sustain the effects developed in the Project, it was necessary to establish an appropriate implementation system on the overall flood management and the responsible organization of each component of the Project. At the time of the ex-post evaluation, the following are the implementation system for flood management as a whole and for each component.

##### (1) Implementation system of flood management as a whole

According to interviews conducted at the implementing agencies, at the time of ex-post evaluation, NWRC is used for managing the water resources including flood management in Thailand. Under the Prime Minister who is the chairperson, the lower committee contains all Ministries concerning the water resource management as the members, and it aims to establish a system to manage the water resources in a unified manner under the Prime Minister. The organization chart of NWRC is shown in Figure 2.

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is expected to be approved by the parliament in January 2017. However, when the situation was confirmed in the interview at the second field survey, the bill was remanded once due to the instruction by the Prime Minister, and it was the stage of submitting the revised proposal to the Cabinet. Therefore, the timing of enactment of the bill is undecided.

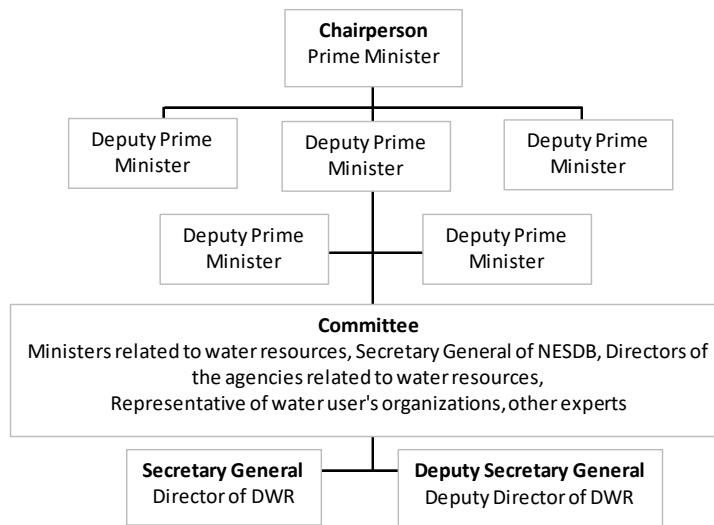


Figure 2 Organization chart of current NWRC

Source: Interview survey results at implementing agencies

The NWRC is chaired by the Prime Minister, and the committee composed of relevant ministries and experts is formed under it. In addition, the secretariat is DWR. The current organizational structure is to be reorganized again for efficient organizational management after the *National Water Act* is enforced<sup>14</sup>.

According to interviews conducted at the implementing agencies, the main responsibilities of NWRC are: (1) to drive SPTWRM for concrete and efficient outcome, (2) to recommend the water resources management policy or plan that are necessary to proceed to the cabinet in order to carry out SPTWRM to achieve its objective, (3) to prepare overall water resources management and action plan of the country under SPTWRM in normal and crisis situation, and to propose overall plans for the cabinet to endorse so that the government sectors and agencies can carry out the plans, (4) to formulate rules and conditions for appropriate water resources control and allocation to related organizations with the requirement of consumption, agriculture, industry, ecosystem, water transportation, hydropower and other related areas, (5) to consider and review plans, action plans and projects of the government sectors or relevant agencies including water resource management, development plan and action plan at river basin levels to be in line with SPTWRM and the national economic and social development plans as well as policy and environmental quality management plan to be the guidance for the integrated water resources management budget plan, (6) to supervise, monitor, review, evaluate and advises the government sectors and agencies as well as the river basin committee to carry

<sup>14</sup> According to the interview survey at DWR, it is requesting Khon Kaen University to examine the draft of the reorganization.

out SPTWRM, the water resources development and management plan, water resources management action plan and integrated water resources management budget plan. In addition, to propose to the Prime Minister to command or control to take some course of action for the highest benefit of water resources management, (7) to appoint a subcommittee or working group to assist when the task is required, (8) to provide recommendations to adjust the law, rules and regulations or other related regulations for the benefits of water resources management of the country as well as the international water resources management, and (9) to perform any other tasks assigned by the cabinet or the Prime Minister. The meeting is held approximately once a month.

## (2) Implementation system for each component

Regarding the implementation system for each component at the time of the ex-post evaluation, the substantive works excluding Component 2-2 (Renovation (raising) of the Eastern Outer Ring Road (National Highway No.9) are conducted by RID, and Component 2-2 is carried out by DOH. RID, DWR, and DOH have sufficient organizational structures to utilize the results of the Project as follows.

### 1) Implementation system of RID

According to the interview survey at RID, all relevant results have been utilized and sustained by RID after the completion of the Project. The departments which mainly follow up the Project are the Bureau of Project Management, the Bureau of Engineering Topographical and Geotechnical Surveys, the Bureau of Engineering and Architectural Design, the Bureau of Water Management and Hydrology and the Regional Irrigation Offices.

RID is conducting major activities concerning the water resources development, the water management and prevention against the water-related disasters. The total number of permanent staff in whole of RID is 24,897 in the central and local areas together, and it is 225,167 if temporary staff members are included.

### 2) Implementation system of DWR

According to the interview survey at DWR, DWR utilized the Master Plan at the time of SPTWRM formulation and has utilized the outcome of the new Component 3 after the completion of the Project. The department which mainly utilizes the outcome of the Project is the Water Crisis Prevention Center in DWR. The role is to analyze disaster areas, propose disaster prevention guidelines and develop alarm systems, etc.

DWR is developing policies on water resource management at domestic and international levels, enhancing the capacity of water management organizations and

networks, maintaining and rehabilitating and developing water resources to maintain efficiency and ecosystems and wetlands; standardization of knowledge base, information systems, and integrated water resource management; and development of alarm system and others. The total number of permanent staff in DWR is 647 in the central level and 1,707 in the regional offices, and the total is 2,354.

### 3) Implementation system of DOH

The number of staff at DOH is 15,410 in total in the central and regional offices. DOH is in charge of overall road administration such as planning, maintenance, operation and maintenance of Thailand's main arterial roads, and plays a central role in the maintenance of major arterial roads.

#### 3.4.3 Technical Aspects for the Sustainability of Project Effects

Based on the outcomes of the Project, it was necessary that the implementing agencies for each component have sustained the technologies to implement the proposed plans or F/S and to manage the equipment provided. At the time of ex-post evaluation, the technical level of the implementing agencies was as follows.

##### (1) RID and DWR

According to the interview survey at RID, 14 out of 16 persons to whom technologies were directly transferred in the Project, except for two who retired, are still in service, and the transferred technologies have been maintained in RID.

In addition, according to the interview survey at DWR, the four persons to whom technologies were directly transferred through the Project are still in service, and the transferred technologies have been retained in DWR.

According to an interview survey at RID, the detailed topographic map obtained from the airborne laser measurement of Component 1-1 is still effectively used. Regarding the revised Master Plan of Component 1-2, whenever RID proposes projects related to flood management, they always refer to the Master Plan, and they have independently carried out or are in progress of implementation of F/S for each of the two recommendations of the Master Plan. In addition, although the flood management system of the new Component 3 had been always used for the water management but had limited opportunities for utilization on the flood management at the time of drought in the past three years, the model developed in the Project allows accurate flood prediction up to seven days later and the gap of abilities that was missing so far has been filled and it became possible to conduct accurate flood prediction. The system was fully utilized by RID and DWR during the flood at the Chao Phraya River which occurred in 2014.

Thus, RID and DWR are considered to have a sufficient technological level to utilize the transferred technologies. In addition, five members from RID and four from DWR participated in training in Japan on the new Component 3 and capacities on disaster prevention knowledge were strengthened. In addition, follow-up cooperation on further utilization of flood management system were carried out and it strengthened technologies related to the utilization of the flood management system further.

## (2) DOH

Three of whom the technologies had been directly transferred by the Project are still in service, and the transferred technologies are retained in DOH.

DOH is carrying out planning and management of all highways including the Project without problems and the technical level is high.

### 3.4.4 Financial Aspects for the Sustainability of Project Effects

Based on the outcomes of the Project, it was necessary to maintain financial strength by the implementing agencies in charge of each component to implement the proposed projects or F/S, and to operate and maintain the equipment provided. The financial situation of the implementing agencies at the time of ex-post evaluation is as follows.

#### (1) RID

The transition of RID's budget over the past seven years is as Table 5 below.

Table 5 Transition of RID's budget over the past seven years

Unit: million baht

Year	2010	2011	2012	2013	2014	2015	2016
Personnel expense	6,633	6,195	6,438	6,708	6,382	6,537	6,722
Operation expense	1,263	1,326	1,300	1,392	1,392	1,490	1,381
Investment expense	16,314	32,419	35,042	27,200	31,711	34,854	38,449
Subsidy	1	1	1	1	1	1	1
Others	173	174	138	193	159	165	115
Total amount	24,384	40,115	42,919	35,494	39,645	43,047	46,668

Source: Materials provided by RID

Since the emergency projects on flood countermeasures were implemented ahead of schedule in FY 2011 and FY 2012, the budget was temporarily reduced in 2013. However, it recovered to the pre-flood level in 2014 and the budget has been following an increasing trend after that. Within the budget, investment expenses to be used for construction and survey expenses have also increased in recent years. In addition, RID has allocated budget



to implement F/S of the project proposed in the Project and it has completed or is being implemented. Therefore, RID has the financial strength necessary to maintain the outcome of the Project and to maintain and manage the equipment of the new Component 3.

(2) DWR

The transition of DWR's budget over the past five years is as Table 6 below.

Table 6 Transition of DWR's budget over the past seven years

Unit: million baht

Year	2012	2013	2014	2015	2016
Personnel expense	674	700	745	698	739
Operation expense	152	152	152	152	142
Investment expense	5,955	8,724	7,909	6,239	6,573
Subsidy	17	19	20	23	26
Others	1,066	343	265	481	644
Total amount	7,864	9,938	9,091	7,593	8,124

Source: Materials provided by DWR

DWR also has revenues through mid-year budgets, loans, etc. The DWR budget has been stable between about 7,600 to 9,900 million baht. Investment expenses are the highest, and there is much room for expenditures for projects and others. In addition, although not shown in Table 6, the budget has increased by five to six times considering that the budget at the time of 2005 which was about 1,500 million baht, and it is considered that its importance has also increased as an agency.

Since RID mainly follows up the activities of the Project and DWR is in charge of the policy aspects of the water resources management as the secretariat of the NWRC, many budgets are not necessary for the sustainability of the project activities. Therefore, the current financial situation is a sufficient financial level to utilize the outcomes of the Project.

(3) DOH

The transition of DOH's budget over the past five years is as Table 7 below.

Table 7 Transition of DOH's budget over the past seven years

Unit: million baht

Year	2012	2013	2014	2015	2016
Personnel expense	4,463	4,844	4,643	4,648	4,793
Operation expense	675	736	717	725	700
Investment expense	45,140	46,988	46,972	54,597	71,479
Subsidy	10	13	15	8	8
Others	134	386	412	356	530
Total amount	50,422	52,967	52,759	60,334	77,510

Source: Materials provided by Department Highway

The annual budget of DOH has been increasing in the past five years. Investment expenses including operation and maintenance expenses are allocated in excess of 40 billion baht, and it reached at 70 billion baht in 2016. Therefore DOH has high financial strength for operation and maintenance of the highways. Since they operate on all the highways without problems, there is no problem in the financial situation in terms of sustaining the project effects.

In this way, the sustainability of policy and institutional aspects have been secured by utilization of NWRC and formulation of SPTWRM. Regarding the structure of the implementing agencies, the integrated water resource management system using NWRC has been established in Thailand. Even in the implementation system of the institution responsible for the implementation of concrete activities of the Project, RID and DOH have mainly been in charge of the activities and DWR takes advantage of utilizing the outcomes. There are no problems with the technical capabilities and financial situations of RID, DWR and DOH.

Based on the above, no major problems have been observed in the policy background and the organizational, technical, financial aspects. Therefore, sustainability of the project effects is high.

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

##### 4.1 Conclusion

This Project was conducted to support recovery from the flood damage in the Chao Phraya River basin which occurred in Thailand during 2011 and to take emergency measures to prevent subsequent flooding. As a consequence, the aim was to carry out a flood management project and feasibility studies based on the "Master Plan for Chao Phraya River basin" developed in the Project and to implement comprehensive disaster

prevention and reconstruction in cooperation with Japan's grant aid projects at the same time.

Implementation of the Project is fully consistent with the policy and the needs of flood management in Thailand, and Japan's aid policy. In addition, although the content of the Project was partially modified during the implementation period, the logic of the project design and the outcomes were not affected. Therefore, the relevance of the Project is high.

Through the implementation of the Project, the Project Purpose which was "to carry out the emergency measures for flood prevention in the Chao Phraya River basin" has been achieved. In addition to this, achievements have been confirmed for the Overall Goal including: (1) projects and feasibility studies have been implemented based on the priorities laid out in the Master Plan; and (2) disaster prevention and reconstruction grant aid projects have been conducted. Therefore, the effectiveness and the impact is high.

The Outputs of the Project had been achieved as planned. Regarding the required Inputs for generating results, although the project was completed within the planned timeframe, the project budget exceeded the predicted expenditure. Therefore, the efficiency is fair.

No problems were observed in regards to the policies and systems to manage flooding in Thailand or the organizational structures to sustain the results of the Project, and the technical and financial aspects of the implementing agencies. Therefore, the sustainability of the outcomes expressed by the Project is high.

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

#### 4.2 Recommendations

##### 4.2.1 Recommendations to the Implementing Agency

None

##### 4.2.2 Recommendations to JICA

None

#### 4.3 Lessons Learned

##### (1) Creating outcomes in line with technologies

Based on scientific and engineering evidence, the Master Plans etc., which are the outcomes of the Project, were created to express maximum results at low cost. The results were highly appreciated by counterparts of the implementing agencies that were direct beneficiaries. However, there was a period when the flood management was led by politicians, and the results of the Project were not sufficiently utilized and a flood management without emphasis on scientific and engineering evidence had been promoted

(as they could appeal their results). After that, the administration was changed. The initiative for flood management was handed back to the working-level again and the outcomes of the Project were again recognized and it led to the high evaluation results in the ex-post evaluation. As a result of consistent activities based on scientific and engineering evidence, the project outcomes have been utilized in the long-term.

Kingdom of Cambodia

FY2016 Ex-Post Evaluation of Japanese Grant Aid Project  
“The Project for Replacement and Expansion of Water Distribution Systems  
in Provincial Capitals”

External Evaluator: Satoshi Nagashima, INTEM Consulting, Inc.

## **0. Summary**

This Project aims to improve the water supply service by implementing replacement and expansion of existing water distribution systems in the target provincial capitals (Pursat, Preah Sihanouk and Battambang), thereby improving the operation aspects of the water supply business in each province through improving the rate of non-revenue water.

Cambodia’s policy to improve access to safe water in urban areas has not changed before and after implementation of the Project, and the Project is consistent with Cambodian development policy. In addition to this, the percentage of population served for water supply is lower than the national average in the three target provincial capitals of the Project and there is a continuous need to support the construction of urban water distribution systems in the three target provincial capitals. Furthermore, since the Project is consistent with Japan’s aid policy, the relevance is high.

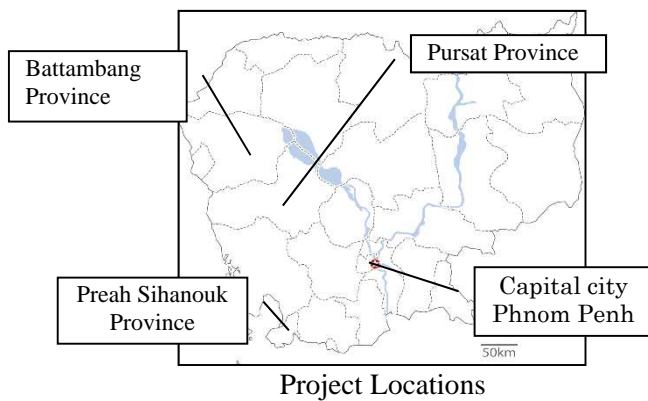
In the Project, the total expansion of the replacement of existing distribution pipes and of new water distribution pipes was slightly less than anticipated in the project plan. However, the cost of the Project was significantly lower than planned, while the duration of the Project was as planned. Therefore the efficiency is considered high.

Due to synergy with the Project, projects implemented by other donors and other projects undertaken by JICA, the operation and effect indicators for effectiveness such as increase of the maximum daily water supply, the population served by the water supply and decrease of water leakage rate. Furthermore, indicators for impact such as reduction of non-revenue water rate and the improvement of operational efficiency have mostly been achieved. Therefore, the effectiveness and impact of the Project are considered high.

The operation and maintenance institution, technique and finance necessary for maintaining the effectiveness of the Project have been secured for the water supply units in the three target provinces, and they are able to properly manage the water distribution network at the time of ex-post evaluation. Therefore, the sustainability is considered high.

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

## 1. Project Description



Rusted water distribution pipe replaced in the Project and model of newly installed water distribution pipe (Preah Sihanouk)

### 1.1 Background

In Cambodia, assistance projects were carried out after the civil war for the construction of water supply systems and for the training of personnel for water supply operation and maintenance with the support of a range of donors including Japan, in order to improve the water supply capacity. In Phnom Penh especially, assistance to Phnom Penh Water Supply Authority (hereinafter referred to as “PPWSA”) has greatly succeeded in expanding the water supply area, decreasing the non-revenue water rate and increasing the number of water supply connections by utilizing various schemes including grant aid, technical cooperation, ODA loans by Japan. This has been referred to as the ‘miracle of Phnom Penh’ and its success is well regarded worldwide.

Meanwhile, the water supply capacity in local cities beyond Phnom Penh was still low and the supply of safe water to the public had not been sufficient prior to the implementation of the Project. According to the ex-ante evaluation, in the provincial capitals of Pursat, Preah Sihanouk and Battambang, the total population of those being served by the urban water supply services was only 80 thousand people, about 30% of the total population (269 thousand people), and the improvement of water supply services in local cities was a problem. Among the three target provincial capitals of Pursat, Preah Sihanouk and Battambang, installation of the water distribution network had not progressed sufficiently, and existing water supply capacities were not fully utilized although the water treatment plants had been expanded and improved through the support of donors such as the World Bank and the Asian Development Bank. In addition to this, leakage caused by aging of the water distribution pipes occurred frequently, and the loss due to non-revenue water was a major problem for the effective use of tap water and water supply operation management. Based on this background situation, the Cambodian Government requested a grant aid project to Japan for the expansion and replacement of the water

distribution network for the purpose of improving the water supply services in the three target provincial capitals above.

## 1.2 Project Outline

The objective of the Project is to improve the water supply service in the target provincial capitals, Pursat, Preah Sihanouk and Battambang by the replacement and expansion of existing water distribution system, thereby contributing to the improvement of the operational aspects of the water supply business in each province through improving the non-revenue water rate.

E/N Grant Limit or G/A Grant Amount / Actual Grant Amount	2,760 million yen / 1,645 million yen
Exchange of Notes Date (/Grant Agreement Date)	March 2011 / March 2011
Executing Agency	Ministry of Industry, Mines and Energy (currently Ministry of Industry and Handicrafts)
Project Completion	June 2013
Main Contractor	Kubota Construction Co., Ltd
Main Consultant	NJS Consultants Co., Ltd
Basic Design	July 2010 – March 2011
Related Projects	<p><b>【Technical Cooperation】</b>  The Project on Capacity Building for Urban Water Supply System in Cambodia Phase 1 (2003-2006), Phase 2 (2007-2012), Phase 3 (2012-ongoing)</p> <p><b>【Grant Aid】</b>  The Project for Expansion of Water Supply Systems in Kampong Cham and Battambang (2013)</p> <p><b>【Other international organizations, aid organizations etc.】</b>  Provincial Towns Improvement Project (Asia Development Bank, 2000-2006)  Urban Water Supply Project (World Bank 1998-2004)  Provincial and Peri-Urban Water and</p>

	Sanitation Project (World Bank 2001-2005) Mekong Region Water and Sanitation Initiative (UN-HABITAT 2010-2015)
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## 2. Outline of the Evaluation Study

### 2.1 External Evaluator

Satoshi Nagashima, INTEM Consulting, Inc.

### 2.2 Duration of Evaluation Study

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

Duration of the Study: July, 2016 – December, 2017

Duration of the Field Study: October 15, 2016 – November 1, 2016

January 15, 2017 – January 27, 2017

## 3. Results of the Evaluation (Overall Rating: A<sup>1</sup>)

### 3.1 Relevance (Rating: ③<sup>2</sup>)

#### 3.1.1 Consistency with the Development Plan of Cambodia

At the time of the project planning, the Cambodian Government positioned “access to safe water” as one of the priority development goals for the *National Strategic Development Plan* (hereinafter referred to as “NSDP”) (2006-2013) and it aimed to raise the rate of access to safe water<sup>3</sup> in urban areas to 80% by 2015.

At the time of this ex-post evaluation, the NSDP (2014-2018) is still an important policy. In the plan, the goals of the urban water supply sector are listed to; 1) develop a legal framework for urban water supply, 2) promote decentralization and de-concentration<sup>4</sup> in urban water supply sector, 3) transfer full autonomy for service delivery to provincial waterworks, 4) increase sector financing through good partnership with other donors and encouraging investment from the private sector, 5) improve water source protection and enforcement of regulations, 6) rehabilitate water supply systems through funds from Cambodian Government and donors, 7) grasp difficulties related to income and expenditure of the water supply business, 8) improve human resources, and 9) improve sector performance (improve water quality, access

<sup>1</sup> A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

<sup>2</sup> ③: High, ②: Fair, ①: Low

<sup>3</sup> The numerical value of the indicator includes supply of not only urban water service but also other water (mineral water etc.). Unit of water supply amount is 60 liters/person/day. According to the statistics ([http://www.wssinfo.org/documents/?tx\\_displaycontroller\[type\]=count\\_files](http://www.wssinfo.org/documents/?tx_displaycontroller[type]=count_files)) provided by the joint monitoring program of WHO and UNICEF on water supply and sanitation, access rate to safe water is 100% in 2015, among which the water supply rate through the urban water supply is 75%.

<sup>4</sup> Decentralization is transferring the authority to the local cities, and de-concentration is to establish institutions in the local cities to implement services (as an independent organization, not a branch office of the central ministry).



to safe water) through utilization of PPWSA etc., and promoting access to safe water is still a priority goal. According to the indicators shown in the NSDP, it is stated that the rate of access to safe water in urban areas was already more than 85% as of 2013, and the goal of improving this in urban areas to 80% by 2015 had already been achieved.

As mentioned above, since there has been no change in the policy of providing safe water either before or after the Project, the consistency of the Project with policy is still high.

### 3.1.2 Consistency with the Development Needs of Cambodia

Prior to the Project, the water supply capacity of cities other than Phnom Penh was still low, and in the provincial capitals, especially in Pursat, Preah Sihanouk and Battambang, the urban water supply served was only 80 thousand in total (around 30%) of the population (269 thousand in total). In order to improve this situation, the Ministry of Industry, Mines and Energy (currently Ministry of Industry and Handicrafts) increased the number of the water treatment plants in the first half of the 2000s with the support of the World Bank (in Preah Sihanouk) and the Asian Development Bank (in Pursat and Battambang). However, the non-revenue water rate reached around 20 to 35% due to water leakage caused by severe aging of the water distribution pipe network. In addition to this, the total expansion of the water distribution pipe network was insufficient. Therefore, it was difficult to fully utilize the water supply capacity of the new water treatment plants to improve the water supply services.

At the time of the ex-post evaluation, the non-revenue water rate in the three target provincial capitals has been improved since assistance has continued to be offered by the Project and also the JICA technical cooperation project “The Project on Capacity Building for Urban Water Supply System in Cambodia (Phase 2 and Phase 3) (hereinafter referred to as “Technical Cooperation Phase 2” and “Technical Cooperation Phase 3”), and the water supply capacity of the water treatment plants can be utilized. Meanwhile, the water supply area of the three target provincial capitals of the Project has been expanded year by year, and the water supply rate of the urban water supply is still low as shown in the table below.

Table 1 Urban water supply rate in the targeted provincial capitals<sup>5</sup>

	2011	2012	2013	2014	2015
Pursat	54.8%	58.2%	56.2%	-	50.5%
Preah Sihanouk <sup>6</sup>	-	33.5%	38.3%	45.7%	53.0%
Battambang	27.1%	34.7%	34.9%	34.5%	37.7%

Source: Calculate based on the information provided by the water supply units in Pursat, Preah Sihanouk and Battambang

From the above, the urban water supply rate in the three target provinces in 2015 in the above table is less than water supply rate (75%) in urban areas nationwide based on the statistics provided by the joint monitoring program of WHO and UNICEF on water supply and sanitation, which suggests that the needs are high for continuing support to the urban water distribution systems in the three target provincial capitals.

### 3.1.3 Consistency with Japan's ODA Policy

During the planning period for the Project, improvement of the urban water supply system was taken up as one of the important subjects for the development of infrastructure for socioeconomic development in Japan's *Country Assistance Plan for Cambodia* (2002). According to the above analysis, the water supply is recognized as one of the important subjects, and there is no difference between the Project and Japan's aid policy. Therefore, the consistency of the Project with Japan's ODA Policy is high.

As mentioned above, this Project is highly relevant to the country's development plan and development needs, as well as Japan's ODA policy. Therefore, its relevance is high.

## 3.2 Efficiency (Rating: ③)

### 3.2.1 Project Outputs

The difference between the plan and actual of Outputs of the Project is as follows.

<sup>5</sup> The water supply rate was calculated based on the population of urban areas and the number of water supply connections, obtained from each water supply unit. However, the data of urban population in 2014 that the water supply unit in Pursat acquired from the statistics bureau was exactly same as in 2013, and it was judged that consistency and reliability could not be secured sufficiently. Therefore, it was not possible to calculate the water supply rate of Pursat for 2014.

<sup>6</sup> As for Preah Sihanouk, data on total population of provincial capital was not available and only data on the number of households was available. Therefore, after the total population of the provincial capital was calculated by multiplying seven by the number of households, urban water supply rate was calculated by utilizing the population served.

Table 2 Difference between the plan and actual Outputs of the Project

		Plan			Actual		
Facility construction	Replacement of existing water distribution pipe	Pursat	4.48km		Pursat	5.16km	
		Preah Sihanouk	6.48km		Preah Sihanouk	14.08km	
		Battambang	20.81km		Battambang	26.48km	
		Total	31.77km		Total	45.72km	
	Expansion of new water distribution pipe	Pursat	9.37km		Pursat	9.44km	
		Preah Sihanouk	30.93km		Preah Sihanouk	22.45km	
		Battambang	52.82km		Battambang	45.03km	
		Total	93.12km		Total	76.92km	
	Particular route	3 units			3 units		
	Major accessory	3 units			3units		
	Flow monitoring system	3 units			3 units		
	Distribution flow control	1 unit			1 unit		
Procurement of equipment	Materials for water pipe connection	Clamp saddle, HDPE, Valves, Fittings etc. for re-connection (replaced pipe)	4,400 sets		Clamp saddle, HDPE, Valves, Fittings etc. for re-connection (replaced pipe)	4,700 sets <sup>7</sup>	
		Clamp saddle, water meters for new connection (expansion pipe)	2,400 sets		Clamp saddle, water meters for new connection (expansion pipe)	2,400 set	
		Water meters for new connection (existing pipe)	700 sets		Water meters for new connection (existing pipe)	700 sets	
	HDPE connector	SF connector	5 units		SF connector	5 units	
		Portable engine generator	5 units		Portable engine generator	5 units	
Soft component	Technical guidance on service connection (clamp saddle/connection of pipe) and proper turn-over inspection (water pressure/water flow)				Technical guidance on connection of pipe		
	Technical guidance on system operation and usage of integrated data (leakage reduction/facility design/action plan)				Technical guidance on flow monitoring system		

Source: Materials provided by JICA

The total replacement of the existing water distribution pipes and expansion of the new water

<sup>7</sup> Among the materials for service connection, materials for reconnection have increased by 300 sets at the time of implementation compared with planning. According to the consultant who was in charge of the design, this was due to delayed confirmation of the number of newly connectable households by the Cambodian side, and it was found after the tender at the time of contract signing that there was a shortage in the estimated number of connections in the design stage. Therefore the quantity was increased without changing the contract amount due to negotiation at the time of contract.

distribution pipes in three target provincial capitals amounts to 45.72 km for the replacement of the existing water distribution pipes (143.9% of the plan) and 76.927 km for the expansion of the new distribution pipes (82.6% of the plan). Therefore, this is a 2.25 km decrease from the total expansion planned. This is due to the fact that 1) a part of the distribution pipes had been serviced in a hurry by the water supply units and 2) there was a change in the route of the water distribution pipes in each province from the viewpoint of the project efficiency as a result of a careful examination of each pipe. The reasons for the changes are appropriate. It was decided through formal procedures and it is reasonable.

According to interviews with the executing agencies, inputs by Ministry of Industry and Handicrafts and by three target provinces in Cambodia were conducted as planned.

### 3.2.2 Project Inputs

#### 3.2.2.1 Project Cost

Regarding the project cost, it was estimated at 2,760 million yen at the time of the plan, but the actual result was 1,645 million yen (59.6% of the plan). The reason why the project cost fell below the planned amount was due to the fact that the contracted price at the time of the tender for the contractor was much lower than planned. In addition to this, although it was confirmed that all the items to be borne by the Cambodian side were carried out as planned, it was difficult to confirm the actual project cost.

#### 3.2.2.2 Project Period

Regarding the Project period, the Project was supposed to be completed within 28 months. Compared with the plan, the actual project period was also 28 months (100% of the plan).

As for the Outputs of the Project, as a result of detailed design, the actual total expansion for the replacement of existing distribution pipes and the expansion of new distribution pipes was slightly less than anticipated in the plan. Regarding the inputs of the Project, the project cost fell within the planned amount since the tender amount for the contractor was significantly less than anticipated in the plan. Regarding the project period, it was as planned.

From the above, both the project cost and project period fell within the planned value. Therefore, efficiency of the Project is high.

### 3.3 Effectiveness<sup>8</sup> (Rating: ③)

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

The level of achievement of two indicators (daily maximum water supply, population served)

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<sup>8</sup> Sub-rating for Effectiveness is to be put with consideration of Impact.

set for measuring the quantitative effects of the Project in the three target provincial capitals is as follows<sup>9</sup>.

Table 3 Indicators of quantitative effects in three target provinces

		Baseline	Target	Actual				Percentage of actual achieved against the target
		2009	2016	2013	2014	2015	2016	
		Planned Year	3 Years After Completion	Completion Year	1 Year After Completion	2 Years After Completion	3 Years After Completion	
Pursat	Daily maximum water supply (m <sup>3</sup> /day)	3,410	5,760	5,065	5,880	5,905	6,864	119%
	Population served (person)	Approx. 18,200	Approx. 31,500	29,773	32,549	35,879	36,310	115%
Preah Sihanouk	Daily maximum water supply (m <sup>3</sup> /day)	6,200	12,210	6,775	9,278	12,130	13,743	113%
	Population served (person)	Approx. 23,000	Approx. 48,200	44,184	53,032	61,600	68,404	142%
Battambang	Daily maximum water supply (m <sup>3</sup> /day)	9,220	11,520	10,868	11,598	15,009	16,242	141%
	Population served (person)	Approx. 42,900	Approx. 56,400	60,507	60,835	67,374	71,255	126%

Source: Documents provided by JICA, Water supply units in Pursat, Preah Sihanouk and Battambang

In the three target provinces, both of the set indicators (daily maximum water supply, population served) for the quantitative effects have been achieved. However, in addition to the contribution of the Project, this is a composite result by provision of materials for water supply connection for the poor by UN-HABITAT (1,310 households, connection to 6,550 people) (in Pursat), JICA technical cooperation and self-help effort of the water supply units in three target provinces.

<sup>9</sup> However, since the water supply areas of the three target provincial capitals of the Project are expanding year by year, the object of comparison differs between 2009 and 2016.

### 3.3.2 Qualitative Effects (Other Effects)

The level of achievement is as follows on the set of indicators for measuring qualitative effects of the Project in the three target provinces.

(1) Leakage rate is improved.

Statistical data on water leakage rate and non-revenue water rate are not individually measured in the three target provinces. According to the results of interviews obtained from the water supply units of each province, non-revenue water is mostly caused by leakage. Therefore, the data of the non-revenue water rate is used and analysed in this section.

Table 4 Change of non-revenue water rate in water supply units of three target provinces<sup>10</sup>

	2011	2012	2013 (Project completion year)	2014	2015	2016
Pursat	21%	21%	16%	14%	11%	10%
Preah Sihanouk	22%	16%	17%	20%	13%	16%
Battambang	21%	21%	20%	15%	11%	10%

Source: Water supply units in Pursat, Preah Sihanouk and Battambang

At the water supply unit in Pursat, the non-revenue water rate, which was 20.8% in 2011, has been improved to 10% in 2016 by replacing the old water distribution pipes for new ones in the Project, and the leakage has been improved. On the other hand, leakages have occurred frequently since there are some parts where old steel pipes have still been used and there is water leakage due to damage to water distribution pipes during road expansion works, and so on.

According to the interview survey at the water supply unit in Preah Sihanouk, the non-revenue water rate, which was 22.2% in 2011, is changing repeatedly. The reasons mentioned from the water supply unit in Preah Sihanouk were that since Preah Sihanouk has many uphill and downhill areas the water supply pressure naturally increases due to gravity, and it was difficult to manage the water supply pressure well. If the pressure inside the water pipes became high, there was a possibility that it might cause water leakage. This leakage from the joints of water distribution pipes frequently occurred in some sections after the completion of the Project (2013-2015)<sup>11</sup>. The other reason was that there was a lot of damage to the water distribution pipes due to road construction (2016).

According to the interview with the water supply unit in Battambang, the non-revenue water

<sup>10</sup> Regarding the data on non-revenue water, it was checked with the official information that was approved by the Ministry of Industry and Handicrafts, which was created under the support of the Technical Cooperation Phase 3 and confirmed that there was no problem on the data.

<sup>11</sup> However, this is not connected to the data change of non-revenue water rate. The reason is unknown.

rate was 21.3% in 2011, but it decreased to 10% in 2016. Water leakage from the old water distribution pipes is decreasing due to the replacement. However, just as in Pursat, water leakage is occurring frequently due to damage to the water pipe at the time of road extension works.

(2) Shortage of water volume and water pressure from the faucet has improved by maintaining an appropriate water supply pressure in the water distribution pipe

In the Project, planned water pressure (minimum dynamic water pressure, urban area network: equivalent to 150kPa, suburban single main line: equivalent to 100kPa, maximum dynamic water pressure: equivalent to 600kPa in whole distributed area) was set at the time of the project planning. The information obtained from each water supply unit was as follows on the minimum dynamic water pressure and maximum dynamic water pressure at suburban level of three target provincial capitals.

Table 5 Minimum and maximum dynamic water pressure at suburban areas of three target provincial capitals

		2011	2012	2013 (Project completion year)	2014	2015	2016
Pursat	Minimum dynamic water pressure	150 kPa	150 kPa	150 kPa	120 kPa	100 kPa	100 kPa
	Maximum dynamic water pressure	200 kPa	200 kPa	200 kPa	150 kPa	150 kPa	150 kPa
Preah Sihanouk	Minimum dynamic water pressure	200kPa	200kPa	200kPa	200kPa	200kPa	200kPa
	Maximum dynamic water pressure	700kPa	700kPa	700kPa	700kPa	700kPa	700kPa
Battambang	Minimum dynamic water pressure	-	-	-	-	-	80 kPa
	Maximum dynamic water pressure	75 kPa	70 kPa	65 kPa	60 kPa	50 kPa	220 kPa <sup>12</sup>

Source: Water supply units in Pursat, Preah Sihanouk and Battambang

From the above, it can be observed that the minimum dynamic water pressure is almost as planned in the suburbs of the three target provincial capitals. Although Battambang recorded 80

<sup>12</sup> Since the new water treatment plant which was constructed with Japan's grant aid in 2016 went into operation, the maximum dynamic water pressure has increased greatly.

kPa in 2016, which is lower than the planned water pressure value, the water supply service was sustained without service problems even at the lower pressure than 50 kPa until 2015.

The maximum dynamic water pressure is lower than planned in Pursat and Battambang, and the one in Battambang is lower than the planned value of the minimum dynamic water pressure. However, the maximum dynamic water pressure is set to prevent damage due to high pressure and increase in water leakage.

According to interviews conducted at the water supply units in Pursat and Battambang, it was confirmed that the Project reduced the leakage from water distribution pipes, and water services were provided without problems in these provincial capitals. The reason why the maximum dynamic water pressure was lower than planned is due to increased leakage from water distribution pipes damaged by road construction, and the policy of Cambodia to expand the service areas of urban water supply by which the population served has exceeded the assumptions of the Project.

On the contrary, in Preah Sihanouk, the tendency of maximum dynamic water pressure exceeds the planned value has not changed before and after the project implementation, and there was originally no rack of water volume and pressure. This is the effect of the uphill and downhill sloping of the terrain. However, it is not desirable to exceed the planned value, and it is one of the factors for leakage occurring at the joints of pipes. However, since the maximum dynamic water pressure is thus high only in part of the areas, there has not been a major impact on the overall water supply operation and water supply service is properly provided in Preah Sihanouk.

### 3.4 Impacts

#### 3.4.1 Intended Impacts

##### (1) Quantitative Effects

Implementation of the Project was indirectly expected to reduce the non-revenue water rate and to improve the operation rate of the water treatment plants. In addition, improvements to the efficiency of the operation of the water supply units in three target provinces were expected through improvement of business income and expenditure. Higher achievement levels for the two indicators (non-revenue water rate and the operation rate of water treatment plants) and reference indicators (energy efficiency for the water supply and water cost recovery) for measuring the operational efficiency were considered as indicative of expected effects in the preparatory survey report to confirm the impact of the Project in the three target provincial capitals. With regard to the information on the operation rate for each water treatment plant, the accomplishment of the target on the operation rate is handled as analysis material for “the improvement of operational efficiency” according to the purpose of the Project, and is not directly used for the evaluation judgement.



1) Pursat

The baseline, target and actual values of the quantitative effect indicators of the impact in Pursat are as follows.

Table 6 Quantitative effect indicators of the impact in Pursat

	Baseline	Target	Actual			
	2009	2016	2013	2014	2015	2016
	Planned Year	3 Years After Completion	Completion Year	1 Year After Completion	2 Years After Completion	3 Years After Completion
Non-revenue water rate <sup>13</sup>	23%	19-14%	16%	14%	11%	10%
Operation rate of Pursat water treatment plant	59%	100%	88%	102%	103%	95%
Energy efficiency for water supply <sup>14</sup>	Consumption of diesel 0.222 L/m <sup>3</sup>	Consumption of diesel 0.199 L/m <sup>3</sup>	Consumption of diesel 0.145 L/m <sup>3</sup>	Consumption of diesel 0.169 L/m <sup>3</sup>	Consumption of diesel 0.159 L/m <sup>3</sup>	Consumption of diesel 0.152 L/m <sup>3</sup>
				Consumption of electricity 0.407kwh/m <sup>3</sup>	Consumption of electricity 0.434kwh/m <sup>3</sup>	Consumption of electricity 0.429kwh/m <sup>3</sup>
Water cost recovery <sup>15</sup>	114%	127%	127%	143%	173%	181%

Source: Water supply unit in Pursat

Regarding Pursat, the non-revenue water rate target has been achieved for the indicator. According to the water supply unit in Pursat, it was mentioned in the interview that leakage accounts for the majority of the non-revenue water rate. Therefore, it is likely that the effect of the Project and the support provided by other donors etc. is considerable.

The operation rate of the water treatment plant has almost reached the indicator target. Though it reached 103%<sup>16</sup> in 2015, it decreased slightly in 2016. The reason was that additional pumps for water intake and water distribution were installed in 2015 with the independent efforts of the water supply unit in Pursat and the water treatment capacity was improved in

<sup>13</sup> The rate at which the water supply fee which is not able to be collected although it was distributed from the water treatment plant due to water leakage or stolen water.

<sup>14</sup> Energy efficiency for water supply = Diesel amount (or consumption of electricity) used for water supply ÷ amount of water supply (m<sup>3</sup>)

<sup>15</sup> Water cost recovery = income from water supply ÷ expenses for water supply. Concerning the items for calculation, it follows from the calculation method of the preparatory survey report for before and after comparison.

<sup>16</sup> Operation rate of the water treatment plant in Pursat in 2015 exceeds 100%. This is set with a margin so that the numerical value of the daily water supply capacity of the water treatment plant, which is the denominator at the time of calculation, can be supplied with the target water quality. It does not mean that the water treatment plant cannot produce more treated water. Therefore, as a result of water supply beyond the daily water supply capacity of the water treatment plant, it may exceed 100%.

2016<sup>17</sup>.

In addition, since the water cost recovery has improved significantly, it can be judged that the operation is more efficient at the water supply unit in Pursat as below.

It was expected that water leakage would be reduced as a result of the project implementation and the efficiency of the management of the water treatment plant would be improved. For this reason, an indicator related to energy efficiency for water supply was set as a reference value. In the case of Pursat, the generator had been used at the time of the ex-ante evaluation. Following this, public electricity has been used except at the time of a power cut at the time of the ex-post evaluation. Since there was no prior data for comparing energy efficiency for water supply related to electricity, this indicator is not included in the evaluation judgment.

Regarding the water cost recovery, it is significantly higher than the targeted value. The two contributing factors appear to be 1) an increase of water supply revenue due to an increase of customers and a decrease in water leakage and 2) a decrease of fuel costs due to switching from generator to electric power as an energy source for the pump, and material expenses such as chemicals.

## 2) Preah Sihanouk

The baseline, target and actual value of the quantitative effect indicators of the impact in Preah Sihanouk are as follows.

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<sup>17</sup> The operation rate of the water treatment plant is calculated by the daily maximum water supply ÷ the daily water supply capacity of the water treatment plant. Therefore, the operation rate may decrease when the daily water supply capacity of the water treatment plant improves beyond the rate of increase of the daily maximum water supply.

Table 7: Quantitative effect indicators of the impact in Preah Sihanouk

	Baseline	Target	Actual			
	2009	2016	2013	2014	2015	2016
	Planned Year	3 Years After Completion	Completion Year	1 Year After Completion	2 Years After Completion	3 Year After Completion
Non-revenue water rate	19%	14-10%	17%	20%	13%	16%
Operation rate of Wat Loeu water treatment plant <sup>18</sup>	81% (ANCO: 0%)	100% (ANCO: 45%)	44% (ANCO: 34%)	38% (ANCO: 64%)	51% (ANCO: 41%)	20% (ANCO: 61%)
Energy efficiency for water supply	Consumption of electricity 0.704 kWh/m <sup>3</sup>	Consumption of electricity 0.634 kWh/m <sup>3</sup>	Consumption of electricity 1.100kWh/m <sup>3</sup>	Consumption of electricity 0.815 kWh/m <sup>3</sup>	Consumption of electricity 0.762 kWh/m <sup>3</sup>	Consumption of electricity 1.008 kWh/m <sup>3</sup>
Water cost recovery	153%	161%	131%	130%	141%	-

Source: Water supply unit in Preah Sihanouk

At the water supply unit in Preah Sihanouk, the indicator of the non-revenue water rate has not been achieved. According to the interview survey at the water supply unit, the reason is that water leakage has not decreased.

As for the operation rate of Wat Loeu water treatment plant in Preah Sihanouk, indicators have not been achieved. The water supply unit in Preah Sihanouk originally had bought a part of the water to be distributed from ANCO, which was a private company, and the purchased water was supposed to be around 45% of the maximum daily supply amount of 10,000 m<sup>3</sup>/day which had been agreed in the memorandum of buying water with ANCO at the time of the ex-ante evaluation. However, at the time of the ex-post evaluation, 90% and above of the water supplied by the water supply unit in Preah Sihanouk is covered by the water that ANCO is treating and selling<sup>19</sup>. Water treated at the water treatment plant maintained by the water supply unit in Preah Sihanouk is used only in emergency where ANCO cannot supply water, and the operation rate of the water treatment plant is low.

In addition to this, as described below, the improvement in operational efficiency was limited in Preah Sihanouk.

As for the energy efficiency for the water supply in Preah Sihanouk, the target values of the

<sup>18</sup> (ANCO:%) is a percentage of purchased water from ANCO, against the maximum daily water supply amount for the province according to the Memorandum of Understanding. Maximum daily water supply from ANCO is calculated at 10,000 m<sup>3</sup>/day until 2014, and at 20,000 m<sup>3</sup>/day from 2015 when the water supply unit in Preah Sihanouk started purchase of treated water from ANCO year-round.

<sup>19</sup> As a factor to rely on purchasing the water from ANCO, the water in Prektob Lake which the water supply unit in Preah Sihanouk had used as a water source dried up during the drought in 2013, and ANCO increased the supply of treated water. In return, the water supply unit agreed to buy the water year-round.

indicator have not been achieved. The cause is considered that the volume of the treated water is small despite consuming the electric power necessary for operation since the facilities of the water treatment plant are continuously used.

As for the water cost recovery, the target values of the indicator have been almost achieved. In Preah Sihanouk, the reason for this is considered that the cost was expensive due to operating the water treatment plant despite purchasing most of the supplied water from outside.

### 3) Battambang

The baseline, target and actual values of the quantitative effect indicators of the impact in Battambang are as follows.

Table 8: Quantitative effect indicators of the impact in Battambang

	Baseline	Target	Actual			
	2009	2016	2013	2014	2015	2016
	Planned Year	3 Years After Completion	Completion Year	1 Year After Completion	2 Years After Completion	3 Year After Completion
Non-revenue water rate	36%	20-13%	20%	15%	11%	10%
Operation rate of water treatment plant	80%	100%	94%	100%	130%	88%
			Water treatment plant which is newly constructed with Japan's grant aid <sup>20</sup>			
Energy efficiency for water supply	Consumption of electricity 0.609 kWh/m <sup>3</sup>	Consumption of electricity 0.453 kWh/m <sup>3</sup>	Consumption of electricity 0.42 kWh/m <sup>3</sup>	Consumption of electricity 0.43 kWh/m <sup>3</sup>	Consumption of electricity 0.40 kWh/m <sup>3</sup>	Consumption of electricity 0.41 kWh/m <sup>3</sup>
Water cost recovery	149%	200%	130%	159%	178%	180%

Source: Water supply unit in Battambang

Regarding Battambang, the indicator of the non-revenue water rate has been achieved the target values. The large reduction in water leakage has contributed to a decrease in the non-revenue water rate.

The operation rate of the water treatment plant at the water supply unit in 2016 has not achieved its target value. However, this is because the water supply area is expanding in the provincial capitals (this is beyond the assumption at the planning stage), and the operation rate of existing facilities has been too high (the operation rate of the water treatment plant in 2015 was 130%). To solve this, Wat Loeb water treatment plant was constructed and new investments was carried out for a new water distribution pipe network by Japan's grant aid in 2016, 'the Project for Expansion of Water Supply System in Kampong Cham and Battambang' in

<sup>20</sup> New water treatment plant started to be used in 2016. However, at the time of the ex-post evaluation, the old water treatment plant was still partially used. As the water supply area is expected to expand in the future, it is expected that the operation rate of the new water treatment plant will also be increased gradually.

accordance with an increase in new connections, and currently, two water treatment plants are being operated simultaneously.

In addition to this, the energy efficiency for the water supply has reached the target indicator, and the water cost recovery target values have been mostly achieved (90%) and improvement of the operational efficiency at the water supply unit in Battambang is confirmed.

## (2) Qualitative effects

### 1) Changes to life by supplying safe water to the poor<sup>21</sup>

In the Project, the necessary materials for new connections and reconnections to the water service were provided in order to provide a safe water supply to the poor, aiming to promote connection to water service for the poor by the water supply units in each province after the project completion.

At the water supply unit in Pursat, a new connection for 400 households and 700 reconnections has already been implemented using the provided materials.

The water supply unit in Preah Sihanouk conducted a new water supply connection to 600 households in 2014 and utilized all the materials provided.

At the water supply unit in Battambang, new connections to the water supply were established for 1,124 households by January 2017 by using the materials provided by the Project. With regard to Battambang, they have not used all the materials since they are strictly identifying the poor. By the end of 2017, additional new connections are anticipated to be established to 376 households by utilizing the remaining materials<sup>22</sup>.

According to the beneficiary survey<sup>23</sup>, respondents described the changes to living conditions when the poor were starting to use the new water service this way; “I can use the water when I want (there is no need to go to get the water at the well which is heavy work, I can use the water even at night with peace of mind and I can use the water without worrying when the water

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<sup>21</sup> The World Bank defines the international poverty line as income of US\$ 1.9 per a day. However, the project did not decide the definition of the poor. For this reason, there were differences in definitions, such as those who have the poor certificate at the water supply unit in Battambang, and those who are apparently considered to be poor such as widows and old people at the water supply unit in Pursat.

<sup>22</sup> Regarding new/reconnection materials for each province, there is no complete information on the connection record of the water supply units in three target provinces, and there is also no information how many materials were provided to each province. Therefore, the numbers in this section are not perfectly consistent with the number of materials provided.

<sup>23</sup> Surveyors were employed and a beneficiary survey was conducted. It was a questionnaire survey targeting clients who were at home at three or four villages or communes recommended by each water supply unit for the survey area (Pursat (Chamkar Check village, Sthany village, Porktakouy village, Chlong Kat village), Preah Sihanouk (Kompenh village, Metaphep commune, Tomnuk Rlork town) and Battamban (Dam Spei village, Chamkarsamrong village, Wat Leap village, Wat Romdul village) (70 households with valid responses (210 households in three provinces), and male-female ratio of the respondents was 39% of male and 61% of female, the age composition was 11% of 30 years old or less, 17.6% of 31 to 40 years old, 26.2% of 41 to 50 years old, 25% of 51 to 60 years old, and 20% of 61 years old or over.

sellers will come). This was the highest answer as 141 people out of 174 people (about 81%) from new customers answered so in the questionnaire survey. In addition, while there were some opinions that the quality of water from the sources such as well water and water sellers is bad (water colour and smell are bad), 120 respondents out of 174 (about 69%) stated that “water provided by the water supply unit is clean and safe and I can use it with confidence”. Regarding the economic aspect that expenditure was reduced due to reasonably available water, there were a few answers such as 46 respondents out of 174 (about 26%). The cause was that the main sources of obtaining water before the water supply connection was the well (33%) and rainwater (4%) in the dry season, and the well (24%) and the rainwater (34%) in the rainy season, and the proportion of free water was high. However, while the selling price of the water seller is two dollars (about 8,050 Riel)/m<sup>3</sup>, the water fee of the water supply units in three target provincial capitals was 1,500 to 1,600 Riel/m<sup>3</sup>. Therefore, it is considered that there was a positive economic impact for households who had previously purchased water from the water seller.

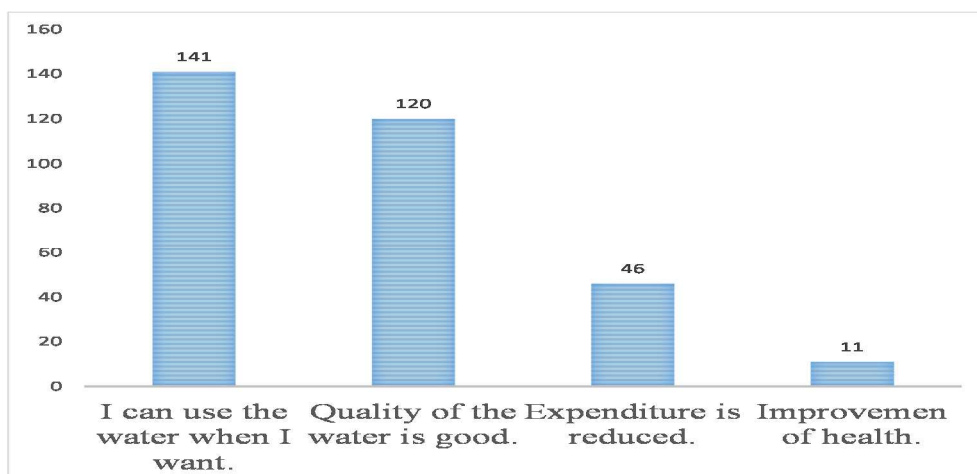


Figure 1 (Positive) impact after starting to use water service

Source: Beneficiary survey

### 3.4.2 Other Positive and Negative Impacts

#### (1) Impacts on the Natural Environment, Land Acquisition and Resettlement

In the preparatory survey for the Project, it was assumed that the project would replace existing water distribution pipes and expand their reach, and that the Project would generally be affected only on these sites during construction work, and so the Environmental Impact Assessment Report Submission was not required. According to interviews with the executing agencies of the three target provinces, there was neither impact on the natural environment, nor land acquisition and resettlement during implementation of the Project.

(2) Synergistic effects through collaboration with other donors and other Projects by JICA

In the Project, synergistic effects with projects of other donors were expected. As stated in the effectiveness section above, materials were supplied for water supply connection to the poor by UN-HABITAT in Pursat. Although there was no direct linkage with this Project, synergistic effects were seen on the increase in population served by the water supply.

In addition, expansion of the capacities of water treatment plants were carried out in Battambang and Pursat by ADB in 2006 and in Preah Sihanouk by the World Bank in 2004. However, due to the aging of the water distribution pipes, the operation rate of these water treatment plants had been lowered. Therefore, the Project was planned. At the time of the ex-post evaluation survey, it was confirmed whether the operation rate of these water treatment plants had increased and whether there were synergistic effects with ADB or the World Bank projects. As a result, in Pursat and Battambang, since the water distribution pipes were replaced by the Project, it became possible to make use of the capacity of the water treatment plants, which were constructed but could not be fully utilized previously, to improve the operation rate of the water treatment plants, to increase population served by the water supply, and to obtain synergistic effects for spreading water supply services.

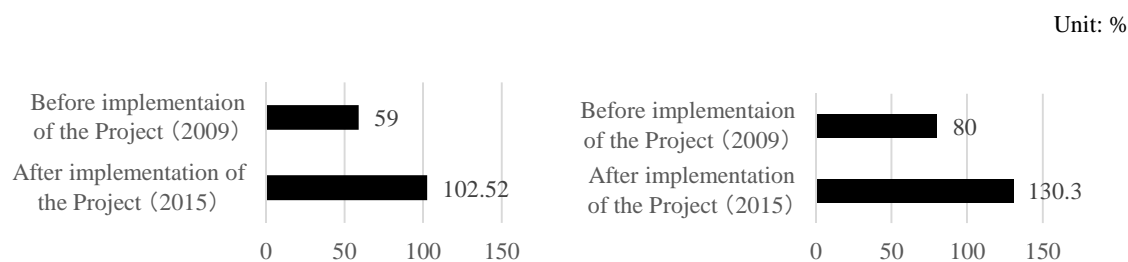


Figure 2 Change in the operation rate of water treatment plants before and after implementation of the Project in Pursat (Left) and Battambang (Right)<sup>24</sup>

Source: Water supply units in Pursat and Battambang

**【Column】** Contribution of JICA technical cooperation projects

The target provincial capitals of the Project were included in the eight target provincial capitals of the Technical Cooperation Phase 2 (2007 - 2012). In the Technical Cooperation Phase 2, techniques were transferred for water quality testing, water treatment, electric facilities, machinery facilities and water distribution systems to the water supply units in each province to aim to improve the operation and maintenance aspects of the water treatment plants. In addition, Technical Cooperation Phase 3 was subsequently implemented after that to transfer techniques relating to the preparation of financial statements and business plan creation to aim

<sup>24</sup> In this figure, the data of 2015 was used as posterior data. The reason is that the water supply unit in Pursat has strengthened the capacities of the facilities since 2016, and a new water treatment plant has been constructed in the water supply unit in Battambang with Japan's grant aid in 2016. Therefore, the conditions of comparison may change if the data of 2016 is used.

to improve business operation aspects. In addition to the replacement and expansion of the water supply pipes by the Project, the techniques were transferred relating to the operation and maintenance of the water treatment plants by Technical Cooperation Phase 2, and the leakage rate was greatly reduced through implementation of the two projects compared to before the Project. Further, immediately after that, by supporting the growth of management capacities within Technical Cooperation Phase 3, a significant improvement in the operational management aspects was confirmed and the income and expenditure of all the water supply units targeted in the Project were found to be in the black. Therefore, since JICA implemented a series of technical cooperation projects which aimed to improve technologies related to the operation and maintenance of water treatment plants and management in parallel, with grant aid which aimed to replace and expand the water distribution pipe network in three target provincial capitals simultaneously, it led to the project generating higher effects.

In the Project, all indicators for the quantitative effects assumed and most indicators for the qualitative effects at the time of planning achieved the target values and the effectiveness is rated high. In addition, in regards to impact, indicators concerning the non-revenue water rate and operational efficiency were generally achieved except for Preah Sihanouk. Moreover, there are no other negative impacts caused by the Project. Therefore, the impact of the Project is considered high. However, these are largely due to synergistic effects with UN-HABITAT and the technical cooperation projects implemented by JICA.

Based on the above, this Project has almost 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

At the time of the ex-post evaluation, the water supply administration in Cambodia is under the jurisdiction of the General Department of Water, the Ministry of Industry and Handicrafts. Concerning the provincial administration, it is supervised by the Department of Industry and Handicrafts, and each of the water supply units in provinces operates and maintains it under the subordinate level. The structure of the water supply unit in each province, which implements operation and management of the Project is shown below.

##### 1) Assignment of staff at the water supply units in each province

The water supply unit in Pursat is operated by total of 37 staff (head of unit, deputy heads of unit, 15 technical staff and 19 administrative staff) in five sections, under the supervision of the head of unit, two deputy heads of unit for production/distribution network and business sections.



The water supply unit in Preah Sihanouk is operated by total of 69 staff (head of unit, deputy heads of unit, 36 technical staff, 28 administrative staff, head of Bureau of Industry and Handicrafts and a technical assistant) in five sections, under the supervision of the head of unit, two deputy heads of unit for production/distribution/administration and planning/finance/business section.

The water supply unit in Battambang, it is operated by total of 71 staff (head of unit, deputy heads of unit, 33 technical staff and 35 administrative staff) in five sections, under the supervision of the head of unit, two deputy heads of unit for finance/business and technical section.

2) Organization of the water supply units in the target provinces

The main duties at the water supply units in the three target provinces are a) operation of the water treatment plant, b) repair and expansion of the water distribution network, c) collection of water fee and related administrative works, and there has been no change in this attributed to the Project.

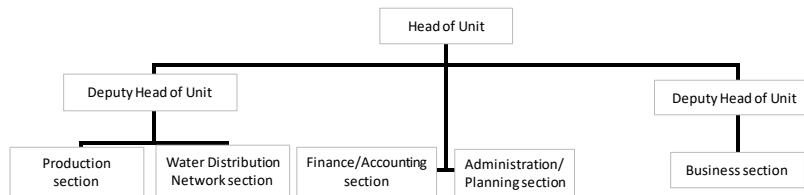


Figure 3 Organization chart of the water supply unit in Pursat  
Source: Water supply unit in Pursat

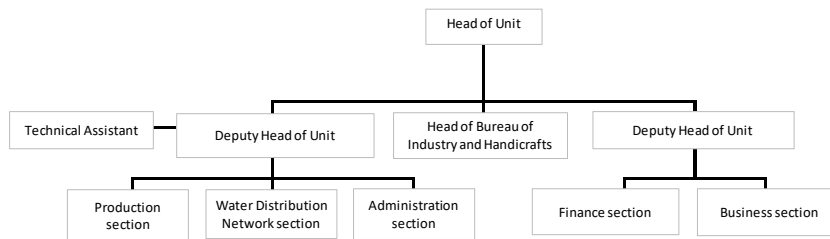


Figure 4 Organization chart of the water supply unit in Preah Sihanouk  
Source: Water supply unit in Preah Sihanouk

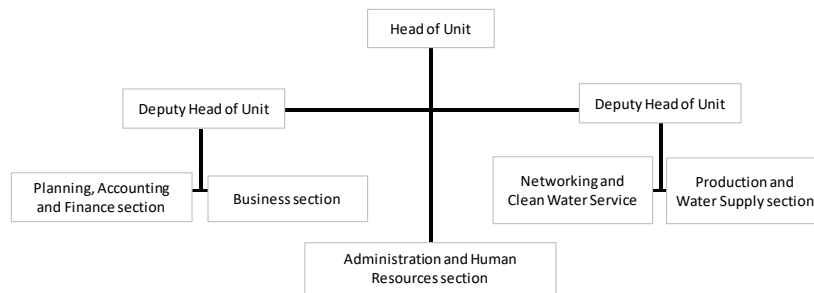


Figure 5 Organization chart of the water supply unit in Battambang  
 Source: Water supply unit in Battambang

As mentioned above, with regard to the organizational structure of the operation, maintenance and management of the water supply units in the three target provinces, the main functions such as the operation duties have not changed before and after the Project. Regarding the number of personnel, the number of staff in the water supply units, which could not be satisfied in all the provinces so far, has been increased by improving the financial situation, and the system is being strengthened. For example, it is possible to increase the number of staff if necessary in the future. In addition, the number of personnel at each water supply unit in the three target provinces is properly assigned exceeding the number of personnel required for operation and maintenance (37 persons in Pursat, 45 persons in Preah Sihanouk and 45 persons in Battambang) described in the preparatory survey report of the Project and these are appropriately assigned within a sufficient organizational structure.

### 3.5.2 Technical Aspects of Operation and Maintenance

In the water supply units at three target provinces covered by the Project, the water distribution network supported by the Project has been properly operated and maintained. In addition, each water supply unit in three target provinces has been a target organization for Technical Cooperation Phase 2 and Phase 3, and it is confirmed by the JICA experts in an interview survey that the techniques for the operation and maintenance are steadily improving through the technical transfer process. Therefore, there is sufficient technical capability for operation and maintenance of the water distribution pipe network in the future.

In addition, through a soft component and the technical cooperations mentioned above, all the water supply units in the three target provinces have acquired the techniques necessary for operation of a flow monitoring system which was installed at the water treatment plants by the Project.

### 3.5.3 Financial Aspects of Operation and Maintenance

The figures on income and expenditure for the past six years (five years for Preah Sihanouk)

obtained at the water supply units in the three target provinces are shown below.

Table 9 Financial balance of the water supply units in three target provinces

Unit: 1,000 Riel

		2011	2012	2013	2014	2015	2016 <sup>25</sup>
<b>Pursat</b>	<b>Total income</b>	1,599,165	1,762,455	2,014,815	2,315,530	2,810,731	2,481,275
	<b>Total expenditure</b>	2,160,296	2,251,603	2,399,386	2,436,362	2,215,314	1,874,210
	<b>Balance</b>	-561,131	-489,148	-384,571	-120,832	595,417	607,065
<b>Preah Sihanouk</b>	<b>Total income</b>	4,119,574	4,869,233	5,106,951	7,002,431	9,313,869	-
	<b>Total expenditure</b>	4,262,176	5,006,152	4,886,424	6,277,435	7,807,019	-
	<b>Balance</b>	-142,602	-136,919	220,527	724,996	1,506,850	-
<b>Battambang</b>	<b>Total income</b>	3,900,834	4,018,751	4,249,205	4,989,858	6,078,446	5,646,202
	<b>Total expenditure</b>	4,642,158	4,448,204	4,484,717	4,566,733	4,972,066	4,798,438
	<b>Balance</b>	-741,324	-429,453	-235,512	423,125	1,106,380	847,764

Source: Water supply units in Pursat, Preah Sihanouk and Battambang

At the water supply units in three target provinces, the balance excluding depreciation expenses was surplus before the start of the Project. The income from water supply service has had tendency to increase after the Project due to increase in the population served by the water supply compared with 2012 at the water supply unit in Pursat. In addition to this, since the increase in expenditure has been suppressed after implementation of the Project, the balance including depreciation expenses has also achieved surplus from 2015.

At the water supply unit in Preah Sihanouk, the income from water supply services has increased due to an increase in the number of connections and an increase in the volume of water usage after the Project, the income from water supply in 2015 has almost doubled compared with 2012. From 2013, it has achieved surplus in the balance including depreciation expenses.

At the water supply unit in Battambang, the income from the water supply service has had tendency to increase subsequent to the project implementation due to an increase in the population served with the water supply compared with 2012. It has also achieved a surplus in the balance including depreciation expenses from 2014.

Thus, in the water supply units in three target provinces, a similar situation of a balance of income can continue if the distribution pipe network and the water treatment plants are operated

<sup>25</sup> For 2016, it is the data until September.

and maintained without any trouble in the future. Therefore, sustainability in terms of finance is high.

#### 3.5.4 Current Status of Operation and Maintenance

The water distribution pipe network in the three target provinces supported by the Project was functioning without any problem at the time of ex-post evaluation. However, with regard to the water flow monitoring system<sup>26</sup>, it has malfunctioned in Battambang and Preah Sihanouk. The cause of the failure has not been identified yet, and there is also no prospect of repairing it. However, since the water supply volume from the water treatment plants can be grasped also by the old system, and there is no immediate serious effect on the operation of the water supply units due to the failure of this system. Therefore, it is considered that the influence on the sustainability for entire operation and maintenance caused by the failures is relatively small.



Water flow monitoring system (Left) and the meters for measuring the volume of the supplied water (Right)

As mentioned above, no major problems have been observed in the institutional, technical, financial aspects and current status of the operation and maintenance system. Therefore, sustainability of the Project effects is high.

## 4. Conclusion, Lessons Learned and Recommendations

### 4.1 Conclusion

This Project aims to improve the water supply service by implementing replacement and expansion of existing water distribution systems in the target provincial capitals (Pursat, Preah Sihanouk and Battambang), thereby improving the operation aspects of the water supply business in each province through improving the rate of non-revenue water.

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<sup>26</sup> The water flow monitoring system can grasp the situation of the water distribution pipe network by the meters which measure the water supply volume of several water distribution networks besides the water treatment plant since the information is collected from not only the water treatment plant but also from the water distribution pipe network. From now on, if the number of meters is increased, it becomes easier to identify the water leakage location from the difference in the water flow of each meter, and it is also possible to operate it more efficiently.

Cambodia's policy to improve access to safe water in urban areas has not changed before and after implementation of the Project, and the Project is consistent with Cambodian development policy. In addition to this, the percentage of population served for water supply is lower than the national average in the three target provincial capitals of the Project and there is a continuous need to support the construction of urban water distribution systems in the three target provincial capitals. Furthermore, since the Project is consistent with Japan's aid policy, the relevance is high.

In the Project, the total expansion of the replacement of existing distribution pipes and of new water distribution pipes was slightly less than anticipated in the project plan. However, the cost of the Project was significantly lower than planned, while the duration of the Project was as planned. Therefore the efficiency is considered high.

Due to synergy with the Project, projects implemented by other donors and other projects undertaken by JICA, the operation and effect indicators for effectiveness such as increase of the maximum daily water supply, the population served by the water supply and decrease of water leakage rate. Furthermore, indicators for impact such as reduction of non-revenue water rate and the improvement of operational efficiency have mostly been achieved. Therefore, the effectiveness and impact of the Project are considered high.

The operation and maintenance institution, technique and finance necessary for maintaining the effectiveness of the Project have been secured for the water supply units in the three target provinces, and they are able to properly manage the water distribution network at the time of ex-post evaluation. Therefore, the sustainability is considered high.

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

## 4.2 Recommendations

### 4.2.1 Recommendations to the Executing Agency

#### 1) Recovery of function of the water flow monitoring system

In the water supply units in Battambang and Preah Sihanouk, the procured water flow monitoring systems have failed and have not functioned. It would be very useful in the future to efficiently operate and manage the water supply business through utilization of this system, for grasping the volume of water supply in the target area and identifying the water leakage location easily by monitoring to the difference in the volume of the water supply. Therefore, it is recommended to recover its function as soon as possible in collaboration with the contractor.

### 4.2.2 Recommendations to JICA

None

### 4.3 Lessons Learned

#### (1) Importance of setting targets in implementation items by the counterpart country

In the Project, materials for household connection or reconnection to water distribution pipes were procured in order to steadily increase the number of water supply connections to poorer households. This was not planned to be implemented during the Project, but the water supply units of the three target provinces were responsible for the implementation of this goal after the completion of the Project. However, at the time of implementation, there was no definite advance agreement on the criteria for the accreditation of the poor household and the timing of completion of connection. As a result, the accreditation criteria of the poor are different in each province and the correspondence was mixed in each province at the time of the ex-post evaluation three years after the completion of the Project. While the water supply units in Pursat and Preah Sihanouk have used all the materials, the water supply unit in Battambang is strictly scrutinizing the accreditation process of the poor and has not used up the material yet. As a consequence, although it certainly has worked effectively as a measure to increase the number of households of the poor for water supply connection, the positioning of the procurement of this material became very ambiguous as an outcome of the Project. If the equipment is procured in the Project for activities to be carried out by an executing agency after the completion of the Project and if this will affect the Project effect such as in this case, the objectives such as the details and the period of implementation should be clarified for implementing these activities efficiently.

Lao People's Democratic Republic

FY2016 Ex-Post Evaluation of Japanese Grant Aid Project

The Project for the Improvement of School Environments in Champasack and Savannakhet  
Provinces

External Evaluator : Yudai NISHIYAMA, INTEM Consulting Inc.

## **0. Summary**

The objective of this project was to improve the quality of primary and lower secondary education in Champasack province and Savannakhet province in the southern region by constructing facilities and providing equipment for 91 primary and lower secondary schools and improving school environment.

At the time of the ex-post evaluation, securing access to high quality primary education and lower secondary education in the two southern provinces continues to be a priority issue. The project is consistent with development policy. In the two target provinces there is still a high need to support the rebuilding of school buildings. Since this project is consistent with Japan's ODA policy at the time of planning as well, the relevance of this project is high.

Although the cost of this project was within the plan, the project period exceeded the plan. So, the efficiency is considered fair.

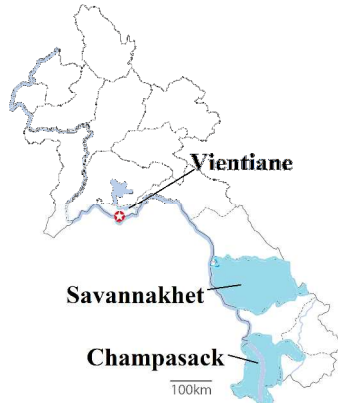
In this project, some problems remain in terms of the achievement rate of the actual against the target in the indicator of "The number of students who can study in a decent learning environment" which is one of the quantitative effect indicators. But other quantitative and qualitative effects indicators are generally high.

Regarding the impact, the indicators were set according to quantitative effects and qualitative effects in which the planned effect was observed such as with an improvement of the net enrollment rate of the target schools and with increased awareness of students' sanitation needs due to the improvement of the toilets. Also, another observed impact included students' willingness to attend school, improving motivation for teachers' teaching and girls' willingness for schooling. Therefore, the project's effectiveness and impact are considered high.

The executing agencies and communities of this project have the necessary operational and maintenance techniques to maintain the effectiveness of this project. On the other hand, some problems have been found in the community-level operation and maintenance system. Thus, sustainability is viewed as fair.

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

## 1. Project Description



Project Locations



Phonethong primary school  
built under this project  
(Champasack, Phonethong)

### 1.1 Background

“The Sixth National Socio-Economic Development Plan (NSEDP: 2006-2010)” of Lao PDR adopts the goal of “the qualitative and quantitative improvement of human resources through educational reform” in the educational sector, which ranks as one of the top priority sectors. In particular, dissemination and improvement of basic education is a prerequisite for sustainable economic growth and poverty reduction in the future, positioned as a priority for promoting human resource development to support fundamental solution of poverty and national development. As a result of these efforts, the primary Net Enrollment Rate<sup>1</sup>(hereinafter referred to as “NER”)improved from 82.5% in 2002 to 92.7% in 2008.

However, the southern region close to the Cambodian-Vietnamese border positioned as the CLV (Cambodia, Laos, and Viet Nam) Development Triangle Area still had a high poverty rate<sup>2</sup> compared to the Lao nationwide average. In addition it was supported that Provincial Education and Sports Service (hereinafter referred to as “PESS”) confirmed the needs through District Education and Sports Bureau (hereinafter referred to as “DESB”) and was planning to develop a reinforced concrete school, Champasack and Savannakhet provinces located in the southern region were still afflicted with a severe shortage of school buildings and classrooms. Even though there were school buildings, many of them were dilapidated and/or temporary ones requiring urgent rebuilding. Overall, the education environment was quite poor in the provinces<sup>3</sup>. In 2005 there was still a bad situation, with about 20% of villages without primary schools. Furthermore in Laos as the lower secondary education had been extended from 3-years to 4-years since FY2009/10, additional classrooms were needed in lower secondary

<sup>1</sup> NER= (corresponding education level school enrollment population ÷ relevant education level population) × 100

<sup>2</sup> Source: Final report on Lao PDR poverty profile survey (2010) p.8

<sup>3</sup> Source: outline design survey report P.3-1



schools urgently due to the lack of classrooms in lower secondary schools. Against this background, the Government of Lao PDR has requested the Government of Japan to provide grant aid for the construction of facilities and provision of equipment for the primary and lower secondary schools in Champasack province and Savannakhet province, to further improve the school environment in the southern region.

## 1.2 Project Outline

The objective of this project is to improve the quality of education in primary and lower secondary education in Champasack province and Savannakhet province in the southern region by constructing facilities and providing equipment for 91 primary and lower secondary schools and improving school environment in these two provinces.

G/A Grant Amount / Actual Grant Amount		1,018 million yen / 1,018 million yen
Exchange of Notes Date		June 2010/June 2010
Executing Agency		Ministry of Education and Sports <sup>4</sup> , Department of Planning
Project Completion Date		January ,2013
Contracted Agencies	Main Contractor(s)	Construction : Kampouang Construction Co., Ltd., Vannavong Construction Co., Ltd., ST Construction Co., Ltd, Khounmixay and Khounkham Joint-Venture Co., Ltd, Samphamith Construction Co., Ltd, Douangphachanh Construction Co., Ltd, Phounethavy Construction Co., Ltd, Khampasong Construction Co., Ltd and Khonexay Construction Company, Sisaketh Construction Building, Road-Bridge and Irrigation Co., Ltd, Sengthong Construction Co., Ltd and Vieng Xay Construction Co., Ltd. Joint-Venture, Sompamith Construction CO., Ltd  Equipment : Somlith Furniture Factory, Konseng Furniture, Phetochalern Furniture, Heuang Furniture Factory, Lao Charoensin Co., Ltd, Central Sign Trading

<sup>4</sup> At the time of project implementation, it was called as "Ministry of Education(MOE)" reorganized in 2011.

	Main Consultant	Mohri, Architect & Associates, INC.
	Procurement Agent	Japan International Cooperation System (JICS)
	Outline Design	July 2009 - March 2010
	Related Projects	<p><b>【Technical Cooperation】</b>  Supporting Community Initiatives for Primary Education Development in the Southern Provinces (2007-2011)  Project for Supporting Community Initiative for Education Development (Phase 2) (2012-2016)  Project for Improving In-service Teacher Training for Science and Mathematics Education (2010-2013)</p> <p><b>【Grant Aid】</b>  The Project for the Improvement of School Environment in Three Southern Provinces (2009)</p>

## 2. Outline of the Evaluation Study

### 2.1 External Evaluator

Yudai NISHIYAMA, INTEM Consulting Inc.

### 2.2 Duration of Evaluation Study

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

Duration of the Study: July, 2016 - December, 2017

Duration of the Field Study: November 1, 2016 - November 30, 2016

March 1, 2017 - March 10, 2017

### 2.3 Constraints during the Evaluation study

Although attempts were made to collect the education statistics data on the target schools necessary for an analysis of impact (NER and NIR(Net Intake Rate)), no reliable data could be obtained from DESB partly. The analysis for achievement of impact evaluation was therefore carried out using data for the target district partly as complementary information.

## 3. Results of the Evaluation (Overall Rating: B<sup>5</sup>)

### 3.1 Relevance (Rating : ③<sup>6</sup>)

#### 3.1.1 Consistency with the Development Plan of Laos

“The Sixth National Socioeconomic Development Plan (NSED: 2006-2010)” of Lao

<sup>5</sup> A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

<sup>6</sup> ③: High, ②: Fair, ①: Low

PDR adopts the goal of “the qualitative and quantitative improvement of human resources through educational reform” in the educational sector, which ranks as one of the top priority sectors. Also in 2009 the Ministry of Education (MOE) set Education Sector Development Framework (ESDF, 2009-2015) as comprehensive education programs. The ESDF guaranteed the equal access of educational services as one of its strategies. The development of educational facilities targeting the provision of multi-grade classrooms in the villages that could not provide 5 year primary education and the provision of the secondary education classrooms was one of its means. At the 8<sup>th</sup> NSEDP (2016-2020) at the time of the ex-post evaluation, the education sector continues to be a priority area, and efforts to expand opportunities for access to high-quality education are continuously conducted. Construction and refurbishment of educational facilities are cited as one means for that. The 8<sup>th</sup> Education Sector Development Plan (hereinafter referred to as "ESDP") (2016-2020) also put the education sector as one of the top priorities to get out of the least developed countries by 2020.

As mentioned above, Laos development policy had not changed at the time of planning and ex-post evaluation, and the development policy of Laos is consistent with this project.

### 3.1.2 Consistency with the Development Needs of Laos

At the time of the ex-ante evaluation of this project, in Champasack province and Savannakhet province the number of school buildings and classrooms were significantly insufficient due to the increased primary school enrollment ratio, and overcrowded classrooms made it difficult to continue learning. As of 2009, existing school buildings themselves were also in need of rebuilding because 50% to 60% of the schools in the area were obsolete with wooden temporary school buildings or semi-permanent school buildings and the learning environment was poor.

As of the ex-post evaluation, as a result of confirming the current state of the existing classrooms in FY2015 at PESS, 16.7% in Champasack province and 16.9% in Savannakhet province are temporary school buildings or wooden semi-permanent school buildings. It was confirmed that the learning environment continued to be poor. Regarding the number of overcrowded classes, 10.3% of primary schools and 10.7% of lower secondary schools in Champasack and 8.1% of primary schools and 24.3% in lower secondary schools in Savannakhet province were still conducting lessons in overcrowded classes.

Regarding the enrollment rate of primary school at the time of planning, the national average, and the averages for Champasack province and Savannakhet province in 2008 were 92.7%, 93.5%, 85.0% respectively. The enrollment rate of lower secondary school was 62.7%, 55.2%, 48.3% respectively. As a result of interviews with the MoES, the enrollment rate of primary school in 2015 at the time of ex-post evaluation was 98.4% as a nationwide average, 98.4% in

Champasack province, 99.1% in Savannakhet province, and the enrollment rate in lower secondary school in 2014 was 78.1 %, 63.7%, 61.7% respectively. The school environment and access has been improved due to the steady increase in the number of schools, and the enrollment rate has increased.

From the above, there is no difference in consistency with the development needs from planning through to ex-post evaluation; development needs continue to be high.

### 3.1.3 Consistency with Japan's ODA Policy

In the Lao Country Assistance Program created in 2009, enhancement of basic education is aimed at promoting poverty reduction, achieving the Millennium Development Goals (MDGs), from the perspective of "human security" out of the three priority issues. Along with that, JICA regards enhancement of basic education as one of six priority areas. Therefore, this project was consistent with Japan's aid policy at the time of planning.

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

## 3.2 Efficiency (Rating: ②)

### 3.2.1 Project Outputs

The output from the Japanese side for this project was the development of educational facilities (classrooms, teacher's rooms, science rooms, toilets) and the procurement of educational equipment (furniture). The output from Laos side was to secure land, dismantling and removal of existing facilities and obstacles, construction work, etc.

Table 1 outlines the output of this project. Regarding the output from the Japanese side, the number of target schools increased by 4 and the number of classrooms increased by 21 after the project. This is because residual funds occurred because of contractor bidding. Among the schools that were subject to planning preparation during the survey but were not subject to implementation due to budgetary reasons, additional inputs were made to four high-priority schools.

Table 1 Planned / Actual number of educational facility

	Number of schools	Number of classrooms	Number of teacher's room	Number of warehouses	Number of science rooms	Number of toilet
<b>Champasack Province</b>						
Primary	35/35	171/171	31/31	34/34	-	30/30
Lower Secondary	15/17	83/93	8/8	14/14	1/1	12/12
Subtotal	50/52	254/264	39/39	48/48	1/1	42/42
<b>Savannakhet Province</b>						
Primary	26/28	92/103	22/22	26/26	-	16/16
Lower Secondary	15/15	60/60	6/6	14/14	1/1	8/8
Subtotal	41/43	152/163	28/28	40/40	1/1	24/24
<b>2 Provinces Total</b>						
Primary	61/63	263/274	53/53	60/60	-	46/46
Lower Secondary	30/32	143/153	14/14	28/28	2/2	20/20
Subtotal	91/95	406/427	67/67	88/88	2/2	66/66

Source: Information provided by MoES

Note: Shaded areas are numbers where changes (increases) were made in planned and actual results

In addition, we confirmed as a result of interviews with the MoES that the quantities of items such as blackboards, desks, chairs and storage shelves that were delivered were more than what was planned for. In addition to the initial plan, as described above, residual funds occurred. Thus additional 11 classrooms of primary school and 10 classrooms of lower secondary school are developed as well as the its school equipment.

Regarding the output from Laos side, as a result of interviewing MoES to see if the input was implemented as planned, there was a response that the output was carried out as planned. At the time of the school visit by the evaluator, it was checked that the items to be borne and inputs by Laos side were implemented by visual confirmation of the site<sup>7</sup>.

### 3.2.2 Project Inputs

#### 3.2.2.1 Project Cost

At the time of planning, the project cost was 1,018 million yen, and the actual result was 1,018 million yen, which was as planned. The details of the project costs borne by Laos were not obtained.

#### 3.2.2.2 Project Period

<sup>7</sup> The items to be borne by Laos side such as dismantling of existing facilities and obstacles, external construction work, connection of electricity, securing of water supply etc. were visually checked on the site by evaluator.

The project period was 22 months<sup>8</sup> in the plan, whereas the actual result was 32 months, exceeding the plan (145% compared to the plan). The reasons for the difference in the project period are: 1) construction of additional schools due to the generation of surplus (output increase), 2) delay in the procedures concerning the construction at additional schools, 3) delay in delivering equipment to additional schools due to the generation of remaining money. The extension procedure itself was in accordance with the formal procedure, which was an extension of the inevitable construction period to use the remaining money. Even if surplus money had not been generated, the plan was exceeded by 123%<sup>9</sup> of the planned duration in implementation. And the actual result of only residual money was 156%<sup>10</sup>, exceeding the plan. So, efficiency declined.

From the above, the project cost was within the plan but the project period exceeded the plan, so the efficiency is fair.

### 3.3 Effectiveness<sup>11</sup> (Rating: ③)

Regarding the effectiveness, to confirm the improvement situation of the school environment at the target schools which is the objective of this project, following indicators of quantitative effects<sup>12</sup> were confirmed and evaluated at the ex-ante evaluation; 1) Number of the decent classrooms 2) Number of students in decent classrooms. At the time of this ex-post evaluation, in addition to these, following indicators were set 3) Number of schools conducting overcrowded classes and 2-shift classes 4) Number of schools with newly provided toilet and actually used<sup>13</sup> 5) Number of schools with newly provided teacher's room and actually used 6) Number of schools with newly provided science room and actually used, as additional indicators and evaluated. Furthermore, as an indicator of the qualitative effects 1) Student's satisfaction towards the school facility, was used and evaluated.

#### 3.3.1 Quantitative Effects(Operation and Effect indicators)

The level of achievement<sup>14</sup> of the quantitative effectiveness of this project is as follows.

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<sup>8</sup> Including two months from the signing date of Exchange of Note (E/N) to the starting date of procurement agency contract in 20 months of implementation as described in the project ex-ante planning sheet

<sup>9</sup> 123% = 27 months / 22 months (including E/N)

<sup>10</sup> 156% = 14 months / 9 months

<sup>11</sup> It is rated by taking impact on the judgment of effectiveness.

<sup>12</sup> At the time of ex-ante evaluation, "The educational environment improves by establishing a facility with appropriate educational environment" was set as a qualitative effect. But it's not effect caused by establishing a facility with an appropriate educational environment. Thus, this indicator is not included in the ex-post evaluation.

<sup>13</sup> In the ex-ante evaluation, the construction of the toilet was set as an indicator. But because it is the output level, we will evaluate whether it was constructed and is currently used properly. The target of the evaluation is 39 schools with newly constructed toilet in this project.

<sup>14</sup> The survey was conducted and analyzed from telephone survey and school visit to all schools covered by the project (52 schools in Champasack and 43 schools in Savannakhet, 95 schools in total).

Table 2 Comparison between target and actual of operation and effect indicators

	Baseline	Target	Actual					Achievement Level (2016)
	2009	2015	2012	2013	2014	2015	2016	
	Planned Year	3 years After completion	Completion Year	1 Year After Completion	2 Years After Completion	3 Years After Completion	4 Years After Completion	Actual /Target
Number of decent classrooms <sup>15</sup>	Primary 106	Primary 380	Primary 266/380	Primary 277/380	Primary 282/380	Primary 301/380	Primary 296/380	Primary 77.9 %
	L/S <sup>16</sup> 107	L/S 260	L/S 217/260	L/S 203/260	L/S 199/260	L/S 199/260	L/S 219/260	L/S 74.7 %
Number of schools with overcrowded classrooms <sup>17</sup> or 2 shift classrooms	NA	Primary 0 L/S 0	Overcrowded	Overcrowded	Overcrowded	Overcrowded	Overcrowded	Overcrowded
			Primary 34/63	Primary 29/63	Primary 29/63	Primary 28/63	Primary 29 /63	Primary 54.0 %
			L/S 17/32	L/S 16/32	L/S 18/32	L/S 17/32	L/S 17 /32	L/S 46.9 %
			2 shift	2 shift	2 shift	2 shift	2 shift	2 shift
			Primary 0 /63	Primary 0 /63	Primary 0 /63	Primary 0 /63	Primary 0 /63	Primary 100 %
L/S 0 /32	L/S 0 /32	L/S 0 /32	L/S 0 /32	L/S 0 /32	L/S 100 %			
Of the constructed 427 classrooms, number of used classrooms	N/A	N/A	N/A	N/A	N/A	N/A	Primary 256 /274 L/S 153 /153	Primary 93.4 % L/S 100%
Number of schools with newly provided toilet and actually used	Primary 0/46	Primary 46/46	Primary 46/46	Primary 46/46	Primary 46/46	Primary 46/46	Primary 43/46	Primary 93.5 %
	L/S 0/20	L/S 20/20	L/S 20/20	L/S 20/20	L/S 20/20	L/S 20/20	L/S 19/20	L/S 95.0 %

<sup>15</sup> The indicator in the ex-ante evaluation of this project is "a classroom in a decent environment" and it is the same as the number of students with decent environment when multiplied by the number of students per class given in the Laos educational quality standard . Therefore, this indicator is the target number set based on the Laos educational quality standards. Therefore, in this ex-post evaluation, the "decent environment" is defined as "the number of classrooms in a decent environment" and "the number of classrooms within 32 students per a classroom in primary school and 40 students per a classroom in lower secondary school classrooms of Laos educational quality standard and evaluated.

<sup>16</sup> Lower Secondary

<sup>17</sup> Based on the project ex-ante evaluation sheet, 33 students or more per a classroom in the primary school and 41 students or more/ classroom in lower secondary school is calculated as overcrowded class.

Number of schools with newly provided teacher's room and actually used	Primary 0/53  L/S 0/14	Primary 53  L/S 14	Primary 53/53  L/S 14/14	Primary 53/53  L/S 14/14	Primary 53/53  L/S 14/14	Primary 53/53  L/S 14/14	Primary 53/53  L/S 14/14	Primary 100 %  L/S 100 %
Number of schools with newly provided science room and actually used	L/S 0/2	L/S 0/2	L/S 0/2	L/S 0/2	L/S 0/2	L/S 0/2	L/S 0/2	L/S 0 %

Source: Provided by JICA(Baseline/ Target), and executing agencies(Actual)

Note: L/S (Lower secondary school)

With respect to the number of decent classrooms in the target schools, 296 classrooms for all 358 classrooms of the primary school and 219 classrooms for all 293 classes of the lower secondary were in a good condition in 2016, 4 years after project completion. In addition, 77.9% of the classrooms of targeted primary schools and 74.7% of the classrooms of targeted lower secondary schools achieved the standard of having a good environment. Thus the indicator has been achieved as the score approximately reached the target.

Both primary and lower secondary schools conducting overcrowded classes or 2 shift classes at the target schools are 0 and indicators have been achieved. Regarding the number of schools conducting overcrowded classes, 29 schools (54%) for 63 primary schools and 17 schools (53.1%) for 32 lower secondary schools. The average number of students per class in primary classrooms where overcrowded classes are being conducted is 45 people / classroom<sup>18</sup>, and the average class size of all classrooms is 25 people / classroom<sup>19</sup>. Meanwhile, the average class size of overcrowded classes for lower secondary is 44 students / classroom<sup>20</sup>. And the average number of one classroom in all classrooms is 35 students / classroom<sup>21</sup>. As a result of analyzing the number of students per classroom with the frequency distribution, as shown in Fig. 1, the number of classrooms (red line in the figure) which is conducting overcrowded classes with primary and lower secondary students has not exceeded the standard largely.

Of the 427 classrooms constructed in this project, there were 18 unused classrooms in total.

<sup>18</sup> There are 2,775 total students in the classroom where overcrowded classes are held and 62 total overcrowded classrooms. Therefore, the average number of students per overcrowded classes is 45 students.

<sup>19</sup> The target school has 8,890 total students and has 358 classrooms. Average number of students per classroom is 25.

<sup>20</sup> There are 3,268 total students in the classroom where overcrowded classes are held and 74 total overcrowded classrooms. Therefore, the average number of students per overcrowded classes is 44 students.

<sup>21</sup> The target school has 10,211 total students and has 293 classrooms. Average number of students per classroom is 35.



The main reasons for the classroom not being used are as follows with the results of the interview from the principal of each school; 1) a shortage of teachers 2) decrease in the number of students since planning

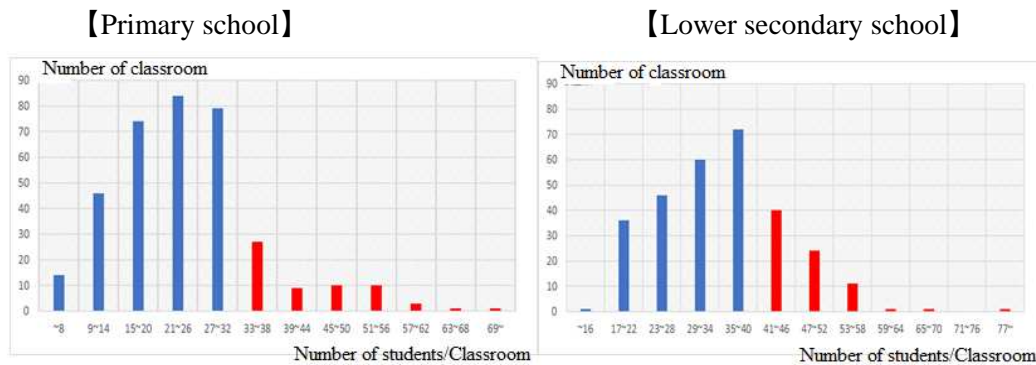


Figure 1 Frequency distribution of the number of students per classroom in primary and lower secondary school

Source: Information provided by school

In this project, toilets were newly provided and actually used at 43 (93.5%) for 46 primary schools and 19 (95.0%) for 20 lower secondary schools at the target schools. So the indicator has already been achieved. Teachers' staffrooms were provided and actually used at 53 primary schools and 14 lower secondary schools at target schools in this project. Indicators have been achieved since all target schools are provided and used as planned.

The science laboratory was newly developed at the 2 lower secondary model schools in this project. At the time of planning, it was expected that the lesson implementation in line with regular curriculum and the improvement of educational quality would be promoted by the development of science laboratories. However, neither of the two science laboratories are used as a science laboratory, one is used as an ICT classroom<sup>22</sup>, and the other one is used as an ordinary classroom. It is because the budget of the experimental equipment cannot be prepared by the school side and DESB. In addition to that, the priority of ICT classes is superior to the science classes for both schools and DESB.

<sup>22</sup> The computer was installed with the support of other donors. There was concern that there would be a shortage of teachers who could manage the experimental equipment or teach experiments. The science room was installed at the time of planning as a room that can be used as a science room in the future.

Table 3 Comparison of target and actual number of effectiveness indicator

	Base line	Target	Actual					Achievement Level (2016)
	2009	2015	2012	2013	2014	2015	2016	
	Planned Year	3 Years After Completion	Completion Year	1 Year After Completion	2 Years After Completion	3 Years After Completion	4 Years After Completion	Actual /Target
Number of students in decent classrooms  (Upper: Number of students in decent classrooms / Lower: Total number of students)	7,672	22,496 <sup>23</sup>	Primary 5,824 /10,004  L/S 6,007 /9,729  Total 11,831 /19,733	Primary 6,104 /9,518  L/S 5,487 /9,637  Total 11,591 /19,155	Primary 5,995 /9,173  L/S 5,822 /10,241  Total 11,817 /19,414	Primary 6,321 /9,154  L/S 6,069 /10,571  Total 12,390 /19,725	Primary 6,114 /8,890  L/S 6,943 /10,211  Total 13,057 /19,101	58.0 %

Source: Provided by JICA(Baseline and target are), and executing agency (Actual)

Note: L/S (Lower secondary school)

For the number of students in decent classrooms, the actual number at 4 years after completion is 13,057 (6,114 in primary school and 6,943 in lower secondary school) for 14,152 of the target. So the achievement level is 58.0% (13,057 / 22,496). At the project completion in 2010, a target number of 22,496 students was set. But as most recently as 2016 the actual number of students was 19,101. The fact that the total number of students has not increased as expected is one of the factors that reduced the achievement. The population of Lao PDR nationwide increased steadily from 1985 to 1995 at an annual rate of 2.47%, and from 1995 to 2005 at an annual rate of 2.08% which is more than 2% or more. However, from 2005 to 2015, the population growth rate declined at an annual rate of 1.45%. It is pointed out that the population is draining to the neighboring country, especially Thailand for economic reasons. Moreover, it is worth pointing out that the population of Champasack province has undergone a

<sup>23</sup> The number of students at baseline is 7,672. The number of student's capacity of classrooms and science rooms constructed in this project is 14,152 (261 classrooms in primary school × 32 students + 143 classrooms in lower secondary school × 40 students + 2 classes in science room × 40 students = 8,352 + 5,720 + 80). The number of students of the classrooms added with residual money is 752 (11 classes in primary school × 32 students + 10 classes in lower secondary school × 40 students). However, since the science room is not a classroom used always, and since it is a double count with ordinary classrooms, 80 students (2 classrooms × 40 students) are subtracted from the total and 22,496 students (7,672 + 14,152 + 752 - 80 = 21,744) was re-set and used as the target of effectiveness indicator.

1.3% decrease and that of Savannakhet province a 1.6% increase. In addition, the two provinces have advanced the concentration of population in the center of the province<sup>24</sup>.

### 3.3.2 Qualitative Effects(Other effects)

(1) Student’s satisfaction<sup>25</sup> towards school facilities has improved

Construction of classrooms and procurement of classroom furniture has led to an improvement of the satisfaction level of the students about the school facilities. We conducted a beneficiary survey<sup>26</sup> and measured the "satisfaction level of the students on classroom". Satisfactory results for all items of classroom size, ventilation / temperature, floor and walls, educational furniture (chair, desk) were high as 4 or more out of 5. In addition, the results of the survey on the 5th graders who experienced the situation before and after the the project also showed an improvement of satisfaction. Before the project the results showed that all items were less than 4, while after the project it showed that all items were more than 4.

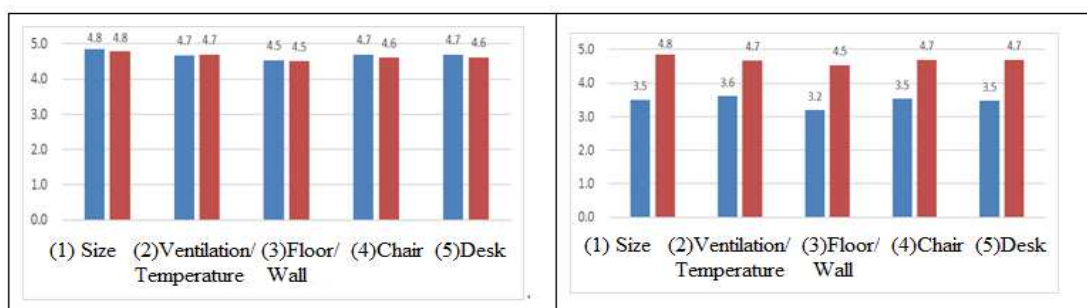


Figure 2 Satisfaction level of students' classroom (left) and 5th grader students' satisfaction level, who experience the situation before and after the project.

Source: Beneficiary survey

### 3.4 Impacts

This project was expected to contribute to improving of the quality of education in the two southern provinces through the improvement of the school facilities. The enrollment rate, which is the most commonly used to evaluate how the improvement of education quality has impacted

<sup>24</sup> Lao Statistic Bureau (2015) Result of population and housing census (National Census), p.11, p.21~30

<sup>25</sup> The degree of satisfaction was surveyed in five stages of "very agree", "I think so", "Fair", "do not agree", "not at all".

<sup>26</sup> Beneficiary survey was conducted on sites visited by evaluators in Champasack and Savannakhet provinces. The questionnaire survey was entrusted to a local consultant. Total sample number of students is 240 (130 in primary schools, and 110 in lower secondary schools. ). Total sample number of teachers is 113 (59 in primary schools, 54 in lower secondary schools). 3 classes were randomly selected at each school. After that student samples were randomly selected from student’s list considering the ratio of male and female. Teachers were randomly selected from teacher’s list. The ratio of students' samples in primary school is 65 for boys and 65 for girls, in lower secondary school 55 in boys and 55 in girls.

on education access, was set as an indicator for this evaluation survey. The following indicators were set as quantitative effects for this ex-post evaluation and evaluated; 1) Net enrollment rate of the target school, 2) Net intake rate of the target school, 3) Enrollment rate of girls in the schools in which toilets were developed. In addition, as indicators of qualitative effects the following indicators were set for this ex-post evaluation and evaluated; 1) With the provision of science rooms the lesson accordance with official curriculum of lower secondary education has been promoted 2) With the provision of toilet, students' awareness of hygiene has been improved, 3) With the improvement of school facilities the community in target schools has been better motivated for school education

#### 3.4.1 Intended Impacts

##### (1) Quantitative effect

##### 1) Improvement of the net enrollment rate of target schools

Regarding the net enrollment rate, which is an indicator of "access to education", when comparing the previous year of implementing project and the year of completing project both primary and lower secondary schools in all districts except Pakse<sup>27</sup> in Champasack province have increased or remain the same as shown in Fig3. Both primary and lower secondary schools in Savannakhet province have slightly increased or remain the same as shown in Fig5. From the above results<sup>28</sup>, some impact on educational access is recognized. In an interview survey with the principal and the community, the following opinions were obtained; "As the learning environment was improved, the children became more active for schooling.", "The financial burden of the parents involved in the repair was reduced since the school was newly renovated. As a result, child was able to continue to attend school." It can be seen that this project contributed to some extent in improving the enrollment rate.

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<sup>27</sup> One of five target schools in Pakse district is in a small village with about 30 students. The low enrollment rate of this school is a factor that lowers the average of Pakse district.

<sup>28</sup> For those schools where some reliable data could not be obtained, we analyzed using the statistical data of the target district level supplementary.

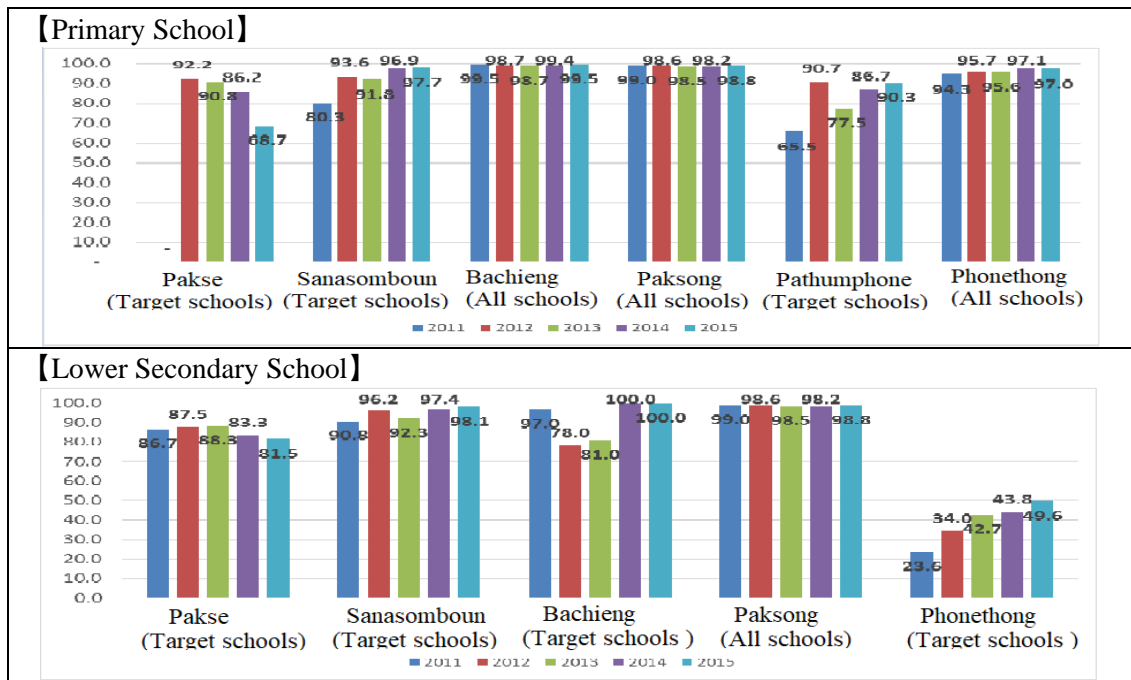


Figure 3 Net enrollment rate (NER) of primary and lower secondary schools in Champasack province

Source: Data provided by DESB

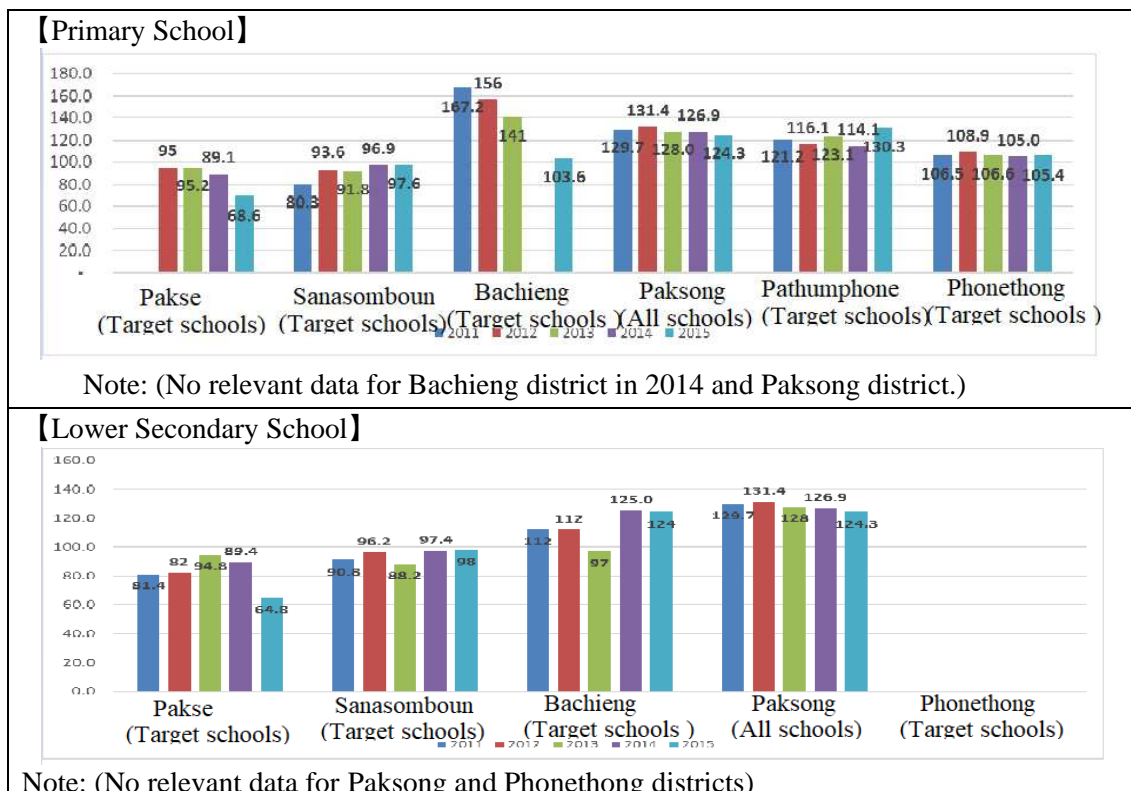


Figure 4 Gross enrollment rate (GER) of primary and lower secondary schools in Champasack province

Source: Data provided by DESB

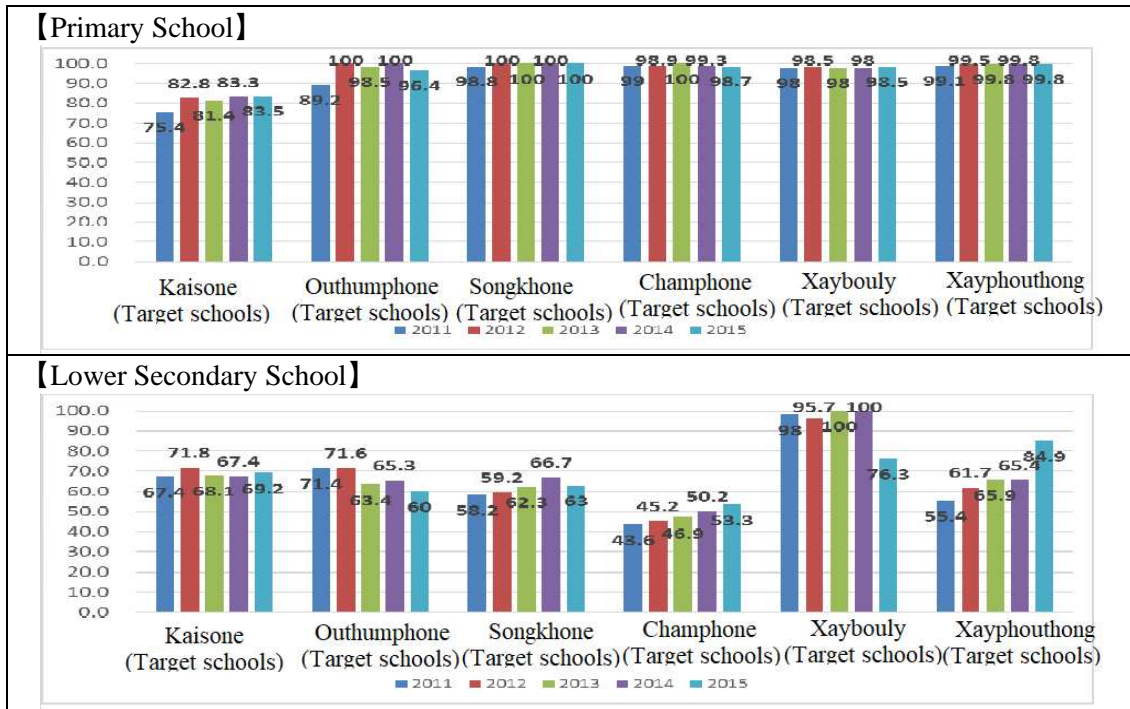
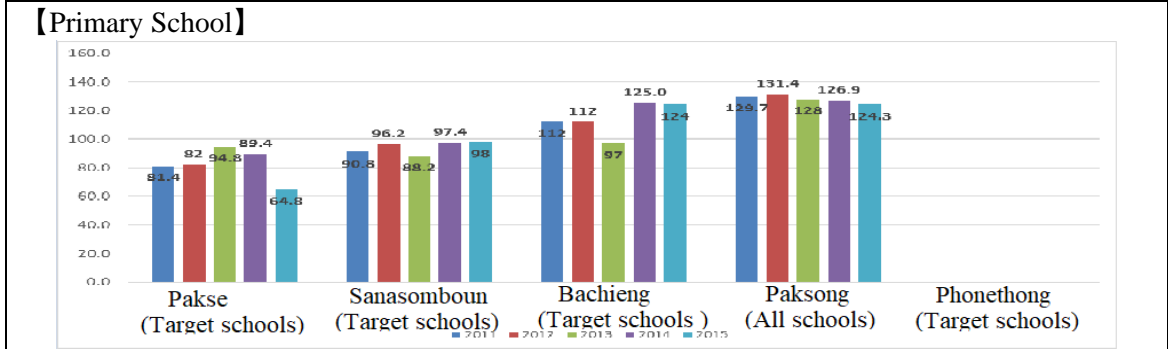


Figure 5 Net enrollment rate (NER) of primary and lower Secondarysecondary schools in Savannakhet province

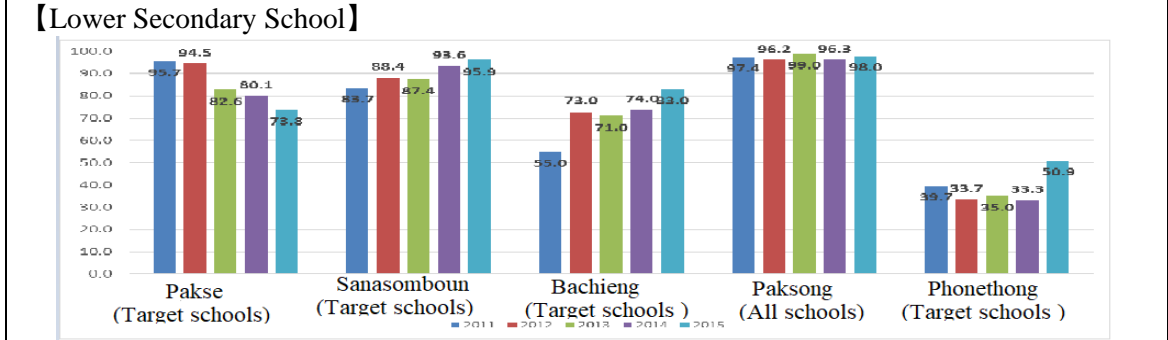
Source: Data provided by DESB

2) Improvement of the net intake rate of the target schools

The net intake rate of both primary and lower secondary schools in all districts in Champasack province have increased or remain the same except Pakse. In Savannakhet the net intake rate of primary schools is the same and its lower secondary has improved except for Kaison district although there are variations in each district. As for the net intake rate as well as the net enrollment rate, opinions from the community were positive, as one parent put it "My feeling that I want to let my children enroll has strengthened as the learning environment are well developed". This project contributed to some extent to the improvement of the net intake rate.



Note: (No relevant data for Bachieng, Paksong and Phonethong districts.)



Note: (No relevant data for Phonethong.)

Figure 6 Net intake rate (NIR) of primary and lower secondary schools in Champasack province

Source: Data provided by DESB

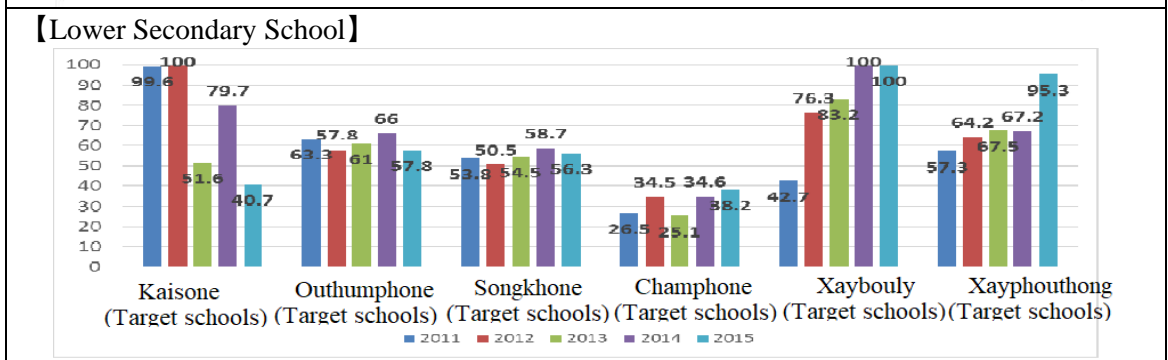
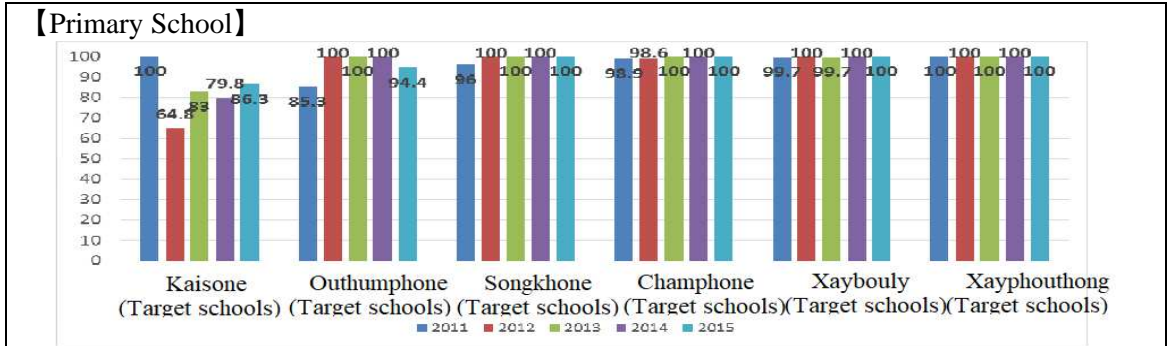


Figure 7 Net intake rate (NIR) of primary and lower secondary schools in Savannakhet province

Source: Data provided by DESB

The proportion of the target schools to the number of schools in the district is as follows.

Table 4 Percentage of target schools to the number of all schools in the district

Province	District	Primary school			Lower secondary school		
		Target	All schools	Coverage	Target	All schools	Coverage
Champasack	Pakse	6	36	16.7%	4	9	44.4%
	Sanasomboun	7	82	8.5%	4	9	44.4%
	Bachieng	7	66	10.6%	1	5	20.0%
	Paksong	5	87	5.7%	3	10	30.0%
	Pathumphone	3	87	3.4%	5	6	83.3%
	Phonethong	9	80	11.3%	0	11	0.0%
	ALL	37	761	4.9%	17	77	22.1%
Savannakhet	Kaison	6	60	10.0%	4	17	23.5%
	Outhumphone	6	72	8.3%	2	9	22.2%
	Songkhone	3	112	2.7%	3	12	25.0%
	Champhone	5	122	4.1%	2	17	11.8%
	Xayboully	5	72	6.9%	3	10	30.0%
	Xayphouthong	1	49	2.0%	1	5	20.0%
	ALL	26	1172	2.2%	15	130	11.5%

Source: Data provided by PESS

## (2) Qualitative effects

1) With the provision of science rooms the lesson accordance with official curriculum of lower secondary education has been promoted

Since the science laboratory was not used as planned, there was no impact effect of promoting the implementation of classes in line with the official curriculum of secondary school education.

As already stated in effectiveness, one of the 2 science laboratories has been used as ICT classroom and another one was being used as a regular classroom. As a result of hearing from the National Education and Research Institute of the Ministry of Education and Sports, ICT has become increasingly necessary recently for acquiring computer skills. 21 schools out of 867 public lower secondary schools (2.4%), 132 schools out of 635 public integrated lower and higher secondary schools (20.8%) have ICT rooms and 2 hours of ICT lessons are conducted in lower secondary school each week.

2) With the provision of toilet, students' awareness of hygiene has been improved

It was confirmed that students' awareness of hygiene was improved by improving the toilets. We conducted a beneficiary survey on the change in awareness of students' sanitation concerning 82 teachers (41 primary teachers and 40 lower secondary school teachers). In the



5-stage evaluation<sup>29</sup>, it scored 5.0 for primary schools and 4.9 for lower secondary schools school<sup>30</sup>. Comments were positive, such as " Toilet is clean and comfortable for use,," "Students wash hands before meals, and became conscious of hygiene" were obtained from the teachers.

3) With the improvement of school facilities the community in target schools has been better motivated for school education

This project was responsible for a positive impact that has led to an improvement of the community's participation in school education. A beneficiary survey was conducted with 113 teachers (primary school 59 , lower secondary school 54 teachers) of visited schools to evaluate if that community's participation in school education had changed or not after the project. The results show that primary schools had a score of 4.6 and lower secondary school had a score of 4.8 out of 5. In addition, as a result of interviewing principal and the Village Education Development Committee (hereinafter referred to as "VEDC<sup>31</sup>") at 24 visited schools<sup>32</sup>, monthly subscriptions are collected from the community in 19 of 24 schools. In addition to this, in 8 out of 24 schools visited, the impact of actively participating in particularly school management was confirmed such as constructing school buildings, school gardens, VEDC offices and others mainly by VEDC after implementation of this project. Before this project was implemented, school participation in the communities in these 8 schools had never occurred. Construction costs were not based on support from districts, provinces or donors, but the funds from the community obtained by agreement. It can be said that the project has some positive impact on improving the community's participation in school education.

Table 5 Awareness of community participation in school education

	Number of schools	Percentage
Percentage of schools conducting regular monthly collections from the community	19/24 school	79.2%

Source: Created from interviews with schools

4) With the provision of new classrooms students have increased motivation to study

<sup>29</sup> The degree of satisfaction was surveyed in five stages of "very agree", "I think so", "Fair", "do not agree", "not at all".

<sup>30</sup> There are 4 schools where toilets are not used, and they are included in survey conducted by random sampling of all schools. Regarding this question, they answered about the situation when the toilet was available.

<sup>31</sup> VEDC members consist of seven people, village chief, elder's organization representative, principal, faculty representative, female alliance representative, youth alliance representative, and parents' association representative, and they are engaged in the administration of the school.

<sup>32</sup> 24 out of 95 target schools (target 2 provinces × 6 districts / province = 12 districts, 1 primary school per 1 district, 1 lower secondary school per 1 district, 2 schools in total) were selected by random sampling and visited and investigated.

As a result of the beneficiary survey, students' motivation to study due to classroom improvement has improved to be 4.0 (primary school) and 4.1 (lower secondary school) out of 5. The following answers were obtained from students; "The school became clean and I am now motivated for study." "There are desks and chairs being maintained and I am well motivated for schooling ."

5) With the provision of new teaching staffrooms teachers have experienced increased motivation for teaching.

As a result of the beneficiary survey, teachers' motivation for teaching has improved to be 4.6 out of 5 for both the primary and lower secondary schools. Its result was quite high. The following answers were obtained from teachers; "The temperature of the room became stable and I can concentrate on my teaching.", "I can continue the lessons even if it rains."

6) With the provision of new toilets female students have increased motivation for schooling

A survey was conducted with 44 primary female students and 40 lower secondary female students in all schools with the provision of new toilet. As a result, female students have increased motivation for schooling by 3.8 in primary and 4.1 in lower secondary school.

#### 3.4.2 Other Positive and Negative Impacts

##### (1) Impacts on the Natural Environment, Land Acquisition and Resettlement

In this project, as a result of an interview with the executing agency, we confirmed that no particular impact was observed on the natural environment and resettlement of residents and land acquisition.

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

### 3.5 Sustainability (Rating: ②)

#### 3.5.1 Institutional Aspects of Operation and Maintenance

##### (1) Institutional Aspects of Operation and Maintenance at MoES

From the time of the ex-ante evaluation to the time of the ex-post evaluation, there is no change in the main functions such as the operation duties etc. regarding the management system. In carrying out the project, under the direction of the Planning and Cooperation Bureau of the Ministry of Education and Sports, the budgetary measures for projects implemented by the provinces, arrangements for teachers concerning school administration, securing teacher salary budgets, etc have been executed. Regarding teacher placements, the required number of teachers based on government standards has not been satisfied due to the lack of current budget.

However, in the hearing from the Director the current number of teachers are enough for the current operation and maintenance. Also it was confirmed by MoES that the improvement policy to eliminate non-regular teachers will be implemented with a high probability during the 8th ESDP implementation. So the lack of teachers due to the classroom development is minor problem.

The organizational chart of the Ministry of Education and Sports is as follows.

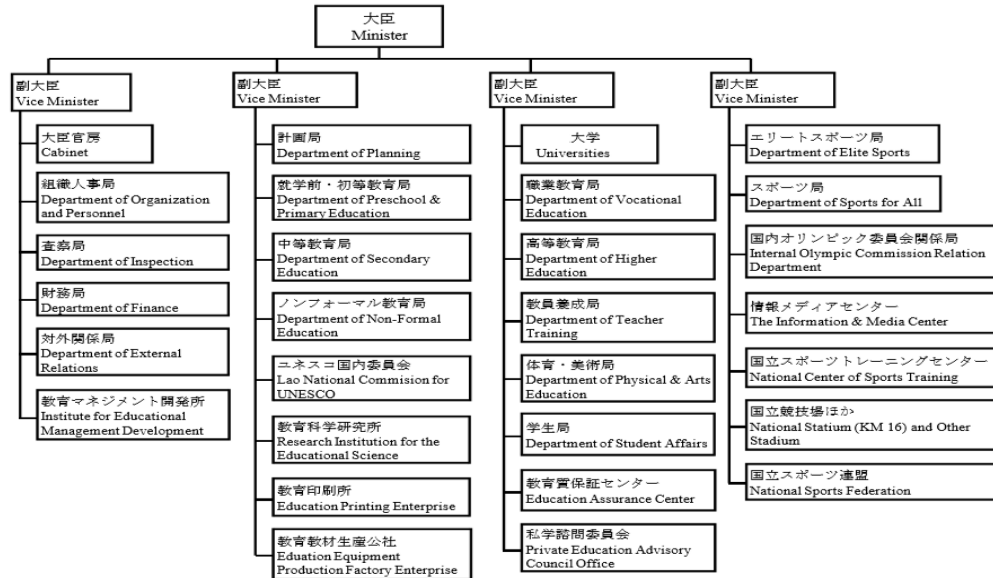


Figure 8 Organization chart of MoES

Source: Confirmed to MoES

The provincial education administration is managed by PESS which is under MoES. Regarding the maintenance and management of the school facilities in the project when the major damages are found VEDC in primary schools and VEDC or parents associations which manage several VEDCs contact to DESB. Since DESB is responsible for coordination and communication between the schools and PESS, it can be said that operation and maintenance at MoES is generally functioning.

(2) Institutional Aspects of Operation and Maintenance at community level

Some problems were confirmed in the coordination system and instructive system in the organizational management at the community level. Active participation in school management by the VEDC was recommended in the 8th ESDP and VEDC was obliged to set up in each village by a ministerial decree<sup>33</sup>. The VEDC is organized in primary schools and VEDC /

<sup>33</sup> It was obliged to set VEDC in Minister of Education Order No. 2300 (September 3, 2008) in 2008.

parents association is organized in lower secondary schools for operation and maintenance at each school. For example, one of the lower secondary schools in Sanasomboun in Champasack province students came from 15 villages. So that 15 VEDCs are involved in school management by forming a parent association managed by a principal mainly. The VEDC or parents association regularly inspects school facilities or holds a meeting on school management. They collect contributions from each student's family and use it for repairing facilities or for expenses etc.

Much of the organizational management is left to the school and VEDC / parents association at present. Only 3 out of 95 of the target primary schools which undertook organized training of the VEDC within JICA's "Project for Supporting Community Initiative for Education Development (Phase2)<sup>34</sup>". In addition to this, the number of workshops was once only. The coordination system and instructional system of VEDC are different for each school and are not necessarily clarified. There are only 10 schools in 24 schools that have organizational charts.

There were 6 out of 24 schools that when the principal retired the knowledge and experience in the previous training, records of financial statements were not inherited properly nor the lack of clarity over the staff in charge of cash management was seen.

### 3.5.2 Technical Aspects of Operation and Maintenance

#### (1) Technical Aspects of Operation and Maintenance at MoES

Regarding the maintenance of school facilities institutionally, DESB provides technical assistance including cost sharing. However, due to the limited budget, VEDC / parents associations are often forced to conduct repairs of small breakages and to do daily maintenance. If there are major damages to facilities and equipment, the school contacts DESB and DESB provides the expenses and technical assistance. The MoES is engaged in the operation and maintenance of the school through the distribution of the budget to the districts and provinces instead of providing technical assistance to the schools directly. DESB is also not only involved in this project but also in other school construction projects supported by other donors and NGOs. They have a certain experience and know-how. For example, through holding monthly meetings and periodical training the principal reports the current situation of school to DESB and at the same time DESB also reports the current status of the whole districts or provides workshops to schools. There are some schools which need repairmen partly, but most schools can manage without major repairs.

#### (2) Technical Aspects of Operation and Maintenance at community level

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<sup>34</sup> JICA's technical cooperation project that supported the strengthening of the management system and capacity at each level of educational administration to expand and develop the learning and improvement effect of primary education through the activation of VEDC conducted in 2012-2016.

The community has sufficient technical capability in the maintenance of facilities. Concerning the operation and maintenance at the community level a result of conducting an interview survey with the principal and the VEDC is shown in Table 6 below.

Table 6 Community level operation and maintenance situation

Number of schools which understand the procedure when repairs occur	23/24	95.8%
Number of school which have a meeting with VEDC more than once a month	19/24	79.2%
Number of school which maintain the school facilities with VEDC more than once a month	19/24	79.2%

Source: Created from interviews with schools

Almost all schools become familiar with the procedure at the time of a repair occurring. If minor repairs occur to school facilities, a principal will hold a meeting with the VEDC to discuss future repair policies, whether they can be repaired within the budget, whether to support the supplies from the community and whether additional funding is required. If serious repairs are required the school reports to the DESB and submits a document stating the improvement plan. In addition to this, 19 out of 24 schools conducted regular meetings at least once a month between the school and the VEDC. At regular meetings they check the current situation and discuss future plans including school administration, student instruction and community activities. There were 19 out of 24 schools that conducted maintenance of facilities more than once a month. Maintenance tasks such as inspecting the door knob in the classroom, confirming the closing of the window, confirming the clean condition of the toilet, etc. are carried out at each school. In addition to this, after the project, 8 of 24 schools proceeded to rebuild their old school buildings as a dining hall and built a VEDC office and conference room on the school grounds.

### 3.5.3 Financial Aspects of Operation and Maintenance

#### (1) Financial Aspects of Operation and Maintenance at MoES

The finance of MoES operation and maintenance is expected to be secured to a certain extent in the future. So the sustainability of finance is generally high. According to the data of the Department of Finance, the annual budget of MoES is as shown in the table below.

Table7 MoES annual budget (Unit: Millions of Kip<sup>35</sup>)

	2012/2013	2013/2014	2014/2015	2015/2016
Education budget	3,811,959	3,951,527	3,714,502	4,416,806
(Ordinary expenses)	(2,785,180)	(2,940,721)	(2,997,217)	(3,623,110)
(Capital expenses)	(1,026,779)	(1,010,806)	(717,285)	(793,696)
Ordinary expenditure rate	73.0 %	74.4 %	80.0 %	82.0 %
Government budget rate	16.7 %	15.5 %	15.5%	17.0 %

Source: MoES Department of Finance (2016), 2015/16 data is based on budget

Although the education budget doubled in the past five years, the government budget ratio has been in the range of 14 to 16%. The 18% targeted goal listed in the Education Law has not yet been achieved. In the 8th ESDP the goal is to increase the share of educational expenses in the government budget from 13% to 18%. And since other donors' financial support is also provided, certain finance related to education is expected to be secured. The maintenance costs of the facilities are included in the maintenance costs of the current budget. According to the Department of Finance, nearly 90% of the current budget has been occupied by employee salaries and allowances. It was confirmed that the proportion of the maintenance budget to the entire education budget and the current budget is extremely small. However, an improvement policy (elimination of non-regular teachers) is expected to be implemented during the 8th ESDP period.

On the other hand, the additional number of necessary teachers for target schools and the actual number of employed teachers are as follows. We confirmed that it's the burden of MoES budget for the additional teaching staffs. The additional number of necessary teachers in the developed classrooms are not sufficiently supplemented due to the lack of budget in MoES, PESS and DESB. However, it is confirmed by interview with the MoES that the improvement policy is expected to be implemented with a high probability by the 8th ESDP. It was confirmed by interviews with the school and VEDCs that the distribution of chalk and the repainting of blackboards was implemented at all of the target schools with the MoES's own budget.

<sup>35</sup> 1Kip=¥ 0.01402(December 2016 present)

Table 8 (Existing school) Additional number of necessary teachers for target schools and the actual number of employed teachers

	Primary			Lower Secondary		
	Necessary	Actual	Fulfillment rate	Necessary	Actual	Fulfillment rate
Champasack	15	3	20.0%	9	2	22.2%
Savannakhet	30	8	26.7%	16	4	25.0%
Total	45	11	24.4%	25	6	24.0%

Source: Interviews with target schools

Table 9 (Newly constructed school) Additional number of necessary teachers for target schools and the actual number of employed teachers

Name of school (ID)	Vang Tao (PT-14S)		Ang Kham (PT-15S)		Somsa Arth (XB-12S)	
	Necessary	Actual	Necessary	Actual	Necessary	Actual
Principle	1	1	1	1	1	1
Vice Principle	2	1	2	1	1	1
Teacher	24	14	16	10	22	17
Administration staff	2	3	1	2	3	8
Total	29	19	20	13	27	27

Source: Interviews with target schools

## (2) Financial Aspects of Operation and Maintenance at community level

The finance of the operation and maintenance at the community level is secured to a certain extent for the future. So the sustainability of finance is generally high. Regarding the school administration budget as an ordinary budget, in primary schools 70,000 kip per student, in lower secondary schools 50,000 kip per student are allocated as the school subsidy transferred from the DESB to the schools through MoES and PESS. In addition to this, many of the schools collect 5,000 to 50,000 kips per student for school operating expenses. In schools which do not collect money from families, there is often a shop in the school or the fields are plowed and vegetables are sold so that the school can secure other income sources. In all the visited schools, the maintenance costs decreased after the project.

### 3.5.4 Current Status of Operation and Maintenance

Classrooms, toilets, equipment, etc. of the target schools are generally used appropriately, and maintained and managed. Table 10 below shows the aging situation of the classrooms, teachers' rooms, and toilets constructed in this project.

Table 10 condition of the classrooms, teachers' rooms, and toilets

(Lower % is the ratio of facilities in a good condition)

	Classrooms		Teachers' rooms		Toilet	
	Constructi on	Good condition	Constructi on	Good condition	Constructi on	Good condition
Primary	274	272 (99.3%)	53	53 (100%)	46	43 (93.5%)
Lower Secondary	153	151 (98.7%)	14	14 (100%)	20	19 (95%)
Total	427	423 (99.1%)	67	67 (100%)	66	62 (93.9%)

Source: Interviews with target schools

Situations such as the ceiling falling out at some of the classrooms and some cracks on the floor of the visited school were seen. Regarding the ceiling falling out, the school submitted a request for repair to DESB. DESB is also already aware of this situation and is planning to take measures. Floor cracks are at a level that can be repaired by the VEDC, which is usually repairable in a short period of time. Other than that, it is mostly minor repairs and schools are mostly in a good situation. After the repairs occurred the schools that were repaired amounted to 6 of 10 schools visited. And it's confirmed by the VEDC that the remaining 4 schools had a plan to carry out repairs during the next semester holiday.

It was confirmed with an oral survey of schools that the MoES have been carrying out improvements concerning the distribution of textbooks and chalk, and the regular exchange of blackboards. Regarding the removal of sediments in the toilet, 62 out of 66 schools that had installed toilets have eliminated themselves using the original budget of the school last year or existing equipment. In the remaining 4 schools toilets could not be used at the time of ex-post evaluation. It was confirmed with an oral survey with schools and the DESB that the reason why 4 toilets could not be used is as follows; 1) 2 schools can not use water during only dry season because the amount of water in water source is not enough and water from the area is not supplied 2) In 1 school there is a water source in the area however it is difficult to maintain a sufficient amount of water because the depth of the water source is not sufficient 3) In 1 school the pipe connecting the toilet was stolen.

Some minor problems have been observed in terms of the institutional aspect. Therefore sustainability of the project effects is fair.



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

### 4.1 Conclusion

The objective of this project was to improve the quality of primary and lower secondary education in Champasack province and Savannakhet province in the southern region by constructing facilities and providing equipment for 91 primary and lower secondary schools and improving school environment.

At the time of the ex-post evaluation, securing access to high quality primary education and lower secondary education in the two southern provinces continues to be a priority issue. The project is consistent with development policy. In the two target provinces there is still a high need to support the rebuilding of school buildings. Since this project is consistent with Japan's ODA policy at the time of planning as well, the relevance of this project is high.

Although the cost of this project was within the plan, the project period exceeded the plan. So, the efficiency is considered fair.

In this project, some problems remain in terms of the achievement rate of the actual against the target in the indicator of "The number of students who can study in a decent learning environment" which is one of the quantitative effect indicators. But other quantitative and qualitative effects indicators are generally high.

Regarding the impact, the indicators were set according to quantitative effects and qualitative effects in which the planned effect was observed such as with an improvement of the net enrollment rate of the target schools and with increased awareness of students' sanitation needs due to the improvement of the toilets. Also, another observed impact included students' willingness to attend school, improving motivation for teachers' teaching and girls' willingness for schooling. Therefore, the project's effectiveness and impact are considered high.

The executing agencies and communities of this project have the necessary operational and maintenance techniques to maintain the effectiveness of this project. On the other hand, some problems have been found in the community-level operation and maintenance system. Thus, sustainability is viewed as fair.

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

### 4.2 Recommendations

#### 4.2.1 Recommendations to the Executing Agency

##### (1) Securing education budget to expand teacher's new employment

There are some schools where classrooms constructed by this project are not used due to a lack of teachers and schools where one teacher teaches a large number of students which causes overcrowded classes. It is desirable that MoES should also take into consideration securing education budgets to expand teachers' new employment as soon as possible using the donor's

financial support and others.

#### 4.2.2 Recommendations to JICA

None

#### 4.3 Lesson Learned

##### (1) Community's active participation in school management through community development support

This project could lead to an improvement in the community awareness for active participation in school education with the school construction project. At 8 out of 24 schools visited, the impact of active participation in school management was confirmed, such as constructing school buildings, school gardens and VEDC offices by mainly VEDC themselves after the project. One of the features of the community development support grants project (current procurement proxy method<sup>36</sup>) is to reduce project costs by utilizing local contractors. VEDC and teachers at schools saw that local contractors and equipment were actively utilized from the stage of construction of schools. It was confirmed by interview with schools that ownership of the facility management and operation after the school construction had been developed. Therefore it can be said that it's important to consider to utilize the local contractors actively in grant aid projects from the viewpoint of not only reducing expenses but also to improve the awareness of participation in school education by the community in the future.

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<sup>36</sup> At present, the sub-scheme of grant aid is abolished, and it is organized as "procurement method of facilities / equipment" and "procurement proxy method". The former community development support grant project is classified into the latter.

Lao People's Democratic Republic

FY2016 Ex-Post Evaluation of Japanese Grant Aid Project

"The Project for the Improvement of School Environments in Three Southern Provinces"

External Evaluator : Yudai NISHIYAMA, INTEM Consulting Inc.

## **0. Summary**

The objective of this project is to enhance learning environment by developing school facilities for 74 schools in six districts in three southern provinces of Laos, thereby contributing to improving the quality of primary education in three southern provinces.

At the time of the ex-post evaluation, expanding access to high quality primary education in the three southern provinces continued to be a priority issue. The project is consistent with development policy. In the three provinces, there is still a high need to support the rebuilding of school buildings. Since this project is also consistent with Japan's ODA policy at the time of planning, the relevance of this project is considered to be high.

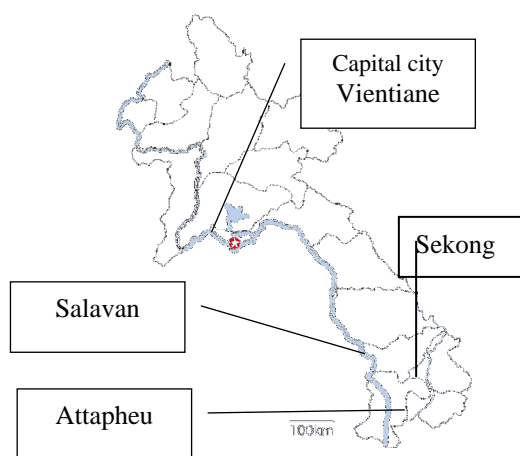
Although the project cost was within the plan, the project period exceeded the plan. Therefore, efficiency of the project is fair.

In this project, some problems remain in terms of the actual achievement rate against the indicator target of "Number of students in decent classroom" which is one of the quantitative effect indicators. But other quantitative and qualitative effects indicators, such as the number of classrooms in a decent environment or the students' satisfaction with school facilities etc. are generally high. Regarding the impact, the indicators were set according to quantitative effects and qualitative effects in which the planned effect was observed, such as with an improvement of the net enrollment rate within the target schools and with an increased students' awareness of sanitation due to the improvement of the toilets. Also, other observed impacts included students' willingness to attend school, improving teachers' motivation for teaching, female students' willingness to attend school and synergy effect of cooperation with the JICA technical cooperation project. Therefore, the effects are generated almost as planned through implementation of the project and the impact are considered high.

The executing agencies and communities of this project do not have any institutional, technical, financial and current status of problems on operational and maintenance system of this project. Therefore sustainability of the project effects is high.

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

## 1. Project Description



Project Locations



Donchan Primary school  
built under this Project  
(Sekong, Lamam)

### 1.1 Background

“The Sixth National Socio-Economic Development Plan (NSEDP: 2006-2010)” of Lao PDR adopted the goal of “the qualitative and quantitative improvement of human resources through educational reform” in the educational sector, which ranks priority sector. In particular, dissemination and improvement of basic education is a prerequisite for sustainable economic growth and poverty reduction in the future, positioned as a priority for promoting human resource development to support the fundamental solution of poverty and national development. As a result of these efforts, the primary NER (Net Enrollment Rate<sup>1</sup>) was improved from 79.0% in 2000 to 82.4% in 2005.

However, the southern region close to the Cambodian-Vietnamese border positioned as the CLV (Cambodia, Laos, and Viet Nam) Development Triangle Area still has a high poverty rate<sup>2</sup> compared to the national average. Particularly in the three provinces of Salavan, Sekong and Attapheu in this area, the net enrollment rates of primary education are less than the national average, which are 74.0%, 70.7%, and 67.3% (2005)<sup>3</sup> respectively. At first the Provincial Education and Sports Service (hereinafter referred to as “PESS”) is to confirm the need through the District Education and Sports Bureau (hereinafter referred to as “DESB”) and is planning to develop a reinforced concrete school. However, the area is dominated by wooden schools built by the community and many of them are dilapidated and/or temporary ones requiring urgent rebuilding. Overall, the education environment is quite poor in the provinces<sup>4</sup>.

<sup>1</sup> Net enrollment rate (NER) = (corresponding education level school enrollment population ÷ relevant education level population) × 100

<sup>2</sup> Source: Final report on Lao PDR poverty profile survey (2010) p.8

<sup>3</sup> Source: Ministry of Education Annual Report 2004/2005

<sup>4</sup> Hearing from MoES

Based on these background, the Government of Lao PDR has requested the Government of Japan to provide grant aid for the construction of facilities and provision of equipment for the primary schools in Salavan, Sekong and Attapeu provinces, to further improve the school environment in the southern region.

## 1.2 Project Outline

The objective of this project is to enhance learning environment by developing school facilities for 74 schools in six districts in three southern provinces of Laos, thereby contributing to improving the quality of primary education in three southern provinces.

G/A Grant Amount / Actual Grant Amount		685 million yen / 685 million yen
Exchange of Notes Date		February 2009/ February 2009
Executing Agency		Ministry of Education and Sports <sup>5</sup> , Department of Planning
Project Completion		September, 2011
Contracted Agencies	Main Contractor(s)	<b>Construction:</b> PHOUNETHAVY CONSTRUCTION Co., LTD, VILAYVONE CO., LTD and SANPO CO.,LTD,DOUANGPHACHANH,CONSTRUCTION CO., LTD,STS CONSULTANTS AND CONSTRUCTION CO., LTD, HONGKHAM CONSTRUCTION Co., LTD, LOUMKHAM CONSTRUCTION Co., LTD, Khamphouang Construction Co., LTD, Mexaypaseurth Construction Company LTD, Samakkhixay Co., LTD and Phosy Construction Company, Khampasong Construction Co., LTD and Khonexay Construction Company, ST Construction Co., Ltd, Khamphoiang Construction Co., Ltd, Phosy Constructing Co., Ltd, PHOUNETHAVY CONSTRUCTION Co., LTD <b>Equipment:</b> Kongseng Furniture, JV Kongseng Furniture & Lao Chaluan Sin Co., Ltd
	Consultant	Mohri, Architect & Associates, INC

<sup>5</sup> At the time of project implementation, it was called as "Ministry of Education (MOE)" reorganized in 2011.

	Procurement Agent	Japan International Cooperation System (JICS)
Outline Design		February 2008 - November 2008
Related Projects		<p><b>【Technical Cooperation】</b>: Supporting Community Initiatives for Primary Education Development in the Southern Provinces (2007-2011), Project for Supporting Community Initiative for Education Development (Phase 2) (2012-2016), Project for Improving In-service Teacher Training for Science and Mathematics Education (2010~2013)</p> <p><b>【Grant Aid】</b>: The Project for the Improvement of School Environments in Champasack and Savannakhet Provinces (2010)</p>

## 2. Outline of the Evaluation Study

### 2.1 External Evaluator

Yudai NISHIYAMA, INTEM Consulting Inc.

### 2.2 Duration of Evaluation Study

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

Duration of the Study: July 2016– December 2017

Duration of the Field Study: November 1, 2016 – November 30, 2016

March 1, 2017 – March 10, 2017

### 2.3 Constraints during the Evaluation Study

Although attempts were made to collect the education statistics data (NER, NIR (Net Intake Rate)) on the target schools necessary for an analysis of the impact, no reliable data could be obtained from DESB partly. The analysis for achievement of the impact was therefore carried out using data for the target district as complementary information.

## 3. Results of the Evaluation (Overall Rating: A<sup>6</sup>)

### 3.1 Relevance (Rating : ③<sup>7</sup>)

#### 3.1.1 Consistency with the Development Plan of Laos

“The Sixth National Socio-Economic Development Plan (NSED: 2006-2010)” of Lao PDR adopted the goal of “the qualitative and quantitative improvement of human resources through educational reform” in the educational sector, which ranks priority sector. Also, the

<sup>6</sup> A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

<sup>7</sup> ③: High, ②: Fair, ①: Low

Ministry of Education (MOE) has set “Education Sector Development Framework (ESDF, 2009-2015)” in 2009 as a comprehensive framework on educational effort. The ESDF specified the equal access of educational services as one of the strategies. The development of educational facilities targeting the provision of multi-grade classrooms in the villages that could not provide five-year primary education was one of the measures for achieving this.

At the 8<sup>th</sup> NSEDP (2016 - 2020) at the time of the ex-post evaluation, the education sector continues to be a priority area, and efforts to expand opportunities for access to high-quality education are continuously conducted. Construction and refurbishment of educational facilities are cited as one mean for that. The 8<sup>th</sup> Education Sector Development Plan (hereinafter referred to as "ESDP") (2016-2020) also put the education sector as one of the top priorities in order to move from least developed country status by 2020.

As mentioned above, development policy of education sector in Laos have not changed at the time of the planning and the ex-post evaluation, and the development policy of Laos is consistent with this project.

### 3.1.2 Consistency with the Development Needs of Laos

In the southern area close to the Cambodian-Vietnamese border, there were many pre-school children. Especially in the three provinces of Salavan, Sekong and Attapeu in this area, NER of primary education as of 2005 was lower than the national average of 84.2% and were 74.0%, 70.7% and 67.3% respectively. As a result of interviews with the Ministry of Education and Sports (hereinafter referred to as “MoES”), NER of primary education for FY 2015 was 98.4% on average nationwide, 98.7% in Salavan, 97.9% in Sekong and 98.5% in Attapeu province. The school environment and access to education had both been improved due to the steady increase in the number of schools and NER had increased. On the other hand, regarding the learning environment, most of the schools were wooden school buildings built by the community in the area. There were many facilities requiring urgent reconstruction due to aging, and the learning environment was remarkably poor<sup>8</sup>. As a result of interviews with PESS in three provinces to gather information on the condition of the existing schools, 16.9% of schools in Salavan, 21.2% in Sekong and 37.4% in Attapeu in the FY2015 (September 2015 - August 2016) were classified as temporary wooden school buildings or semi-durable school buildings and in many aging was prominent. The learning environment has continued to be subject to adverse conditions. Although improvements are seen compared with the ex-ante evaluation in 2008, school aging in each province is still noticeable, and there is a need for refurbishment in situations where the learning environment is poor.

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<sup>8</sup> According to the outline design survey report p.1 to 5, for example, in Salavan district in Salavan province, only 39.3% of existing classrooms were durable school buildings (reinforced concrete structures) as of 2008.

From the above, there is no difference in consistency with the development needs from planning through to ex-post evaluation; these development needs continue to be high

### 3.1.3 Consistency with Japan's ODA Policy

In the Official Data Book for Official Development Assistance (ODA) in FY2008, one of Lao three aid goals, "To support capacity development as a prerequisite for self-help efforts of Lao side in achieving poverty reduction and economic growth" was set up and "enhancement of basic education" was a priority field. Therefore, this project was consistent with Japan's aid policy at the time of planning.

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

## 3.2 Efficiency (Rating: ②)

### 3.2.1 Project Outputs

The output from the Japanese side for this project was the development of educational facilities (classrooms, teacher's room, and toilets) and the procurement of educational equipment (furniture). The output from Lao side was to secure land, maintain and improve the road, and the dismantling and removal of existing facilities and obstacles, etc. Table 1 outlines the output of this project. Regarding the output from the Japanese side, the number of target classrooms was increased by 12 and the number of toilets was increased by 21 after the project. This is because the construction of toilets at the two schools where toilets had been constructed with the aid of the United Nations Children's Fund (UNICEF) was cancelled. In addition, using the remaining money due to foreign exchange gains<sup>9</sup>, the additional 23 toilets were constructed in 23 schools. Those 23 schools were selected as the schools which had not been subject to the construction of the toilet building as no water source was secured at the time of the outline design survey but after the outline design survey, water source were developed by the community and those schools which had not had existing toilet buildings. In addition to this, the additional construction of four classroom buildings (12 classrooms) was implemented by using residual money in three schools where the number of students had increased significantly after the outline design survey.

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<sup>9</sup> Penalty of 9,010.5 dollars (0.7 million yen) for the lot that was delayed in construction was incorporated into the remaining money. Japanese yen is converted at JICA control rate (\$ 1 = ¥ 81.23) in November 2010 when penalty fee was collected.



Table 1 Planned / Actual number of educational facilities

	Number of schools	Number of classrooms	Number of teacher's room	Number of toilet
<b>Salavan Province</b>				
Salavan	14/14	56/59	13/13	6/13
Laongam	14/14	42/45	14/14	2/11
Subtotal	28/28	98/104	27/27	8/24
<b>Sekong Province</b>				
Lamam	9/9	35/35	9/9	1/1
Thateng	12/12	35/41	10/10	5/5
Subtotal	21/21	70/76	19/19	6/6
<b>Attapeu Province</b>				
Samakixay	13/13	43/43	13/13	3/6
Sanamxay	12/12	55/55	12/12	1/3
Subtotal	25/25	98/98	25/25	4/9
<b>3Provinces Total</b>				
	74/74	266/278	71/71	18/39

Source: Information provided by MoES

Note: Shaded areas are numbers where changes (increases) were made in planned and actual results

In addition, we confirmed as a result of interviews with the MoES that the quantities of items such as blackboards, desks, chairs and shelves that had been delivered were more than what was planned for. In addition to the initial plan, as described above, residual funds occurred. Thus output of equipment also increased by developing additional 12 new primary school classrooms

Regarding the output from Lao side, as a result of interviewing MoES to see if the input was implemented as planned, there was a response that the output was carried out as planned. At the time of the school visit by the evaluator, it was verified that the items born by and inputs from the Lao side had been implemented by visual confirmation of the site<sup>10</sup>.

### 3.2.2 Project Inputs

#### 3.2.2.1 Project Cost

At the time of planning, the project budget was 685 million yen, and the actual expenditure was 685 million yen, which was as planned. The details of project costs borne by Laos were not obtained.

#### 3.2.2.2 Project Period

As the project period, 21.5 months<sup>11</sup> was expected in the plan from signing of G/A to

<sup>10</sup> The items to be borne by Lao side such as dismantling of existing facilities and obstacles, external construction work, connection of electricity, securing of water supply etc. were visually checked on the site by evaluator.

<sup>11</sup> Including two months from Exchange of Note (E/N) to procurement agency contract in 19.5 months of implementation as described in the project preliminary planning sheet

completion, whereas the actual project period was 32.5 months, and it exceeded the plan significantly (151% compared to the plan). The main reasons for the difference in the project period are: 1) the construction of additional schools due to the generation of surplus (an output increase), 2) delay in the procedures concerning the construction of additional schools. The extension procedure itself was in accordance with the formal procedures, which was an extension of the inevitable construction period to use up the remaining budget. Even if remaining budget had not been generated, the plan was slightly exceeded by actual results as 102%<sup>12</sup> of the planned amount. This is because the commencement date for project implementation was delayed due to a change in the Cabinet meeting period. So, the planning of target schools that had been divided into two groups needed to be reconsidered taking into consideration the accessibility at the site in the rainy season as well as the bid lot division within the group. And the time of bidding/contracting to construction work/construction management was also slightly delayed from the planned 19.5 months to an actual 20 months. The actual result of only residual budget was 113%<sup>13</sup> which was almost as planned by the contractor.

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

### 3.3 Effectiveness<sup>14</sup> (Rating: ③)

#### 3.3.1 Quantitative Effects (Operation and Effect indicators)

Regarding the effectiveness, to confirm the improvement of the school environment at the target schools, the following indicators of qualitative effects were set at the ex-ante evaluation; 1) Number of schools conducting overcrowded classes and two-shift classes, 2) Number of the decent<sup>15</sup> classrooms, 3) Number of schools with newly provided toilets and that are actually used<sup>16</sup>. In addition, the following indicators were set and evaluated at this ex-post evaluation; 4) Number of schools with newly provided staffrooms that are actually used, 5) Number of students in decent class rooms. Furthermore, as an indicator of the qualitative

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<sup>12</sup> 102% = 22 months / 21.5 months (including E / N)

<sup>13</sup> 113% = 9 months / 8 months

<sup>14</sup> It is rated by taking impact on the judgment of effectiveness.

<sup>15</sup> The indicator of the ex-ante evaluation of this project is "a classroom in a decent environment", and its definition is presumed to be "Not aged / temporary school building". On the other hand, the target number of the students described in the effect indicator is the number of classrooms multiply 32 students which is the number of students per classroom in the Lao education quality standards (In the ex-ante evaluation, the development for small scale school with less than 40 students were planned. Capacity of 12 small scale classrooms planned for small scale schools with less than 40 students in the ex-ante evaluation is defined as 24 students per classroom.). Therefore, in this ex-post evaluation, this indicator is set as "number of classrooms in a decent environment" and it is defined as "number of classrooms that are used within 32 students per classroom according to Lao education quality standards in not aged / temporary school buildings"

<sup>16</sup> In the ex-ante evaluation, the construction of the toilets was set as an indicator. But because it is the output level, we evaluated whether it was constructed and is currently used properly. The target of the evaluation is 39 schools with newly constructed toilet in this project.

effects<sup>17</sup>, 1) Students' satisfaction towards the school facility, was conducted.

Table 2 Comparison between target and actual operation indicators

	Baseline		Target		Actual	
	2008	2010	2011	2015	2016	Achievement Level (2016)
	Planned Year	Planned Completion Year	Completion Year	4 Years After Completion	5 Years After Completion	Actual /Target
Number of schools with overcrowded classrooms <sup>18</sup> or 2 shift classrooms	46	0	Over crowded 58/74 2 shift 0/74	Over crowded 40/74 2 shift 0/74	Over crowded 36/74 2 shift 0/74	Over crowded 51.4 % <sup>19</sup> 2 shift 100 %
Number of decent classrooms	39	317	173/317	236/317	239/317	75.4 %
Number of schools with newly provided toilets which were actually used	21	60	39/39	36/39	36/39	92.3 %
Number of schools with newly provided staffroom which was actually used	NA	71	71/71	71/71	71/71	100.0 %
Of the constructed 278 classrooms, the number and percentage of classrooms used	NA	NA	NA	NA	253/278	91.0 %

Source: Baseline and target are provided by JICA, actual is provided by executing agencies.

Primary schools conducting two shift classes at the target schools became zero and the indicator target was achieved. The number of schools conducting overcrowded classes was 36

<sup>17</sup> At the time of the ex-ante evaluation, no indicator of the qualitative effect was set.

<sup>18</sup> Based on the project ex-ante evaluation sheet, more than 33 students / classroom in the Primary school is calculated as overcrowded class.

<sup>19</sup> 38 schools (74 schools - 36 schools) are schools where overcrowded classes are not held, and the ratio is 51.4% (38 schools / 74 schools).

schools for Primary (out of 74 schools). The average number of students in classroom where overcrowded classes are being conducted is 44 students/ classroom<sup>20</sup>, and the average class size of all classrooms was 26 students / classroom<sup>21</sup>. As a result of analyzing the number of students per classroom with the frequency distribution, as shown in Fig. 1, the number of students who are studying in overcrowded classes (red line in the figure) has not exceeded the standard largely.

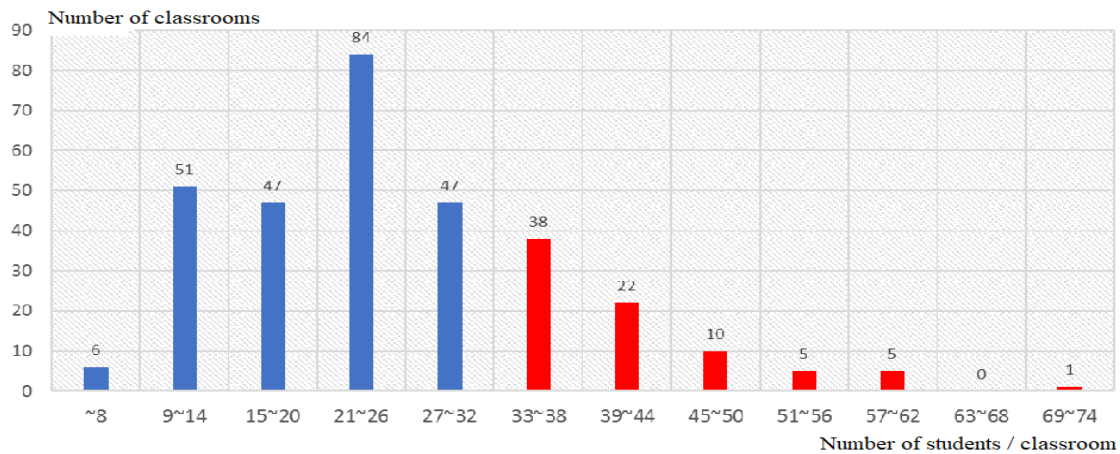


Figure 1 Frequency distribution of the number of students per classroom

Source: Information provided by schools

With respect to the number of decent classrooms in the target schools, 239 out of 317 classrooms in primary schools were in a good condition in 2016, which is 5 years after project completion against the target number of 317 classrooms. Therefore 75.4% of the target numbers were in the appropriate environmental condition and the indicator had not been achieved.

In this project, toilets were provided and actually used at 36 schools (92.3%) at primary level out of 39 target schools. So, the indicator was achieved.

Staffrooms were provided at 71 target primary schools in this project. The indicator was achieved since staffrooms were provided and used as planned.

Of the 278 classrooms constructed in this project, 253 classrooms have been used in total. The main reasons which these classrooms are not being used are as follows with the results of the interview from the principals of each school; 1) There is a shortage of teachers 2) Decreases in the number of students since planning

<sup>20</sup> There are 3,407 total students in the classroom where overcrowded classes are held and 77 total overcrowded classrooms. Therefore, the average number of students per overcrowded classes is 44 students.

<sup>21</sup> The target school has 8,219 total students and has 316 classrooms. Average number of students per classroom is 26.

Table 3 Comparison of target and actual number of effectiveness indicator

	Baseline	Target	Actual			
	2008	2010	2011	2015	2016	Achievement Level (2016)
	Planned Year	Planned Completion Year	Completion Year	4 Years After Completion	5 Years After Completion	Actual /Target
Number of students in decent classrooms (Upper: Number of students in decent classrooms Lower: Total number of students)	1,248 <sup>22</sup> / 9,118 (13.7%)	10,048 <sup>23</sup>	4,011/ 9,747	5,033/ 8,413	5,872/ 8,219	58.4 %

Source: Baseline and target are provided by JICA, actual is provided by executing agencies.

For the number of students in decent classrooms, the actual number at 5 years after completion in FY2016 is 5,872 against the target of 10,048. So, the achievement level is 58.4%. The actual number of students in target schools in 2016 was 8,219. Thus 71.4% of all students were provided with a decent environment. At the project completion year in 2010, a target number of 10,048 students was set. But the recent actual number of students in 2016 was 8,219. The fact that the total number of students has not increased as expected is one of the factors that lowered the achievement level. The population of Lao PDR nationwide increased steadily from 1985 to 1995 at an annual rate of 2.47%, and from 1995 to 2005 at an annual rate of 2.08% which is more than 2%. However, from 2005 to 2015, the population growth rate declined to an annual rate of 1.45%. It is pointed out that the population is draining out to the neighboring country of Thailand for economic reasons. Also, the population increase of the three provinces in the project is 2.0% in Salavan, 2.9% in Sekong and 2.2% in Attapeu. In addition, it is pointed out that the population concentration in the center of the provinces has progressed in all three provinces, especially in Sekong and Attapeu provinces in which it has gone from about 20% (2005) to 35% (2015)<sup>24</sup>.

<sup>22</sup> This figure is not a real number but a number of students who can be accommodated (39 classes × 32 students / classroom)

<sup>23</sup> Capacity of the students in classrooms is calculated as the target number of classrooms × capacity of the students per classroom (305 classrooms × 32 students / classroom + 12 small classrooms × 24 students) and used as the target number of the effect indicator.

<sup>24</sup> Lao Statistic Bureau (2015) Result of population and housing census (National Census), p.11, p.21-30.

### 3.3.2 Qualitative Effects (Other effects)

#### (1) (Additional indicator) Improvement in students' satisfaction<sup>25</sup> with school facilities

The construction of classrooms and the procurement of classroom furniture have led to an improvement of the students' satisfaction level of the school facilities. Beneficiary survey<sup>26</sup> was conducted and it was measured the "satisfaction level of the students with classrooms". Satisfactory results for all items of classroom size, ventilation/temperature, floor and walls, educational furniture (chairs, desks) were high; 4 out of 5. However, all of the students who experienced the situation before the project<sup>27</sup> had already graduated from school. So, it is difficult to compare the data before and after the project and it is an absolute evaluation. This was a restriction on the evaluation.

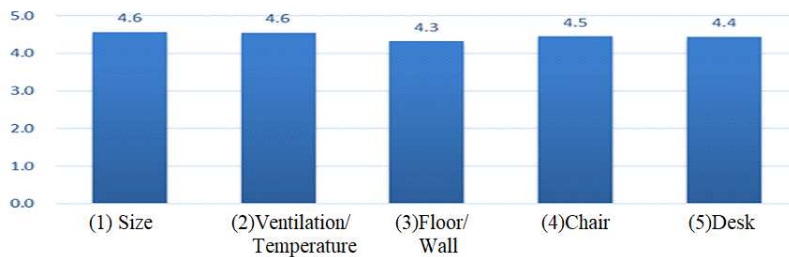


Figure 2 Satisfaction level of students with classrooms

Source: Beneficiary survey

Figure 3 below analyzes whether there is a significant difference in students' satisfaction as to whether the classroom is overcrowded or not. Out of the sample of 180, the number of students taking classes in overcrowded classrooms is 47. As a result of comparing the degree of satisfaction with the classroom, whether the classroom is overcrowded or whether the classroom is not overcrowded, it does not have a significant influence on the students' satisfaction with classrooms.

<sup>25</sup> The degree of satisfaction was surveyed in five stages of "very agree", "I think so", "moderate", "do not agree", "not at all".

<sup>26</sup> Beneficiary survey was conducted on sites visited by evaluators in Salavan, Sekong and Attapheu provinces. 18 schools were selected by random sampling (3 provinces × 2 districts × 3 schools / district). The questionnaire survey was entrusted to a consultant. Total sample number of students is 180. Total sample number of teachers is 73. 3 classrooms were randomly selected at each school. After that student's samples were randomly selected from student's list considering the ratio of male and female. Teachers were randomly selected from teacher's list. The ratio of students' samples is 90 in boys and 90 in girls.

<sup>27</sup> In or before 2008

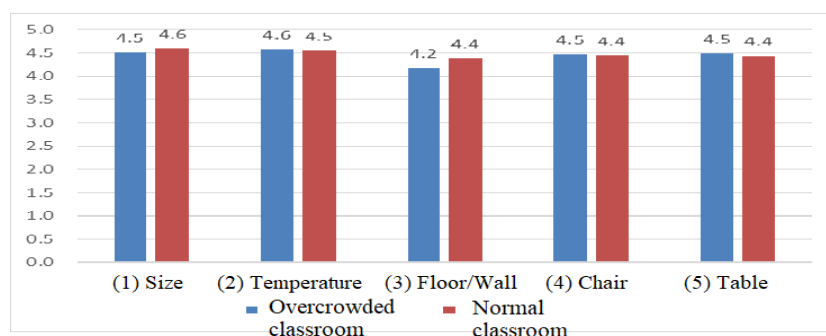


Figure 3 Comparison of satisfaction levels of students with classrooms which are overcrowded or not

Source: Beneficiary survey

### 3.4 Impacts

This project was expected to contribute to improving of the quality of education in the three southern provinces through an improvement of the school facilities. The enrollment rate, which is commonly used to evaluate how the improvement of education quality has impacted on education access, was set as an indicator for this evaluation survey. The following indicators were set as quantitative effect indicators for this ex-post evaluation and evaluated; 1) NER of target schools 2) NIR of target schools 3) Enrollment rate of female in the schools in which toilets were developed.

In addition to this, as indicators of qualitative effects the following indicators were set for this ex-post evaluation and evaluated; 1) With the provision of toilet, students' awareness of hygiene has been improved, 2) With the improvement of school facilities the community has been better motivated to participate in supporting school education.

#### 3.4.1 Intended Impacts

##### (1) Quantitative effect

##### 1) Improvement of the net enrollment rate of target schools

NER is an indicator of “access to education”. Figure 4 shows the result of comparing the previous year of the project in 2007, the year when the project was completed in 2011 and four years after the project in 2015. Comparing the previous years of the project and the years when the project was implemented, it can be seen that NER of all target districts<sup>28</sup> have increased. From the above results<sup>29</sup>, some impact on educational access is recognized. In the interview survey with the principals and the communities, the following opinions were obtained; “The

<sup>28</sup> The proportion of the target school to the number of all schools in the district is 9.1% in Salavan, 14.9% in Laongam, 17.3% in Lamam, 24.0% in Thateng, 37.1% in Samakixay and 26.1% in Sanamxay.

<sup>29</sup> Since some schools' reliable data could not be obtained in only Thateng, the statistical data at district level was used to analyze as complementary data.

learning environment has improved and the schooling of children has become established more than before” and “Thanks to the improvement of classrooms, the safety for child has been improved so that I can send the child to school with peace of mind”. It can be seen that this project contributed to some extent in improving the enrollment rate.

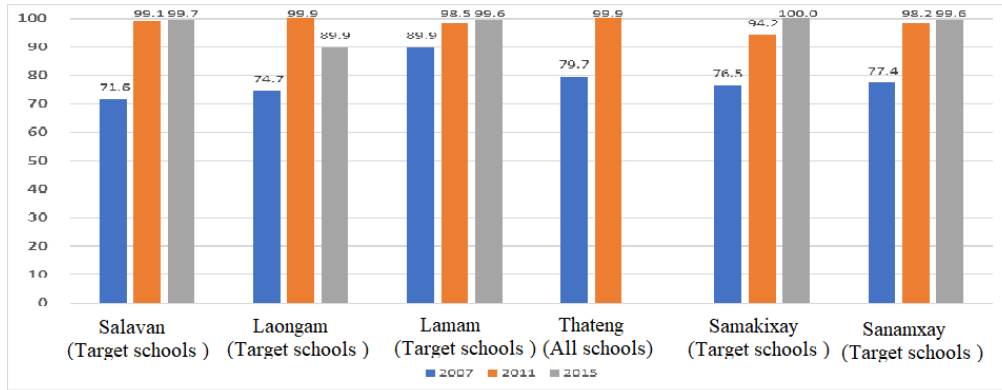


Figure 4 NER of target schools at each target district

Source: Data provided by DESB

Note: (No relevant data for Thateng in 2015)

2) Improvement of NIR of the target schools

NIR of the target schools is shown in Figure 5 below. According to the analysis in this figure, NIR of all the target districts has improved compared with before the project. As for NIR as well as NER, the following opinions from principals were obtained; “Because of a newly built school building it became easier to promote students’ enrollment for the community.” From the above, it can be said that this project contributed to some extent in improving NIR.

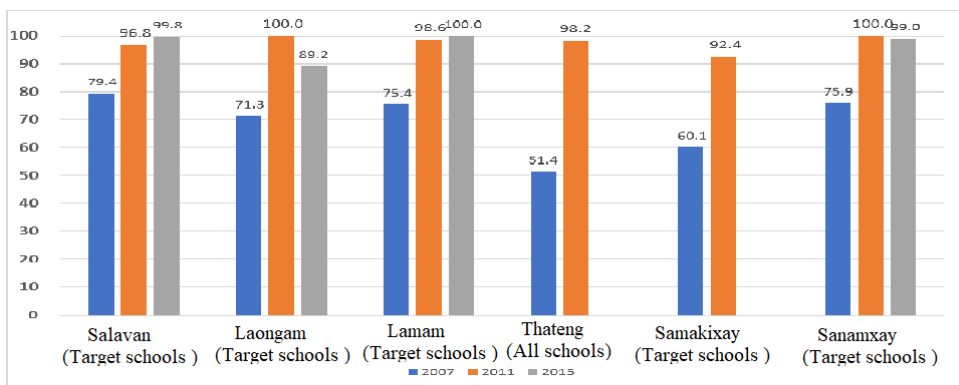


Figure 5 NIR of target schools at each target district

Source: Data provided by DESB

Note: (No relevant data for Thateng and Samakixay in 2015)

(2) Qualitative effects



1) With the provision of new classrooms students have increased willingness to attend school

As a result of the beneficiary survey, students' willingness to attend school due to the classroom improvement has improved to be 3.9 out of five levels. The following answers were obtained from students; "The school is clean and I am well motivated for study." "When the desks and chairs are well installed, I am well motivated for schooling."

2) With the provision of new teaching staffrooms teachers have experienced increased motivation for teaching.

As a result of the beneficiary survey, teachers' motivation for teaching has improved to be 4.3 out of five levels. Its result was quite high. The following answers were obtained from teachers; "Ventilation got better and I can teach lessons intensively.", "A classroom has enough space for teachers to look around the students."

3) With the provision of new toilets female students have increased motivation for schooling

A survey was conducted with 40 primary female students in all primary schools with the provision of new toilets. As a result, female students in the schools with the provision of new toilets have shown increased motivation for schooling by 3.6 in primary schools at the certain high score. However, six students answered, "not at all" or "do not agree". Similarly, four out of those six students answered that "Existence of the toilet is not related to my schooling because I don't have custom of using a toilet since long ago." Thus, it is not necessarily an answer from a negative reason. Likewise, as a result of the survey with 33 teachers of schools where toilets were developed whether the motivation for female students' schooling has improved, the result was high as 4.6.

4) With the provision of toilets, students' awareness of hygiene has been improved

It was confirmed that students' awareness of hygiene was improved by improving the toilets. We conducted a beneficiary survey on the change in awareness of students' sanitation concerning 32 teachers<sup>30</sup>, the result was 4.7<sup>31</sup> in the five levels<sup>32</sup>. Comments were obtained from the teachers such as "Students who did not have a habit of washing hands began to wash." and "Students wash their hands before meals and became conscious of hygiene".

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<sup>30</sup> The number of teachers of the school with newly provided toilet is 32 among 73 samples.

<sup>31</sup> There are 3 schools where toilets are not used, and they are included in survey conducted by random sampling of all schools. Regarding this question, they answered about the situation when the toilet was available.

<sup>32</sup> The degree of satisfaction was surveyed in five stages of "very agree", "I think so", "moderate", "do not agree", "not at all".

### 3.4.2 Other Positive and Negative Impacts

#### (1) Impact on the Natural Environment, Land Acquisition and Resettlement

In this project, as a result of an interview with the executing agency, it was confirmed that no particular impact was observed on the natural environment and resettlement of residents and land acquisition.

#### (2) Other Impacts

1) With the improvement of school facilities the community has been better motivated for school education

This project was responsible for a positive impact that has led to an improvement of the community's participation in school education. A beneficiary survey was conducted with 73 teachers of visited schools to evaluate if that community's participation in school education had changed or not after participating in the project. The results show that primary schools had a score of 4.5 out of five levels. In addition, as a result of interviewing the principal and the Village Education Development Committee (hereinafter referred to as "VEDC<sup>33</sup>") at 18 visited schools<sup>34</sup>, monthly subscriptions have been collected from the 15 community out of 18 schools.

Table 4 Awareness of community's participation in school education

	Number of schools	Percentage
Percentage of schools with regular monthly collections from the community	15/18	83.3%

Source: Created from interviews with schools

In addition to this, in four out of 18 schools visited, the impact of active participation in especially school management was confirmed such as constructing school buildings and VEDC offices, cultivating vegetables and rice at constructed school gardens, and others by VEDC's active participation in community after implementation of this project. Construction was carried out not by support from districts, provinces nor donors but by financial support collected consensually from communities. Before this project was implemented, community's participation in these four schools had never occurred. Construction costs were not based on support from districts, provinces or donors, but the funds from the community obtained by agreement. It can be said that the project has impacted positively to a certain extent on improving the community's participation in school education.

<sup>33</sup> VEDC members consist of seven people, village chief, elder's organization representative, principal, faculty representative, female alliance representative, youth alliance representative, and parents' association representative, and they are engaged in the administration of the school.

<sup>34</sup> 18 out of 74 target schools (target 3 provinces × 2 districts / province = 6 districts, 3 primary schools per 1 district) were selected by random sampling and visited and investigated.



Conference site of community built after this project (Phakkout Nyay Primary school, Laongam)



Vegetable cultivation started after this project (Phakkout Nyay Primary school, Laongam)

One of the factors that improved community's participation in school education is the effect of cooperation with the JICA technical cooperation project. In total 74 out of the 90 schools in the technical cooperation project "Supporting Community Initiatives for Primary Education Development (hereinafter referred to as "CIED (2007 - 2011)"<sup>35</sup>)" were selected as the target schools with needs for facility construction. According to the interview with the principals and VEDC, it was found that the management of community organizations was strengthened by the technical cooperation project. In particular by holding regular meetings, conducting periodic inspections of the facilities, and writing and implementing a school development plan which are being conducted by schools and VEDC. For example, it was confirmed that the school has a system to cooperate with community when minor damage occurs. In addition, the school has a system for requesting support to DESB by writing a school development plan with community when a serious damage occurs.

Based on the above, the implementation of this project generally shows the effect as planned, and its effectiveness and impact are high.

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<sup>35</sup> Technical cooperation project aiming at improving the learning environment of the primary education by the active participation with community and teachers for 3 southern provinces (Salavan, Sekong and Attapheu provinces.)

**【Column: Contribution to quality of education through grant aid through cooperation with technical cooperation project】**

In this ex-post evaluation, we considered how the improvement of school facilities contributes to improving the quality of education from the comparison result between schools with and without school construction at the CIED target schools. Detailed analysis<sup>36</sup> was conducted with the aim of deriving effective lessons from the plan and its implementation in developing school facilities with grand aid project.

Based on the analysis results, it was found that when the facility improvement (remodeling / expansion) was carried out by grant aid in addition to the technical cooperation project, it contributed to an improvement of teachers' teaching activities with the effect of reducing the absence of the students. It is confirmed that by improving the motivation of the teachers and the satisfaction of the students through the school construction, teachers' teaching activities and VEDC organization management which supported by the technical cooperation project were strengthened. As a result, it is highly probable that the student's absence days were also reduced. Furthermore, as a result of the survey from the viewpoint of the primary education quality standards prescribed by MoES, the improvement of the motivation of teachers and the improvement of the quality of education by facilitating school construction could be seen more clearly in the area where teacher's activities are active. For example, with regard to activities supported by technical cooperation projects schools constructed by the project in Sanamxay district are more actively engaged in teaching material creation activities. On the other hand, in the schools in Thateng district, teaching materials are created with or without school construction. In addition to that schools constructed by the project are more active in the continuing promotion of education<sup>37</sup>.

In the ex-post evaluation of similar projects in the past, implemented as soft components or in collaboration with technical cooperation projects were conducted in the most of the school construction projects. As a lesson, it was pointed out that strengthening the capacity of the organization should be supported by a technical cooperation project and not by a soft component which has large time constraints. Regarding the improvement of the quality of education, it is confirmed that there are no examples of school construction projects which improve the qualitative effect beyond the effect of "reducing the overcrowded classroom" or

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<sup>36</sup> From Thateng district in Sekong province and Sanamxay district in Attapeu province, following 12 school were selected and analyzed; (1) 3 schools at each district which had both grant aid of school construction and technical cooperation project (2) 3 schools at each district which had only technical cooperation project without grant aid of school construction. Schools with the needs of school construction are selected among the schools supported by technical cooperation project in this grant aid project. So survey was not conducted at schools with only grant aid project which do not exist.

<sup>37</sup> This is an activity to evaluate students' achievement of learning and to support promotion through supplementary lessons etc. for students who are lag behind in understanding. It is stipulated that it should be conducted at least three times a month in the Ministerial Ordinance of MoES.

“eliminating the two-shift classroom” etc. Such as improving the capacity of teachers or improving the community’s participation in education could not be found in school construction project alone.

One of the lessons learned through this analysis is the need to support the capacity building of the school committee according to the government's system through collaboration between school construction project and technical cooperation project. Like VEDC in Laos, in many countries where similar projects were implemented in the past, creation of school development plan by the community participating in school committee (name is different from country to country) was promoted by the administration. It is being institutionalized as a necessary activity even when receiving subsidies from the administration. In order for the constructed school building to be properly maintained and managed even after completion of the project and to contribute to the qualitative improvement of education, it is important to position the school maintenance management activity in the school development plan according to the country's system. As a result, strengthening the capacity of the school committee supported by the technical cooperation project will further enhance the outcome of the school construction project.

This project can be an example of promoting the effect of the collaboration between the school construction project and the technical cooperation project.

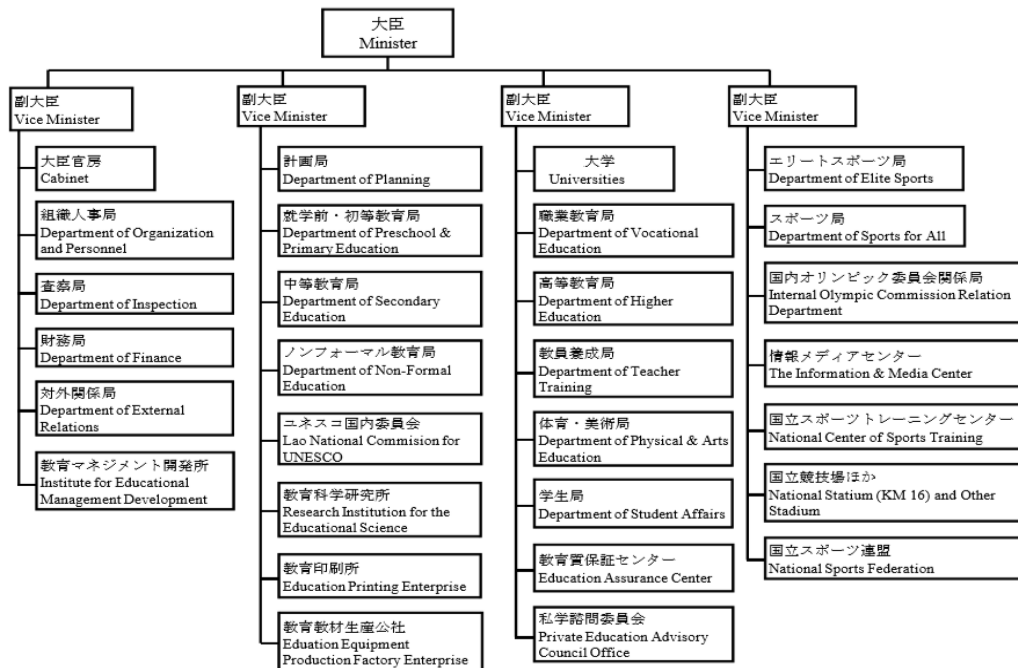
### **3.5 Sustainability (Rating: ③)**

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

##### **(1) Institutional Aspects of Operation and Maintenance at MoES**

From the time of the ex-ante evaluation to the time of the ex-post evaluation, there has been no changes in the main functions such as the operation duties, etc in the institutional aspects of operation. In carrying out the project, under the direction of the Department of Planning of MoES, PESS implement the budgetary measures for projects implemented such as the arrangements of teachers for school management and secures of budget for teacher’s salary, etc. Regarding the teacher placement, the shortage of teachers at additionally constructed classrooms is not sufficiently supplemented due to the lack of budget. However, in the hearing from the Director of PESS and DESB, the current number of teachers is enough for the current operation and maintenance of schools. Also, it was confirmed by MoES that the improvement policy to eliminate non-regular teachers will be implemented with a high probability during the 8th ESDP implementation. So, the lack of teachers is minor problem. The organizational chart of MoES is shown in Figure 6.

Figure 6 Organization chart of MoES



Source: Confirmed to MoES

The provincial education administration is managed by PESS which is under MoES. Regarding the maintenance and management of the school facilities when the major damages are found in facilities and equipment, schools contact to DESB belonging to PESS. DESB is responsible for coordination and communication between the school and PESS. It was confirmed with the director of PESS and DESB that the number of staff who is presently placed is appropriate for operation and maintenance. Regarding the maintenance and management of the school facilities of this project, VEDC contacts DESB when major damages occurs and DESB is responsible for coordination and communication between the schools and PESS. Thus it can be said that operation and maintenance at MoES is generally functioning.

## (2) Institutional Aspects of Operation and Maintenance at the community level

Collaboration systems and instructive system in the organizational management at the community level are functioning. Active participation in school management by the VEDC was recommended in the 8<sup>th</sup> ESDP and a ministerial decree<sup>38</sup> which requires VEDC to be set up in each village. VEDC regularly inspects school facilities or holds a meeting on school management. They collect contributions from each students' family and use it for repairing

<sup>38</sup> It was obliged to set VEDC in Minister of Education Order No. 2300 (September 3, 2008) in 2008.

facilities etc. In total 74 schools covered by this project have experience receiving technical cooperation through CIED. In the 18 schools visited by the evaluator, there were 15 schools that operated the school under the community’s participation. So, the system of operation and maintenance at the community level was generally functioning. Some problems can be seen in the remaining three schools. Such as when the principal retires the financial statements and statistical data are not handed over to the next principal, or the school has difficulty with cash management as they don’t write expenses items in their financial statements. However, VEDC activity itself has continued.

### 3.5.2 Technical Aspects of Operation and Maintenance

#### (1) Technical Aspects of Operation and Maintenance at MoES

Regarding the maintenance of school facilities, DESB institutionally is to provide technical assistance including cost sharing. However, due to the limited budget, VEDC is often forced to conduct repairs for small breakages and to do daily maintenance. If there are major damages to facilities and equipment, the school contacts DESB and DESB provides the expenses and technical assistance. MoES is engaged in the operation and maintenance of the school through the distribution of the budget to the provinces and districts instead of directly to the schools, which is limited to contact among districts, provinces and MoES. DESB is not only involved in this project but also in other school construction projects supported by other donors and NGOs. Thus, DESB has certain experience and know-how. For example, the principal of each school reports the current situation of the school to DESB by holding monthly meetings and periodical training. At the same time DESB also reports on the status of the whole district or provides workshops to schools. As far as this project is concerned, large-scale repairs have not occurred so far.

#### (2) Technical Aspects of Operation and Maintenance at community level

The community has sufficient technical capability in the operation and maintenance of facilities. Concerning the operation and maintenance at the community level, the result of conducting an interview survey with the principal and the VEDC is shown in Table 5 below.

Table 5 Community level operation and maintenance situation

Number of schools which understand the procedure when repairing	18/18	100.0%
Number of schools which have a meeting with VEDC more than once a month	13/18	72.2%
Number of schools which maintain the school facilities with VEDC more than once a month	17/18	94.4%

Source: Created from interviews with schools

As Table 5, all schools become familiar with the procedure at the time of a repair occurring. If minor repairs occur to school facilities, a principal will hold a meeting with the VEDC to discuss future repair policies, whether they can be repaired within the budget, whether to support the supplies from the community and whether additional funding is required. If serious repairs occur in the school, the school reports this to the DESB and submits a document stating the improvement plan. In addition, 13 out of 18 schools conducted regular meetings at least once a month between the school and the VEDC. At regular meetings, they check the current situation and discuss future plans including school administration, student instruction and community activities. There were 17 out of 18 schools that conducted maintenance of facilities more than once a month. Maintenance tasks such as inspecting the door knobs in the classrooms, confirming that windows close and confirming the cleanliness of the toilets, etc. are carried out at each school. In addition to this, after the project, 4 of 18 schools proceeded to rebuild their old school buildings as a dining hall and built a VEDC office and conference room on the school grounds.

In the technical cooperation project, CIED, direct trainings related to operation and maintenance were not carry out. However it was confirmed that CIED provided VEDC with capacity building trainings aimed at improving access to and quality of primary education. Implementation of regular meetings for the school development plan and the implementation of the school development plan through VEDC's capacity building training were confirmed.

### 3.5.3 Financial Aspects of Operation and Maintenance

#### (1) Financial Aspects of Operation and Maintenance at MoES

The finance of MoES operation and maintenance is expected to be secured to a certain extent in the future. So, the sustainability of finance is generally high.

According to the data of the Department of Finance, the annual budget of MoES is as shown in the table below.

Table 6 MoES annual budget (Unit: Millions of Kip<sup>39</sup>)

	2012/2013	2013/2014	2014/2015	2015/2016
Education budget	3,811,910	3,951,526	3,714,502	4,416,806
(Ordinary expenses)	2,785,180	2,940,721	2,997,217	3,623,110
(Capital expenses)	1,026,779	1,010,806	717,285	793,696
Ordinary expenditure rate	73.0 %	74.4 %	80.0 %	82.0 %
Government budget ratio	16.7 %	15.5 %	15.5%	17.0 %

Source: MoES Department of Finance (2016), 2015/16 data is based on budget

<sup>39</sup> 1Kip=¥ 0.01402(as of December 2016)



Although the education budget doubled in the past five years, the government budget ratio has been in the range of 14 to 16%. The 18% targeted goal listed in the Education Law has not yet been achieved. In the 8<sup>th</sup> ESDP, the goal is to increase the share of educational expenses in the government budget from 13% to 18%. Since other donors' financial support is also provided, certain finances related to education are expected to be secured. The maintenance costs of the facilities are included in the maintenance costs of the current budget. According to the Department of Finance, nearly 90% of the current budget has been occupied by employee salaries and allowances. It was confirmed that the proportion of the maintenance budget to the entire education budget and the current budget is extremely small. However, an improvement policy (elimination of non-regular teachers) is expected to be implemented during the 8<sup>th</sup> ESDP period.

On the other hand, the additional number of necessary teachers for target schools and the actual number of employed teachers are as shown on Table 7. We confirmed that the additional teaching staffs have to be managed by MoES budget. Due to the improper placement of teachers, teachers are oversupplied in urban areas, but teachers are in shortage in rural areas. However, it is confirmed by interview with the MoES that the improvement policy is expected to be implemented with a high probability by the 8<sup>th</sup> ESDP.

It was confirmed by interviews with the school and the VEDCs that distribution of chalk and repainting of blackboards were carried out by own budget of MoES.

Table 7 (Existing school) Additional number of necessary teachers for target schools and the actual number of employed teachers

Province	Primary school		
	Necessary	Actual	Fulfillment rate
Salavan	28	10	35.7%
Sekong	23	11	47.8%
Attapheu	15	13	86.7%
Total	66	34	51.5%

Source: Interviews with target schools

## (2) Financial Aspects of Operation and Maintenance at community level

The financing of the operation and maintenance at the community level is to be secured to a certain extent for the future. So, the sustainability of finance is generally high.

Regarding the school administration budget as an ordinary budget, in primary schools 70,000 kip per student will be allocated as the budget which are transferred from the DESB to the schools through MoES and PESS. In addition to this, many of the schools collect 5,000 to 50,000 kips per student for school operating expenses. In schools which do not collect money from families, there is a shop in the school or the school plows the fields and sells the vegetable

so that the school can secure other income sources. In all the visited schools, the maintenance costs are decreased after the project.

### 3.5.4 Current Status of Operation and Maintenance

Classrooms, toilets, equipment, etc. of the target schools are generally used appropriately, and maintained and managed. Table 8 below shows the condition of the classrooms, teachers' rooms, and toilets constructed in this project.

Table 8 Condition of the classrooms, teachers' rooms, and toilets

(% is the ratio of facilities in a good condition)

	Classrooms		Teachers' rooms		Toilet	
	Constructio n	Good condition	Constructio n	Good condition	Constructio n	Good condition
Primary school	278	275 (98.9%)	71	71 (100%)	39	36 (92.3%)

Source: Interviews with target schools

Situations such as the breakdown of door knob and a little cracks on the floor were seen at some of the visited school. Floor cracks can be repaired by the VEDC, and it is usually possible to repair in a short period of time. Other than that, it is mostly minor repairs and schools are mostly in a good situation. It was confirmed with an oral survey of schools that the MoES have been carrying out improvements concerning the distribution of textbooks and chalk, and with the regular exchange of blackboards. Regarding the removal of sediments in the toilets, 36 out of 39 schools that had installed toilets have eliminated them themselves using the original budget of the school last year or existing equipment. In the remaining 3 schools' toilets could not be used at the time of ex-post evaluation. It was confirmed with a hearing survey with schools and the DESB that the reason why it is not possible to use toilets in three schools is as follows; 1) 1 school cannot use water during only dry season because the water supply is not sufficient and water from the area is not supplied 2) In two other schools, there are water sources in the area. However, it is difficult to maintain sufficient amount of water because the depth of the water source is not enough.

No problems have been observed in the institutional, technical, financial aspects and current status of the operation and maintenance system. Therefore sustainability of the project effects is high.

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

### 4.1 Conclusion

The objective of this project is to enhance learning environment by developing school facilities for 74 schools in six districts in three southern provinces of Laos, thereby contributing to improving the quality of primary education in three southern provinces.

At the time of the ex-post evaluation, expanding access to high quality primary education in the three southern provinces continued to be a priority issue. The project as such is consistent with development policy. In the three provinces, there is still a high need to support the rebuilding of school buildings. Since this project is also consistent with Japan's ODA policy at the time of planning, the relevance of this project is considered to be high.

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

In this project, some problems remain in terms of the actual achievement rate against the indicator target of “Number of students in decent classroom” which is one of the quantitative effect indicators. But other quantitative and qualitative effects indicators, such as the number of classrooms in a decent environment or the students’ satisfaction with school facilities etc. are generally high. Regarding the impact, the indicators were set according to quantitative effects and qualitative effects in which the planned effect was observed, such as with an improvement of the net enrollment rate within the target schools and with an increased students’ awareness of sanitation due to the improvement of the toilets. Also, other observed impacts included students’ willingness to attend school, improving teachers’ motivation for teaching and female students’ willingness to attend school. Therefore, the effects are generated almost as planned through implementation of the project and the impact are considered high.

The executing agencies and communities of this project do not have any institutional, technical, financial and current status of problems on operational and maintenance system of this project. Therefore sustainability of the project effects is fair.

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

### 4.2 Recommendations

#### 4.2.1 Recommendations to the Executing Agency

##### (1) Securing education budget to expand teacher's new employment

There are some schools where classrooms constructed by this project are not used due to a lack of teachers and schools where one teacher teaches many students which causes overcrowded classes. It is desirable that MoES should also take into consideration ways to secure education budgets to resolve disproportionate teacher placement in urban areas and rural areas using the financial support from donors and others.

#### 4.2.2 Recommendations to JICA

None

#### 4.3 Lesson Learned

##### (1) Collaboration with JICA technical cooperation project

The sustainability of this project was “high” because of the contribution that the communities had the necessary operational and maintenance systems, techniques and finances. The reasons of good operation and maintenance at a community level are that VEDC’s organizational management was strengthened and the community’s participation in education was promoted comprehensively by the technical cooperation projects. With the support focused on strengthening the operation and maintenance of technology by the soft component of grant aid, it is judged that it was difficult for the community to contribute as seen in this project.

When school construction is supported in the countries which have high importance of the community involvement in the school management like Laos, it is desirable to consider the collaboration with a technical cooperation from the viewpoint of ensuring the sustainability.