

**Ex-Post Project Evaluation 2019**  
**Package II-1 (Indonesia, Mongolia)**

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**JAPAN INTERNATIONAL COOPERATION AGENCY**

**Foundation for Advanced Studies on  
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(FASID)**

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Republic of Indonesia

FY2019 Ex Post Evaluation of Japanese ODA Loan Project  
“National Geo-Spatial Data Infrastructure Development Project”

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

## 0. Summary

The objectives of this project were to achieve efficient and sophisticated administrative operations, to avoid duplicate investment and work and to formulate provincial-level regional development plans by preparing basic map data of Sumatra island, developing a network system to share national spatial data and support the efficient formulation of regional development plans thereby contributing to improving the national and regional economic development and its governance, managing and developing natural resources appropriately and environmental conservation.

This project is consistent with the Indonesian government’s development policy of standardization of spatial data and promotion of national development by sharing spatial data among public institutions. The development need is high, and coherent with Japan’s policy. Thus, the relevance is high. Due to a change in scope after starting the project, it was difficult to judge the outcome based on the accomplishment of initially set indicators. However, the achievement of the alternative indicators shows this project is fully utilized, and has had positive impacts such as the improvement of sector planning and development planning. Therefore, the effectiveness and impact are moderate. In addition, this project plays the role of a platform to promote the Indonesian priority policy “One Map Policy”. Although it is necessary to continue to strengthen the executing agency’s organizational capacity status and secure a budget to meet the increasing need for spatial data, there are no problems in the organization, budget or technical aspects for sustaining the direct effects brought by this project itself; the benefits of this project are expected to continue, so sustainability is high. The project cost was within the plan, but the project period exceeded the plan, so project efficiency is moderate.

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

## 1. Project Description



Project Location



Ina-Geoportal Site

## 1.1 Background

At the time of appraisal, in Indonesia, map data with a scale of 1/250,000 to 1/1,000,000 was already prepared for the entire country. However, basic map data<sup>1</sup> with a scale of 1/10,000 to 1/50,000 used by government agencies for management and development of natural resources and environmental conservation, and utilized by local governments for regional development plans, had not been prepared in Sumatra, Papua, Maluku Island, etc. In particular, in Sumatra, despite progress in its development, basic map data had not been prepared, which occasionally resulted in inappropriate regional development.

Since regional development was carried out without coordination between sectors and regions without basic map data, environmental deterioration and inappropriate use of natural resources progressed in different areas. These problems were pointed out in the national medium-term development plan (Rencana Pembangunan Jangka Menengah, hereinafter referred to as “RPJM”, 2004-2009). Another problem was the duplication of basic map data and thematic map data. Government agencies and research institutes independently created and held basic map data and thematic maps<sup>2</sup> for the same areas. It was urgent to avoid such duplication of work and investment and develop a networking system to share spatial data<sup>3</sup> efficiently.

## 1.2 Project Outline

The objectives of this project were to achieve efficient and sophisticated administrative operations, to avoid duplicate investment and work and to formulate provincial-level regional development plans by preparing basic map data of Sumatra island, developing a network system to share national spatial data and support the efficient formulation of regional development plans thereby contributing to improving the national and regional economic development and its governance, managing and developing natural resources appropriately and environmental conservation.

Loan Approved Amount/ Disbursed Amount	6,373 million yen/6,210 million yen	
Exchange of Notes Date/ Loan Agreement Signing Date	28 March, 2007/29 March, 2007	
Terms and Conditions	Interest Rate	0.4%
	Repayment Period	40 years
	(Grace Period	10 years)

<sup>1</sup> It is the map data, with basic spatial information such as residential area, traffic, vegetation, rivers, contour lines, administrative boundaries, place names, etc. (according to the document provided by JICA).

<sup>2</sup> These are the maps which were produced by 19 government institutions and cover seven themes: (1) boundaries, (2) forestry, (3) spatial planning, (4) infrastructure, (5) land use permission, (6) environment and natural resources, and (7) special residential areas (<https://portalksp.ina-sdi.or.id/>).

<sup>3</sup> In this report, the basic map data and thematic map data are collectively referred to as “spatial data”.

	Conditions for (STEP <sup>4</sup> ) Procurement
Borrower/ Executing Agency(ies)	Republic of Indonesia/Badan Informasi Geospasial (hereinafter referred to as “BIG”) (At the time of appraisal, this agency was called Badan Koordinasi Survey dan Pametaan Nasional (BAKOSURTANAL) <sup>5</sup> )
Project Completion	April 2015
Target Area	Sumatra Island and Jakarta DKI
Main Contractor(s) (Over 1 billion yen)	PASCO CORPORATION (Japan) Itochu Corporation(Japan) /NTT Data Corporation(Japan)
Main Consultant(s) (Over 100 million yen)	(I) Consultant service for entire project LAPI ITB(Indonesia/Aero Asahi Corporation(Japan)/ Yachiyo Engineering Co., Ltd.(Japan) (II) Consultant service exclusively for Output 3 PT. DEMENSI RONAKON(Indonesia)/ORIENTAL CONSULTANTS Co., Ltd.(Japan)
Related Studies (Feasibility Studies, etc.)	Special Assistance for Project Formation (SAPROF) for Development of National Geo-Spatial Data Infrastructure Indonesia
Related Projects	None

## 2. Outline of the Evaluation Study

### 2.1 External Evaluator

Keiko Asato, Foundation for Advanced Studies on International Development (FASID)

### 2.2 Duration of Evaluation Study

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

Duration of the Study: August 2019-October 2020

Duration of the Field Study: November 27-December 18 2019

### 2.3 Constraints during the Evaluation Study

The second field study was scheduled in March 2020, but was cancelled due to the global expansion of the COVID-19 epidemic. Instead, the additional information was collected through online interviews, etc. The information collection process was partially affected: no information was collected from Statistic Agency, which could not be visited during the first field study.

<sup>4</sup> Japan excels in designing and customizing bottom-up integrated systems that efficiently share information, taking advantage of the characteristics of existing systems owned by different institutions. To build the network system for this project, it is important to utilize the existing systems of the 10 ministries and agencies, and the aforementioned technology, with which Japan has an advantage, was decided to be applied.

<sup>5</sup> In this report, the unified name “BIG” is used, regardless of the time.

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

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

##### 3.1.1 Consistency with the Development Plan of the Republic of Indonesia

Development policies related to this project include those related to the regulation of spatial data and those related to the regulation of the National Spatial Data Infrastructure<sup>8</sup> (hereinafter referred to as “NSDI”) to promote the utilization of spatial data.

Regarding spatial data regulation, at the time of appraisal, Law No. 24, 1992, required the use of maps for the formulation of spatial plans such as regional development plans, and Law No. 32, 2004, also obliged the local government to formulate a regional development plan using maps of a specific scale (1/50,000 or greater scale for cities, 1/100,000 or greater for provinces, specified by Ordinance No. 10, 2000).

At the time of ex post evaluation, Law No. 4, 2011 stipulated that government agencies use and share standardized basic map data. In 2016, Presidential Decree No. 9, called OMP<sup>9</sup>, required that one standardized basic map data set for the country had to be created by compilation, integration and synchronization of the different maps, and that thematic map data had to be created based on that standardized basic map data. OMP also recommended to share such spatial data and promote its utilization. In addition, in 2019, the “One Data Policy” (hereinafter referred to as “ODP”) was promulgated by Presidential Decree No. 39, designating that the standardized data (mainly spatial data and statistical data) be utilized as a country in order to objectively formulate development plans. The importance of spatial data preparation was also mentioned in the relevant RPJM (2015-2019) as one of nine national development agendas: the importance of basic map data was stated, such as a common map to promote land utilization and prevent illegal logging, fishing and mining, for the development of cities and regions. Moreover, the current RPJM (2020-2024) states the importance of the use of spatial data for balanced growth between the urban and regional areas throughout the country, the promotion of basic map data at a scale of 1/5,000, and driving the implementation of OMP.

As a development policy related to NSDI, at the time of appraisal, Presidential Decree No. 85, 2007, required Indonesian government agencies and local governments to share spatial data through NSDI. At the time of ex post evaluation, Presidential Decree No. 27, 2014, regulating the establishment of the National Geospatial Information Network (hereinafter referred to a “NGIN ”), was promulgated. The decree requested 644 public organizations nationwide<sup>10</sup>, such

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

<sup>7</sup> ③: High, ②: Fair, ①: Low

<sup>8</sup> This is the network system used for sharing spatial data (map information) throughout the country.

<sup>9</sup> This is according to the documents of BIG, “Peranan Informasi Geospasial Dalam Mendukung Percepatan Pembangunan Berkelanjutan di Indonesia”.

<sup>10</sup> There is a total of 644 institutions, including 62 ministries, 34 state governments, 514 municipalities, and 34 universities.

as the central government, local governments, universities and other public institutions, to connect to NGIN (these connecting institutions are called distributed network nodes (hereinafter referred to as “DNN”).

In this regard, this project is consistent with Indonesian development plans.

### **3.1.2 Consistency with the Development Needs of the Republic of Indonesia**

At the time of appraisal, Sumatra Island, whose development was progressing, only had a 1/50,000 map formulated from 1974-1976. Due to this situation, environmental degradation and inappropriate use of natural resources had progressed, so the preparation of basic map data was an urgent need for the appropriate development. Moreover, although many government agencies and research institutes were using the spatial data for their work, these data were not standardized, so the same region looked different and important information was missing from agency to agency. In addition, due to insufficient sharing of spatial data among the government agencies, problems such as duplicate investment in spatial data for the same area and unnecessary time and cost for obtaining maps had arisen. It was pointed out that the regional development plan did not show the characteristics of the region.

At the time of the ex post evaluation, local government was required to formulate a development plan based on the basic map data at 1/5,000 scale, but the national coverage rate of that scale is only about 1.9%.<sup>11</sup> There is an urgent need to formulate large-scale basic map data. Spatial data sharing among the institutions is indispensable to drive forward the OMP promoted by the government, and NSDI plays an important role as a tool for data sharing.

In this regard, this project was consistent with the development needs at the time of appraisal and upon ex post evaluation.

### **3.1.3 Consistency with Japan’s ODA Policy**

At the time of the appraisal, the *Country Assistance Plan for Indonesia* (2004) set “construction of a democratic and fair society” as a prioritized field, and “support for formulation and implementation of the development plan and the improvement of various administrative services, etc. in the local government” was prescribed to assist in decentralization. In addition, in the *Implementation policy for Overseas Economic Cooperation Operations* (2005),<sup>12</sup> “improvement of infrastructure for sustainable growth” was prioritized, and “support for the establishment of an efficient administrative system utilizing IT” was emphasized. The *Country Base Implementation Policy* (2006)<sup>13</sup> also supports “private investment/infrastructure”

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<sup>11</sup> Based on the documents provided by BIG (Ketersediaan Data PetaRupabumi Indonesia [RBI] January 2020).

<sup>12</sup> The name of the project policy applied to each country, formulated by JBIC before it and JICA integrated.

<sup>13</sup> The name of the project policy applied to each country, formulated by JICA before it and JBIC integrated.

and “governance” as a priority issue.

In this regard, this project was consistent with Japan’s ODA policy at the time of appraisal.

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

### 3.2 Efficiency (Rating:②)

#### 3.2.1 Project Outputs

##### (1) Planned and Actual Outputs

The achievement of the outputs of this project is as follows:

**Table 1: Planned and actual outputs**

Planned	Actual
<b>1. Output 1: Production of basic map data of Sumatra Island</b>	
-Basic map data of Sumatra Island (scale: 1/50,000)	
411,000 km <sup>2</sup>	303,439 km <sup>2</sup>
-Basic map data of 4 local governments (scale: 1/10,000)	
Medan	698.20 km <sup>2</sup>
Padang	1003.70 km <sup>2</sup>
Jambi	384.42 km <sup>2</sup>
Pekanbaru	470.60 km <sup>2</sup>
Bandar Lampung	Not produced
Pangkalpinang	Not produced
Bengkulu	Not produced
<b>2. Output 2: Construction of NSDI network system</b>	
-Construction of network to connect BIG and the related government agencies	-Constructed the network with the following changes; 1) Consolidation of server, network and storage equipment for the stable operation and function improvement 2) Construction of network system to accommodate the open source software to promote more number of access of DNN in the future
-Construction of map metadata <sup>14</sup> information searching system utilizing Geo-Portal (GIS software)	-Changed the GIS software to ArcGIS Online and construct a portal site that can directly search spatial data (hereinafter “Ina-Geoportal”), in addition to a search system using metadata <a href="https://tanahair.indonesia.go.id/portal-web">https://tanahair.indonesia.go.id/portal-web</a>

<sup>14</sup> These data are given to describe the other related data, not the data themselves. In the GIS sector, these are “data that shows the attributes of information such as the type, characteristics, quality, and acquisition method of spatial data in detail” (according to Pasco’s GIS Glossary, <https://www.pasco.co.jp/recommend/word/word031/>).



-Strengthening of GIS data centre	-In order to accommodate the above changes in scope, data and storage capacity was increased, resulting in expansion of the data centre
-Construction of recovery centre at the time of disaster (Disaster Recovery Centre, hereinafter referred to as “DRC”)	-Constructed on Batam Island
-Capacity development for BIG, related ministries, agencies and local governments	-As planned
Output 3: Support for regional development plan formulation	
-Elaboration of modeling for regional development plan for 5 islands (Java, Bali, Sulawesi, Kalimantan, and Sumatra) and its training	-Elaboration of modeling for regional development plans for 2 islands (Sulawesi, Kalimantan)
Consulting Service I (hereinafter referred to “CS-I”)	
-Detailed design study, preparation of bidding documents, assistance for bidding process and contract, and supervision of the project implementation process and operation for Outputs 1, 2, and 3	-The consulting services are related to Outputs 1 and 2 and were conducted as scheduled. However, the amount of work had increased due to the change in scope of Output 2 -The consulting services related to Output 3 were transferred to CS-II
Consulting Service II (hereinafter referred to “CS-II”)	
-Technical support for BAPPENAS for Output 3 -Training and workshops for local governments and universities in the target area on forming regional development plans	-The nature of the work remains the same, but the amount of work had decreased, with fewer target islands, due to the budget cut caused by the scope change of Output 2

(Source: Documents provided by JICA)

## (2) Main Points of Change

The main changes in outputs and the reasons for them are as follows.

### ① Reduction of coverage of Sumatra in basic map data production

Due to the change in the scope of Output 2, the budget allocation for the entire project was reviewed, and the budget for Output 1 was reduced. The target area of the 1/50,000-scale basic map data for Sumatra was reduced to 74% of the original plan. The number of municipalities targeted for producing 1/10,000-scale basic map data was also reduced from the original 7 to 4.

The basic Sumatran map data were produced at a scale of 1/50,000, but their resolution was quite high<sup>15</sup>.

## ② Change of scope of the NSDI network system

The detailed design study for this project was conducted in 2008. We planned to use software (Geo-Portal) to construct a metadata search system by utilizing the technology which was common at that time. However, as system construction began after the bidding procedure (2011), another program (ArcGIS Online), which was excellent in user interface and displays the spatial data itself, had begun to appear on the market. Considering the better convenience in the future, BIG requested to change the scope to build the spatial data direct search function in ArcGIS Online, not only the original function using Geo-Portal. System development had already begun, and the scope change would cause various adjustment, so there was a lot of hot discussion between BIG and the contractor. However, BIG firmly requested that a system which more users would use for a longer time in the future should be built. Even after starting system development, the work process was reviewed and a network system, Ina-Geoportal, incorporating the new ArcGIS technology, was to be built.

Along with this change, several changes were made accordingly, such as changes to the specification of the hardware integration (server, network, storage device), the increase of communication capacity by mounting a map with image data, system changes to increase the number of DNN connections, the expansion of the data centre with these changes and so on. With these changes, the workload of contractors and consultants increased.

## ③ Support for formulating regional development plans

With the increase of the budget for Output 2, the budget for Output 3 was reduced, and the number of islands to be supported was also reduced from 5 to 2 (the training for related stakeholders was also reduced accordingly). Regarding the selection of the two islands, BAPPENAS had their own priority for the regional development plan formulation in the order of Java, Bali, Sulawesi, Kalimantan and Sumatra. Java and Bali had already formulated regional development plans, so the next prioritized islands, Sulawesi and Kalimantan, were targeted for development planning support. As a methodology to formulate the regional development plan, a “dynamic model”<sup>16</sup> was applied to support these two islands. Development plans for Sulawesi and Kalimantan were formulated together with the BAPPENAS database unit, and training was given to each island’s provincial government on how to use the model and how to interpret the analysis results.

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<sup>15</sup> High-resolution basic map data with a mesh of 62.5 cm were produced, which was highly appreciated by BIG (according to the interview with BIG).

<sup>16</sup> The dynamic modeling system, which is used to produce outputs, while the modeling, in itself, continues to change, subject to the changes in input data (variables). This model predicts how traffic congestion might be changed in response to population changes (changes in the number of people and their movements) and in the construction of new buildings.

As mentioned above, the scope change from a metadata searching system to one with an additional spatial data searching system with a superior user interface (Ina-Geoportal) brought a major change of direction, with adjustment to the project funding amount, project period and staffing. However, owing to this conversion, the system was highly utilized at the time of ex post evaluation (see 3.3.1 Effectiveness for details), and it is considered that this scope change was necessary and important. Although this affected the achievement of other outputs, it is considered that the planned outputs were generally achieved.

## 3.2.2 Project Inputs

### 3.2.2.1 Project Cost

While the total planned project funding amount at the time of appraisal was 7,520 million yen, the actual amount was 6,210 million yen. The project cost was 82.6% of the original plan, which was within the plan. The details are as follows:

**Table 2: Planned and actual project cost**

(unit: million yen)

	Planned			Actual		
	JICA	Others	Total	JICA	Others	Total
Production of spatial data, Construction of NSDI network	4,862	0	4,862	5,660	0	5,660
Consulting service	638	0	638	550	0	550
Price escalation	600	0	600	0	0	0
Physical contingency	273	0	273	0	0	0
Administration cost	0	510	510	0	N.A.	N.A.
Tax and duties	0	637	637	0	0	0
<b>Total</b>	<b>6,373</b>	<b>1,147</b>	<b>7,520</b>	<b>6,210</b>	<b>0</b>	<b>6,210</b>

(Source: documents provided by JICA)

Remarks: Exchange rate at the time of planning: USD1 = JP¥115.88 Rupiah 1 = JP¥0.0124 (September 2006).

Exchange rate for the actual amount: The actual amount was only borne by JICA, so the exchange was applied at the time of disbursement.

The biggest change compared with the plan was the increase of the budget for constructing the NSDI network. As mentioned above, the amount was increased by 1,146 million yen due to changes to the software that displays spatial data itself (Geo-portal and ArcGIS), the consolidation of hardware, changes in the scope of network systems to increase the number of DNN connections (larger scalability of NSDI system) and expansion of data centres. On the other hand, to keep the expenditure within the planned budget, the amount of spatial data production and support for development plan formulation and consultant services associated with it were reduced.

Regarding the budget that was originally to be borne by the Indonesian side, administrative costs were spent as part of BIG's ordinary expenditure, and expenditure amounts separate to this project could not be obtained. According to the executing agency, no taxes or duties were levied on ODA projects.

### 3.2.2.2 Project Period

At the time of the appraisal, the project period was planned for 88 months (March 2007-June 2014), but the actual period turned out to be 98 months (March 2007-April 2015). The project period was 111.4% of the original plan, exceeding the plan.

**Table 3: Project period**

	Planned	Actual
Selection of consultants and contractors		
Selection of consultants	March-November 2007	CS-I: March 2007-June 2008 CS-II: March 2009-March 2010
Selection of contractors	June 2007-June 2009	January 2009-December 2010
Production of outputs		
Production of spatial data	August 2009-December 2012	January 2011-June 2014
Construction of NSDI network	August 2009-June 2013	February 2011-April 2014
Support for the formulation of regional plan	August 2008-December 2009	April 2010-July 2011
Project completion	June 2014	April 2015

(Source: documents provided by JICA)

The main reasons for the extension of the project period are as follows:

#### ① Selection of consultants and contractors

Regarding the consultant for CS-II, the one initially selected was involved in a case leading to a proceeding in Japan, which caused a re-bid process. The bidders in the re-bid did not reach the reference point in terms of technical points, which required another bid.

Regarding the selection of contractors, Indonesia's procurement regulations require another bidding in the case that no more than three companies pass the pre-qualification examination (Pre-Qualification, hereinafter referred to as "PQ"). Only one company passed the PQ for spatial data production and only two companies for NSDI network construction; this required re-PQ processes in each.

#### ② Spatial data creation

The company for spatial data acquisition<sup>17</sup>, selected by international bidding, had had an accident before in which it flew over a restricted area, so it took time to gain approval for flight permission: the start of work was delayed by seven months. Even after its start, data acquisition

<sup>17</sup> Spatial data production consists of two stages: data acquisition (acquisition) and data processing (process).

was affected by the weather. However, data processing progressed in parallel by inputting many personnel, and the working period was extended only by about one month. The task was completed in delay by more than a year and half, comparable to the plan.

③ NSDI system construction

The working period increased from the initial 882 days to 1,232 days due to major changes in the scope of work after starting work, as mentioned above.

④ Support for formulation of development plan

Even though it took time to select a consultant, the working period to complete the task was as planned.

### 3.2.3 Results of Calculations for Internal Rates of Return (Reference only)

This project contributed to the planning of development projects and does not generate direct benefits. Both EIRR and FIRR are difficult to calculate quantitatively, and their values have not been expected from the beginning.

In this regard, although the project cost was within the plan, the project period exceeded the plan. Therefore, efficiency of the project is fair.

## 3.3 Effectiveness and Impacts<sup>18</sup> (Rating: ②)

### 3.3.1 Effectiveness

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

The achievement of the operational indicators in this project is as follows.

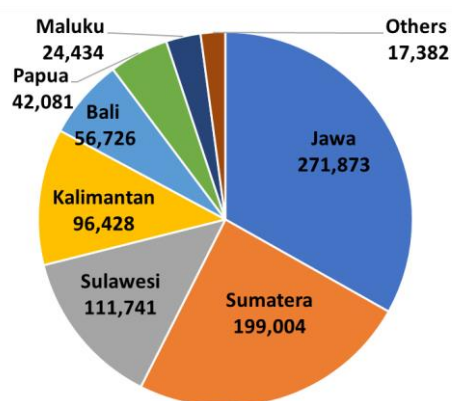
**Table 4: Achievement of operational indicators**

Indicators	Baseline	Target	Actual	
	2006	2016	2014	2020
		Two years after project completion	Upon project completion	Upon ex post evaluation
Indicator 1: Number of requests for the geospatial data of Sumatra Island, which was created under the project	N/A	2,000	Approximately 120	N/A
Indicator 2: Number of newly registered metadata in NSDI networking system	5,000 records	13,000 records	Approximately 12,000	10,118 <sup>19</sup>

(Source: documents provided by JICA and executing agency)

<sup>18</sup> Sub-rating for effectiveness is to be set with consideration of impacts.

<sup>19</sup> The number of metadata aggregated by BIG is the one uploaded by DNN. According to the executing agency, the number of aggregates of metadata once would change due to DNN's correction and consolidation of metadata. And some metadata of DNN which are not connected due to server trouble etc., cannot be aggregated by BIG. Under these situations, the number of metadata has not increased as expected.



Graph 1: Number of spatial data downloaded by each island (2017-2020\*)

\*: figure for 2020 is for the period from April to June

(Source: elaborated by evaluator based on the data provided by BIG)

The number of requests for the basic map data of Sumatra Island created in this project could not be obtained from the executing agency at the time of the ex post evaluation. On the other hand, the numbers of spatial data for each island downloaded through Ina-Geoportal were as stated in the Graph 1.

Since this number of downloaded spatial data includes various spatial data for Sumatra in addition to the basic map data created in this project, it is difficult to judge whether the original objective was achieved by this

number alone.

However, from the time of project completion to that of ex post evaluation, Sumatran spatial data were the most downloaded after those of the island of Java (24% of the total number of downloads in Indonesia), and it can be assumed that the basic map data produced in this project were also used. Even though it is difficult to judge the level of achievement for this indicator, we can infer that the basic map data created are in use.

Regarding the actual record of the number of metadata registered in the NSDI network system (the second indicator), even though the scope of the NSDI network system was changed, the following numbers in the Table 5 were registered. The information to be stated as metadata is defined by BIG, subject to ISO 9115, and each DNN prepared metadata observing these definitions. BIG checks whether the metadata submitted by each DNN meet its request; if the metadata satisfy the requirements, they are made public. The status of utilization of the NSDI network system, which was originally intended to be measured under the second indicator, can be judged by the increase of the number of network users, the number of DNNs connected to the network, the number of uploading institutions and the number of uploaded data. The transition of the data is as follows:

**Table 5: Status of utilization of Ina-Geoportal**

	2017	2018	2019	2020
Number of users	113,643	422,145	875,796	583,569*
Number of data downloaded	46,893	244,312	331,279	197,185*
Number of data uploaded	1,617	4,345	4,156	N/A**
Number of DNNs connected to the network	72	96	242	244*

(Source: elaborated by evaluator based on data provided by BIG, \*: data as of 9 July 2020, \*\*: data as of 16 December 2019)

Ina-Geoportal also contains 85 thematic map data sets collected and combined by each ministry in accordance with OMP policy. The main ministries publishing thematic map data are the Ministry of Energy and Natural Resources (18 maps), the Ministry of Public Works and Settlement (11 maps), the Ministry of Agrarian Reform and Spatial Planning (10 maps), the Ministry of Environment and Forestry (9 maps), and the Ministry of Marine Affairs and Fisheries (6 maps).

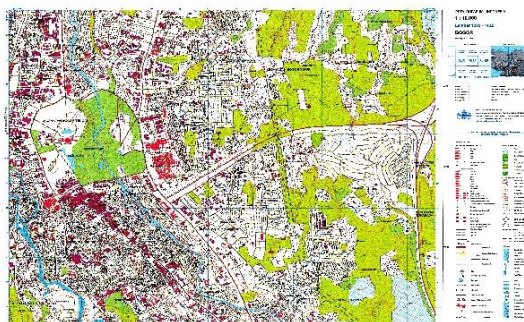
In light of the above, usage of Ina-Geoportal is increasingly active year by year. The number of users and the number of downloaded data are increasing year by year, and the amount of uploaded data is also on the rise. Although the number of DNNs is increasing, the connection rate is still around 37%, considering that the total number of DNNs is 644. The institutions having particular difficulty being connected are local governments, such as cities and villages. 66% of the total are still unconnected. The reason why connection could not expand is that the installation of the equipment to connect Ina-Geoportal is expensive. BIG are promoting the connection by using the cloud system and free software so that the local governments can connect as a lower cost (please refer to 3.4.4 Status of Operation and Maintenance for details).

### 3.3.1.2 Qualitative Effects (Other Effects)

#### (1) Qualitative effects of Ina-Geoportal construction

The main advantages of using the NSDI network system are: (1) It is easy to share maps produced by other ministries, and duplicate production of similar maps by multiple ministries can be avoided. (2) The way to obtain a map became easier, by switching from a request conventionally submitted to another ministry in writing to a download through Ina-Geoportal. (3) Utilization of the standardized maps allows the overlays of different thematic maps to be more accurate without deviation, which enables advanced analysis of spatial data. However, for a while after project completion, the ministries and agencies hesitated to share spatial data actively using the NSDI network system.

Although these advantages were explained to each ministry and agency at the time of project completion, not many of them were willing to upload their maps to Ina-Geoportal for a while for the following reasons: (1) Each ministry had already produced and used maps using their own method, so they did not realize the necessity of adopting a new method; (2) It was troublesome to switch to the BIG-designated format for posting on Ina-Geoportal; (3) There were still no users who had utilized the geospatial data on



Ina-Geoportal geospatial data

the network, and the benefits explained could not be realized; and (4) The ministries and agencies were afraid that their maps would be edited without permission by acquisition through the network, and other reasons.

This trend has changed since 2016, when the presidential OMP decree was promulgated. This project contributed to the promotion of OMP. As mentioned above (see 3.1.1, Consistency with the Development Needs), OMP is a policy to promote the production, sharing and utilization of standardized basic map data. The production of basic map data for Sumatra was part of standardized cartography, and Ina-Geoportal served as a platform for enhancing map sharing and promoting utilization. Due to their strong coherence with this policy, the ministries that initially hesitated to use Ina-Geoportal gradually began to post various maps after the promulgation of this decree.

The utilization status of Ina-Geoportal of each institution at the time of ex post evaluation is as follows.

**Table 6: Utilization status of other ministries' maps in each ministry**

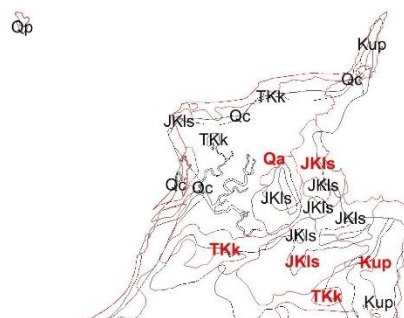
Ministries of which Maps are used	BIG	Ministry of Environment and Forestry	Ministry of Energy and Natural Resources	Ministry of Agrarian Reform and Spatial Planning	Ministry of Public Works and Settlement	Ministry of Agriculture	Ministry of Marine Affairs and Fisheries	Others
BIG								
Ministry of Environment and Forestry	○		○	○	X		X	Statistic Agency
Ministry of Energy and Natural Resources	X	○		X	X	X	X	
Ministry of Agrarian Reform and Spatial Planning	○	○	○		X	X	X	Ministry of Interior, Meteorological agency
Ministry of Public Works and Settlement	○	○	○	○		X	X	Ministry of Transportation, Ministry of interior
Ministry of Agriculture	○	X	○	○	○		X	LAPAN
Ministry of Marine Affairs and Fisheries	○	○	○	X	○	X		
Jakarta DKI	X	X	X	X	X	X	X	Ministry of Transportation
West Java	○	○	○	○	X		X	

(Source: results of interviews from each ministry)

Various benefits are recognized by the ministries who use Ina-Geoportal. The previous complicated procedure to obtain the maps is now avoided, and they can obtain maps more quickly. In addition, digital maps, instead of on paper, facilitate overlaying multiple spatial data sets, making their work less complicated. They can analyse the maps more precisely with the various information posted. Moreover, the maps posted on public networks have become more reliable than before.



A common benefit is that by superimposing standardized maps, overlaps between uses in a given area are revealed at the planning phase. This way, troubles can be avoided which would have arisen after starting a project. For example, an area designated as a protected area by the Ministry of Environment and Forestry might be classified as a developable area by the Ministry of Energy and Natural Resources. In the past, the maps used by each ministry were different, so overlap was not realized during planning. After starting a project, it was often found that a protected area was being developed.



Graph standardization of the map (result of the work to standardize the difference of different maps for the same area)

When overlap is found while planning, adjustments are made such as excluding zones from project areas and discussing development along with related ministries and agencies. The spatial planning of each ministry is now done more efficiently and effectively by utilizing Ina-Geoportal.

On the other hand, some negative opinions were also heard: The large-scale spatial data at 1/50,000 scale is not sufficient<sup>20</sup>, the overlap on the spatial data between ministries is not resolved, and there remain many maps which still need the synchronization process. The number of thematic maps (85) is not enough. Many of the maps are in WMS format,<sup>21</sup> which is difficult to edit, and so on. BIG also recognizes that production of large-scale spatial data is an urgent issue, and is currently considering how to handle it (please refer to 3.4.4 Status of Operation and Maintenance” for details). Regarding expansion of the thematic map, BIG is currently working on internal standardization with 250 candidate maps, and the number of thematic maps to be posted is expected to increase by the end of this fiscal year.<sup>22</sup>

## (2) Qualitative effect of creating basic map data for Sumatra

BAPPENAS formulated the regional development plan of Sumatra Island (2015-2019) utilizing its basic map of 1/50,000 scale (based on the experience in Output 3), to analyse and judge the result of dynamic model analysis together with a Japanese consultant. By using this dynamic model, BAPPENAS simulated the multiple plans necessary to achieve the targeted

<sup>20</sup> The coverage rate of 1/5,000 basic map data is about 1.9%. The coverage rates for 1/10,000 data is 1%, 42.6% for 1/25,000, and 89.1% for 1/50,000 (from the documents provided by BIG).

<sup>21</sup> This is the abbreviation for Web Map Service. This map is produced based on images, so the data cannot be edited directly. On the other hand, Web Feature Service (WFS) maps can be edited. WMS is comparable to PDF, and WFS is comparable to Microsoft Word. The ministry that produced the map can decide which format to post on Ina-Geoportal. It was said that each ministry is prone to select WMS for uploads to Ina-Geoportal so that the posted spatial data cannot be edited by the user and the data will go beyond the ministry’s control (according to the interview to each ministry).

<sup>22</sup> According to the interview with BIG.

economic growth, then selected the optimal plan subject to the change of the main variables of the target area, such as movement of people and development of the city. The regional development plan was formulated using this process.

On the other hand, while the basic 1/10,000-scale map was used in the cities of Medan and Pekanbaru, it was not used in Padang or Jambi.

The city of Medan produces its own 1/1,000-scale basic map data, which is used for detailed development planning of urban areas. The 1/10,000 scale data are for wider areas' development plans. Various resources (such as administrative boundaries, roads, various facilities, land use and others) are superimposed on the basic Medan map data to elaborate project plans. It is said that working from one standardized map, it is easier to make any adjustments and negotiations based on the facts, even if the opinions of city departments differ<sup>23</sup>. In Pekanbaru, to utilize the spatial data is the ultimate



Map information found at the Hotel in Pekanbaru (Utilization of spatial data in tourism sector)

policy in entire city office. All city offices, not only the departments of development planning, public works, and spatial planning, as well as the department of education and health and hygiene also use spatial data for project planning. It is said that an appropriate development plan can be elaborated rapidly with the necessary information posted on standardized spatial data, even though the necessary resources to formulate a development plan was identified by hearing with the staff in charge before<sup>24</sup>.

On the other hand, in Padang and Jambi, the spatial data produced by this project were not used because these maps were not in the hands of the persons currently in charge of the development plans (in the department of development planning and spatial planning). According to them, the new spatial data were not delivered to them. However, the professor from the university which gives technical support to cities cited the high possibility that the map delivered in the form of data was not recognized as a "map" because officials only understood maps in the form of paper, and that the information was not taken over during the rotation of the personnel. At the time of the ex post evaluation, Padang is formulating a development plan using a 1/25,000-scale map. Jambi uses a 1/25,000-scale map for its general development plan, and a 1/5,000-scale map purchased from a private company for detailed development planning<sup>25</sup>.

Currently, in Indonesia, local governments are obliged to formulate development plans using 1/5,000 spatial data. Each local government tries to obtain a map of 1/5,000 scale, but until such

<sup>23</sup> According to the interview with Medan city officials.

<sup>24</sup> According to the interview with Pekanbaru city officials

<sup>25</sup> According to the interview with Padang and Jambi city officials

maps become available, Padang and Jambi will substitute 1/10,000 spatial data for 1/5,000 maps. They want to get the data from BIG.

### 3.3.2 Impacts

#### 3.3.2.1 Intended Impacts

The map data on Ina-Geoportal are used among the ministries, and the spatial data production process of each ministry has improved. Similar opinions were heard from two out of four target cities of the local governments in Sumatra Island on obtaining basic map data. The effects of the improvement of these spatial data on the planning of each ministry and local government are as follows: Overall, acquiring spatial data with standardized information enabled fair, impartial, accurate and appropriate decision-making. This in turn improved sector planning and development planning. On the other hand, others requested greater accuracy of the spatial data published in Ina-Geoportal and the large-scale maps.

**Table 7: Impact to development plans brought by use of Ina-Geoportal by each ministry, agency and local government**

	Impact on sector plan and development plans
Ministry of Environment and Forestry	Since it is based on one standardized accurate spatial data set, appropriate judgment can be made when planning. The ministry can make efficient and effective plans.
Ministry of Energy and Natural Resources	Little impact is seen on this ministry's sector plans. The role of this ministry is rather to provide the spatial data through Ina-Geoportal to be utilized by other ministries, such as (1) Geological data, (2) Earthquake/Tsunami/Landslide/Volcano areas, (3) Mineral/Coal/Geothermal areas and (4) Groundwater status.
Ministry of Agrarian Reform and Spatial Planning	Land use information of the target area (whether the target area is a forest reserve or not) is standardized by OMP and easily available through Ina-Geoportal, so an appropriate land use permission can be issued. In the currently promoted project for complete land registration, Pendaftaran Tanah Sistematis Lengkap (PTSL), accurate land information can be obtained by sharing spatial data among ministries and agencies through Ina-Geoportal, which is useful.
Ministry of Public Works and Settlement	The information posted to Ina-Geoportal by each ministry is often too small-scale and not updated, so they are not useful as a reference. To improve the accuracy of spatial data, it is necessary to strengthen the capacity of local governments. On the other hand, using the available information to prepare hazard maps and reconstruction plans enables this ministry to elaborate reliable plans.
Ministry of Agriculture	Spatial data from Ina-Geoportal was used to complete the thematic map data on suitable sites for nationwide cultivation of nine strategic crops (rice, sugarcane, corn, soybeans, cacao, etc.). Some information difficult to obtain through Ina-Geoportal was requested by writing letters.
Ministry of Marine Affairs and Fisheries	This ministry can now comprehend exactly where the mangroves live. Standardized spatial data (such as ship routes and marine resource reserves) are now easily accessible and accurate, which makes it possible to identify appropriate farms. Information on a wide range of states was available in a shorter period of time, which facilitated the planning of ocean space.
Jakarta DKI	Spatial data of each ministry are available through Ina-Geoportal, and are now referred to when development plans are formulated.
West Java	In addition to basic map data, maps of land use, economic infrastructure (electricity, dams, irrigation), hazard maps, and so on are now obtained through Ina-Geoportal, which

	facilitated the Javanese to formulate spatial plans. By referring to various information posted in Ina-Geoportal, it became possible to analyse more deeply and make appropriate plans. Moreover, by seeing a lot of spatial data published in Ina-Geoportal, the knowledge on how to utilize spatial data can be deepened.
Medan	Now, the city's development plans are formulated by each department based on one map. This enables appropriate decision-making based on the facts, instead of by political voice as before, in case that the different opinions are expressed from different departments of the city office. The problems are visualized, and issues to be addressed have become clearer.
Pekanbaru	The visualization of the resources in the region enables the city to formulate an appropriate development plan. Unused land can be clarified, and a land use plan can be elaborated strategically. The transparency of the planning process is improved because it is now based on one basic map data.

(Source: results of the interviews from each ministry)

### 3.3.2.2 Other Positive and Negative Impacts

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

No impact on the natural environment, on resettlement or on land acquisition occurred due to this project.

#### (2) Unintended Positive/Negative Impacts

No other negative impact was observed.

As mentioned, the achievement indicators originally set could not be confirmed because the outputs changed from the time of the detailed design study, and it was not possible to measure the achievement of the project's purpose by the original indicator. On the other hand, the number of utilized spatial data on Sumatra Island is the second largest after Java, including the 1/50,000 and 1/10,000-scale basic map data produced by this project. 1/50,000 basic map data were used by BAPPENAS to formulate regional development plans, and the 1/10,000 maps are still used in two of the four target cities. The usage of Ina-Geoportal has increased since the presidential OMP decree was issued in 2016, and the numbers of DNNs and general users are also increasing.

By preparing basic map data and using Ina-Geoportal, the process of spatial data formulation in each ministry and local government became more efficient, which brought positive effects in sector planning and development planning as a result.

In light of the above, this project has achieved its objectives to some extent. Therefore, the effectiveness and impact of the project are fair.

### 3.4 Sustainability (Rating : ③)

#### 3.4.1 Institutional/Organizational Aspects of Operation and Maintenance

A coordinating committee organized by the Coordinating Ministry for Economic Affairs has been set up to promote OMP, and BIG is in charge of its secretariat. Since 2011, BIG has been

designated as the only institution that provides basic map data<sup>26</sup>; and since 2015, BAPPENAS has supervised BIG, changing from its prior position directly under the presidential office. This project plays an important role as a platform for promoting OMP and ODP, which are important policies of the Indonesian government, and BIG is positioned as a core organization to promote the policy, which is effective for this project to continue its effect.

The total number of BIG staff is about 700, of which about 10 have doctoral degrees (civil engineering, urban engineering, geodesy), and 60% of the staff are qualified surveyors. The implementing bodies of each department directly involved in this project are as follows:

**Table 8: Staff allocation and sufficiency in each department of BIG and required expertise**

Department	Number of staff	Sufficiency		Required expertise and qualifications
		To continue the effect of project	To promote OMP	
BIG main body				
Project Management Office	1	Enough	Enough	No special requirements
Centre for Topographic Mapping and Toponyms	74	Enough	Not enough	Geography, geodesy
Centre for Management and Dissemination of Geospatial Information	48	Enough	Not enough	IT infrastructure, application, database management
Centre for Atlas and Spatial Mapping	37	Enough	Not enough	Geography, geodesy
Data Centre	41	Enough	Not Enough	
Operation Manager	2	Enough	Enough	Bachelor's degree in IT, data management
Business Relation Manager	2	Enough	Not enough	Bachelor's degree in IT, IT management
Service Management	12	Enough	Not enough	Bachelor's degree, IT management, IT services, IT audit training
Database Administrator	5	Enough	Not enough	Bachelor's degree, database management & operations
Application Administrator	10	Enough	Not enough	Bachelor's degree, spatial/non-spatial application development
IT Service	10	Enough	Not enough	Bachelor's degree in IT, IT management

(Source: response to the questionnaire by executing agency and interview with executing agency)

With the promotion of OMP by the government, the needs for the preparation of spatial data and its sharing system are increasing. In this project, 10 government agencies were targeted for network connection, but now BIG is aiming for DNN connection of all public institutions (644 institutions). Among them, 244 agencies have already been connected. In addition, there is a strong need for large-scale basic map data, and the president has instructed us to prepare 1/5,000-scale basic map data to cover the whole country by 2024, which will be posted to Ina-Geoportal and BIG plan to enhance the Ina-Geoportal.

The institutional and organizational status to sustain the direct effect caused by this project

<sup>26</sup> Presidential Decree No. 94 (2011)

seems to be in place<sup>27</sup>. On the other hand, the current organization of BIG is not sufficient to meet the growing needs mentioned above. To respond to these needs, various works are expected to increase, such as the support for DNN connection to organizations with insufficient financial and technical capabilities, such as local governments; guidance on how to use the software (please refer to 3.4.2 Technical Aspects of Operation and Maintenance for details); the procurement, the supervision of the process and quality, and the verification of output to produce the nationwide basic 1/5,000-scale map product. It is difficult to handle this variety of tasks with the current number of people, and BIG is applying to the Ministry of Finance to increase their number of staff.

On the other hand, the organization for spatial data utilization and maintenance in each ministry and local government is as follows. It is considered that the organizational status is generally in place.

**Table 9: Sufficiency of the number of staff for utilizing and maintaining spatial data in each ministry and local government**

Institutions	Sufficiency	Institutions	Sufficiency	Institutions	Sufficiency
Ministry of Agriculture	Sufficient	Ministry of Marine Affairs and Fisheries	Sufficient	Ministry of Agrarian Reform and Spatial Planning	Sufficient
Ministry of Public Works and Settlement	Sufficient	Ministry of Energy and Natural Resources	Insufficient	Ministry of Environment and Forestry	Sufficient
Statistic Agency	N/A	Jakarta DKI	Sufficient	West Java	Sufficient
Medan city	Insufficient	Padang city	Sufficient	Jambi city	Insufficient
Pekanbaru city	Sufficient				

(Source: results of the interviews from each ministry)

### 3.4.2 Technical Aspects of Operation and Maintenance

In addition to the Project Management Office, the Centre for Topographic Mapping and Toponyms was responsible for producing basic map data (Output 1). The Centre for Management and Dissemination of Geospatial Information was responsible for NSDI network system construction (Output 2). The Centre for Atlas and Spatial Mapping was responsible for supporting regional development plan formulation (Output 3) as a counterpart. They worked together with Japanese consultants and learned methods of updating and constructing data and sharing them with related parties. Even now, they continue to work on expanding the production of basic map data, enhancing the NSDI network system and increasing the number of DNNs. However, well planned capacity building roadmap regarding geo specific IT and ICT skills & IT management is desirable to respond the rapidly increasing needs to the basic map data, which

<sup>27</sup> According to the interview with BAPPENAS

requires the budget allocation but delivers a consistent career path of human resources.

Regarding ministries and agencies, there were no major technical problems with the staff in charge of maintenance of spatial data or in charge of formulation of spatial plans and development plans using the data. On the other hand, the local governments, such as cities and villages, call for training on how to use the installed software and applications. In particular, in order to formulate an entire city development plan using map information, it is necessary that the staff in the different departments dealing with the project all need to be able to use the system (software and application). The strengthening of their technical capabilities was requested. Technical guidance by a visit from BIG and technical support from local academic institutions are also available, but these assistances are not yet sufficient (please refer to 3.4.4 Status of Operation and Maintenance, for details).

### 3.4.3 Financial Aspects of Operation and Maintenance

The changes in revenue and expenditure from the completion of this project to the time of the ex post evaluation of BIG are as follows.

**Table 10: BIG's revenues and expenditures in the past 4 years**

(unit: billion Indonesian rupiah)

	2015	2016	2017	2018
<b>Revenue</b>				
Budget for data centre	61.9	102.9	83.8	78.3
Sales of spatial data and maps	0	0	0	0
sub-total	61.9	102.9	83.8	78.3
<b>Expenditure</b>				
Maintenance of hardware	4.0	4.0	4.0	4.0
Maintenance of software	3.1	3.5	13.4	11.0
System operations	0.5	0.5	0.5	0.5
Personnel	--		0.5	0.5
Communication	5.0	5.0	5.0	5.0
sub-total	12.6	13.0	23.4	21.0

(Source: data provided by BIG)

Every year, the expenditures were within the budget for the data centre, and the budget necessary for the operation and maintenance of the current system is secured. Regarding spatial data and map sales, the basic map is no longer on sale because it can be accessed free of charge through Ina-Geoportal, even though it was sold at the time of project planning. BIG had borne the communication cost of connection between the 10 ministries and Ina-Geoportal until 2015.



However, since then, each ministry bears the cost. The main hardware expense item is the purchase of consumables and spare parts. The increased expense for software, especially since 2017, is attributed to the installation and maintenance of the cloud system, local government-friendly software development, license renewals, security software enhancements and others. In addition, it is estimated that 605 million dollars will be prepared for the production of 1/5,000-scale basic map data covering the whole country by raising funds from donors (the donors to be procured are currently under examination). The capacity of the current data centre in BIG will not be sufficient when the nationwide 1/5,000-scale map data are available and the expansion of the number of DNN connections is realized. As of the time of ex post evaluation, under the promotion of ODP, the Indonesian government plans to set up four data centres in the country in the next five years. The expanding spatial data will also be maintained and managed as part of this plan. The budget for setting up these centres is expected to be borne by the Indonesian government and donors (mainly assuming the World Bank). The budget for maintenance will be borne by the Indonesian government.

No specific budget figure was obtained for the 10 ministries and local governments, but all of them use Ina-Geoportal within their own budgets, and no major financial problems were found.

#### **3.4.4 Status of Operation and Maintenance**

As mentioned above, the Sumatran basic map data and Ina-Geoportal constructed by this project were utilized, and a regional development plan for Sumatra was also formulated. The outputs of this project are utilized continuously as part of OMP, Indonesia's prioritized policy, and play a role in promoting the policy.

Public agencies at the ministerial level use Ina-Geoportal subject to their own purposes, but many local governments cannot realize DNN connection. For those who hesitated to access Ina-Geoportal due to the cost-wise aspect, BIG encourages them to connect with cloud services and to install the custom application developed from open source geospatial software, named "PALAPA" by BIG. BIG also implements training programs<sup>28</sup> for local governments. However, the city officials cannot master the software with only 2- to 3-day training, and in some cases, the staff who participated in the training are transferred. Due to these reasons, not all local governments can show the effects of improvement of the development plan. Since BIG does not have a regional office, training on how to use the map and spatial data (how to use spatial data and Ina-Geoportal, how to input map data, etc.), and also support needed to formulate spatial

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<sup>28</sup> Policy explanations such as of OMP, the role of DNN, explanations of necessary equipment, downloads of free software, instructions on how to map resources to basic diagram data using this software and how to upload basic diagrams to Ina-Geoportal, etc. It is a program of about two and a half days (from the "training program" obtained from BIG).



plans and development plans are conducted with the cooperation of local universities.<sup>29</sup> As such, continuous technical support is necessary to realize concrete effects such as improvement of development plans.<sup>30</sup>

Moreover, aiming to standardize the spatial data, BIG has established procedures to produce the spatial data and their quality standards, to be posted on Ina-Geoportal. In addition, BIG has introduced a certificate system to approve the ability of handling spatial data if certain criteria is satisfied, to foster the human resources. By this way, BIG is working on creating a mechanism for the quality control of spatial data.

The 1/5,000-scale basic map data in high demand will be prepared by an international bid to be held in August-September this year to cover the whole of Indonesia by 2024. BIG has been examining the most realistic technology to be applied for map production which should be chosen, based on three aspects: data quality, time required to produce, and cost. Highest priority was put on time and cost, and the combined technology of aircraft-mounted IFSAR<sup>31</sup> and satellite imagery was chosen for map production<sup>32</sup>.

The hardware and software for Ina-Geoportal operation have been maintained and updated with BIG's budget, and are still in use. On the other hand, many of the mini-servers installed in ministries and local governments are not in use at the time of ex post evaluation.

**Table 11: Status of mini-server use in each ministry and local government**

Status of use	Related ministries, agencies and local governments
In use	Ministry of Environment and Forestry, Jakarta DKI, Padang, Pekanbaru
Not in use	Ministry of Marine Affairs and Fisheries, Ministry of Public Works and Settlement, Ministry of Energy and Natural Resources, Ministry of Agrarian Reform and Spatial Planning, West Java
N/A	Ministry of Agriculture, Statistic Agency, Medan, Jambi

(Source: result of interview by the evaluator)

The reasons why the equipment are not in use are as follows: (1) Documents for transferring materials and equipment were not exchanged, and the ownership was not clear, so a budget for maintenance could not be secured, which prevented the ministries from using the equipment actively. (2) The temperature of the server room was not adjusted accordingly, and the out-of-order equipment was left unrepaired. (3) Servers already owned by the ministry could fulfil the

<sup>29</sup> Such as Surabaya University, Institute of Technology of Bandung, Gadjah Mada University, Udayana University.

<sup>30</sup> According to the interview with BIG officials

<sup>31</sup> This is the abbreviation for interferometric SAR, which is a technology for determining the elevation and fluctuation of terrain using imagery from two synthetic aperture radars.

<sup>32</sup> According to BIG, they plan to produce 1/5,000 basic map data with 25-cm resolution (aspect of quality), 60-100 dollars/km<sup>2</sup> (cost aspect), 885,000 to 1,000,000 km<sup>2</sup>/year (timeline aspect). The estimated budget for this project is \$605 million. Of these costs, donors are being selected and are expected to bear \$565 million.

function originally expected, so they were used instead.

As mentioned above, no major problems have been observed in the institutional/organizational, technical, financial aspects or the 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 objectives of this project were to achieve efficient and sophisticated administrative operations, to avoid duplicate investment and work and to formulate provincial-level regional development plans by preparing basic map data of Sumatra island, developing a network system to share national spatial data and support the efficient formulation of regional development plans thereby contributing to improving the national and regional economic development and its governance, managing and developing natural resources appropriately and environmental conservation.

This project is consistent with the Indonesian government's development policy of standardization of spatial data and promotion of national development by sharing spatial data among public institutions. The development need is high, and coherent with Japan's policy. Thus, the relevance is high. Due to a change in scope after starting the project, it was difficult to judge the outcome based on the accomplishment of initially set indicators. However, the achievement of the alternative indicators shows this project is fully utilized, and has had positive impacts such as the improvement of sector planning and development planning. Therefore, the effectiveness and impact are moderate. In addition, this project plays the role of a platform to promote the Indonesian priority policy "One Map Policy". Although it is necessary to continue to strengthen the executing agency's organizational capacity status and secure a budget to meet the increasing need for spatial data, there are no problems in the organization, budget or technical aspects for sustaining the direct effects brought by this project itself; the benefits of this project are expected to continue, so sustainability is high. The project cost was within the plan, but the project period exceeded the plan, so project efficiency is moderate.

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

### **4.2 Recommendations**

#### **4.2.1 Recommendations to BIG**

Basic 1/10,000 map of Padang and Jambi produced by this project should be provided to both cities to help them to formulate development plans. The reason why the cities cannot utilize the basic map data assumed by the university officials who gave technical guidance to the local

government is that the basic map data in the form of a CD-ROM was not recognized as a map, and it was not handed over to the next person in charge in the rotation of local government personnel. It is recommended to prepare a certificate regarding the transfer of outputs and keep a record of their transfer when the project deliverables are handed over to an organization other than the executing agency.

#### **4.2.3 Recommendations to JICA**

None

#### **4.3 Lessons Learned**

Flexible response in projects of a sector with rapid technology renovation

ODA cooperation in a sector where technology changes rapidly may result in the content of the initial plan not being appropriate at the actual start of the project. This occurs because the technology has progressed and the business environment changes as the years pass from the formulation of a detailed plan to the start of the project. In this project, after the start of the project, the scope was changed from the originally planned network system of searching spatial data by metadata to a scope including a network system with an excellent user interface. It was a change after the start of the project, and there was a lot of trouble for the people involved, such as adjusting other outputs. However, this change greatly enhanced the sustainability of the project. The government's priority policy (OMP) might be an important factor in the high utilization of the system. But unless the available platform is user-friendly, the increase of network utilization cannot be expected only by the existence of the policy.

Assuming that ODA projects take time from planning to implementation, in case that the cooperation is for the sector with rapid technological changes, it is important to identify the risks and countermeasures to revise the original plan due to changes in the business environment at the time of planning. In addition, if the business environment changes after the start of the business, it is crucial to examine the necessity of project revision, considering the sustainability from a long-term perspective, and respond the situation flexibly.

### Comparison of the Original and Actual Scope of the Project

Planned	Actual
① Outputs	
1. Output 1: Production of basic map data of Sumatra Island	
-Basic map data of Sumatra Island (scale: 1/50,000)	
411,000 km <sup>2</sup>	303,439 km <sup>2</sup>
-Basic map data of 4 local governments (scale: 1/10,000)	
Medan	698.20 km <sup>2</sup>
Padang	1003.70 km <sup>2</sup>
Jambi	384.42 km <sup>2</sup>
Pekanbaru	470.60 km <sup>2</sup>
Bandar Lampung	Not produced
Pangkalpinang	Not produced
Bengkulu	Not produced
2. Output 2: Construction of NSDI network system	
-Construction of network to connect BIG and the related government agencies	-Constructed the network with the following changes; 1) Consolidation of server, network and storage equipment for the stable operation and function improvement 2) Construction of network system to accommodate the open source software to promote more number of access of DNN in the future
-Construction of map metadata information searching system utilizing Geo-Portal (GIS software)	-Changed the GIS software to ArcGIS Online and construct a portal site that can directly search spatial data (hereinafter “Ina-Geoportal”), in addition to a search system using metadata. <a href="https://tanahair.indonesia.go.id/portal-web">https://tanahair.indonesia.go.id/portal-web</a>
-Strengthening of GIS data centre	-In order to accommodate the above changes in scope, data and storage capacity was increased, resulting in expansion of the data center.
-Construction of recovery centre at the time of disaster (Disaster Recovery Centre, hereinafter referred to as “DRC”)	-Constructed on Batam Island
-Capacity development for BIG, related Ministries, agencies and local governments	-As planned
3. Output 3: Support for regional development plan formulation	
-Elaboration of modeling for regional development plan for 5 islands (Java, Bali, Sulawesi, Kalimantan, and Sumatra) and its training	-Elaboration of modeling for regional development plans for 2 islands (Sulawesi, Kalimantan)

4. Output 4: Consulting Service I (hereinafter referred to “CS-I”)	
Detailed design study, preparation of bidding documents, assistance for bidding process and contract, and supervision of the project implementation process and operation for Outputs 1, 2, and 3	-The consulting services are related to Outputs 1 and 2 and were conducted as scheduled. However, the amount of work had increased due to the change in scope of Output 2. -The consulting services related to Output 3 were transferred to CS-II.
5. Consulting Service II (hereinafter referred to “CS-II”)	
-Technical support for BAPPENAS for Output 3 -Training and workshops for local governments and universities in the target area on forming regional development plans	-The nature of the work remains the same, but the amount of work had decreased, with fewer target islands, due to the budget cut caused by the scope change of Output 2.
3) Project period	
March 2007-June 2014 (88 months)	March 2007-April 2015 (98 months)
4) Project cost (million JPY)	
Foreign currency 4,536 million JPY Local currency 2,984 million JPY Total 7,520 million JPY ODA loan portion 6,373 million JPY	Foreign currency 6,210 million JPY Local currency N.A. Total 6,210 million JPY ODA loan portion 6,210 million JPY
5) Final disbursement	
July 2017	

Republic of Indonesia

FY2019 Ex-Post Evaluation of Japanese ODA Loan

“Aceh Reconstruction Project”

External Evaluator: Mayumi Hamada

Foundation for Advanced Studies on International Development

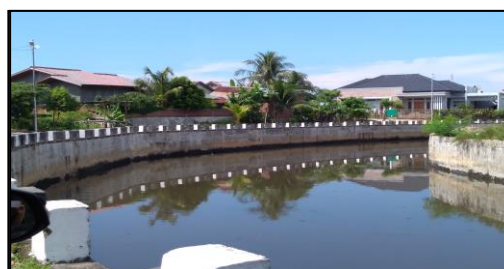
## **0. Summary**

This project was implemented to reconstruct infrastructures in the transportation and water resources sectors to make them better than they had been before disasters in Aceh, thereby contributing to improvement of living conditions for the people affected by the disaster and conflict, and enhancing the local economy and sustainable peace in Aceh. The project's direction, which aimed at reconstruction of economic society by rehabilitation of infrastructure in the area affected by disaster and peace building in the area affected by conflict in Aceh Province, where development was delayed and conflict prolonged for a considerable time, has been highly relevant to the country's development plan and needs, as well as Japan's ODA policy. Therefore, its relevance is high. The project outputs were achieved mostly as planned, although the section of the road was changed in the road sub-project. Although the project cost was within the plan, the project period exceeded that of the plan. Therefore, efficiency of the project is fair. Concerning the quantitative effects, it is judged that the project's objective was partially achieved for the road sub-project, and achieved for the drainage sub-projects at Banda Aceh City and Meulaboh City. As for the improvement of living environment by the project, these included an improvement of convenience in traffic by the road sub-project, as well as a decrease in bad smell and improved convenience in traffic after rainfall by the drainage sub-projects. There were other positive impacts, such as the smooth distribution of agricultural crops and an increase in amount of sales by the road sub-project, as well as the decrease in mosquitoes, flies, and dengue fever and so on by the drainage sub-project. Therefore, effectiveness and impacts of the project are high. Some minor problems have been observed in terms of the institutional / organizational aspect, technical aspect, financial aspect and current status of operation and maintenance. Therefore, sustainability of the project effects is fair. In light of the above, this project is evaluated as satisfactory.

## 1. Project Description



Project Locations



The improved drainage facility at Banda Aceh

### 1.1 Background

The earthquake and tsunami in the Indian Ocean off Sumatra (December 2004 and March 2005) caused large-scale damage in Aceh Province<sup>1</sup> and North Sumatra Province (mainly Nias Island) in Indonesia, both in terms of materials and human resources. The damage included approximately 130,000 deaths and cost 4.5 billion US dollars. Although many donors expressed a huge amount of support in response to this situation, there was a shortage of 1.3 billion US dollars as of April 2006.

In Aceh Province, armed conflict between the Aceh Free Movement (hereinafter referred to as GAM), separatist, and Indonesian government security forces had been ongoing for about 30 years. However, the security status of the area drastically improved after a peace agreement between the government of Indonesia (hereinafter referred to as GOI) and the leaders of the GAM on August 15, 2005. Although GOI addressed not only rehabilitation and reconstruction from the damage by the earthquake and the tsunami but also from the conflict in the above area, the external support to Aceh Province was concentrated in the area damaged by the tsunami (i.e., Banda Aceh City and the coast area).

Under these circumstances, the Japanese government Mission Team for ODA Loan was dispatched in September 2006, responding to an official request from the GOI in August 2006. Following the dispatch of the Japan Bank for International Development (JBIC, the partial function of which has been taken over by JICA) appraisal mission in November 2006, the Exchange of Notes (hereinafter referred to as E/N) and Loan Agreement (hereinafter referred to as L/A) for this project were concluded in March 2007.

### 1.2 Project Outline

The objective of this project was to reconstruct infrastructures in transportation and water resources sector to be better than before these disasters in Aceh, by improving roads and drainage facilities, thereby contributing to improvement of living conditions of the people

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<sup>1</sup> The name of Aceh Province used to be Aceh Special Province until 2001 and Nanggroe Aceh Darussalam from 2002-2009 (i.e., from appraisal up to implementation of the project), and was revised to Aceh Province in 2009. To avoid confusion, the name Aceh Province is utilized throughout the report.

affected by disaster and conflict, enhancing the regional economy and sustainable peace in Aceh.

<ODA Loan Project>

Loan Approved Amount/ Disbursed Amount	11,593 million yen/8,619 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	March 2007/March 2007
Terms and Conditions	Interest Rate                      0.75% Repayment Period                40 years (Grace Period                      10 years) Conditions for Procurement    General Untied (including consultant)
Borrower / Executing Agencies	Republic of Indonesia / (until April 2009) Agency for Rehabilitation and Reconstruction for Aceh and Nias (hereinafter referred to as BRR) (since May 2009) Directorate General of Highways and Directorate General of Human Settlement, Ministry of Public Works and Housing (hereinafter referred to as PUPR)
Project Completion	June 2017
Target Area	Aceh Province
Main Contractors (Over 1 billion yen)	Drainage: PT. Pembangunan Perumahan (PERSERO) (Indonesia) Road: 1) PT. Nindya Karya (Indonesia)/PT. Lampiri Djaya Abadi (Indonesia), 2) PT. Wijaya Karya (Indonesia)/Pelita Nusa Perkasa (Indonesia), 3) PT. Waskita Karya (Indonesia)/Andesmont Sakti (Indonesia)
Main Consultant(s) (Over 100 million yen)	Drainage: PT. Kwarsa Hexagon (Indonesia)/PT. Infratama Yakti (Indonesia)/Nippon Koei Co., Ltd. (Japan)/CTI Engineering International Co., Ltd. (Japan) Road: Yachiyo Engineering Co., Ltd. (Japan)
Related Studies (Feasibility	“JBIC Special Assistance for Project Formation



Studies, etc.)	(SAPROF) for Assistance for Preparation of Rehabilitation and Reconstruction Plan for Nanggroe Aceh Darussalam Province and Nias Island, North Sumatra Province, Indonesia”
Related Projects	<p><b>Technical Cooperation</b></p> <p>- “Banda Aceh City Quick Impact Project” (2005)</p> <p><b>Grant Aid Cooperation</b></p> <p>- “Non-Project Grant Aid (Assistance for the Damage Caused by the Earthquake off the Coast of Sumatra and Tsunami in the Indian Ocean) (January 2005)</p> <p><b>Other International Organizations and Donors</b></p> <p>- “Multi-Donor Fund for Aceh and Nias” (World Bank, etc., 2005-2012)</p> <p>- “Earthquake and Tsunami Emergency Support Project” (ETESP) (Asian Development Bank, 2005-2010)</p>

## 2. Outline of the Evaluation Study

### 2.1 External Evaluator

Mayumi Hamada, Foundation for Advanced Studies on International Development

### 2.2 Duration of Evaluation Study

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

Duration of the Study: August 2019–October 2020

Duration of the Field Study: November 12, 2019–December 1, 2019

February 9, 2020-February 20, 2020

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

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

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

*The Master Plan for Rehabilitation and Reconstruction for the Regions and People of the Province of Nanggroe Aceh Darussalam and Nias Island of the Province of Sumatra* (approved in April 2005) was formulated by the National Development Planning Agency (hereinafter referred to as BAPPENAS) concerning Aceh Province, which was seriously damaged by the

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

<sup>3</sup> ③: High, ②: Fair, ①: Low

earthquake and tsunami in the Indian Ocean off Sumatra (2004, 2005). It positioned the period between July 2006 and the end of 2009 as a reconstruction stage focused on the reconstruction of comprehensive socioeconomic system, through restoration of economic system, rehabilitation of infrastructure and administrative systems at local level; as well as revitalization of social and cultural systems<sup>4</sup>. Moreover, *The National Medium-Term Development Plan 2004-2009* underlined the importance of normalization of people's lives in Aceh Province, where conflict had persisted for 30 years, as well as prevention of a new conflict in specific areas related to "preventing and overcoming separatism." The direction of the above-mentioned rehabilitation and reconstruction plan was unchanged during the project implementation. At project completion and at the time of the ex-post evaluation, *The National Medium-Term Development Plan 2014-2019* set human resources development, the priority development sector, and equity as its three pillars of development<sup>5</sup>. Furthermore, the *Master Plan for Acceleration and Expansion of Indonesia Economic Development 2011-2025* (hereinafter referred to as MP3EI, 2011) upholds economic development through Economic Corridors as one of the three strategies, and six Economic Corridors are planned. The Sumatra Central Road, which was the target of the road sub-project (both at the appraisal and implementation stages) is a part of the Sumatra Economic Corridor<sup>6</sup>. Hence, consistency has been maintained from appraisal to the time of the ex-post evaluation between the project direction—aimed at reconstruction through improvement of infrastructure, thereby enhancing the living environment of people affected by the disaster and the conflict, as well as enhancing sustainable peace—and Indonesia's development plan.

### 3.1.2 Consistency with the Development Needs of Indonesia

The earthquake and tsunami in the Indian Ocean off Sumatra resulted in damage both in terms of material and human resources, totaling 130,000 deaths and 4.5 billion US dollars. According to a survey conducted by the GOI (late January 2005), infrastructure damage reached approximately 900 million US dollars. The transportation sector accounted for 61%, followed by the water resources sector at 25%. The damage to the water resources sector was estimated to be approximately 200 million US dollars, and rehabilitation of the rivers and the drainage system was urgently needed. In spite of many donors' support, there was still a shortage of funds for the transportation and water resources sectors compared with the needs of reconstruction and development.

Moreover, as a result of the 30-year armed conflict between the GAM and the Indonesian security forces, advancement and development were delayed in Aceh Province even before the earthquake and tsunami. The poverty rate in Aceh Province was 29.76%, which significantly

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<sup>4</sup> THE NATIONAL MEDIUM-TERM DEVELOPMENT PLAN 2004-2009 (Chapter 5-1-5-3)

<sup>5</sup> MEDIUM-TERM DEVELOPMENT PLAN: RPJMN 2014-2019 (Presentation, Director of Forestry and Water Resources Conservation, BAPPENAS)

<sup>6</sup> MP3EI (P46-72)

surpassed the national average of 17.42%<sup>7</sup>. At the time of project completion, the poverty rate of Aceh Province was 15.97% (2018), which was still higher than the national average of 10.98%; Aceh Province was positioned as the 6<sup>th</sup> among 33 provinces (including special provinces) in the country<sup>8</sup>.

Furthermore, support for Aceh Province was concentrated in the area damaged by the tsunami, in contrast to the central area affected by the conflict, where support was insufficient. Working opportunities were insufficient for the rehabilitation of ex-GAM soldiers, which led them to unstable economic and mental situations and prompted a new destabilizing factor in society. Accordingly, developing the local economy through rehabilitation and reconstruction of distribution and economic infrastructures was necessary for the rebuilding and advancement of Aceh Province.

Thus, the project's direction to reconstruct the area affected by disaster, mitigate unstable factors in the area affected by conflict, and develop the local economy through rehabilitation of infrastructure in the sectors of transportation and water resources in Aceh Province, where the poverty rate is high, were consistent with development needs, both during appraisal and ex-post evaluation.

### 3.1.3 Consistency with Japan's ODA Policy

*The Country Assistance Program for the Republic of Indonesia (2004)* emphasized the importance of supporting the improvement of public goods (such as water, sanitation, and roads) and measures against natural disaster from the viewpoint of sustainability of local area for the sake of the "creation of a democratic and fair society." It also underlined the importance of rehabilitation and reconstruction of infrastructure in the areas affected by conflict (such as Aceh) from the standpoint of "peace and stability." *The Overseas Economic Cooperation Implementation Principle (2005)* set "support for global issues and peace building" as a priority and aimed to support the establishment of disaster-resilient infrastructure through rehabilitation and reconstruction of public infrastructure in the area affected by the earthquake and tsunami in the Indian Ocean off Sumatra. Therefore, the rehabilitation of drainage infrastructure in the seriously disaster affected area in and the improvement of road infrastructure in the conflict area in the above province were highly consistent with Japan's ODA policy at the time of appraisal.

### 3.1.4 Appropriateness of the Project Plan and Approach

With regard to the road sub-project, there was no road in the originally planned section, indicating a "Missing Link" for the Sumatra Central Corridor. Thus, the need was especially high. However, the initial plan to construct a new road between Geumpang and Pameu (64.8

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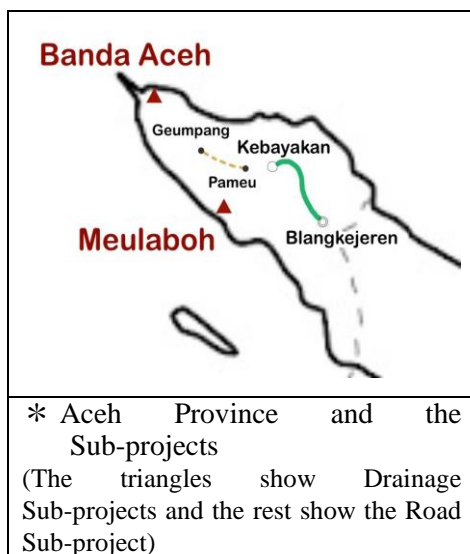
<sup>7</sup> Minutes of Discussions (Annex I-2)

<sup>8</sup> Data dan Informasi Kemiskinan Kabupaten/Kota Tahun 2018 (Badan Pusat Statistik, P9-P24)

km) was changed to improve an existing road between Kebayakan and Blangkejeren (137.24 km) during the implementation period. The reason for the change was that the Ministry of Environment did not grant permission for the new road; the ministry and an NGO opposed the construction, as the initially planned section included an environmentally protected area (forest).

At the time of appraisal, it was not grasped that the section between Geumpang and Pameu included an environmentally protected area. It is possible that there was not sufficient time for a detailed survey due to the chaos during the restoration period. Moreover, the possibility of drastic delays could not be denied if the section were not changed, as progress was already delayed significantly when the section change was requested and accepted by JICA based on the recommendation of the Special Assistance for Project Implementation (hereinafter referred to as

SAPI) Team in March 2011.



On the other hand, it is unlikely that the above change significantly lowered the relevance of the project, although consistency with the need is slightly lower due to the shift from road construction that would have connected the missing link. The reasons are that both sections of the road belong to the area severely affected by conflict, both are part of the Sumatra Economic Corridor, and the revised section is a route for moving crops from production to urban areas. Therefore, the change can be judged appropriate.

Based on the above, this project aiming at reconstruction of economic society by rehabilitation of infrastructure in the area affected by disaster and contribution to peace building in the area affected by conflict in Aceh Province, where development was delayed and conflict prolonged for a long time, has been highly relevant to the country's development plan and development needs as well as Japan's ODA policy. Therefore, its relevance is high.

### 3.2 Efficiency (Rating: ②)

#### 3.2.1 Project Outputs

With regard to the sub-project, it was expected to be implemented upon concurrence of the JBIC after the implementing agency's submission of Project Plan/Investment Action Plan<sup>9</sup> for each sub-project. At the time of appraisal, the road and drainage sub-projects (Banda Aceh City and Meulaboh City) were expected to be implemented. After the project commencement, no

<sup>9</sup> It consists of project scope, cost, schedule, implementing structure, operation and maintenance structure, internal rate of return, and so on.

additional request for the sub-project other than the above was made by the implementing agency, and each sub-project was implemented as follows.

The three sub-projects expected at the time of appraisal were implemented as planned, except for the section change of the road sub-project (as shown in Table 1).

Regarding the road sub-project, the section of road was changed as stated above because the Ministry of Environment did not grant permission for construction, as the intended construction area included an environmentally protected area. However, the revised section is also located in an area seriously affected by conflict and part of Sumatra Central Corridor. Moreover, it was stated at the time of appraisal that the sub-project was subject to change. Thus, there is no significant problem in the above change of the road section from the viewpoint of the project outcome, i.e., “to reconstruct infrastructures to a level better than before the disasters.”

Table 1: Achievement of Outputs

	Appraisal (2007)	Ex-post Evaluation (2019)
1. Central Road	Construction of road between Geumpang and Pameu (64.8km)	1) Improvement of road between Kebayakan – Blangkejeren 137.24 km (4.5 m width pavement, 1.5 m x 2 shoulders) was implemented in the following three sections: <ul style="list-style-type: none"> <li>- Package 1: Kebayakan – Sp. Kraft (39.510 km)</li> <li>- Package 2: Sp. Kraft – Batas Aceh Tengah (45.545 km)</li> <li>- Package 3: Batas Aceh Tengah – Blangkejeren (52.182 km)</li> </ul>
2. Drainage at Banda Aceh City	No detailed description	1) Drainage channel improvement Drainage cleaning 2,500 m, drainage channel improvement 3,000 m, pavement 3,000m <sup>2</sup> , box culvert 33 pieces, concrete slab 151 pieces, flood gate 3 units 2) Retention basin Concrete sheet pile 900 m, embankment dike 1,130 m, pavement 4,000 m <sup>2</sup> , flap gate 5 units, slide gate 2 units, collector drain 1,500 m, drain culvert 5 units, pipe culvert 455 units <ul style="list-style-type: none"> <li>- The collector drain is 225 m less than planned because 3,180 m<sup>2</sup> of land could not be acquired due to budget shortage and design change.</li> <li>- The size of the retention basin was decreased because 460 m<sup>2</sup> of land could not be acquired due to budget shortage and design change.</li> </ul> According to Banda Aceh City, the influence of this decrease on the overall plan was small. 3) Lower Kr. Neng channel improvement Concrete sheet pile 450 m, pavement 3,500 m <sup>2</sup> , slide gate 2 units 4) Mid Kr. Neng channel improvement 2,600 m 5) Kr. Neng drain outlet 8 units
3. Drainage at Meulaboh City	No detailed description	1) Drainage channel improvement 16,514 m 2) Kr. Meurebo flood dike 650 m 3) Kr. Cangkoy flood wall Concrete 1,400m <sup>2</sup> , flap gate 4 units, slide gate 4 units 4) Jl. Garuda embankment 120 m

Source: Ex-ante evaluation sheet, appraisal document, PCR, questionnaire to implementing agencies, interviews with implementing agencies

Since the appraisal stage, it had been expected that BRR would be the implementing agency from project commencement to April 2009, transferring to PUPR starting in May 2009. Consequently, a Project Management Unit (hereinafter referred to as PMU) was planned for all the sub-projects before transition from BRR to PUPR to secure smooth transitions among the implementing agencies by assigning PUPR staff to the PMU<sup>10</sup>. As for the transition of the implementing agencies during the implementation stage, there was no problem because the staff at the Directorate General of Highways of PUPR (seconded to BRR) continued to be engaged after the transition<sup>11</sup>. It was considered to be meaningful for the smooth transition that a key person at PUPR who was engaged before the transition from BRR to PUPR continued their engagement after the transition for the road sub-project. However, those concerned did not necessarily recognize that setting up PMU would promote a smooth transition, because PMU had been established for all the loan projects<sup>12</sup>. On the other hand, sufficient information could not be gained on the transition status from BRR to the Directorate General of Human Settlement and PUPR on the drainage sub-projects, because most of those at the executing agencies and consulting companies who knew the situation at that time were not in the same organizations anymore.

### 3.2.2 Project Inputs

#### 3.2.2.1 Project Cost

Compared to the planned total project cost at the time of appraisal (15,458 million yen, including a loan of 11,593 million yen), the actual total project cost was 9,869 million yen (including a loan of 8,619 million yen). Thus, the project cost was within the planned constraints (63.8% of the plan and 74.3% of the loan). As for the Indonesian side, the actual cost was 1,270 million yen, compared to the planned amount of 3,865 million yen (for details, please refer to the “Comparison of the Original and Actual Scope of the Project” on the last page).

There is no problem with the project cost, because the total cost was lower than planned. Furthermore, as one of the reasons for the gap between the planned and the actual amount is that no request was made by the Indonesian side other than the three sub-projects, although the planned amount included construction of ports and so on, which were on the list of candidate sub-projects in case they were needed to flexibly cope with the restoration from disaster.

#### 3.2.2.2 Project Period

The planned project period was 94 months<sup>13</sup>, whereas the actual project period was 124 months. Thus, it exceeded the plan (131.9% of planned period). The reason for the delay was

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<sup>10</sup> The ex-ante evaluation sheet (P3)

<sup>11</sup> Interview with the implementing agency

<sup>12</sup> Interview with the implementing agency

<sup>13</sup> The project completion was defined as the completion of the final guarantee period in the loan agreement.

that the road sub-project required time for coordination, as the initially planned section of the road included an environmentally protected area. As a result, the road section was changed, which led to a delay of 2 years and 5 months for the road sub-project.

### 3.2.3 Results of Calculations for Internal Rates of Return (Reference Only)

The financial internal rate of return (FIRR) was not recalculated because this project was not profitable, and the FIRR was not calculated at the time of appraisal. The economic internal rate of return (EIRR) for the road sub-project was not recalculated, either, because it was not calculated at the time of appraisal. The drainage sub-project in Meulaboh City could not be recalculated, as sufficient data was not available. The EIRR for the drainage sub-project in Banda Aceh City was 13% based on the condition of a 30-year project life after the loan agreement was signed, including the cost of construction and maintenance, the benefit of prevented damage, benefit to the surrounding area, and increasing land value. The major reason for the gap with the value at the time of appraisal (9%) is considered to be the less maintenance cost compared with the estimation.

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

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

### 3.3.1 Effectiveness

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

This project consists of three sub-projects: one in the road sector and two in the drainage sector. Thus, the project's effectiveness was assessed based on the achievement of indicators for respective sub-project, and then analyses of qualitative indicators and impacts were added. The actual values of the indicators set at the time of appraisal are shown in Table 2.

Concerning the road sub-project, the annual average daily traffic between Takengon and Blangkejeren (via a provincial road for the section from Kebayakan to Blangkejeren) was 1,410 (vehicles/day) in 2018 and 1,515 in 2019, both of which significantly fell below the target of 3,590. Hence, the target value was not achieved. On the other hand, time saving reached 3.1 hours in 2018, which achieved the target. Although it was 3.4 hours in 2019, having increased by 18 minutes, it was significantly improved compared with 5.5 hours in 2016. Thus, the quantitative indicators for the road sub-project were partially achieved.

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<sup>14</sup> Sub-rating for Effectiveness is to be put with consideration of Impacts.

Table 2 Operation Indicators

Indicator	Baseline	Actual (PCR)	Target	Actual	
<b>1. Central Road</b>	(Before Earthquake)	(2016)		(2018)	(2019)
(Appraisal) Annual Average Daily Traffic (vehicle/day) Pameu – Banda Aceh	N/A	N/A	(2017) 1,158	(the section not constructed)	(the section not constructed)
(Revised Plan) Annual Average Daily Traffic (vehicle/day) Takengon – Blangkejeren	N/A	1,028 (Remarks 1) 940 (Remarks 2)	(2018) 1,378 (Remarks 1) 3,590 (Remarks 2)	N/A (Remarks 1) 1,410 (Remarks 2)	N/A (Remarks 1) 1,515 (Remarks 2)
(Appraisal) Time saving Pameu – Banda Aceh	Approx. 12 hrs	N/A	(2017) Approx. 8hrs	(the section not constructed)	(the section not constructed)
(Revised Plan) Time saving Takengon – Blangkejeren	N/A	Approx. 5.5 hrs	(2018) Approx. 3.1 hrs	3.1 hrs	3.4 hrs
Indicator	Baseline (Before Earthquake)	Actual (PCR)	Target (2 years after completion)	Actual	
<b>2. Drainage at Banda Aceh City</b>	(recurrence period: 5 yrs)	(2012)	(2014) (recurrence period: 5 yrs)	(2014) (recurrence period: 5 yrs)	(2019) (recurrence period: 5 yrs)
Annual Maximum Inundated Area (ha)	(2000) 118.8	213	64	N/A	5.4
Annual Maximum Inundated Time (hrs)	(2002) 4 - 12 (Remarks 3)	6	2 (10 – 15 cm)	N/A	0.4 (10 – 15 cm)
Annual Maximum Number of Inundated Houses	(2000) 1,087 (Whole Aceh)	N/A	N/A	N/A	N/A
<b>3. Drainage at Meulaboh City</b>	(2005)	(2012)	(2013) (recurrence period: 5 yrs)	(2013) (recurrence period: 5 yrs)	(2019) (recurrence period: 5 yrs)
Annual Maximum Inundated Area (ha)	264.6	178	54	54	62
Annual Maximum Inundated Time (hrs)	N/A	12	4 (Remarks 4)	4	8
Annual Maximum Number of Inundated Houses	N/A	N/A	N/A	N/A	N/A

Source: documents provided by JICA and Implementing agencies

Remarks 1: via National Road for section Takengon – Blangkejeren (average speed 26 km/h)

Remarks 2: via Provincial Road for section Kebayakan – Blangkejeren (average speed 46 km/h)

Remarks 3: “4 - 12 hrs” is indicated in the PCR of the road sub-project, while it is “4 hrs - 12 days” in the ex-ante evaluation sheet and appraisal document. The above correction was made based on the information collected through the questionnaire and interview with Banda Aceh City Office that the “day” is unrealistic and should be understood as the mistyping of “hours.”

Remarks 4: Although it was “2 (10 – 15 cm)” at the time of appraisal, it was corrected as “4” at PCR.



Regarding the drainage sub-project in Banda Aceh City, the annual maximum inundated area was 5.4 ha and the annual maximum inundated time was 0.4 hour at the time of the ex-post evaluation (2019), both of which show favorable results far below the target values, although 2014 data for each indicator were not available. Data on the annual maximum number of inundated houses do not exist. However, it is considered appropriate to assess the achievement based on the annual maximum inundated area and annual maximum inundated time, because the number of inundated houses is influenced by the increase in the number of houses and not necessarily vital as an indicator. Hence, the objective was achieved in Banda Aceh City.

Furthermore, the drainage in Banda Aceh City received many donors' support, such as the Multi-Donor Fund for Aceh and Nias (2005-2012), Japan's Non-Project Grant Aid "Assistance for the Damage Caused by the Earthquake off the Coast of Sumatra and Tsunami in the Indian Ocean" (2015), and JICA's technical cooperation project, "Banda Aceh City Quick Impact Project" (2005). The achievement of the indicator did not result from only this project, but the synergetic effects of those projects were large.

Concerning the drainage in Meulaboh City, both the annual maximum inundated area and the annual maximum inundated time achieved the target values in 2013, the target year. At the time of the ex-post evaluation (2019), the annual maximum inundated area had increased by 14.8% and the annual maximum inundated time had doubled compared with the target year. According to the implementing organization, the reasons are extreme weather conditions and damage to the river<sup>15</sup>.

Therefore, the achievement of quantitative effects for the road sub-project was medium, and the drainage sub-projects in Banda Aceh City and Meulaboh City achieved the targets.

### 3.3.1.2 Qualitative Effects (Other Effects)

Concerning the improvement of traffic volume on the Central Road, interviews were conducted with 20 road users<sup>16</sup> who knew the situation both before and after the project at the location of the starting point, the ending point, and the middle of the road. As a result, the traffic volume at the time of the ex-post evaluation significantly increased compared with before the project implementation (See Table 3). Although the representativeness is low due to the small sample size, the road users recognized the increased traffic volume compared to before the project implementation.

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<sup>15</sup> Questionnaire to the implementing organization

<sup>16</sup> The interviews were conducted in December 2019 with interviewees who knew the situation both before and after the improvement of the road by the project. The interviews were conducted with 20 road users (14 males and 6 females); 6 persons at Kebayakan, the starting point of the section, 5 persons at Blangkejeren, the end point of the section, and 9 persons in between the two locations on the road. The breakdown of the interviewed road users was: 8 road users living near the road, 11 road users working around the road (4 shop owners, 3 road users engaged in transportation such as drivers of mini busses and taxis, and 4 other road users) and 1 student.

Moreover, regarding the drainage sub-projects, interviews were conducted in Banda Aceh City and Meulaboh City with 77 residents who knew the situation before and after the project implementation. The results of a question about the frequency of inundation are shown in Table 4<sup>17</sup>. Concerning the frequency of inundation, 54 out of 77 interviewees responded “almost none” at the time of the ex-post evaluation, while 30 out of 77 interviewees responded “often” before the project implementation. Thus, the frequency of inundation decreased. Although this data cannot be said to represent the tendencies of the whole population, it can be assumed that the residents at the project sites recognized that the frequency of inundation had decreased at the time of the ex-post evaluation compared to before the project was implemented.

Therefore, the qualitative effects of the road sub-project and the drainage sub-projects in Banda Aceh City and Meulaboh City were high.

Table 3 Change of Traffic Volume  
(for section Takengon – Blangkejeren)

(Unit: persons)		
	2004	2019
Very big	0	20
Big	1	0
Fair	4	0
Small	6	0
Very small	9	0
Total	20	20

Source: Interviews with road users

Table4 Frequency of Inundation

(Unit: persons)		
	2008	2019
Almost none	18	54
Not often	13	11
Fair	9	3
Often	30	9
Very often	7	0
Total	77	77

Source: Interviews with residents near the drainage sub-projects' sites

### 3.3.2 Impacts

#### 3.3.2.1 Intended Impacts

It was expected at the time of appraisal that the project would contribute to the improvement of the living environment for people who had been unable to benefit from development and advancement due to long conflict; the project was also intended to contribute to the promotion and establishment of peace after the conflict. The improvement status of the living environment at the time of the ex-post evaluation is as follows.

<sup>17</sup> In November 2019, interviews were conducted with residents living near the drainage facilities constructed by the project who knew the situation before and after the project implementation (42 residents at Banda Aceh City, consisting of 25 males and 17 females, and 35 residents at Meulaboh City, consisting of 17 males and 18 females).

a) The road sub-project

Concerning the safety and convenience of traffic and its influence, interviews were conducted with 20 users<sup>18</sup> of the road improved by the project. Their replies to questions regarding the status before the tsunami and at the time of the ex-post evaluation are shown in Table 5. The time required for commuting, going to school, and clinics as well as for shopping was shortened. Thus, it is regarded that the convenience of traffic improved.

Table 5 Change of Living Environment by Road Improvement

Time for Commuting (Unit: person)			Time for Going to School (Unit: person)		
	2004	2019		2004	2019
5 Very short	0	20	5 Very short	0	20
4 Short	1	0	4 Short	1	0
3 Neither short nor long	6	0	3 Neither short nor long	6	0
2 Long	4	0	2 Long	4	0
1 Very Long	9	0	1 Very Long	9	0
0 I don't know	0	0	0 I don't know	0	0
Total	20	20	Total	20	20

Time for Going to Clinics/Hospitals (Unit: person)			Time for Going to Shops (Unit: person)		
	2004	2019		2004	2019
5 Very short	0	20	5 Very short	0	20
4 Short	1	0	4 Short	1	0
3 Neither short nor long	6	0	3 Neither short nor long	6	0
2 Long	4	0	2 Long	4	0
1 Very Long	9	0	1 Very Long	9	0
0 I don't know	0	0	0 I don't know	0	0
Total	20	20	Total	20	20

Source: Interview of road users

b) The drainage sub-projects

In Banda Aceh City and Meulaboh City, interviews were conducted with 77 residents<sup>19</sup> who lived near the drainage facilities improved by the project and knew the situation both before and after the project. The result of the interviews surrounding the questions about the change of sanitary status and convenience of traffic after rain are shown in Tables 6 and 7. A decrease in bad odor is recognized as a change in the sanitary aspect of the living environment. However, the accumulation of sludge and bad odor at the time of low tide were pointed out at a specific place. Moreover, some interviewees recognized that certain infectious diseases that are common after rainfall, such as diarrhea and malaria, also decreased. However, this cannot be assessed as

<sup>18</sup> The timeframe of the interviews and the interviewees were the same as indicated in footnote No. 16.

<sup>19</sup> The timeframe of the interviews and the interviewees were the same as indicated in footnote No. 17.

a significant change because neither disease was particularly prevalent, even before the project. On the other hand, regarding the change in the convenience of traffic, it is recognized frequency in taking a detour, time for commuting, going to school, and clinics after rain improved compared with before the project.

However, the above may not show the full tendency of each sub-project, due to the small sample size.

Table 6 Change in the Living Environment by Drainage Improvement  
(Sanitation)

Frequency of Bad Smell (Unit: persons)			Diarrhea after Rainfall (Unit: persons)		
	2008	2019		2008	2019
5 Almost none	28	48	5 Almost none	63	74
4 Not often	18	21	4 Not often	6	2
3 Fair	11	3	3 Fair	5	0
2 Often	15	4	2 Often	2	1
1 Very often	3	0	1 Very often	0	0
Total	75	76	Total	76	77

Cholera after Rainfall (Unit: persons)			Tetanus after Rainfall (Unit: persons)		
	2008	2019		2008	2019
5 Almost none	68	76	5 Almost none	68	76
4 Not often	2	1	4 Not often	3	1
3 Fair	4	0	3 Fair	4	0
2 Often	1	0	2 Often	0	0
1 Very often	1	0	1 Very often	1	0
Total	76	77	Total	76	77

Source: Interview with residents of the drainage sub-projects' sites

Remarks: The reason why there is difference between the sub-total of 2008 and 2019 is that the number of the respondents who did not answer the question is excluded.

Table 7 Change in the Living Environment by Drainage Improvement  
(Traffic after Rainfall)

Frequency in Taking Detour (Unit: person)			Time for Commuting (Unit: person)		
	2008	2019		2008	2019
5 Very Good	25	58	5 Very Good	26	57
4 Good	12	14	4 Good	12	14
3 Fair	25	4	3 Fair	23	5
2 Bad	10	0	2 Bad	12	0
1 Very Bad	3	0	1 Very Bad	2	0
Total	76	76	Total	75	76

Time for Going to School (Unit: person)			Time for Going to Clinics/Hospitals (Unit: person)		
	2008	2019		2008	2019
5 Very Good	28	56	5 Very Good	27	55
4 Good	12	15	4 Good	12	16
3 Fair	22	5	3 Fair	23	5
2 Bad	10	0	2 Bad	10	0
1 Very Bad	3	0	1 Very Bad	3	0
Total	75	76	Total	75	76

Source: Interview with residents of the drainage sub-projects' sites

Remarks: The reason why there is difference between the sub-total of 2008 and 2019 is that the number of the respondents who did not answer the question is excluded.

### 3.3.2.2 Other Positive and Negative Impacts

#### (1) Impacts on the Natural Environment

At the time of appraisal, the project may have had a certain impact on the environment<sup>20</sup>, because it was not possible to determine all of the sub-projects before acceptance of the loan, as there was an emphasis on quick and flexible measures against the disaster. Among the expected sub-projects, BRR and PUPR obliged the contractor, in its contract of the road sub-project, to formulate an environmental management plan, which included public health and internal safety training, and agreed upon measures, including an HIV/AIDS prevention clause in the bidding document<sup>21</sup>.

At the implementation stage and at the time of ex-post evaluation, there were no negative impacts on the environment by the construction of any sub-project. Procedures for necessary permission were taken without delay<sup>22</sup>. In the road sub-project, the initially planned section of the road was revealed to include an environmentally protected area (forest). As a result, the plan was modified to make an improvement to another section of the road. Consequently, the project was implemented without destroying the environment. Although the contractor's contract did not include an HIV/AIDS prevention clause, formulation and implementation of the

<sup>20</sup> Categorized as FI in Japan Bank for International Cooperation Guidelines for Confirmation of Environmental and Social Consideration (April 2002)

<sup>21</sup> PCR of the road sub-project (P16)

<sup>22</sup> Questionnaire by implementing organizations

environment management plan and environment monitoring plan were conducted by contractors and consultants<sup>23</sup>. However, these monitoring records could not be obtained.

## (2) Impacts on the Resettlement and Land Acquisition

As not all of the sub-projects were determined before acceptance of the loan, it was planned at the time of appraisal to confirm the assessment of environmental and social impacts for each sub-project, according to the environment guideline and with the support of the consultant.

As for the road sub-project, land acquisition was not conducted because the initial plan to construct a new road was changed to improve the existing road<sup>24</sup>. Concerning the drainage sub-project in Banda Aceh City, 22.5 ha of land was acquired and approximately 200 persons were resettled. This did not produce a significant change, although a partial scale-down was observed, due to the delay in land acquisition<sup>25</sup>. Based on the examination made in accordance with the domestic law, financial compensation was made for the acquisition of the land and buildings in the above city, and resettlement was conducted without a problem<sup>26</sup>. In Meulaboh City, small-scale land acquisition was conducted to broaden the width of the drainage facility (about 1 – 2 m). However, there was neither a problem with the procedure for the acquisition nor was resettlement required<sup>27</sup>.

## (3) Other Positive/Negative Impacts

Decreases in flies, mosquitoes, and dengue fever were other positive impacts of the drainage sub-projects in the interviews with the residents as mentioned before. Moreover, interviewees pointed out that the scenery was improved due to the construction of the retention basin, which became a place of relief of the citizens<sup>28</sup>. As for the road sub-project, smooth distribution and increased sales of agricultural crops, as well as positive effects on the local economy, were positive impacts.

On the other hand, concerning negative impacts, a bad odor is generated in the retention basin in Banda Aceh City depending on the area, due to accumulated sludge at high tide. Moreover, some have fallen into the retention basin (including one fatal accident) because there was no fence<sup>29</sup>. After falling into the retention basin, even an adult can hardly get out by himself or help someone out of it, because there are no stairs or handrail. However, it cannot be said that there was a specific problem compared with the other retention basins in Indonesia, because it

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<sup>23</sup> PCR of the road sub-project (P16 – 18)

<sup>24</sup> Interview with implementing organization

<sup>25</sup> Interview with maintenance and operation (M&O) organization

<sup>26</sup> Interview with M&O organization

<sup>27</sup> Interview with M&O organization

<sup>28</sup> Interview with the residents at the drainage sub-projects sites. The timeframe and the target are the same as in footnote No. 17.

<sup>29</sup> Interview with the residents at the drainage sub-projects sites. The timeframe and the target are the same as in footnote No. 17.

was constructed in accordance with the Indonesian design standard of the retention basin. Furthermore, at the time of appraisal, the possibility of a fatal accident resulting from the children's wandering onto the rim of the retention basin was unforeseeable.

Based on the above, concerning the quantitative effects, the project's objective was partially achieved for the road sub-project, and achieved for the drainage sub-projects at Banda Aceh City and Meulaboh City. As for the improvement of the living environment, among the impacts expected at the time of appraisal, improvement of convenience in traffic by the road sub-project as well as a decrease in bad odor and improved convenience in traffic after rainfall by the drainage sub-projects were observed. There were other positive impacts, such as economic effects, including the smooth distribution of agricultural crops and an increase in amount of sales by the road sub-project, as well as decreases in mosquitoes, flies, and dengue fever by the drainage sub-projects, although there were also negative impacts, such as accidents where children fell into the retention basin and the emission of a bad odor from accumulated sludges by the drainage sub-projects. As stated above, this project has mostly achieved its objectives. Therefore, effectiveness and impacts of the project are high.

### 3.4 Sustainability (Rating: ②)

#### 3.4.1 Institutional / Organizational Aspects of Operation and Maintenance

In this project, the operation and maintenance structure were expected to be determined upon submission of the project plan document by the implementing organization. The sub-projects already expected at the time of appraisal were those of the road, the drainage at Banda Aceh, and the drainage at Meulaboh. The expected implementing structure was as follows.

- 1) Executing agency until April 2009 was BRR.
- 2) Executing agency since May 2009 was PUPR (a. Central Road: Directorate General of Highway, b. Drainage at Banda Aceh City: Directorate General of Human Settlement, c. Drainage at Meulaboh City: Directorate General of Human Settlement)

The project was implemented in accordance with the above implementing structure. Also, there was no request for an additional sub-project other than the above three sub-projects. In this project, the establishment of the PMU and dispatch of staff from PUPR to PMU were planned, because the executing agencies were scheduled to be changed (from BRR to PUPR) during implementation, and the maintenance and operation organizations would be different from the executing agencies. During the implementation period, PMU was established and the staff was dispatched from PUPR.

The operation and maintenance structure after project completion is as follows.

a) The road sub-project

At the time of appraisal, the Directorate General of Highway, PUPR was expected to be responsible for operation and maintenance. Investment Action Plan stated that PUPR would conduct O&M through its local office in Aceh. At the time of the ex-post evaluation, PUPR's local office (Balai Pelaksanaan Jalan Nasional (hereinafter referred to as Balai) PU Jalan) in Aceh conducted O&M until December 2019 (sufficient number of staff, i.e., 90 staff, are allocated to the O&M section, and secured). Although a part of the road improved by the project (section Kebayakan – Sp. Kraft) is a provincial road, the central ministry coped with its implementation, together with the other section of the road, to ensure smooth progress. As of 2019, a landslide had occurred at the provincial road section mentioned above, which required repair of the road. Due to a misunderstanding of the responsibility for the repair among Balai and the road section of the Aceh Province Government (Dinas), maintenance was delayed. However, Dinas was confirmed as being responsible for the O&M of the above section from January 2020, and the problem was solved<sup>30</sup>. Dinas also has a sufficient number of staff at the section in charge of road maintenance<sup>31</sup>.

b) The drainage sub-project at Banda Aceh

At the time of appraisal, the Human Settlement Section of Banda Aceh City and the Water Resources Section of Aceh Province Government were expected to be responsible for O&M. At the time of appraisal, the Water Resources Section of Banda Aceh City was intended to be responsible for the drainage system in the city (Zone 1), City Cleaning Service of the city responsible for cleaning the channel, and the Water Resources Section of Aceh Province Government responsible for Kr. Neng (Neng River). At the time of ex-post evaluation, the Water Resources Section of Banda Aceh City was responsible for the O&M, including monitoring. The section has 37 staff, including 12 staff and 25 outsourcing staff (such as pump operators), who were engaged in O&M of the drainage facilities. No significant shortage of staff was observed. The channels are cleaned by the City Cleaning Services on regular basis.

c) The drainage sub-project at Meulaboh

At the time of appraisal, the Human Settlement Section of Meulaboh City was expected to be responsible for the O&M. At the time of appraisal, the Water Resources Section of Meulaboh City was expected to be responsible for the drainage facilities in the city, while Water Resources Section of Aceh Province Government was responsible for the water dikes of the rivers. At the

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<sup>30</sup> It was confirmed at PUPR Headquarters, during the 2<sup>nd</sup> field visit of the ex post evaluation team, that the asset was not transferred from the provincial government to the central ministry from the beginning, i.e., from the project commencement until the ex-post evaluation, and that recognition of those who were concerned at the project site was based on misunderstanding.

<sup>31</sup> Interview with implementing organization



time of ex-post evaluation, West Aceh District (district capital is Meulaboh City) owned the drainage facility and was in a position to assume responsibility for O&M. However, those who were concerned with the project in the past were not available, due to sudden and frequent personnel reshuffling, and taking over of the task from the predecessors to the successors were not conducted sufficiently, in addition to inappropriately filing and storing documents. Thus, there was confusion about the O&M's responsibility for the drainage facilities by the project, as it was not recognized by the organization. It is possible that serious damage and chaos caused by a huge earthquake and tsunami resulted in a confusion of O&M responsibilities for drainage facilities, and it was not taken over from the predecessors. The Water Resources Section of West Aceh District is responsible for the drinking water, sanitation, and drainage in West Aceh District, including Meulaboh City. However, the staff is eight in number, which is small for the task. Moreover, the Environment Office of West Aceh District is responsible for general cleaning (including drainage facilities) of West Aceh District. The staff is nine in number, which is insufficient. Also, residents do not have the mindset to clean up on their own initiative. Hence, the O&M structure in West Aceh District is fragile.

On the other hand, West Aceh District established a cross-sectoral committee in 2017, with the aim of improving the district by choosing a theme annually. Currently, Coordinating Team for Flood Control has been established and there have been regular policy-level discussions among Offices of Public Works, Human Settlement, Environment, Disaster Prevention. Moreover, at the working level, "1<sup>st</sup> Response Team for Flood Control" was established in January 2020, and it started a survey on the current flood situation. Furthermore, during the 2<sup>nd</sup> field visit by the ex-post evaluation team, those concerned with West Aceh District understood the responsibility for O&M of the drainage facilities supported by the project. As of August 2020, the procedure is taken by West Aceh District for asset transfer and budget requests<sup>32</sup>, and there is an indication for improvement of the organizational aspect.

#### d) Other

There is insufficient information to judge whether the establishment of PMU contributed to continuous monitoring during the implementation stage and after project completion, because very few people are familiar with the history of the project due to organizational changes/restructuring.

Based on the above, the O&M implementation structure is sufficient for the road sub-project and the drainage sub-project at Banda Aceh City, whereas that for the drainage sub-project at Meulaboh City is medium. Therefore, sustainability from institutional/operational aspects is fair.

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<sup>32</sup> Telephone interview with implementing organization

### 3.4.2 Technical Aspect of Operation and Maintenance

At the time of appraisal, it was judged there was no problem from technical aspect. The reasons were as follows: project managers were expected to be dispatched from PUPR to BRR to ensure quality control from a technical aspect and a smooth transition among the implementing organizations; both the Directorate General of Highway and the Directorate General of Human Settlement of PUPR, the Executing Agency from 2009, had considerable experience with ODA Loan.

At ex-post evaluation, Balai of PUPR and the Road Section of Aceh Province Government are regarded to have sufficient technical capacity for O&M of the road<sup>33</sup>. Banda Aceh City also is considered to have sufficient technical capacity for O&M of the drainage facilities<sup>34</sup>. However, West Aceh District commented on Meulaboh City on the questionnaire, indicating that the technical capacity was insufficient, as it could not cope with the increased inundated area and time caused by extreme weather and damage to the watershed of Meurebo River (Kr. Meurebo)<sup>35</sup>.

Based on the above, the technical capacity of O&M is sufficient for the road sub-project and the drainage project at Banda Aceh City, whereas that for the drainage sub-project at Meulaboh City is insufficient. Therefore, sustainability from the technical aspect of O&M is fair.

### 3.4.3 Financial Aspect of Operation and Maintenance

At the time of appraisal, the GOI budget was intended to cover the construction cost except for that covered by the loan and administration costs that are not covered by the loan, as well as tax and duties. The actual cost for O&M at ex-post evaluation is shown in Tables 8 and 9.

Table 8 Actual Cost of O&M for the Road Sub-project

(Unit: million Rupiah)

	2016	2017	2018
Sp. Kraft - Batas Aceh Tengah	N/A	N/A	946
Batas Aceh Tengah – Blangkejeren	N/A	N/A	5,877
Kebanyakan – Sp. Kraft	N/A	N/A	N/A

Source: Questionnaire by Implementing Organization

<sup>33</sup> Questionnaire by and interview with implementing organization

<sup>34</sup> Questionnaire by implementing organization

<sup>35</sup> Questionnaire by implementing organization

Table 9 Actual Cost of O&M for the Drainage Sub-projects

(Unit: million Rupiah)

	2016	2017	2018
The Drainage Sub-project at Banda Aceh City	1,000	1,000	1,000
The Drainage Sub-project at Meulaboh City	0	0	0

Source: Questionnaire to and Interview with Implementing Organization

According to the implementing organization, the cost of O&M for the road sub-project is sufficient<sup>36</sup>. For the drainage sub-project at Banda Aceh City, the response indicated that the O&M cost was not sufficient. However, it has borne a certain level of maintenance costs for the last three years. On the other hand, there was no O&M cost secured for Meulaboh City for the last three years. This was due to a confusion of responsibility for O&M of the drainage facility, due to frequent personnel changes among those who were concerned, insufficient taking-over, and document filing and storing as already described; moreover, the district-level budgetary status is generally severe. However, as described in the section “Institutional / Organizational Aspect of Operation and Maintenance,” the committee members of the Coordination Team for Flood Control at West Aceh District consist of Offices of Public Works, Environment and Disaster Prevention, in addition to Human Settlement; each office has a certain budget<sup>37</sup>. Hence, sustainability from a financial aspect may, to some extent, improve in the future.

Based on the above, no major problems have been observed from financial aspect for the road sub-project and the drainage sub-project at Banda Aceh City, whereas the major financial problem is observed for the drainage sub-project in Meulaboh City. Thus, sustainability from financial aspect of O&M is fair.

#### 3.4.4 Status of Operation and Maintenance

At ex-post evaluation, landslides had occurred at several sites along the provincial road of the road sub-project. As stated before, the Indonesian domestic law stipulates that the owner of the facility is responsible for O&M, although Balai had been coping with the O&M of the road improved by the project. However, those who were concerned with the sites recognized the difficulty of making major repairs on the provincial road (section Kebayakan – Sp. Kraft) until asset transfer from the central government to the provincial government is completed. This resulted in insufficient maintenance status, as the major repair works were not conducted<sup>38</sup>. However, this problem was solved, as in January 2020, there was clarification that the road section of Aceh Province is for O&M of the provincial road section, as stated in the clause of Institutional / Organizational Aspect of Operation and Maintenance.

<sup>36</sup> Questionnaire by implementing organization

<sup>37</sup> Interview with related organizations

<sup>38</sup> Interview with implementing organizations

As for the drainage sub-project at Banda Aceh City, the main channel generally functioned well<sup>39</sup> at ex-post evaluation, despite accumulated sludge and so on. The improved Neng River (Kr. Neng) also functions well as a whole, although the watergate is partially damaged.

Concerning the drainage sub-project at Meulaboh City, the O&M status of some areas was insufficient, including the cleaning status.

As explained above, the O&M status of the road sub-project and the drainage sub-project at Banda Aceh City are in good condition, whereas the drainage sub-project at Meulaboh City has problems. Hence, the project's O&M status is fair.

Based on the above, some minor problems have been observed in terms of the institutional/organizational aspect, technical aspect, financial aspect, and current status. Therefore, sustainability of the project effects is fair.

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

##### 4.1 Conclusion

This project was implemented to reconstruct infrastructures in the transportation and water resources sectors to make them better than they had been before disasters in Aceh, thereby contributing to improvement of living conditions for the people affected by the disaster and conflict, and enhancing the local economy and sustainable peace in Aceh. The project's direction, which aimed at reconstruction of economic society by rehabilitation of infrastructure in the area affected by disaster and peace building in the area affected by conflict in Aceh Province, where development was delayed and conflict prolonged for a considerable time, has been highly relevant to the country's development plan and needs, as well as Japan's ODA policy. Therefore, its relevance is high. The project outputs were achieved mostly as planned, although the section of the road was changed in the road sub-project. Although the project cost was within the plan, the project period exceeded that of the plan. Therefore, efficiency of the project is fair. Concerning the quantitative effects, it is judged that the project's objective was partially achieved for the road sub-project, and achieved for the drainage sub-projects at Banda Aceh City and Meulaboh City. As for the improvement of living environment by the project, these included an improvement of convenience in traffic by the road sub-project, as well as a decrease in bad smell and improved convenience in traffic after rainfall by the drainage sub-projects. There were other positive impacts, such as the smooth distribution of agricultural crops and an increase in amount of sales, as well as the decrease in mosquitoes, flies, and dengue fever and so on. Therefore, effectiveness and impacts of the project are high. Some minor problems have been observed in terms of the institutional / organizational aspect, technical aspect, financial aspect and current status. Therefore, sustainability of the project

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<sup>39</sup> Questionnaire by implementing organization, direct observation

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

## 4.2 Recommendations

### 4.2.1 Recommendations to the Executing Agency

#### (1) The drainage sub-project at Banda Aceh

It is recommended that Banda Aceh City promptly constructs a guard fence to prevent accidents, mainly of children, involving a fall into the retention basin. Also, it is suggested to equip the retention basin with stairs and handrail, to facilitate rescue or getting out of the basin, in case a person falls. It is also desired that the sludge be removed in a prompt manner.

#### (2) The drainage sub-project at Meulaboh

The West Aceh District, i.e., the O&M organization for the drainage sub-project is recommended to secure the necessary budget and to promote maintenance of the drainage facilities at Meulaboh City, in collaboration with the Coordination Team for Flood Control as well as the 1<sup>st</sup> Response Team for Flood Control through integrated coordination.

### 4.2.2 Recommendations to JICA

None.

## 4.3 Lessons Learned

### Safety measures required for construction of a retention basin

The retention basin constructed by the drainage sub-project commands a fine view and became a place of relief for the residents. On the other hand, some accidents involving falls into the retention basin occurred, mainly involving children, including one fatal accident, as there is no guard fence. The residents around the retention basin pointed out that even an adult can hardly get out by himself or help someone get out of it, once someone has already fallen into the retention basin, because there are no stairs or handrail. As the retention basin was constructed in accordance with the Indonesian design standard, it is not regarded as having a design problem, compared with other retention basins in Indonesia. However, when a retention basin is constructed in a drainage improvement project, when formulating a construction plan, it is useful to include in the design the construction of a guard fence to prevent accidents involving falling into the basin, as well as stairs and handrails to get out or for rescue, in case someone falls, to prevent accidents and keep them from becoming serious.

### Planning and follow-up for a facility to be handed over to district level government

Among the three sub-projects of the project, the status at ex-post evaluation was most serious for the drainage sub-project at Meulaboh City, where the facility had been handed over to the

district-level government. Other sub-projects were handed over to either the province or the city. In general, financial and organizational aspects of a district-level government body tend to be fragile. In the case of the sub-project at Meulaboh City, there was no expenditure of the maintenance cost for the facility from project completion until ex-post evaluation. The O&M responsibility in the project was not recognized, due partly to frequent personnel transfer in the past.

It is desirable to include at the time of appraisal, “prior coordination of asset transfer from the central government to local government,” into the terms of reference of the contract of consultant, in case asset transfer is expected for the constructed facility, especially in the ODA Loan related to restoration from disasters.

Particularly when there is an anticipated asset transfer to local government, the financial and organizational capacities of which are fragile, it is necessary to conduct sufficient information collection and analysis on these capacities and select the organization to which it will be handed over, to ensure that the organization can conduct O&M appropriately after completion.

Comparison of the Original and Actual Scope of the Project

Item	Plan	Actual
1. Project Outputs		
a) The Road Sub-project	a) Central Road: construction of road Geumpang – Pameu (64.8km)	a) Central Road: improvement of existing road Kebayakan – Blangkejeren (137.24 km)
b) The Drainage Sub-project at Banda Aceh	b) Drainage facilities (No detailed information at the time of appraisal)	b) Drainage facilities Collector Drain Retention Basin Drain Outlet Improvement of Kr. Neng
c) The Drainage Sub-project at Meulaboh	c) Drainage facilities (No detailed information at the time of appraisal)	c) Drainage facilities Kr. Meurebo flood dike Kr. Cangkoy flood wall
2. Project Period	April 2007 – January 2015 (94 months)	March 2007 – June 2017 (124 months)
3. Project Cost		
Amount Paid in Foreign Currency	3,844 million yen	729 million yen
Amount Paid in Local Currency	11,614 million yen (936,612 million Rupiah)	9,140 million yen (993,478 million Rupiah)
Total	15,458 million yen	9,869 million yen
ODA Loan Portion	11,593 million yen	8,619 million yen
Exchange Rate	1Rupiah = 0.0124 yen (As of September 2006)	1Rupiah = 0.0092 yen (Average between January 2008 and December 2016 <sup>40</sup> )
4. Final Disbursement	July 2017	

<sup>40</sup> In this project, there was no expenditure in 2007, the 1<sup>st</sup> year, and in 2017, the last year. Thus, the annual average rate between 2008 and 2016 for nine years is applied as the exchange rate.

Mongolia

FY2019 Ex-Post Evaluation of Japanese ODA Loan

“Two-Step-Loan Project for Small and Medium-Scaled Enterprises Development and Environmental Protection Phase II”

External Evaluator: Nobuko Fujita,

Foundation for Advanced Studies on International Development

## **0. Summary**

This project was implemented to strengthen small and medium-scaled enterprises (SMEs) and the financial sector and to reduce emissions of environmental pollutants by the provision of long-term financing to SMEs, including projects for environmental protection, thereby contributing to the sustainable growth of Mongolia.

This project was consistent with the policies to promote SMEs and to protect the environment in Mongolia at the time of project appraisal as well as ex-post evaluation. Since it was also consistent with the needs of SMEs in Mongolia with few opportunities to access low interest, long-term loans, as well as with Japan’s development cooperation policies towards Mongolia at the time of project appraisal, the relevance of this project is high. Although the project’s cost remained within the budget, the project period exceeded the planned time; thus, the efficiency of the project is fair.

By implementing this project, the promotion of SMEs in Mongolia, strengthening the financial sector by dissemination of know-how regarding long-term credit, and reduction of emissions of environment pollutants were observed. 596 sub-projects<sup>1</sup> were funded including sub-loans from the revolving fund after the completion of the project, which had a high employment-generation effect. The sub-loans not only led to business development of each SME which took out sub-loan, but also each sub-project contributed to growth of export industries, import substitution by domestic production and improvement of processing and storage, improvement of workers’ safety, industrial development and improvement of medical services in the countryside thereby contributed on avoiding overdependence on the mining industry and leading Mongolia to a path for sustainable growth. Therefore, the effectiveness and impacts of the project are high.

No major problems were observed in the institutional/organizational, technical, or financial aspects, nor in the current status of maintenance and operation. Therefore, the sustainability of the project’s effect is high.

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

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<sup>1</sup> In this report, ‘sub-project’ refers to the projects of each SME that received funds in this project, and ‘sub-loan’ refers to the funding to those sub-projects.



## 1. Project Description



Project Location



Cashmere factory built by a sub-loan

### 1.1 Background

Mongolia is blessed with rich mineral resources, and its economic structure is heavily dependent on the mining sector. Therefore, it is vulnerable to commodity market fluctuations and economic climates of other countries.

Since the 1990s, many private companies have been founded in the process of transitioning to a market economy, most of which are SMEs. When the domestic economy began to slump due to the impact of global financial crisis starting in 2008, credit to the private sector became sluggish due to rising credit risk. There was an urgent need to provide support that contributes to the development of SMEs from the perspective of expanding the employment base through diversification of domestic industries and maintaining balanced and sustainable growth.

Since commercial banks in Mongolia accounted for 96% of total assets of the financial sector as of 2009, while trading on the securities markets was limited, companies relied mostly on bank loans for financing. When the international price of copper, a major export product, plunged due to the financial crisis mentioned above, banks' assets deteriorated, and stabilization and strengthening the financial sector was necessary.

In the environmental sector, laws such as the Environmental Protection Act and the Environmental Impact Assessment Act were developed after the transitioning to a market-based system. However, air pollution became serious due to winter heating using coal as an energy source and the increase of economic activities. The air pollution problem was also one of the issues to be solved immediately, but the financing system for environmental measures was not established.

JICA implemented ODA loan “Two-Step-Loan Project for Small and Medium-Scaled Enterprise Development and Environmental Protection Phase I (2006-2011; TSL(I)) which provided sub-loans to 125 projects,<sup>2</sup> and collected repayment of principal and interest in a

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<sup>2</sup> Ex-post evaluation report on Mongolia, *Two-Step-Loan Project for Small and Medium-Scaled Enterprise Development and Environmental Protection* (FY2013).

revolving fund account and used for new sub-loans. Based on that achievement, meeting the further financing needs of SMEs was required.

## 1.2 Project Outline

The objective of this project is to strengthen SMEs and the financial sector and reduce emissions of environment pollutants by providing long-term financing to SMEs, including projects for environmental protection, thereby contributing to the sustainable growth of Mongolia.

Loan Approved Amount/ Disbursed Amount	5,000 million JPY/4,995 million JPY
Exchange of Notes Date /Loan Agreement Signing Date	November 2010/November 2010
Terms and Conditions	Interest Rate: main portion 0.65%, consulting services 0.01% Repayment Period 40 years (10 years) (Grace Period): Conditions for Procurement: General untied
Borrower/ Executing Agency	The Government of Mongolia/Ministry of Finance (MOF)
Project Completion	February 2015
Target Area	Across Mongolia
Main Contractor (More than 1 billion JPY)	N/A
Main Consultant (More than 100 million JPY)	Koei Research & Consulting Inc. (Japan)
Related Studies (Feasibility studies, etc.)	<ul style="list-style-type: none"> <li>• Special Assistance for Project Implementation (SAPI) (July 2009)</li> <li>• SAPI (August 2013-June 2014)</li> </ul>
Related Project	<p>ODA Loan:</p> <ul style="list-style-type: none"> <li>• Two-Step-Loan Project for Small and Medium-Scaled Enterprises Development and Environmental Protection Phase I (2006-2011)</li> </ul> <p>Technical Cooperation:</p> <ul style="list-style-type: none"> <li>• Mongolia-Japan Human Resources Development Cooperation Center Project Phase II (2007-2012), Project</li> </ul>

	<p>for Capacity Development of Business Persons through Mongolia–Japan Center for Human Resources Development (2012-2015) (hereafter the Japan Center Project)</p> <ul style="list-style-type: none"> <li>• Capacity Development Project for Air Pollution Control in Ulaanbaatar City Phase I (2010-2013), Phase II (2013-2017) (hereafter Air Pollution T/C)</li> </ul> <p>Other aid institutions: Agriculture and Rural Development Project, Asian Development Bank (ADB) (2008–2020)</p>
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## 2. Outline of the Evaluation Study

### 2.1 External Evaluator

Nobuko Fujita, Foundation for Advanced Studies on International Development

### 2.2 Duration of the Evaluation Study

This ex-post evaluation study was conducted as follows.

Duration of the Study: August 2019-October 2020

Duration of the Field Study: November 11-27, 2019 (First field study)

May 27-June 30, 2020 (Second field study, implemented by local consultant)

### 2.3 Constraints during the Evaluation Study

The second field study was scheduled for March 2020, but due to travel restrictions caused by the worldwide spread of COVID-19, it was conducted remotely using an online conference system, etc. At the site, a local consultant (Narmandakh Sandagsuren, Mikeny Co. Ltd), making close contact with the external evaluator, conducted information collection through interviews and site visits based on the questionnaire created by the external evaluator. The quality of information was secured with the cooperation of local stakeholders.

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

### 3.1 Relevance (Rating: ③<sup>4</sup>)

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

At the time of appraisal, in the *Millennium Development Goals-based Comprehensive National Development Strategy of Mongolia* (2008), the promotion of SMEs, especially the promotion of provincial SMEs, was mentioned as an important issue. Furthermore, as part of the

<sup>3</sup> A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

<sup>4</sup> ③: High, ②: Fair, ①: Low

macroeconomic policy, emphasis was placed on strengthening banks and financial services. Environmental degradation and air pollution problems were also pointed out, and investment in pollution prevention was emphasized.<sup>5</sup>

Likewise, in the *Action Plan of the Government* (2008), one of the five goals was “to develop SMEs that utilize the mining industry and domestic resources,” and it identifies human resource development, financial support, and support for provincial SMEs. The plan also set the goal of reducing air pollution in Ulaanbaatar.<sup>6</sup>

Similarly, at the time of the ex-post evaluation, according to the *Mongolia Sustainable Development Vision 2030*, to promote employment that achieves social equality through inclusive growth, financial support for SMEs was clarified and the SME Development Fund will be expanded to 300 billion MNT<sup>7</sup> by 2030.<sup>8</sup> The *Vision 2030* also emphasized environmental protection and aims to eliminate air pollution in Ulaanbaatar by 2020.

Furthermore, in 2019, a *National Program for SME Development* was formulated, aiming to increase production, enhance competitiveness, and increase employment via development of legislation for SMEs and improving their access to loans. With the revision of the *SME law* in June 2019, SMEs became eligible to receive various tax incentives.

This project, which aims to provide long-term funds to SMEs (including environmental protection sub-projects) to foster and strengthen SMEs and the financial sector and control the emission of environmental pollutants, is consistent with the policies at the time of appraisal and ex-post evaluation.

### 3.1.2 Consistency with the Development Needs of Mongolia

At the time of appraisal in 2008, SMEs (50 employees or fewer) accounted for 96.7% of registered companies, but loans from banks were mainly short-term (within 1 year) and interest rates were high. For SMEs, long-term and low-interest financing was a challenge.<sup>9</sup>

At the time of the ex-post evaluation (Q3 2019), SMEs accounted for 97.3% of registered companies.<sup>10</sup> As a low-interest and long-term loan, ADB’s Agriculture and Rural Development Project exists, but the sector is limited to agriculture and livestock. The government-funded SME Development Fund did not fully meet the demand of SMEs because the scale of the fund

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<sup>5</sup> Government of Mongolia (2008), *Millennium Development Goals–Based Comprehensive National Development Strategy of Mongolia*.”

<sup>6</sup> Government of Mongolia (2008), *The Action Plan of the Government for 2008-2012*.

<sup>7</sup> Mongol tugrik. 1 MNT  $\approx$  0.051 JPY (2016 average). <https://data.imf.org> (retrieved on May 26, 2020. The source for the exchange rate is the same throughout the report.)

<sup>8</sup> State Great Hural of Mongolia (2016), “Mongolia Sustainable Development Vision 2030.”

<sup>9</sup> Koei Research & Consulting Inc. (2009), *Final Report of the Special Assistance for Project Implementation for Two-Step-Loan Project for Small and Medium-Scaled Enterprise Development and Environmental Protection* (Summary in Japanese). The policy interest rate was 11% at the start of the project. Thereafter, through November 2019, it ranged from 11.5 to 15.0%; as of November 2019, the policy rate was 11%, and the market rate was more than 14% per annum. (Bank of Mongolia, accessed May 13, 2020, <https://www.mongolbank.mn/eng/dblistmongolbankrate.aspx>, and hearings at the PFIs.)

<sup>10</sup> National Statistical Office of Mongolia, accessed November 26, 2019, <http://www.en.nso.mn/>.

was not stable each year since its source is the government's budget. In addition, there was a problem with transparency in its loan appraisal process.<sup>11</sup>

In addition, Mongolia's private banks have a structural problem that limits their ability to provide loans for more than 1 year, because most deposits (i.e., the source of loans) are short term, mostly less than 1 year. Regarding loans to SMEs with insufficient collateral assets, public funds such as those from international organizations are the main source, which was the case at the time of both project appraisal and ex-post evaluation.

At the time of the appraisal, Ulaanbaatar City had serious air pollution, especially in winter, due to topographical features, coal burning of gel, coal-fired power plants, automobile exhaust, etc. The air pollution in Ulaanbaatar City at the time of the ex-post evaluation was slightly improved due to the policy of prohibiting the import of raw coal into the city enforced in 2019 and the spread of improved fuel.<sup>12</sup> However, this project was the only loan in local currency that was given preferential treatment for environmental pollution control projects.<sup>13</sup>

From the above, it can be said that this project is consistent with the development needs of Mongolia at the time of appraisal and ex-post evaluation.

### 3.1.3 Consistency with Japan's ODA Policy

According to the *Country Assistance Program for Mongolia* (2004) document, support for institution building necessary for promoting a market economy is a priority area. Strengthening the financial system and the management capacity of SMEs are mentioned as urgent issues. Also, with regard to "support for environmental protection," support for Ulaanbaatar's environmental measures is listed, and therefore this project is consistent with Japan's assistance policy at the time of appraisal.

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

## 3.2 Efficiency (Rating: ②)

### 3.2.1 Project Outputs

#### (1) Structure of the Two-Step-Loan (TSL) Project

In this project, the ODA loan is funded to the participating financial institutions (PFIs) by the Mongolian government, and PFIs provide sub-loans to SMEs as long-term, low-interest

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<sup>11</sup> Hearings at the PFIs, companies using TSLs, and executing agency.

<sup>12</sup> In addition to banning raw coal from being brought into the city, improved fuels at the same price as raw coal were supplied by the state-run plant, and other commercially available fuels such as briquettes were allowed to be distributed only in products that meet government standards. As a result, in winter 2019, PM10 and PM2.5 significantly improved in the city's air pollution compared to the previous year. On the other hand, SO<sub>2</sub> and NO<sub>2</sub> have increased year-on-year. (Socio-Economic Situation of Mongolia, Dec. 2019 - Mar. 2020).

<sup>13</sup> Hearings at the PFIs, companies using TSLs, and executing agency.

funds in US dollars (US\$) or MNT (Fig. 1). Each sub-loan application is appraised by a PFI and examined by the Project Implementation Unit (PIU), which consists of MOF officials-in-charge and the consultants. Then, the Counterpart Steering Committee (CSC) organized by the MOF<sup>14</sup> performs the final review. Through PFIs, repayments from SMEs enter into a revolving fund managed by the MOF, which is used as a source for further sub-loans.

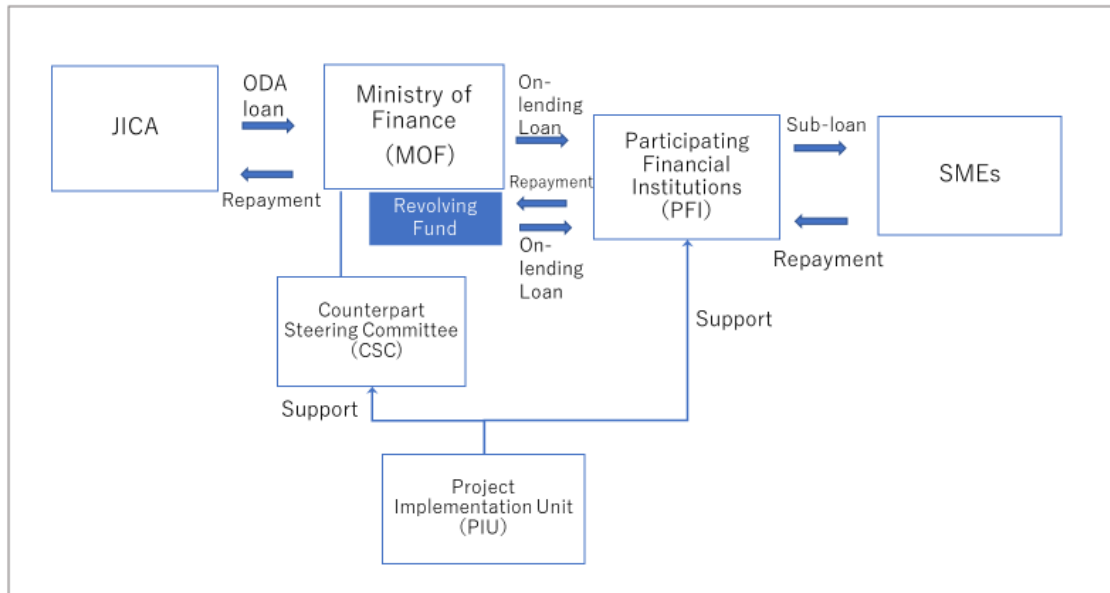


Fig. 1 The structure of the Two-Step-Loan Project

## (2) Number and amount of actual sub-loans

The number and the amount of sub-loans during the project implementation period are as follows.<sup>15</sup>

- Number of SMEs sub-projects: 245
- Number of environmental protection sub-projects: 38
- Amount of sub-loans: 4,640 million JPY (US\$3.38 million and 78 billion MNT)<sup>16</sup>

## (3) Consulting Services<sup>17</sup>

### i) Project implementation/support for capacity building

- Support for the CSC: PIU scrutinized the sub-loan applications that had been appraised by each PFI, submitted an application for approval to the CSC, and assisted

<sup>14</sup> Composed of members from the MOF; Ministry of Environment and Tourism; Ministry of Food, Agriculture and Light Industry; Bank of Mongolia (BOM); the Mongolian Bankers Association; and the Mongolian National Chamber of Commerce and Industry. (For detail, see 3.4.1, Institutional/Organizational Aspects of the Operations and Maintenance, Table 7).

<sup>15</sup> Up to February 23, 2015 for both the number and the amount of sub-loans. Documents provided by PIU.

<sup>16</sup> *Project Completion Report* (2015).

<sup>17</sup> *Ibid.*

with the loan-execution request for the approved project. CSC held 40 committee meetings during the project period.

- Support of PFIs: PIU explained the objective and procedure of TSL to PFIs selected by the MOF, explained the method of long-term loan appraisal, and supported the initial sub-loan appraisal and process.
- Guidance for SMEs: PIU introduced the TSL project at seminars and events held by PFIs and other organizations and conducted training on loan application.
- Organizing seminars and training sessions for SMEs and PFIs: 181 in total, with 4,224 participants in all.<sup>18</sup>

#### (4) Terms and conditions of the sub-loans

##### i) TSL for SMEs

- Target industries: All industries except entertainment, mining, real estate, military related, consumer finance, etc.<sup>19</sup>
- Target companies: Companies defined by the SME Law (enacted in 2007)<sup>20</sup>
- Lending period: 3 to 10 years (grace period: 0 to 3 years)
- Sub-loan amount: US\$10,000 - 600,000
- Currency: MNT or US dollars
- Interest rate: Set by the PFIs by adding the spread, based on the margin and end user credit risk, to the on-lending interest rate from the MOF. Regarding this on-lending loan interest rate, the MOF set the PFI margin at 4% in MNT and 3.6% in US dollars in response to the opinion of the State Great Hural (Parliament) of Mongolia that the government's low-interest loan program should provide fair and even terms to borrowers. The on-lending interest rate was reviewed every six months. None of the PFIs had any particular complaints.<sup>21</sup> Table 1 shows the on-lending and sub-loan interest rates for each period.

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<sup>18</sup> *Project Completion Report* (2015).

<sup>19</sup> Project Memorandum on TSL (II) between JICA and Executing Agency (Feb. 4, 2011).

<sup>20</sup> The definition of SMEs in the SME Law of 2007 was a manufacturing industry with 199 or fewer employees and annual sales of 1.5 billion MNT or less, and a service industry with 49 or fewer employees and 1 billion MNT or less (JICA et al. (2018) 3-1). The Act was amended in 2019 to include no more than 199 employees and annual sales of 2.5 billion MNT or less in both manufacturing and service industries at the time of the ex-post evaluation (SME Support Act, amended in June 2019).

<sup>21</sup> Hearings at the PFIs.

Table 1 On-lending and sub-loan interest rates (%)

Period		On-lending		Sub-loan	
Year	Month	US\$	MNT	US\$	MNT
2011	7-12	1.40	4.00	5.00	8.00
2012	1-6	1.80	4.00	5.40	8.00
	7-12	1.70	4.00	5.30	8.00
2013	1-6	1.51	4.00	5.11	8.00
	7-12	1.40	3.00	5.00	7.00
2014	1-6	1.35	3.00	4.95	7.00
	7-12	1.33	3.00	4.93	7.00
2015	1-6	1.33	3.00	4.93	7.00

Source: Prepared by the evaluator from the document provided by PIU

ii) Environmental protection TSL

- Target companies: SMEs engaged in air-quality-conservation projects<sup>22</sup>
- Loan terms: Same as TSL for SMEs, except that there is no upper limit on sub-loan amounts.

(5) Breakdown of companies using TSLs

The breakdown of companies using TSLs is as follows.<sup>23</sup>

- By region: 58% in Ulaanbaatar and 42% in rural areas, with loans being provided in all 21 provinces (Fig. 2).
- By company size: More than half of companies have 10 employees or fewer (Fig. 3). By annual sales, SMEs with sales less than 100 million MNT (about 6.11 million JPY<sup>24</sup>) accounted for 40% of companies using TSLs.
- By loan amount: 30% of sub-loans are less than 200 million MNT (about 8 million JPY), and 74% are less than 600 million MNT (about 24 million JPY).
- By sector: The manufacturing industry accounts for 64% of companies using TSLs, the service industry accounts for 19%, and agriculture and others for 17% (Fig. 4).
- By use: Machinery and equipment account for 62% of TSLs, and construction of factories and warehouses accounts for 30% (Fig. 5).

<sup>22</sup> The main focus was on air pollution control projects, which fell into three categories: i) heat-only boiler (HOB) and stove upgrades; ii) fossil fuels (e.g., coal briquettes and coke production); and iii) energy efficiency and renewable energy use.

<sup>23</sup> *Project Completion Report* (2015), JICA et al. (2018), *Two-Step-Loan Project for Small and Medium-Scale Enterprises Development and Environmental Protection (Support for Establishment of Finance Scheme for Small and Medium Enterprises) in Mongolia: Final Report*, pp. 7–15.

<sup>24</sup> Converted at 1 MNT = 0.0611 JPY (average exchange rate from November 2010 to February 2015).



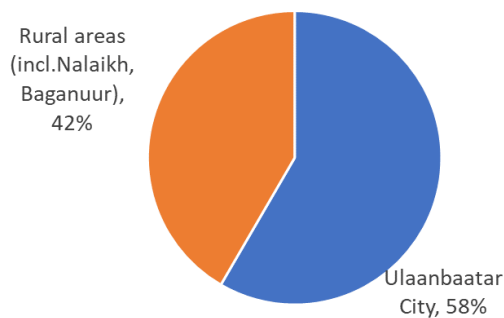


Fig. 2 Breakdown of sub-loan companies by region

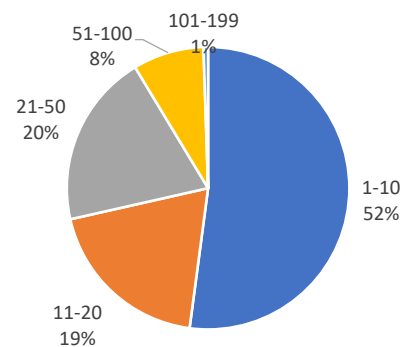


Fig. 3 Breakdown of sub-loan companies by number of employees

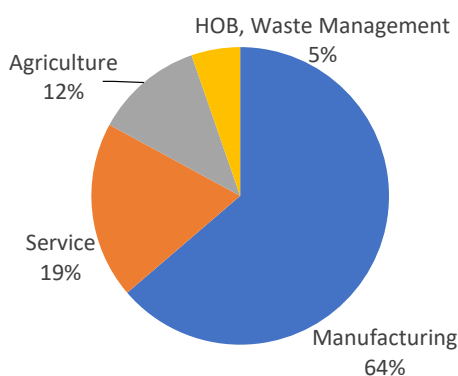


Fig. 4 Breakdown of sub-loan companies by sector

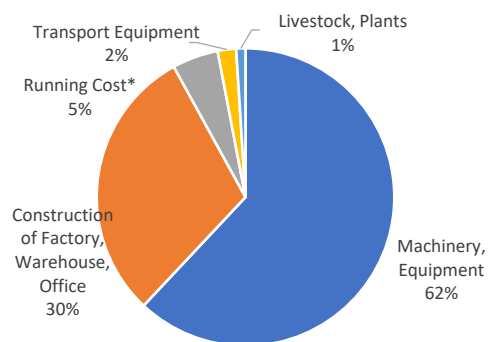


Fig. 5 Breakdown of sub-loan by use

Note: From the start of Phase II to 6/30/2015. \*Running cost was restricted within 20% of the loan amount.  
Source: Prepared by the evaluator from *Project Completion Report* (2015) and other documents.

## (6) PFIs

At the time of the appraisal, three banks – the Trade and Development Bank of Mongolia (TDB), Khan Bank, and Xac Bank – were selected as PFIs, but other banks that met the MOF selection criteria also submitted expressions of interest. In order to improve user convenience by increasing the number of PFIs, Golomt Bank and Capital Bank were accredited as PFIs in December 2011, and Ulaanbaatar City Bank was also accredited in August 2012.<sup>25</sup>

The number of loans and the ratio of loan amounts for each bank are shown in Table 2 below.

<sup>25</sup> The original three banks approved in July 2011 had 666 total branches, and the additional three banks had 183 branches (as of Q3 2013). JICA/Koei Research & Consulting Inc. (2014), *Special Assistance for Project Implementation (SAPI) for Two-Step-Loan Project for Small and Medium-Scaled Enterprise Development and Environmental Protection (II), Mongolia*, p. 9-3.

Table 2 The number of loans and the ratio of loan amount for each PFI

	PFI	Number of sub-loans				Amount of sub-loans
		SMEs Support	Environmental Protection	Total	Ratio (%)	Ratio (%)
1	Khan Bank	126	12	138	28	27
2	TDB	104	11	115	24	26
3	Golomt Bank	80	18	98	20	19
4	Xac Bank	67	7	74	15	13
5	UB City Bank	10	2	12	3	3
6	Capital Bank	42	8	50	10	12
	Total	429	58	487	100	100

Note: 2011 - November 2019. Source: Prepared by the evaluator from document provided by PIU.

### 3.2.2 Project Inputs

(For details, see Comparison of the Original and Actual Scope of the Project on the last page of the report.)

#### 3.2.2.1 Project Cost

The planned project cost at the time of appraisal of this project was 5,484 million JPY (of which 5,000 million JPY was covered by the Japanese ODA loan and 484 million JPY was covered by the Mongolian side). The actual amount was 5,155 million JPY (of which 4,995 million JPY<sup>26</sup> was covered by the ODA loan, 160 million JPY was from the Mongolian side, and no data exist on general administrative expenses since they were disbursed from the MOF's regular budget). It was within the plan (94% of the plan).

#### 3.2.2.2 Project Period

The project period planned at the time of appraisal was from November 2010 (when the L/A was signed) to June 2014, and the actual period was from November 2010 to February 2015.<sup>27</sup> Compared to the planned 44 months, the actual period was 52 months, exceeding the plan (118% of the plan).

The consulting service was planned from June 2011 to June 2015, but after project completion, it was extended to May 2017 by utilizing the contingencies.

The actual period exceeded the planned period because it took time for each PFI to conduct public relations activities and find sub-loan projects for environmental protection sub-projects. In Phase I, the criteria for selecting environmental protection projects were unclear, and the system was not fully utilized. Therefore, in Phase II, the target was focused on sub-loans for air pollution control, and the TSL project requested that SMEs specify the environmental improvement effects numerically with loan application. On the other hand, for borrowers, the

<sup>26</sup> Documents provided by JICA.

<sup>27</sup> Project completion was defined as "the disbursement for the final TSL," which was June 2014 for SMEs and February 2015 for environmental protection projects.

conditions were the same as for SME support, except without an upper limit on the loan amount, so the application for SME support and its appraisal proceeded. The PIU cooperated with PFIs to hold events as public relations activities for TSLs targeted for environmental protection projects and solicited the participating companies. As a result, loans were generally provided according to the fund allocation shown in the L/A (actual 15%, L/A 18%).<sup>28</sup>

### 3.2.3 Results of Calculations for Internal Rates of Return (Reference only)

Neither the financial internal rate of return (FIRR) nor the economic internal rate of return (EIRR) was calculated at the time of the ex-post evaluation because the projects that utilized sub-loan could not be identified at the time of the appraisal.

From the above, although the project cost was within the plan, the project period exceeded the plan. Therefore, the project's efficiency is fair.

## 3.3 Effectiveness and Impacts<sup>29</sup> (Rating: ③)

### 3.3.1 Effectiveness

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

Regarding the quantitative effects, i) the non-performing loan (NPL) ratio, ii) the target SMEs' sales growth rate, and iii) the operating profit growth rate were listed as operation indicators (Table 3).

Regarding i) the NPL (overdue 90 days or more) ratio, two years after the project's completion, the average of the six PFIs was below the average for the entire banking sector, achieving the target. Even at the time of the ex-post evaluation, the average of all of the PFIs excluding Capital Bank (amount of NPL unknown) was 7.9%, which is below the banking sector average of 11.0%.<sup>30</sup> For reference, the total number of NPLs among the six banks, including Capital Bank, was 39 out of 487 sub-loans, or 8.0% (each PFI's NPL ratio and number/ratio of NPLs to TSLs are shown in Table 4). Repayment of on-lending loans from the PFIs is on schedule for all PFIs, excluding Capital Bank.

No data exists on the sales and operating profit growth rates of the target SMEs two years after the project's completion. However, at the time of the ex-post evaluation, out of the 76 companies, total of 33 companies which the evaluation team visited and 43 companies which responded to the questionnaire, sales increased at 73 companies, and operating profits increased at 74 companies, both significantly (Figs. 6 and 7).

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<sup>28</sup> Hearing at the PIU.

<sup>29</sup> The sub-rating for effectiveness is to be listed with the consideration of impacts.

<sup>30</sup> Concerning Capital Bank, see 3.4.1 Institutional/Organizational Aspects of Operation and Maintenance.

Table 3 Operation Indicators

Indicator	Baseline (2010)	Target (2 years after the project's completion)	Actual (2 years after the project's completion) Feb. 2017	Actual (at the time of the ex-post evaluation) Nov. 2019
i) NPL ratio (%)	<ul style="list-style-type: none"> <li>• PFI average: 3.7%*<sup>1</sup></li> <li>(Financial Sector average: 8%*<sup>1</sup>)</li> </ul>	Each PFI's NPL ratio is below the financial sector average.	<ul style="list-style-type: none"> <li>• All PFIs: 5.3%*<sup>2</sup></li> <li>(Financial sector average: 8.2%*<sup>2</sup>)</li> </ul>	<ul style="list-style-type: none"> <li>• Average of 5 PFIs: 7.9%</li> <li>(Average of financial sector: 11.0%*<sup>3</sup>)</li> <li>(Note: NPL for the TSLs was 4.9% for all the PFIs excluding Capital Bank. See Table 4.)</li> </ul>
ii) Sales growth rate of the target SMEs (%)	-	Increased from the time of sub-loan approval (% is positive)	N/A	<ul style="list-style-type: none"> <li>• Increased for 73 SMEs among 76. See Figure 6.<sup>31</sup></li> </ul>
iii) Operating profit growth rate of the target SMEs (%)	-	Increased from the time of sub-loan approval (% is positive)	N/A	<ul style="list-style-type: none"> <li>• Increased for 74 out of 76 SMEs. See Figure 7.<sup>32</sup></li> </ul>

Source: \*<sup>1</sup> Annual Report 2010 of each PFI (TDB: 4.1%, UB City Bank: 2.0%, Golomt Bank: 7.0%, Xac Bank: 1.5%, Khan Bank and Capital Bank: N/A. \*<sup>2</sup>JICA et al. (2018), pp. 7-29. \*<sup>3</sup>Central Bank of Mongolia website (Retrieved on November 22, 2019).

Table 4 Each PFI's NPL ratio and number/ratio of NPLs to TSLs

	PFI	NPL ratio of each PFI	Comparison to the average of banking sector (11%)	Number of NPLs/sub-loans to TSLs	NPL ratio of TSLs (amount-base) (%)
1	Khan Bank	5.95	Low	4/138	2.70
2	TDB	13.70	High	5/115	0.05
3	Golomt Bank	7.00	Low	3/98	12.00
4	Xac Bank	5.90	Low	8/73	9.60
5	UB city Bank	7.00	Low	0/12	0.00
6	Capital Bank	N/A	N/A	19/50	N/A
		Avg. of 5 PFIs: 7.91	Avg. of 5 PFIs: Low	6 PFIs total: 39/486	Avg. of 5 PFIs: 4.87

Note: 1-5: As of Oct. 31, 2019. 6: As of April 8, 2019. Source: 1-5: PFIs' hearings, 6: PIU, BOM.

<sup>31</sup> The average specific percentage increase reported by the 28 companies that responded was 244%. The actual increase was higher because we excluded the case of starting a business from the calculation.

<sup>32</sup> The average of the 26 companies that responded with specific increases was 444%. The actual increase was higher because we excluded the case of starting a business from the calculation.

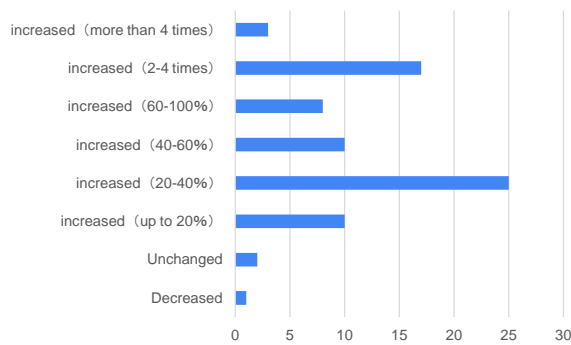


Fig. 6 Change in sales

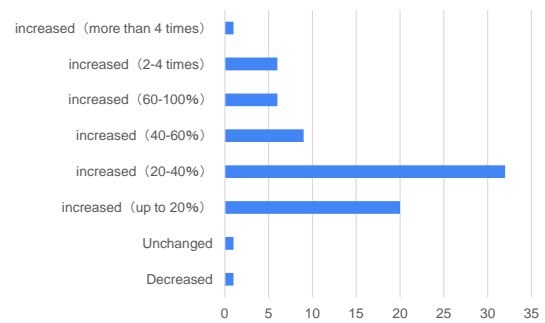


Fig. 7 Change in profit

As effect indicators, iv) increased rate of employment among the target SMEs; v) long-term credit ratio (3 years or more); vi) coal consumption of the target companies and vii) the sub-borrowers' SO<sub>2</sub>, NO<sub>x</sub>, CO, CO<sub>2</sub>, and dust emissions were listed (Table 5).

The number of employees among the sub-borrowers increased from the time of sub-loan approval by 95.7% two years after project completion and by 96.2% at the time of the ex-post evaluation.<sup>33</sup>

Regarding iv) Increased rate of employment figures of sub-borrowers, in 78 companies, total of 33 companies visited and 45 companies that responded to the survey, the total number of employees was 1,173 before the loan and 2,117 at the time of the ex-post evaluation, showing an 86% increase. Although it is necessary to consider reasons other than TSLs, such as subsequent investment, many projects showed spillover effects namely increased employment due to domestic procurement of raw materials. On the other hand, at some companies, mechanization and automation had tripled the work efficiency, while the number of employees did not change. The employment in two companies decreased, caused by the death of livestock due to drought and zodo,<sup>34</sup> but business was picking up at the time of the ex-post evaluation.

As for the ratio of long-term credit for 3 years or more at PFIs, although no data exists two years after project completion, it increased by 50 - 56% at the time of the PFI interview during the ex-post evaluation.

The sub-borrowers' coal consumption and SO<sub>2</sub>, NO<sub>x</sub>, CO, CO<sub>2</sub>, and dust emissions are indicators related to environmental protection sub-loans. All was reduced ever since the sub-loan was approved, and the targets have been achieved.

<sup>33</sup> Document provided by PIU.

<sup>34</sup> Meteorological disasters that have a great impact on the resources used by nomads due to the accumulation of extreme heavy snowfall, low temperatures, strong winds, and feed depletion.

Table 5 Effect Indicators

Indicator	Baseline (2010)	Target (2 years after the project's completion)	Actual (2 years after the project's completion) Feb. 2017	Actual (at the time of the ex post evaluation) Nov. 2019
iv) Increased rate of employment of sub-borrowers (%)	-	Increase from the time of sub-loan approval (% is positive)	95.7%* <sup>1</sup> (number of employees for 391 sub-borrowers increased from 7,352 to 14,888)	96.2%* <sup>1</sup> (number of employees for 516 sub-borrowers increased from 8,749 to 17,169)
v) Ratio of long-term loan (more than 3 years) (%)	N/A	Ratio of long-term loans (more than 3 years) for each PFI increases	N/A	50-56% increase compared with Nov. 2011* <sup>2</sup>
vi) Project's coal consumption (t/year)	-	Reduced from the time of sub-loan approval	Reduced from the time of sub-loan approval by 55,484 t * <sup>1</sup>	Reduced from the time of sub-loan approval by 61,675 t * <sup>1</sup>
vii) SO <sub>2</sub> , NO <sub>x</sub> , CO, CO <sub>2</sub> , and dust emissions from the projects	-	Reduced from the time of sub-loan approval	All reduced from the time of sub-loan approval (See Table 6)	All reduced from the time of sub-loan approval (See Table 6)

\*<sup>1</sup> Documents provided by PIU. The number is cumulative from the start of Phase II. \*<sup>2</sup> UB City Bank 50%, Golomt Bank 53%, and Xac Bank 56%. N/A for Khan Bank and TDB.

Table 6 Actual reduction of air pollutant emissions

Indicator (tons/year)	Actual (2 years after the project's completion) Feb. 2017	Actual (at the time of ex -post evaluation) Nov. 2019
SO <sub>2</sub>	164.30	422.19
NO <sub>x</sub>	297.83	584.52
CO	12,205.58	12,697.69
CO <sub>2</sub>	134,595.66	136,202.98
Dust	35,259.09	35,588.42

Source: Documents provided by PIU. Total of all sub-loans for environmental protection from the start of Phase II.

### 3.3.1.2 Qualitative Effects (Other Effects)

#### (1) Improving the banking sector's loan-appraisal ability and building creditworthiness for SMEs

Through this project, training on long-term loan appraisal and project finance screening was conducted, and loan officers who did not have long-term loan appraisal experience were able to acquire screening skills. In addition, each PFI acquired new customers by providing SMEs with loans with favorable terms and conditions and supporting their applications. PFIs could also establish trusting relationships with old customers and offer new loans after the sub-loans were fully repaid. Many PFI staff members said that it was also a pleasure for banks to see the borrowers' growth.<sup>35</sup>

<sup>35</sup> Hearings at the PFIs.


Not only were SMEs able to implement their business plans with low-interest and long-term loans, but they were also able to build trust in the bank, which led to the next loan and establish a foothold for further business development.<sup>36</sup>

## (2) Cooperation/Synergy Effects with the Air Pollution T/C and Japan Center Project

The environmental protection TSLs' financing guidelines were developed in collaboration with experts from Air Pollution T/C and PIU's environmental experts. In addition, the experts from Air Pollution T/C provided cooperation for selecting priority sectors, examining the environmental impacts indicated in the environmental protection TSLs' applications, calculating effect indicators, performing on-site pre-project measurements and post-project observation, monitoring sub-projects in rural areas, and implementing promotion seminars for environmental protection TSLs, jointly held with PFI at the Japan Center.<sup>37</sup> In this way, the knowledge of the environmental sector in Mongolia accumulated by Air Pollution T/C and the expertise of relevant parties were utilized in various ways, which contributed to the implementation of environmental protection TSLs.

Although there was no specific collaboration with the Japan Center Project, many of TSL's promotion seminars were held at the Japan Center as a venue, and participants from the center's business course also participated.<sup>38</sup> Many business owners succeeded in the project by utilizing TSLs while taking business courses and short-term seminars at the Japan Center. Of the 33 companies that the evaluation team visited, owners or executives of 12 companies took business courses or seminars at the Japan Center, and all responded that doing so helped with the management of their companies.<sup>39</sup>

### Examples of sub-loans in the manufacturing and food processing industry

		<p><b>Mattress manufacturing automation</b> The manufacturing process was automated with a sub-loan, which increased production by 1.8 times. By selling to hospitals, hotels, gers, etc., its share in the Mongolian mattress market expanded to 70%. Plans to export to Russia are underway. The employee cafeteria was also improved with the sub-loan. (Ulaanbaatar City)</p>
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<sup>36</sup> Hearings at the PFIs and companies using TSLs.

<sup>37</sup> Hearings at the PIU.

<sup>38</sup> Hearings at the Japan Center, PIU, companies using TSLs.

<sup>39</sup> Hearings from companies using TSLs.



### Dairy processing

A milk-processing plant existed on the company's farm, but it did not meet the national hygiene standards. A new processing plant was built with a sub-loan, and the number of cows increased from 25 to 280 by the second sub-loan. The amount of processing doubled, and the number of dairy products increased from three to eight types, which are supplied to kindergartens and elementary schools in the city. (Orkhon Province)



### Sea buckthorn processing

Healthy drinks and oils are produced from the local specialty: nutritious fruits of the family *Elaeagnaceae*. Capital investment from a loan increased production nine-fold, and the products are exported to Japan and Germany. Cash-based purchases from farmers support stable cultivation.

Sales for this drink to boost the immune system did not fall during the recent pandemic. (Ulaanbaatar City)

### Examples of sub-loans in rural areas

#### Installation of refrigeration equipment in a warehouse

In Mongolia, vegetables are harvested once a year, in September; after April, vegetables start to become damaged and must be discarded. By installing a refrigeration system with a sub-loan, it became possible to supply safe organic vegetables throughout the year. This also reduced dependence on imported vegetables in the summer. (Darkhan-Uul Province)



#### Newly constructed drive-in

In this case, the loan provided heating, internal equipment, and toilets for a newly constructed restaurant and hotel. It has created 42 new jobs (52 during the tourist season in summer) and the company procures meat and dairy products locally. A clean rest facility is valuable for moving in vehicles in Mongolia, which embraces vast areas of land, and it has improved the convenience when traveling to and from rural areas. (Tuv Province)

#### New hospital laboratory

After participating in TSL seminars held in the province, this hospital took out a loan to purchase laboratory equipment. In addition to blood and urine tests, 13 types of cancer screenings became available. Patients no longer have to go to Ulaanbaatar for testing, which contributed to saving lives through early detection of 100 cases of cancer annually. (Uvurkhangai Province)





## Examples of environmental protection sub-loans



### **Manufacturing of improved heat-only boilers**

With the introduction of eight types of machines that produce improved heat-only boilers (HOBs), production efficiency has tripled. In the past, many HOBs were imported from China and Russia, but it was difficult to replace parts in case of failure; therefore, the government is aiming to produce HOBs domestically. Manufacturing of a smokeless stove that can significantly reduce air pollutants was also started. (Ulaanbaatar City)

### **Sawdust briquette production**

In this case, the loan was used to introduce two German-made machines, consuming one-third of the power and reducing the number of workers from four to one compared to the previous Chinese machines. Sawdust briquettes cost twice as much as the government-certified improved fuel, but NO<sub>x</sub> emissions are halved, and no CO, SO<sub>2</sub>, smell, and ash are emitted. The briquette also warms up quickly; therefore, it is used as a gift for elderly family members who stay home all day long. It is made of waste wood and waste oil from fried chicken. (Ulaanbaatar City)



### **Manufacturing of medical waste containers**

A sub-loan was used to produce medical waste containers with a lid. 80% of the raw material is recycled plastic. These containers now are used in many small and medium hospitals throughout the city. Previously, medical waste was dumped in cardboard boxes, putting collectors at risk of touching needles and drugs. With this project as a trigger, the company received an order for a recycling business from a major mining company. (Ulaanbaatar City)

## 3.3.2 Impacts

### 3.3.2.1 Intended Impacts

#### (1) Economic Effects of Job Creation

As seen from the effect indicators, the sub-loan for this project created 8,420 new jobs at 516 companies at the time of the ex-post evaluation. Multiplying this by 4, the average number of people per household in Mongolia, yields 33,680, which means that the households benefiting from this project represent approximately 1% of the total population. If multiplied by the national average wage in Mongolia (1,166,400 MNT per month), it is possible to estimate that the annual wages were more than 118 billion MNT (about 4.7 billion JPY)<sup>40</sup>. This is not a net amount because some people may have transferred from other jobs. However, the sub-loan companies also contributed to the increase of employment of farmers by procuring raw materials from them, thereby produced significant economic effects.

<sup>40</sup> The wage is a national average of the 3<sup>rd</sup> quarter 2019. Socio-Economic Situation in Mongolia, Nov.2019 (National Statistics Office of Mongolia, p49) . Calculated by 24.85 MNT=1JPY.

## (2) Air Pollution Improvement in Ulaanbaatar City

Mongolia consumes about 8.5 million tons of coal per year, and the annual reduction of 61,675 tons by this project is equivalent to about 0.7% of that total. The total amount of carbon dioxide emissions from all of Mongolia is 20.8 million tons per year, and the reduction amount by this project is equivalent to 0.6% of that amount.<sup>41</sup> In Mongolia, where power generation accounts for 63.5% of coal consumption,<sup>42</sup> certain effects have been recognized, even though the impacts on overall air pollution were limited.

### 3.3.2.2 Other Positive and Negative Impacts

#### (1) Impacts on the Natural Environment

This project was classified as Category FI<sup>43</sup> in the *JBIC Guidelines for Confirming Environmental and Social Considerations* (April 2002). All sub-loans require an environmental impact assessment by the PFI at the time of application. Depending on the contents of the project, a simple assessment may be sufficient, or a detailed assessment may be required.

The PIU conducted field visits to almost all of the companies in Ulaanbaatar and about 80% of the companies in rural areas that applied to the CSC for a loan, before the loan was approved and when each project was completed (factory completion, etc.). During the site visits, the PIU also confirmed the environmental impacts. Each PFI also accompanied the PIU and confirmed the business contents, including the environmental impacts.<sup>44</sup>

Similarly, regarding environmental protection TSLs, an environmental impact assessment is obligatory at the time of the loan application, and the results are confirmed by the risk-management section or environmental and social consideration section of each PFI.<sup>45</sup>

According to the PIU and PFIs, no project had a negative impact on the natural environment. None of the projects by the 33 companies that the evaluation team visited had any negative environmental impacts.

#### (2) Resettlement and Land Acquisition

None of the projects resulted in resident relocation or problematic land acquisition. For the

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<sup>41</sup> Japan Oil, Gas and Metals National Corporation (2019) World Coal Situation Survey, p. 35. Coal use is in 2016. The carbon dioxide emissions are in 2014.

<sup>42</sup> Ibid.

<sup>43</sup> The loans classified as category FI: JBIC's funding of the project is provided to a financial intermediary etc.; the selection and assessment of the actual sub-projects is substantially undertaken by such an institution only after JBIC's approval of the funding and therefore the sub-projects cannot be specified prior to JBIC's approval of funding (or assessment of the project); and those sub-projects are expected to have potential impact on the environment. JBIC checks through the financial intermediary etc. to see whether appropriate environmental and social considerations as stated in the Guidelines are ensured for projects in this category. (*JBIC Guidelines for Confirmation of Environmental and Social Considerations*, April 2002)

<sup>44</sup> Hearings at the PFIs and PIU.

<sup>45</sup> Hearings at the PFIs and the TSL sub-loan companies.

33 companies that the evaluation team visited, the land they occupied was originally owned by the companies or leased from a public institution, and there were no cases in which resettlement was necessary.

### (3) Contributions to the sustainable growth of Mongolia

This project supported 596 projects – 283 by the completion of the project and 313 by the revolving fund after the completion – with the clear goal of SME development and environmental protection. Not only did this project expand the business of the sub-loan companies, but each sub-project also contributed to export-oriented industries' growth, including the cashmere and health drinks, and to import substitution by improving domestic production, processing, and preservation. It also contributed to the improvement of safety and medical treatment, and industrial development and employment promotion in rural areas. As such, this project contributed to the sustainable growth of Mongolia in various ways without relying too much on the mining industry.

This project has achieved its objective as planned. Therefore, the project's effectiveness and impacts are high.

## 3.4 Sustainability (Rating: ③)

### 3.4.1 Institutional/Organizational Aspects of Operation and Maintenance

The MOF is the project's implementing agency, and as shown in Figure 1, after each PFI conducts a loan appraisal, the Counterpart Steering Committee (CSC) organized by the MOF is responsible for final screening of the loan.

After the consulting service for this project ended in May 2017, the PIU signed a one-year contract with the MOF under the Mongolian government's budget and provided consulting services until May 2018. The personnel at this time were seven Mongolians, including an environmental expert, and three Japanese consultants. The Mongolian side performed the work, and the Japanese consultants provided assistance on a business trip basis.

Then, after an open recruitment under Mongolian law, a new PIU was established under the MOF on September 1, 2018, which assists the CSC and manages the revolving fund.<sup>46</sup> At the time of the ex-post evaluation, the team consisted of a project coordinator as a key member, an attorney, an accountant, an operational staff member, and an assistant, a total of five members, which was sufficient for the operation and management of the revolving fund.<sup>47</sup>

After the project was completed, the establishment of a special purpose entity (SPE) was proposed as a management system to transfer the revolving fund's management, based on SAPI (2013–2014). In May 2018, the Cabinet decided to establish a SPE named Small and Medium

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<sup>46</sup> The number of sub-loans after becoming a PIU under MOF was 56 (since September 1, 2018 through January 2020).

<sup>47</sup> Hearing at the PIU. There has been no support for PFIs or SMEs as was in place during the project period.

Business Corporation (Government Ordinance No. 159). After that, preparations to establish the SPE began in line with the roadmap agreed between JICA and the MOF. However, at the end of 2018, a scandal of the Small and Medium Enterprise Development Fund under the Ministry of Food, Agriculture and Light Industry (MOFALI) was discovered. In response, the government announced its *Measures to Be Taken concerning Government-Affiliated Funds (Government Ordinance No. 87)* in February 2019, and it tried to increase the efficiency, transparency, and accountability of government-affiliated funds under a unified SME- development policy.

In response to this trend, in June 2020, the MOF and MOFALI agreed to subcontract management (sublease in Mongolian) of the revolving fund’s balance and the PFI’s loans to the MOFALI<sup>48</sup>. The CSC is now led by the MOFALI (Table 7), but many of the former members of the MOF and others stay and are supposed to play the same role as before. The first CSC meeting under the new system was held on June 29. The TSL fund will be operated as an independent fund without being integrated with other funds, and the PIU members under the MOF also remains in the PIU under the MOFALI. Companies that wish to take a sub-loan will continue to apply through PFIs<sup>49</sup>.

Table 7 Composition of CSC (number of the members)

	Nov. 2010-June 24, 2020	June 25, 2020-
Chair	• MOF, Director of Development Policy	• MOFALI, Director of Finance and Investment
Member	<ul style="list-style-type: none"> <li>• MOF(2)</li> <li>• MOFALI(1)</li> <li>• Ministry of Environment and Tourism(1)</li> <li>• BOM(1)</li> <li>• Mongolian National Chamber of Commerce and Industry(1)</li> <li>• Mongolian Bankers Association(1) ※from April 2018, NGO (Corporate Governance) (1)</li> </ul>	<ul style="list-style-type: none"> <li>• MOFALI(3)(Director of Policy Planning, Director of SMEs and Cooperatives Promotion Policy Coordination, Director of SMEs Support Fund)</li> <li>• MOF(2)(Director of Development Finance, Chief of Debt Management Division, Fiscal Policy Bureau)</li> <li>• Ministry of Nature Environment and Tourism(1)(former Ministry of Environment and Tourism)</li> <li>• BOM(1)</li> <li>• Mongolian National Chamber of Commerce and Industry(1)</li> </ul>

Source: Hearing at the PIU, the MOF/the MOFALI Ministers’ Joint Decree No: 124/A-224 (June 25, 2020)

The PFI group consisted of 6 banks during the project period. As for Capital Bank, its financial statements were not disclosed from 2015 onwards and the management situation became uncertain, so the on-lending loan from the revolving fund was suspended in 2016. After that, the repayment from Capital Bank to the revolving fund was occasionally done with major delays. However, in April 2019, BOM announced the closure of Capital Bank, took over the bank’s management by appointing its authorized representatives, and transferred the

<sup>48</sup> As per the sublease agreement between MOF and MOFALI (signed on June 2, 2020).

<sup>49</sup> Hearings at MOF and MOFALI.

sub-loans from Capital Bank to BOM<sup>50</sup>.

The on-lending loan to Capital Bank is supposed to be repaid from the MOF to the revolving fund after completion of liquidation of Capital Bank by BOM. The remaining debt is equivalent to 9.4% of the outstanding loan (as of May 2020) and is not large enough to affect the management structure of the revolving fund. In addition, PFIs other than Capital Bank were carefully re-examined by the MOF and BOM at the time of transition to the new system in June 2020, and the risk of a similar situation occurring is low. Based on the above, it is determined that the bankruptcy of Capital Bank will not affect the continuation of this project.

As the revolving funds of TSL (I) and (II) were integrated in 2015, two PFI banks from only TSL (I) (State Bank and Capiron Bank) continue to provide sub-loans. These two banks have also participated in the new system after undergoing a review at the time of system transition, as described above.

### 3.4.2 Technical Aspects of Operation and Maintenance

As mentioned in 3.2.1 Output (3), the consultants of this project provided technical assistance to the CSC members and each PFI. The CSC members were provided with support for approving sub-loan applications, monitoring operation and effect indicators, etc. Guidance was provided to the PFI on appraising long-term loans, including environmental and social considerations. In addition, the MOF was assisted in selecting additional PFIs and so forth.

In 2019, the CSC meeting was held every two months regularly, with an average of 12 to 15 loan reviews each time.<sup>51</sup> The CSC meetings have been held for many years since TSL (I) started in 2006, and there are no technical problems in fund management. However, regarding the appraisal of environmental protection sub-loans, it is understood that the PIU was unable to conduct specialized appraisals because it lacked an environmental expert.<sup>52</sup>

Regarding the technical aspect of the PFIs, because the PFIs of TSL (II) has been managing sub-loans and appraising loans since 2005 as PFIs of TSL (I),<sup>53</sup> there is no technical problems in the loan appraisal. At the five PFIs the team interviewed, training for new employees and at the branches is conducted by experienced staff who are familiar with the TSL within each PFI.<sup>54</sup>

Although the operational management of the fund was practically transferred to the MOFALI, many former members of the CSC, including the members from the MOF, remains in

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<sup>50</sup> A synthesis of the various information regarding the reasons for the bankruptcy shows laxity in loan screening, management's reliance on deposits of social insurance funds and other government funds, and a lack of oversight by the BOM due to politician involvement, among other reasons.

<sup>51</sup> Hearing at the PIU.

<sup>52</sup> Hearings at the PIU and MOF.

<sup>53</sup> UB City Bank was selected as a PFI in 2012, and the others were selected in 2005; JICA et al. (2014) *Special Assistance for Project Implementation (SAPI) for Two-Step-Loan Project for Small and Medium-Scaled Enterprise Development and Environmental Protection (II) Final Report*. UB City Bank is included here in TDB because it merged with TDB on June 29, 2020.

<sup>54</sup> Hearings at the PFIs.

place, as mentioned above, and the PIU members remains the same. This means that operational management know-how, in terms of loan appraisal, monitoring, etc., will be retained, and technical issues will be unlikely to arise.<sup>55</sup>

### 3.4.3 Financial Aspects of Operation and Maintenance

The PIU has been funded from the MOF's regular budget through FY2020; from FY2021 onwards, it is expected to be funded by the MOFALI budget, but not less than the previous year.<sup>56</sup>

The margin for each PFI is 4% in MNT and 3.6% in US dollars, as previously mentioned in the Output section. The evaluation team has confirmed with the MOF that the loans' terms and conditions under the new regime will remain unchanged. A comparison between the banks' prudential ratios<sup>57</sup> and the standards set by the BOM shows that all five banks in TSL (II) and two banks from only TSL (I) meet the criteria.<sup>58</sup>

### 3.4.4 Status of Operations and Maintenance

Principal and interest from the sub-loans, after the PFI's brokerage fees are deducted, are paid to the revolving fund's account. PFIs are making their repayments to the MOF as planned.

The revolving fund continues to be utilized through PFIs for new sub-loans that meet the TSL project's objective and financing conditions. Information about the sub-loans from the revolving fund after the project's completion are shown in Table 8.

Table 8 Sub-loans from the revolving fund after the project's completion<sup>59</sup>

Number of sub-loans (From the project's completion to the end of May 2020)	-Support of SMEs: 279 sub-loans -Environmental protection: 34 sub-loans -Total: 313 projects
Amount of sub-loans (same as above)	-US\$ 400,000 and MNT 138.7 billion (total about 5.55 billion JPY)
Balance of the revolving fund (as of May 15, 2020)	-About MNT 15.9 billion (JPY 640 million)

Note: Including sub-loans from TSL (I)'s PFIs. The exchange rate used is as of May 15, 2020. Source: Documents provided by the PIU.

In terms of operations and maintenance, it is highly evaluated that the revolving fund has been properly managed, and 313 new sub-loans have been disbursed since the project's completion, from February 2015 up to the time of the ex-post evaluation (Table 8). One of the

<sup>55</sup> ADB's Agricultural and Rural Development Project, which was earlier transferred from the MOF to the MOFALI in October 2019, has been operating without problems under a similar system; ever since the transfer, policy issues have become more important in the CSC's loan reviews (Hearing at ADB; June 2020).

<sup>56</sup> Hearings at MOF and MOFALI (June 2020).

<sup>57</sup> Tier 1 capital ratio, capital adequacy ratio, liquidity ratio, single foreign currency open position ratio, and total foreign currency open position ratio.

<sup>58</sup> Capitron Bank is Q2 2020; UB City Bank and State Bank are Q4 2019. Others in Q1 2020. According to the respective PFI websites.

<sup>59</sup> As of November 22, 2019.

PFI went bankrupt in 2019, but the other PFIs are performing well and will continue to play a role as PFIs after the transition to the 2020 structure.<sup>60</sup>

The revolving fund for TSLs will be operated independently under the MOFALI, and no problems are expected from operating under the new system. Due to the economic downturn caused by the 2020 pandemic, 25 of the 430 ongoing sub-loan companies have applied for rescheduling of their repayments as of May 25, but this has not had a significant impact on the TSL as a whole.<sup>61</sup> Employment was protected at all 17 companies interviewed between May and June 2020.<sup>62</sup>

No major problems have been observed in the institutional/organizational, technical, or financial aspects or in the current status of the operations and maintenance system. Therefore, the sustainability of the project's effects is high.

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

##### 4.1 Conclusion

This project was implemented to strengthen SMEs and the financial sector and to reduce emissions of environmental pollutants by the provision of long-term financing to SMEs, including projects for environmental protection, thereby contributing to the sustainable growth of Mongolia.

This project was consistent with the policies to promote SMEs and to protect the environment in Mongolia at the time of project appraisal as well as ex-post evaluation. Since it was also consistent with the needs of SMEs in Mongolia with few opportunities to access low interest, long-term loans, as well as with Japan's development cooperation policies towards Mongolia at the time of project appraisal, the relevance of this project is high. Although the project's cost remained within the budget, the project period exceeded the planned time; thus, the efficiency of the project is fair.

By implementing this project, the promotion of SMEs in Mongolia, strengthening the financial sector by dissemination of know-how regarding long-term credit, and reduction of emissions of environment pollutants were observed. 596 sub-projects were funded including sub-loans from the revolving fund after the completion of the project, which had a high employment-generation effect. The sub-loans not only led to business development of each SME which took out sub-loan, but also each sub-project contributed to growth of export industries, import substitution by domestic production and improvement of processing and storage, improvement of workers' safety, industrial development and improvement of medical services in the countryside thereby contributed on avoiding overdependence on the mining

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<sup>60</sup> Hearing at MOF.

<sup>61</sup> Hearing at the PIU.

<sup>62</sup> Hearings at sub-loan companies (2<sup>nd</sup> field survey).

industry and leading Mongolia to a path for sustainable growth. Therefore, the effectiveness and impacts of the project are high.

No major problems were observed in the institutional/organizational, technical, or financial aspects, nor in the current status of maintenance and operation. Therefore, the sustainability of the project's effect is 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

In order to facilitate the professional review of environmental protection loans, the executing agency is encouraged to strengthen its capacity for reviewing environmental loans, such as by adding an environmental specialist to the PIU in an unburdening way, even if not full-time, at the earliest possible time.

### 4.2.2 Recommendations for JICA

Although the project itself was successfully completed and the MOF and MOFALI jointly manage the revolving fund, the beneficiaries are still repaying their loans, and future beneficiaries are waiting their turn. During the interviews with the sub-loan companies, many of their representatives expressed the hope that many other SMEs will have the same opportunities to achieve their dreams as they did, and some of the SMEs want to repay their loans as soon as possible for this reason. There is a great deal of trust and expectation in JICA-TSL. It is expected that JICA will continue to pay close attention to the TSL revolving fund to ensure that its independence is sustained, the CSC's mechanism for reviewing loans is maintained, and the valuable operational know-how accumulated since TSL (I) will be passed on through the PIU and CSC so that Mongolia's SME support can continue.

## 4.3 Lessons Learned

### Monitoring of PFIs and prompt action in response to business deterioration

Capital Bank, which was selected as a PFI, fell into financial difficulties around 2016, and its on-lending loan from the MOF was suspended. On the other hand, the bank kept partially repaying its on-lending loan until just before announcing its bankruptcy; therefore, it must have been difficult to anticipate the future. However, under Mongolia's Banking Law, sub-loans cannot be transferred to other banks after bankruptcy,<sup>63</sup> and all sub-loans through Capital Bank were transferred to the Central Bank of Mongolia. As a result, the companies that received loans from Capital Bank lost the opportunity to obtain new loans at favorable terms and conditions to further develop their business once they fully completed their repayment, as they had

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<sup>63</sup> Amendment to the Mongolian Banking Law in June 2018.



established creditworthiness with their banks. These opportunities could have been obtained if they had used other PFIs.

It is difficult to make general statements since the bankruptcy procedures of banks depends on each country's banking laws. However, in future TSL in countries where sub-loans cannot be transferred to another bank after bankruptcy, the executing agency must monitor the PFI eligibility requirements specified in the on-lending loan agreement regularly. When a PFI no longer meets the criteria, with worst-case scenarios in mind, not only should the on-lending loan be suspended, but prompt actions should also be taken, such as the transfer of sub-loans to other PFIs.

Comparison of the Original and Actual Scope of the Project

Item	Plan	Actual
1. Project Outputs (up to February 2015)	<ul style="list-style-type: none"> <li>• Number of sub-loans:170<sup>64</sup></li> <li>• Amount of sub-loans:4,720 million JPY</li> </ul>	<ul style="list-style-type: none"> <li>• Number of sub-loans:283</li> <li>• Amount of sub-loans:4,640 million JPY<sup>65</sup></li> </ul>
2. Project Period	November 2010 – June 2014 (44 months)	November 2010 – February 2015 (52 months)
3. Project Cost <sup>66</sup>		
Amount Paid in Foreign Currency	5,092million JPY	4,995million JPY
Amount Paid in Local Currency	392 million JPY (6,262million MNT)	160 million JPY (2,597 million MNT)
Total	5,484 million JPY	5,155million JPY
ODA Loan Portion	5,000 million JPY	4,995million JPY
Exchange Rate	1MNT = 0.0626JPY (As of September 2010)	1MNT = 0.0611JPY <sup>67</sup> (Average between November 2010 and February 2015)
4. Final Disbursement	March 2018	

<sup>64</sup> Project Memorandum Feb.4, 2011

<sup>65</sup> *Project Completion Report*, p.9

<sup>66</sup> *Ibid.* pp.8-9

<sup>67</sup> Calculated from <https://data.imf.org>