

Ex-Ante Evaluation (for Japanese ODA Loan)

1. Name of the Project

Country: The Republic of Indonesia

Project: Urgent Disaster Reduction Project for Mount Merapi and Lower Progo River Area II

Loan Agreement: February 24, 2014

Loan Amount: 5,111 million yen

Borrower: The Republic of Indonesia

2. Project Background and Necessity

(1) Current State and Issues of Disaster Management Sector in Indonesia

In Indonesia, earthquakes, floods, tsunamis, landslides and other natural disasters occur frequently every year. According to statistical data covering the period between 1980 and 2011, natural disasters caused approximately 190,000 deaths, 21.7 million casualties and an estimated 23.7 billion US dollars of economic damage. In this country of 130 active volcanoes, volcanic disasters heavily affect human lives, assets and social/economic infrastructure. Against this background, countermeasures to mitigate such catastrophes are extremely significant for regional safety and sustainable economic development.

Mt. Merapi in central Java is one of the Indonesia's most active volcanoes, and erupted on a large scale in October 2010. Most of the masses of sediment emitted as the result of eruption still remains today, and debris flow continues to occur frequently although urgent recovery works have been implemented.

(2) Development Policies for the Disaster Management Sector in the Republic of Indonesia and the Priority of the Project

The National Mid-Term Development Plan (RPJM: 2010 – 2014) in Indonesia emphasizes 11 priorities, and one of the priorities is "Environment and Natural Disaster." Structural measure for flood control is also one of the core substances as "Infrastructure," which is another priority of RPJMN.

The eruption of Mt. Merapi in October 2010 was the scale of once in more than 100 years, and the debris flow caused by the eruption buries major river channels including Gendol and Putih rivers and damages sabo facilities. Although the Rehabilitation works have still been continuing, there is a high risk of additional debris flows caused by river inundation which will continuously hit the downstream areas and cause the significant damages, since huge amount of unstable sediment has still been remained at the upstream of the mountain. In the Project, sabo facilities will be constructed as structural measures to restore and consolidate the erosion control capacity of the above two rivers. The Project also includes review of Master Plan and public campaign on the sobo works for public awareness of sediment disaster as non-structural measures. The Government of Indonesia places high priority in implementing the Project to protect human lives, assets and social infrastructure of the area.

(3) Japan and JICA's Policy and Operation in the Disaster Management Sector

The Government of Japan considers "Assistance for correction of inequality and establishment of a safe society" as one of the priority areas in the Country Assistance Policy for Indonesia (April 2012) and stipulates to support disaster prevention and emergency response. JICA Analytical Work for the Republic of Indonesia also prioritizes disaster management as one of the cooperation programs. Therefore, the Project is consistent with such policies and analyses. JICA has supported implementation of ODA Loan Project since 2005 in Mount Merapi for the construction of sabo facilities and installation of early warning system. It was effective in reducing damages in the downstream areas at the time of eruption in 2010, and the reconstruction works of sabo facilities was also conducted. In addition, JICA dispatched Japanese Disaster Relief (JDR) experts at the time.

(4) Other Donors' Activity: none

(5) Necessity of the Project

As mentioned above, the Project is to contribute the mitigation of debris flow damage and protects human lives, assets and social infrastructure which is consistent with the country's issues and development policies as well as the assistance policies of Japan and JICA. Therefore, it is highly necessary and relevant for JICA to provide assistance through the Project.

3. Project Description

(1) Project Objective(s)

The Project is to protect Mt. Merapi and the lower Progo River areas against volcanic sediment flows which occurred massively and frequently after the 2010 eruption by providing constructions of sabo facilities, thereby contributing to protect lives, assets, and social infrastructure of the area.

(2) Project Site/Target Area

Central Java Province and Yogyakarta Special Region

(3) Project Component(s)

- i) Construction of Sand Pocket (Gendol River)
- ii) Construction of Diversion Channel (Putih River)
- iii) Consulting services (detailed design, tender assistance, construction supervision, review of master plan, and public campaign on sabo works)

(4) Estimated Project Cost (Loan Amount)

6,364 million yen (Loan Amount: 5,111 million yen)

(5) Schedule

February 2014 – March 2018 (50 months in total)

The Project will be deemed completed when construction of the facilities are completed (September 2017).

(6) Project Implementation Structure

- 1) Borrower: The FRepublic of Indonesia

- 2) Executing Agency: Directorate General of Water Resources, Ministry of Public Works
- 3) Operation and Maintenance System: Pejabat Pembuat Komitmen (PPK) Pengendalian Lahar Gunung (PLG) Merapi (PPK PLG Merapi)
- (7) Environmental and Social Considerations/Poverty Reduction/Social Development

1) Environmental and Social Considerations

① Category B

② Reason for Categorization: The Project is not considered to be a large-scale erosion control project, is not located in a sensitive area and has none of the sensitive characteristics under the JICA Guidelines for Environmental and Social Considerations (April 2010), it is not likely to have significant adverse impact on the environment.

③ Environmental Permit: While Environmental Impact Assessment (EIA) is not required for the Project in accordance with the Indonesian domestic law, Environment Management Plan (UKL) and Environment Monitoring Plan (UPL) are necessary for anticipated negative impacts on environment. For the Diversion Channel, UKL and UPL have been approved by the Magelang Regional Environmental Management Agency. Likewise, UKL and UPL for Sand Pocket will be completed after detailed design and approved by the Sleman Regional Environmental Management Agency.

④ Anti-Pollution Measures: Earth and sand waste will be collected by recycling companies. Any excess waste will be disposed in line with the domestic law.

⑤ Natural Environment: The Project area is not located in and around any sensitive areas such as national parks, and it is likely to have minimal adverse impact on the natural environment.

⑥ Social Environment: The Project involves the land acquisition of approximately 44 ha (34 ha in Putih River for diversion channel and 10 ha in Gendol River for sand pocket), which will be conducted in line with Indonesia's domestic procedures. No major resettlement is expected.

⑦ Other/Monitoring: The executing agency will conduct monitoring for air pollution, noise and other forms of monitoring during construction.

2) Promotion of Poverty Reduction: The Project is expected to mitigate damage from disaster and improve the living environments for poor people, who are vulnerable to floods and other natural disasters.

3) Promotion of Social Development (e.g. Gender Perspective, Measure for Infectious Diseases Including HIV/AIDS, Participatory Development, Consideration for the Person with Disability etc.) : none

(8) Collaboration with Other Donors or Schemes: JICA has implemented “Multi-disciplinary Hazard Reduction from Earthquakes and Volcanoes in Indonesia” as well as “the Project for Integrated Study on mitigation of multimodal disasters caused by ejection of volcanic products” to be commenced in July 2014 through the Science and Technology Research Partnership for Sustainable Development (SATREPS). In addition, The Project will also collaborate with JICA’s technical cooperation for “the Integrated Disaster Mitigation Management Project for Banjir Bandang” in terms of synergistic effect since field surveys and other activities concerning amounts of pyroclastic flow deposits, debris flow inundation and riverbed fluctuation conditions have been conducted in Mt. Merapi areas.

(9) Other Important Issues: The Project is expected to contribute to the unification of domestic and overseas cooperation, as it will lead to the development of sabo technology not only in Indonesia but also in Japan based on a return of the findings obtained through support for mitigation of sediment disasters in Indonesia to Japan.

4. Targeted Outcomes

(1) Quantitative Effects

1) Performance Indicators (Operation and Effect indicator):

Indicator	Baseline (2010)	Target (Year 2019) (2 years after project completion)
(Diversion Channel in Putih River) Annual Maximum Debris Flow Discharge	Present Flow Capacity of Putih River 237 m ³ /s	Harmful discharge by debris flow of which discharge is less than 635 m ³ /s flows in diversion channel properly.
(Sand Pocket in Gendol River) Sediment Control Volume	---	Debris flow discharge is trapped in sand pocket every year. (Capacity ^{**} :800,000m ³)
(Diversion Channel in Putih River) Scale of inundation area by debris flow	530,000 m ²	0 m ²
(Sand Pocket in Gendol River) Scale of Inundation area by existing deposited sediment	800,000 m ^{2***}	0 m ²

**The effective volume of sand pocket will be set up in the Project. The above mentioned volume is the current assumed figure.

*** The scale of inundation area indicated in the table is assumed as the inundation area without sabo facility.

2) Internal Rate of Return

Based on the conditions below, the economic internal rate of return (EIRR) of the Project will be 15.8%.

Cost: project costs (excluding taxes) and operation & maintenance costs

Benefits: mitigation of damage caused by debris flow

Project life: 50 years

- (2) Qualitative Effects: Stabilization of livelihoods, promotion of regional economic activities, and protection of historical/cultural structures through the mitigation of damage from debris flow inundation based on the improvement of sabo facilities

5. External Factors/Risk Control

None in particular

6. Lessons Learned from Past Projects

(1) Lessons from similar projects: The results of ex-post evaluation for the Mt. Merapi & Mt. Semeru Volcanic Disaster Countermeasures (ii) pointed out the possibility of reducing the financial burdens of administrative operation/management for removal/excavation of sediment accumulating at sabo dams) by politically guiding private sand mining companies if sandy materials from eruptions have market value.

(2) Lessons applicable to the Project: In order for sand mining industry to operate sustainably and to conserve the river environment, the local governments provides licenses to private mining companies for their sand mining activities in certain areas. Bali Besar Wilaya Sungai Serayu-Opak provides technical recommendation to the local governments for proper management of sand mining to protect river basins and sabo facilities.

7. Plans for Future Evaluation

(1) Indicators to be Used

- 1) Annual Maximum Debris Flow Discharge (Diversion Channel in Putih River) (m^3/s)
- 2) Sediment Control Volume (Sand Pocket in Gendol River) (m^3/s)
- 3) Scale of inundation area by debris flow (Diversion Channel in Putih River) (m^2)
- 4) Scale of Inundation area by existing deposited sediment (Sand Pocket in Gendol River) (m^2)
- 5) Economic Internal rate of Return (EIRR) (%)

(2) Timing

Two years after the completion of the project