

Ex-Ante Evaluation
Southeast Asia Division 1, Southeast Asia and Pacific Department
Japan International Cooperation Agency

1. Basic Information

- (1) Country: The Republic of Indonesia
- (2) Project Site/Target Area: Mt. Semeru and Mt. Kelud in Eastern Java, Mt. Agung in Bali and/or other selected provinces
- (3) Project: Volcanic Disaster Risk Reduction Sector Loan
Loan Agreement: December 24, 2024

2. Background and Necessity of the Project

- (1) Current State and Issues of the Disaster Prevention Sector and the Project's Position in the Republic of Indonesia

The Republic of Indonesia (hereinafter "Indonesia") is prone to natural disasters such as floods, landslides, earthquakes, and volcanic eruptions. According to EM-DAT (The International Disaster Database) statistics for 1990 through 2023, Indonesia suffered serious damage with about 190,000 deaths, 50 million people affected, and approximately US\$50 billion in economic damage. Volcanic eruptions were responsible for more than 1,000 of these deaths, 700,000 people affected, and causing approximately US\$560 million in economic damage. Indonesia is one of the world's most volcanic countries (accounting for 13% of the world's total), with more than 500 volcanoes, including about 130 active ones. Volcanic eruptions can cause disasters such as volcanic ash deposition, pyroclastic flows, and debris flows, and these disasters have a significant impact on human life, property and socio-economic infrastructure. Addressing volcanic and landslide disasters is extremely important for the promotion of regional safety and sustainable growth.

The Indonesian government has set disaster risk reduction as one of the seven development priorities in its National Medium-Term Development Plan (RPJMN 2020-2024), which was formulated in January 2020, and has included countermeasures against volcanic eruption in the plan. JICA has been supporting implementation of countermeasures for volcanic eruption and sediment-caused disaster since the 1970s. Even after all these years of assistance, eruptions at Mt. Kelud in East Java province in 2014, Mt. Agung in Bali province in 2017 and 2018, and Mt. Semeru in East Java province in 2021 and 2022 have weakened erosion control functions by damaging related facilities. Under these circumstances, the Indonesian government has included disaster prevention projects for these three volcanoes in the Blue Book (Medium-term External Loan Plan) 2020-2024, and the Green Book (Annual External Loan Plan) 2022 (US\$174 million) and immediate assistance has been requested by the Ministry of Public Works. The Volcanic Disaster Risk Reduction Sector Loan (hereinafter "the Project") aims to revise and develop a volcanic

debris control plan, repair and construct sabo facilities for these three volcanoes, and implement non-structural measures to reduce disaster risk, assisting recovery from debris flow damage and mitigating future damage, which, as mentioned above, causes the Project to be positioned as a high priority project in Indonesia. Also, based on a request from the Ministry of Public Works, a Technical Assistance Project related to Japanese ODA Loan is assisting capacity building in the detailed design of sabo facilities for the recently erupted Mt. Semeru, with construction to begin as soon as possible.

(2) Japan and JICA's Cooperation Policy and Project Positioning in the Disaster Risk Reduction Sector and the Project's Position in Issue-Specific Cooperation Strategies (Global Agenda/Clusters)

Japan's Country Assistance Policy for Indonesia (September 2017) identifies "assistance for realizing safe and fare society through balanced growth: as one of its focus areas, and specifies assistance for the improvement of administrative functions such as disaster risk reduction measures. The Project is positioned under the assistance program "Program for Enhancement of Disaster Risk Reduction Capacity and Administrative Capabilities" in the Policy as important assistance for disaster risk reduction in Indonesia, which is a key country in the Free and Open Indo-Pacific (FOIP) initiative. The "JICA Country Analysis Paper for the Republic of Indonesia" (June 2018) also sets out disaster risk reduction cooperation as a priority area, and aims to strengthen comprehensive disaster risk reduction, including through structural measures, to contribute to the sustainable development of Indonesia, and the Project is in line with this analysis and policies. The Project will also contribute to the realization of Cluster 1 "Realization of investment for disaster risk reduction (DRR) in capital concentration, especially in mega cities" and Cluster 2 "Establishment of DRR institutions for understanding disaster risk and strengthening disaster risk governance" under the JICA Global Agenda of "Disaster Risk Reduction through Pre-disaster Investment and Build Back Better."

In 1977, JICA supported development of a volcanic disaster risk reduction master plan for Mt. Merapi and Mt. Semeru in "Master Plan for Land Erosion and Volcanic Debris Control in the Area of Mt. Merapi" (technical cooperation) and sabo facilities were constructed through the "Mt. Semeru Urgent Rehabilitation Project" (ODA loan) in 1983. JICA also supported the updating of the master plan through the "Mt. Semeru Erosion Control and Water Resources Conservation Plan Survey" (technical cooperation) in 1984. "Mount Kelud Urgent Volcanic Disaster Mitigation Project" (ODA loan) in 1991, "Mt. Merapi and Mt. Semeru Volcanic Disaster Countermeasures Project (2)" (ODA loan) in 1995 and "Urgent Disaster Reduction Project for Mount Merapi (2)" (ODA loan) in 2014 also supported the repair of erosion control facilities that had been damaged by eruptions.

(3) Other Donor's Activities

No assistance has been confirmed from donors other than Japan in the sector of

volcanic disaster risk reduction.

3. Project Description

(1) Project Description

(i) The objective of the Project is to recover from the damage and mitigate future disaster risk caused by volcanic eruptions, by rehabilitating and constructing the sediment control facilities and implementing non-structural measures, and thereby contribute to the sustainable social and economic development of the region.

(ii) Project Components

a) Outline of the overall the project

Repair, reconstruction, and new construction of sabo facilities, installation of rainfall radar, and non-structural measures such as creation of master plans for the volcanic disaster risk reduction at Mt. Semeru, Mt. Kelud, Mt. Agung, etc.

b) Component of Civil works

Restoration and reconstruction sabo facilities, crater lake drainage tunnels, etc. whose function have been degraded by eruptions and sedimentation and are highly necessary and urgent, which is making surrounding villages, farmland, fishing villages, and tourist spots face at risk of debris flow flooding. Installation of rainfall radar for early warning of flooding. The target facilities will be finalized after the master plan is revised and prepared.

c) Consulting Services

Detailed design, tender assistance, construction supervision, facilitation for environmental and social considerations, formulation of revision and creation of master plans for the volcanic disaster risk reduction, support for maintenance and management of sabo facilities, study for raising awareness of disaster risk reduction, support for formulating a volcanic eruption emergency response plan

(iii) Project Beneficiaries (Target Group)

The direct beneficiaries: about 300,000 will be less susceptible to direct damage from the flow of debris caused by volcanic eruptions, due to the construction of sabo facilities.

The ultimate beneficiaries: about 3.7 million people will benefit from the reduced risk of volcanic disasters.

(2) Total Project Cost

28,500 million yen (of which, 23,148 million yen is covered by ODA loan)

(3) Project Implementation Schedule (Cooperation Period)

Scheduled for December 2024 to July 2031 (total of 80 months). The project completion will be when all target sub-projects are completed (scheduled for July 2030). Technical Assistance Project is scheduled for December 2023 to December 2024 (total of 13 months).

(4) Project Implementation Structure

(i) Borrower: The Government of the Republic of Indonesia

- (ii) Guarantor: None
- (iii) Executing Agency/Implementation System: Ministry of Public Works, Directorate General of Water Resources (hereinafter “DGWR”). In the implementation of each sub-project, River Basin Management Offices (hereinafter “BWS”) responsible for each target area will oversee the bidding for civil works and the project implementation.
- (iv) Collaboration with Other Organizations and Division of Roles: Plan to collaborate with Yamanashi Prefecture Mount Fuji Research Institute, Fujiyoshida City, and Fujikawaguchiko Town.
- (v) Operation and Maintenance System: The BWS will be responsible for maintenance after the completion. While the technical staff at the BWS are experienced in erosion control projects implemented by the DGWR and ODA loan projects in this field, they are scheduled to provide technical support for maintenance with the use of drones, etc. as a consulting service. The cost of operation and maintenance will be covered by the national budget.

(5) Cooperation and Sharing of Roles with Other Projects and Donors

“Data collection survey on Volcanic Disaster Reduction in East Java and Bali Islands in the Republic of Indonesia,” (June 2022 to March 2024) has been conducted. The information collected in this survey, such as the state and distribution of each sabo facility and targets of conservation, will be used for the Project. JICA expert “Integrated Water Resource Management Policy Advisor” (July 2019 to September 2025) and “Disaster Risk Reduction Advisor” (February 2022 to January 2027) have been dispatched, who are expected to collaborate with the introduction of Japanese case studies and technical advice based on cases of volcanic erosion control in Japan and experience related to the Project. Technical Assistance Project “The Project for Capacity Development of Mt. Semeru Volcanic Disaster Structural Measures Planning” (December 2023 to December 2024) was conducted. Its aim is to start construction as soon as possible for multiple sabo facilities at Mt. Semeru, where the need is particularly urgent, by providing capacity building related to detailed design. Disaster risk reduction community systems are being strengthened and education for disaster risk reduction is being provided for the Mt. Agung area under the grassroot technical cooperation project “Project for Building a Disaster-Resistant Community through the Utilization of Local Universities as a Base for Responding to Low-Frequency, Large-Scale Disasters” (July 2022 to July 2025). It is expected that the Project will support the raising of disaster prevention awareness, providing synergistic effects, and the results of the grassroot technical cooperation project will be considered for use in other regions.

(6) Environmental and Social Considerations

- (i) Category: FI

Reason for Categorization: Under the JICA Guidelines for Environmental and Social

Considerations (established January 2022), the project is expected to have an impact on the environment through its sub-projects, although the sub-projects could not be identified before JICA loan approval. A survey will be conducted for the preparation of the Environmental Impact Assessment (AMDAL) report during the Project implementation once the sub-projects have been identified.

(ii) Other/Monitoring: In the project, with the support of consultants hired through ODA loan assistance, the executing agency will categorize each sub-project based on the Indonesian legal system and the “JICA Guidelines for Environmental and Social Considerations,” and will take necessary measures for each category. Sub-projects will not include Category A projects.

(7) Cross-Cutting Issues

It was confirmed that implementation of the citizen participatory activities to contribute to raising awareness of disaster risk reduction by through discussions and agreed to implement these activities in cooperation with local governments and other non-executing agency.

(8) Gender Category: GI (Gender mainstreaming needs assessment and analysis)

<Reason for Categorization>

Though gender mainstreaming needs for the Project were surveyed, no plan including specific indicators was developed for gender mainstreaming initiatives. In construction work for the Project, promote the employment of women The project will promote gender equality by setting an employment quota for female workers, ensuring equal pay for equal work for men and women, and providing facilities to make it easier for women to work, and the Project will promote the employment of women and actively promote the appointment of women within the Project implementation structure and the operation and maintenance structure.

(9) Other Important Issues

It is anticipated that if there is an eruption during the implementation of the Project, including at other volcanoes in Indonesia, the Project’s contingency funds, etc. will be used to conduct emergency surveys and to restore facilities, etc.

4. Target Outcomes

(1) Quantitative Effects

Operation and Effect Indicators

Indicator	Baseline (Actual Recorded in 2022)	Target (2032) [2 years after completion]
(1) Capturable sediment (m ³)		
Mt. Semeru	0	23,547,076
Mt. Kelud	3,293,000	4,965,000
Mt. Agung	2,541,217	3,959,014

(2) Crater lake water level (m) (Mt. Kelud)	Measurement scheduled	Below entry to crater lake drainage tunnel
(3) Debris flow flood area (km ²)		
Mt. Semeru	45.90	24.26
Mt. Kelud	298.1	46.3
Mt. Agung	Setting scheduled	99.1

(1), (2) = Operational indicators, (3) = Effectiveness indicators

*Baseline and target values are set for limited facilities covered under the Project. These values will be reviewed based on the finalized target facilities. Damage from the eruption of Mt. Kelud is mitigated by keeping the crater lake water level below the height of the drainage tunnel. The crater lake water level will be measured as part of the consulting service for the Project during the survey phase, prior to the detailed design phase. The baseline for Mt. Agung is scheduled to be set after the volcanic erosion control plan has been formulated and the facilities finalized.

(2) Qualitative Effects

Sustainable economic and social development for the region

(3) Internal Rate of Return

Not calculated, given that sub-projects have not be identified in advance.

5. Preconditions/External Factors

Preconditions/External Factors: Land acquisition completed on schedule. No volcanic eruptions that would prevent civil works from being carried out.

6. Lessons Learned from Past Projects and Application to the Project

In a previous ex-post evaluation of the Indonesia ODA loan “Mt. Merapi and Mt. Semeru Volcanic Disaster Risk Reduction Projects (2)” (evaluated in 2003), it was noted that it may be possible to reduce the financial burden by allowing private companies to mine the sand and gravel deposited by eruptions if they have market value, but excessive mining can damage sabo facilities and this can be difficult to regulate. The Project will support improving the capacity for issuing mining permits and monitoring to prevent excessive mining by existing sand miners.

Furthermore, in the ex-post evaluation of the Indonesia ODA loan “Water Resources Existing Facilities Rehabilitation and Capacity Improvement Project (Water Resource Sector)” (evaluated in 2014), it was learned that for data and evidence related to operational and effect indicators to be obtained reliably, the capacity and evaluation capabilities of the implementing agency should be fully examined in terms of measurement, collection and data compilation, and then agreement should be made with the executing agency on the setting of indicators to set operational and effect indicators for evaluation. Based on this lesson, specific

agreement was made for the Project as to the details of indicators, their clear definition, and the method, timing and scope of data collection.

7. Evaluation Results

The Project is consistent with the government of Indonesia's development policy and Japan's cooperation policy, and will contribute to the economic and social recovery and the reduction of damage from volcanic disasters of the target region, through the implementation of structural and non-structural volcanic disaster risk reduction initiatives.

The Project is expected to contribute to SDGs Goal 9 (Build resilient infrastructure) and Goal 11 (Make cities and human settlements inclusive, safe, resilient and sustainable), so there is a strong need for JICA to support the implementation of the Project.

8. Plan for Future Evaluation

(1) Indicators to be Used for Future Evaluation

As shown in 4.

(2) Timing of the Next Evaluation

Two years after project completion (Ex-post Evaluation)

END

Attachment: Volcanic Disaster Risk Reduction Sector Loan Map



Map Data ©2024 50 km