

Japanese ODA Loan

Ex-Ante Evaluation (for Japanese ODA Loan) Southeast Asia Division 3, Southeast Asia and Pacific Department Japan International Cooperation Agency

1. Name of the Project

Country: The Socialist Republic of Vietnam

Project: Project for Disaster and Climate Change Countermeasures Using Earth Observation Satellite (II)

L/A signed on: May 23, 2022

2. Background and Necessity of the Project

(1) Current state and issues facing the disaster management sector and satellite technology development in Vietnam

The Socialist Republic of Vietnam (hereinafter referred to as “Vietnam”) is one of the most disaster-prone countries in the world, with frequent water and wind damage caused by typhoons and torrential rains. According to the Ministry of Agriculture and Rural Development, about 3,600 people died or went missing due to disasters from 2007 to 2017, and the economic loss amounts to 1% of the GDP (as of 2016). In addition, over 70% of the population lives in areas vulnerable to storm and flooding, hence, disaster countermeasures to reduce disaster risk to help prevent loss of life and socio-economic damage is an urgent issue.

The earth observation satellite (1 Optical Satellite) owned by Vietnam cannot be observed at all times due to limitations of observable time and weather condition. Therefore, whenever disaster occurs, Vietnam acquire satellite observation data from other countries’ Synthetic Aperture Radar (SAR)¹ through bilateral arrangement or Sentinel Asia², and use them for analysis. However, the provision of SAR data is not guaranteed as each country has the right to decide whether or not to accept the request. In addition, even if the request is accepted, it might take a few days to acquire the observation data based on the position of satellite on orbit. Therefore, it is urgent to strengthen its own earth observation satellite monitoring system in order to quickly understand the damage situation at the time of disaster.

¹ Synthetic Aperture Radar satellite can obtain data in bad weather and night.

² [Home - Sentinel Asia Web Site \(sentinel-asia.org\)](http://sentinel-asia.org)

In “National Strategy for Natural Disaster Prevention, Response and Mitigation to 2020” (Prime Minister Decision November 2007) and the updated version “National Strategy for Natural Disaster Prevention, Response and Mitigation to 2030” (Prime Minister Decision March 2021), Vietnam adopted the policy to apply the latest technology, including utilization of satellite remote sensing in disaster risk reduction for effective monitoring, observation and early warning. In the “Strategy for Space Technology Research and Applications to 2020” (Prime Minister decision June 2006), Vietnam aims to launch the domestic produced satellite by 2020. The “Project for Disaster and Climate Change Countermeasures Using Earth Observation Satellite” (hereafter referred to as “the Project”) was formulated based on the “Specific Plan for the Development of Hoa Lac Space Center” (May 2008) under the above-mentioned Strategy. Furthermore, the latest space strategy “Strategy for the development and Application of Space Science and Technology to 2030,” (Prime Minister decision February 2021), clearly states that space science and technology will be used for monitoring to reduce the damage from natural disasters, and complete the Project in accordance with the schedule approved by Prime Minister. Hence, the Project is considered as a high priority in Vietnam.

(2) Japan and JICA’s development policy and priority of the Project in Vietnam’s disaster management sector and in satellite technology

Japan’s Country Assistance Policy for the Socialist Republic of Viet Nam (December 2017) specifies “Response to Fragility” as a priority area, and states that Japan provides assistance for promoting countermeasures for threats and negative impact from natural disasters and climate change risks. Japan’s “Basic Plan on Space Policy” (Cabinet decision June 2020) states that “Japan will promote international cooperation through utilization of Japan’s strengths in the space field, to contribute to the achievement of SDGs and solve global issues such as energy, climate change, environment, food supply, public health and large-scale natural disasters. Furthermore, JICA Country Analysis Paper for the Socialist Republic of Viet Nam (June 2020) prioritize the cooperation for climate change, disaster risk reduction and countermeasures for natural environment degradation. The Project is in line with these policies and analysis.

(3) Assistance by other donors

The French government supported the development of optical satellite to monitor resources, environment, and natural disasters from 2009 to 2013, which was launched in 2013.

3. Project Description

(1) Project Objectives

The objective of the Project is to upgrade and establish Vietnam's disaster and climate change planning, mitigation, and response by procuring and developing facilities necessary for the development and utilization of earth observation satellite in the Hoa Lac area (Hanoi), and carrying out human resources training to utilize the satellite observation data, thereby contributing to disaster risk mitigation in the country.

(2) Project Site/Target Region

Hoa Lac District, Hanoi City

(3) Project Components

- 1) Procurement of one earth observation satellite (including capacity development related to satellite development technology and satellite observation data utilization)
- 2) Set up related facilities and equipment: Headquarter building, transmitting and receiving antenna (7 m in diameter), control/operation building, research and development building, manufacturing and processing building, power facility, etc.
- 3) Consulting services: Tender support, construction supervision, etc.

(4) Total Project Cost

34,579 million yen (Japanese ODA loan portion: 18,871 million yen)

(5) Schedule

November 2011 - December 2023 (145 months in total) The Project will be completed upon the completion of the orbital test flight of Satellite I (December 2023).

(6) Implementation Structure

- 1) Borrower: The Government of the Socialist Republic of Vietnam represented by the Ministry of Finance of the Socialist Republic of Vietnam
- 2) Executing Agency:
 - ① Line Agency: Vietnam Academy of Science and Technology (VAST)
 - ② Executing Agency: Vietnam National Space Center (VNSC)
- 3) Operation and Maintenance Agency: VNSC

(7) Cooperation and Sharing of Roles with Other Donors

- 1) Japan's Assistance Activities
JICA has been providing technical cooperation project for Strengthening

Capacity in Weather Forecasting and Flood Early Warning System from May 2018 until December 2023. Strengthening weather observation system on the ground in addition to satellite observation system, provides more accurate information and further strengthen disaster countermeasures.

Furthermore, ODA loan for the Hoa Lac Science and Technology City Development Project (Phase I and Phase II) developed the basic infrastructure of a science and technology hub in Hoa Lac District in Hanoi City, which facilities of the Project will be built in the same district.

2) Other Donors' Assistance Activities

N/A

(8) Environmental and Social Consideration / Cross-Sectoral Issues / Gender Category

1) Environmental and Social Consideration

① Category: B

② Reason for Categorization: This Project does not fall into any category of "sensitive sectors" or "sensitive areas" as per the JICA Guidelines for Environmental and Social Considerations (issued April 2010), and it has been determined that this Project will not result in serious undesirable impacts to the environment.

③ Environmental Approval: The domestic laws of Vietnam do not mandate the preparation of an Environmental Impact Assessment (EIA) report for this Project.

④ Pollution control: Measures will be taken during construction for air quality, noise, vibrations and water quality, such as water sprinklers, restrictions on the use of heavy machinery, and the establishment of on-site sewage system. As for noise and waste during operation, waste collection facility and soundproof equipment will be installed to meet the requirements of Vietnamese environmental standards.

⑤ Natural environment: The area(s) affected by the Project are not designated as or near national parks, or other sensitive areas, and the level of undesirable impact to natural environment is expected to be minimal.

⑥ Social environment: As this Project uses land (approximately 9 ha) that was acquired for the Hoa Lac Science and Technology City Development Project and will be within the Hoa Lac High Tech Park, no additional land

acquisition or involuntary relocation of residents will take place.

⑦ Monitoring/other: VSNC will monitor air quality, noise, vibrations, water quality, waste, etc.

2) Cross-Sectoral Issues

The satellite image acquired from the outcome of the Project will help understand the adverse effects of climate change including natural disasters, which could be used for planning countermeasures. Furthermore, observation data could be used for forest management, which would contribute mitigating climate change.

3) Category of Gender: GI (Gender mainstreaming needs assessment and analysis project)

Reason for Categorization: Although gender mainstreaming needs were studied and confirmed, the Project fell short of including any specific activity that would contribute to gender mainstreaming. However, facilities for women (toilets, changing rooms, etc.) will be facilitated to improve the working environment for women.

(9) Other Important Issues

Japanese technology, including quick delivery, small, cost efficient and highly performance synthetic aperture radar will be utilized to the satellite procured in the Project.

4. Project's Effects

(1) Quantitative Effect

1) Outcomes (operation and effects indicators)

Indicators	Baseline (2011 Actual)	Target (2025) [2 years after project completion]
Acquisition time of image data at the time of disaster (hours)	120~168	6
Data processing capability improvement (scenes/day)	10	60
Number of data utilization engineers (persons)	Less than 10	120
Ratio of good quality image (without cloud coverage and noise) (%)	25 (optical satellite only)	50 (SAR satellite + optical satellite)

(2) Qualitative Effects

The Project is expected to have the following effects in the country, including upgrading the countermeasures technology for disasters and climate change, and optimizing rescue activities at the time of disaster.

1) Disaster Countermeasures (mainly from the effects of technical assistance related to satellite observation utilization technology)

- Creation of nationwide hazard maps and simulations
- Prediction and identification of affected area
- River monitoring, damage prediction, wide-range observation
- Observation of affected area, damage expansion prediction, identification of relief and evacuation routes
- Provision of information on secondary disasters prediction
- Provision of information on earth crust movement and risk

2) Climate Change Countermeasures

- Understanding changes in land use, vegetation, etc.
- Provision of information on carbon dioxide absorption amounts
- Monitoring land subsidence, coastlines and river basins

(3) Internal Rate of Return

This was not calculated as it is difficult to quantify and monetize the benefits.

5. Preconditions and External Factors

- (1) Preconditions: N/A
- (2) External Factors: N/A

6. Lessons Learned from Past Projects

Development of communication satellite receiving stations in the Republic of Paraguay identified that it is effective to (1) strengthen partnerships with relevant agencies at the planning stage to avoid design changes and administrative procedure delays at the implementation stage, (2) develop manuals and dispatch experts through collaboration with other schemes, and (3) hire new expert personnel who has good knowledge of the newly introduced technology.

The Project held workshops to promote cooperation with relevant agencies using satellite images. JICA provided detailed design consultants and dispatched experts through technical cooperation in relation to the Project. Also, the Project includes human resource development programs to strengthening institutional capacity. Close attention is being paid to administrative procedures in Vietnam to ensure prompt approval, and JICA will communicate with relevant authorities to avoid further delays.

7. Evaluation Results

This project is in line with Vietnam's development issues and policies, as well as Japan and JICA's cooperation policies and analysis. It will contribute to disaster reduction in Vietnam by strengthening management system for disaster and climate change. The Project is considered to contribute to Goal 13 (climate action) of SDGs. Thus, the need to support the implementation of this Project is high.

8. Plan for Future Evaluation

- (1) Indicators for Future Evaluation
As shown in Section 4
- (2) Future Evaluation Schedule
Ex-poste evaluation: Two years after the project completion

End