

Ex-ante Evaluation

1. Name of the Project

Country: The Socialist Republic of Vietnam

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

L/A signed on: November 2, 2011

L/A Amount: ¥7,227,000,000

Borrower: The Government of the Socialist Republic of Vietnam

2. Background and Necessity of the Project

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

Vietnam is a narrow and long country lying along a north/south axis. The Country has multitudinous climatic and geological conditions. Therefore, Vietnam has a relatively higher risk of the incidence of natural disasters in the world. Particularly, typhoons and floods and other hydrological events are serious problems. Losses from these natural disasters are nearly 1.5% of Vietnam's gross domestic product. Additionally, more than 70% of the population lives in regions vulnerable to storm and flood damage. It is, therefore, an urgent issue to take measures for emergency disaster relief and disaster damage mitigation and prevention from the perspectives of saving human lives and preventing losses of socioeconomic capital. With the frequency of heavy rains and powerful tropical storms increasing in recent years—possibly due to the effects of climate change—there are concerns that Vietnam may be facing even greater flood risks than ever before.

Given such circumstances, the formulation of policies, systems, and action plans based on scientific evidence is given serious consideration in Vietnam, and it is recognized that creation of a continuous earth observation satellite system is essential to conduct monitoring, forecasting, and impact evaluation of climate change. Currently, the satellite data purchased from foreign countries are used for disaster monitoring and forest management, but the data is not fully utilized due to time limitation and expensive data costs. Therefore, in order to obtain the satellite data timely and accurately, it is an urgent issue to introduce the equipment and technology to design, produce and operate an earth observation satellite in Vietnam.

- (2) Development policy and priority of the project in Vietnam's disaster management sector and in satellite technology

The Vietnamese government has established a national strategy of becoming an industrialized nation by 2020, and has announced a policy of promoting advanced technology as a means of reaching that goal. In its National Strategy on Natural Disaster Prevention, Fighting and Reduction till 2020 (Prime Minister Decision No.172, November 16, 2007), Vietnam set forth policies to encourage the introduction of

state-of-the-art technology and equipment. Satellite-related technologies in particular requires a broad range of sophisticated technologies, including advanced machine, electric, communications, materials, control equipment, software, and optics technology. Furthermore, Vietnam sets satellite-related technology as a national strategic area, since there is a substantial need for disaster and forest monitoring as well as broadcast and telecommunication infrastructure.

In terms of developing satellite technology, Vietnam sets a target of launching a domestically produced earth observation satellite by 2020 upon approval of its Strategy on Research into, and Application of, Aerospace Technology up to 2020 (Prime Minister Decision No.137, June 24, 2006). The Project for Disaster and Climate Change Countermeasures Using Earth Observation Satellite was formulated based on the Pre-Feasibility Study of the Hoa Lac Space Center Project (May 2008)—a plan which grew out of the above space technology strategy.

(3) Japan and JICA's policy and operations in the disaster management sector and in satellite technology

In September 2004, Japan's Council for Science and Technology Policy adopted the Basic Strategy for Space Development and Utilization in Japan. This strategy stipulates policies that contribute to better disaster response and quality of life in Asia while making use of cooperative international frameworks. The Basic Space Plan formulated in June 2006 also set forth policies for the utilization of satellite technology to protect the lives and livelihoods of citizens in developing countries from a host of threats—among them disasters, environmental pollution, and climate change—while enriching their daily lives.

Through its work in the disaster management sector, JICA has been carrying out cooperation primarily through its Program for Building Disaster Resilient Societies, which focuses on the central part of Vietnam—the area of the country that suffers the most in terms of human suffering and property damages. This program aims to provide comprehensive support through a set of three initiatives designed to achieve disaster resilience in the region: (1) enhancement of disaster prevention and management capacities at community level from the perspective of human security, (2) enhancement of the administrative planning / implementation capacities for disaster prevention measures at central and local government level through training programs and similar efforts, and (3) infrastructure building for disaster prevention. The Project is expected to contribute to achieve the above-mentioned initiatives by providing satellite data timely and accurately. This is the first project to provide assistance on satellite development.

(4) Assistance by other aid organizations

Cooperation from various donors to combat disasters began in earnest after major flooding hit central Vietnam in 1999. Led by the United Nations Development Programme (UNDP) and the Dutch government, a team of donors conducted a joint study in 2000 and each carried out specific roles to provide disaster recovery support in

the affected central region. In order to spread the lesson learned nationwide for disaster management throughout Vietnam, the UNDP and the Dutch government helped to set up a national disaster response partnership with the aim of building cooperative alliances among donors, NGOs, and the Vietnamese government. They are now running a Disaster Response Working Group to give donors a place to share information and coordinate their efforts.

In the area of satellite development technology, the French government provided an ODA loan for procurement of the VNREDSat-1a, an earth observation satellite for natural resource, environment, and disaster monitoring.

(5) Necessity of the project

This project, addressing issues in Vietnam, is defined as an important project which contributes to Vietnam's national strategy through advancement of technology for disaster and climate change countermeasures, and is in line with Japan and JICA's priority support areas. This project is therefore considered highly necessary and relevant.

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 providing earth observation satellites, equipment and facilities for satellite development and utilization, and, capacity development for O&M of the facilities and equipment, by contributing to improvements of living and social conditions in Vietnam.

(2) Project Site/Target Region

Hoa Lac High-tech Park, Hanoi City, the Socialist Republic of Vietnam

(3) Project Outline

- 1) Procure earth observation satellites
- 2) Set up related facilities and equipment
- 3) Capacity Development
- 4) Consulting services

(4) Total Project Cost

54,400 million yen (Japanese ODA loan portion: ¥46,595 million)

(5) Schedule

November 2011 ~ December 2022 (134 months in total): Check-out of Satellite II (March 2021) shall be the time of the project's completion.

(6) Implementation Structure

- 1) Borrower: The Government of the Socialist Republic of Vietnam
- 2) Executing agency: VAST/Vietnam National Satellite Center (VNSC)
- 3) Operation and maintenance system: Same as above.

(7) Environmental and Social Consideration, Poverty Reduction, and Social Development

1) Environmental and social consideration:

- i. Category: B

- ii. Justification: This project does not fall into any category of “sensitive sectors” or “sensitive areas” as per the JBIC Guidelines for Confirmation of Environmental and Social Consideration (issued April 2002), and it has been determined that this project will not result in serious undesirable impacts to the environment.
 - iii. Environmental approval: The domestic laws of Vietnam do not mandate the preparation of an Environmental Impact Assessment (EIA) report for this project.
 - iv. Pollution control: The project is expected to satisfy all domestic environmental standards in Vietnam through the use of renewable energy, anti-seismic design, and other measures to preserve air quality and reduce noise.
 - v. 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 environments is expected to be minimal.
 - vi. Social environment: The approximately 9 ha of land needed for the project will be purchased from within an existing industrial complex, making relocation of residents unnecessary.
 - vii. Monitoring/other: The project will have the Vietnam National Satellite Center carry out monitoring of air pollution, noise, vibration, water quality, and other environmental factors.
- 2) Poverty reduction: None in particular
- 3) Promotion of social development: (e.g. gender perspective, measure for infectious diseases including AIDS, participatory development, considerations for persons with disabilities, etc.): None in particular
- (8) Partnership with other donors: None
- (9) Other important issues: None

4. Project's Effects

(1) Quantitative Effect

1) Operation and Effect Indicators

Indicators	Baseline (2011 Actual)	Target (2023) 【2 years after the project completion】
Time until image data acquisition at the time of disaster (hours)	120~168	6~
Data processing capability improvement (scenes/day)	10	60
Number of data utilization engineers finished the technology transfer course (persons)	less than 10	120
Ratio of good quality image (without cloud coverage and noise) (%)	25	50

2) Internal Rate of Return

The internal rate of return for this project was not calculated due to the difficulty of quantifying or placing a monetary value on its benefits.

(2) Qualitative Effect

The Project is expected to upgrade Vietnam's disaster and climate change planning, mitigation, and response as shown below.

1) Disaster mitigation

Ordinal times:

- Creation of nationwide flooding hazard map using DEM extracted from the satellite image data.
- Evacuation and rescue route simulation utilizing hazard map.

On alert:

- Identification of area and specific disaster forecast utilizing the simulation
- Monitoring river water level and forecast flood area
- Wide area can be monitored in short time using the satellite data

On disaster:

- Whether monitor disaster situation can be quasi-real time, and whether forecasts are possible for a potential disaster area.
- Possibility of secondary accidents can be predicted.

After disaster:

- Geological deformation caused by the disaster can be measured using satellite interferometer technology. The result will be used for the revision of hazard map.

2) Climate change

- Change of vegetation and forestry can be measured by monitoring continuously using satellite, thus enables quick countermeasure. Forest monitoring will contribute to estimation of carbon dioxide absorption.
- Ground subsidence can be monitored.

5. External Risk Factors and Control

Failure to launch the earth observation satellites is a risk; however, launch insurance is covered under the ODA loan.

6. Lessons Learned from Findings of Similar Projects Undertaken in the Past

The following lessons were learned from past projects on construction of receiving stations for communications satellites. Effective steps include: (1) ensuring tighter collaboration among agencies involved from the project formulation phase in order to prevent delays like design changes and sluggish government procedures during the implementation phase, (2) preparing manuals through tie-ups with expert dispatches and other schemes, and (3) hiring on expert personnel familiar with the new technologies being introduced. In response to these lessons, this project will (1) promote collaboration among the agencies involved (including organizations that will use the satellite images) by holding workshops and the like, (2) consider detailed design survey and expert dispatches through JICA's technical assistance, and (3) strengthen institutional capacity through assistance on development of expert personnel.

7. Plans for Future Evaluation

(1) Indicators for Future Evaluation

- 1) Time until image data acquisition at the time of disaster (hours)
- 2) Data processing capability improvement (scenes/day)
- 3) Number of data utilization engineers finished the technology transfer course (persons)
- 4) Ratio of good quality image (without cloud coverage and noise) (%)

(2) Timing of the Next Evaluation: Two years after the completion of the project