



## JICA's Cooperation in Vietnam in the field of Disaster Risk Reduction

Japan International Cooperation Agency (JICA)





△Site Survey (Project Name: Strengthening the capacity to cope with and minimize damages caused by flash floods and landslides for the northern mountainous region of Vietnam), ▽Distributing pamphlets summarizing local disaster risk reduction tips (Project Name: Capacity building of local community for slope disaster risk reduction)

# Message

It can be said that the national development of Japan has been accompanied by disaster risk reduction. For example, in Tokyo, more than 300 years ago, the mouth of the Tone River, which emptied into the ocean at the center of Tokyo, was replaced to the Pacific Ocean about 100 km to the east, thereby reducing the risk of flood and contributing to increased food production as wetlands that had been along the river were developed into rice paddies.

Since then, flood control measures have been steadily implemented along the Tone River and other rivers near Tokyo, such as levees, retarding basins, and dams, which have supported intensive urban development and economic growth on the vast flatlands.



Both Vietnam and Japan are vulnerable to natural disasters, and they also share the same background of frequent heavy rains caused by storms, as well as steep terrain and fragile geology that can lead to floods, flashfloods and landslides rapidly and intensely.

We would like to contribute to disaster risk reduction in Vietnam and thus to the development, by utilizing the technology and know-how that Japan has been using to overcome such conditions.

This pamphlet introduces JICA's projects for disaster risk reduction in cooperation with Vietnamese agencies and Japanese companies, etc. As you can see, all of them are working on disaster risk reduction in various aspects, utilizing Japanese experience and technology. JICA will continue to contribute to disaster reduction in Vietnam.

SUGANO Yuichi,  
Chief Representative of JICA Vietnam Office

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## Current situation and issues

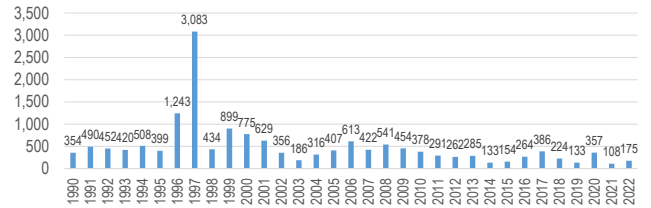
Natural disasters occur frequently in Vietnam due to weather and topographical conditions.

Most of the damage is caused by storms and floods, with the central region being most affected, but in recent years landslides and flashfloods in the northern mountainous region have also become more frequent. In addition to human damage, economic damage is becoming increasingly serious.

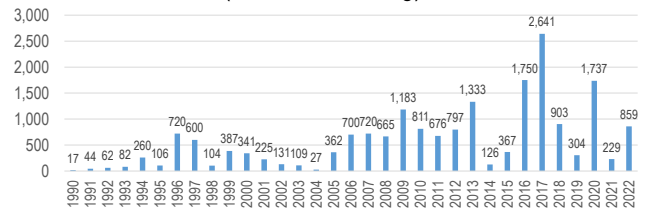
Vietnamese government has been working to improve its disaster prevention system by enacting the Disaster Prevention Law in 2013 and amending it in 2020.

Furthermore, measures are being taken based on the disaster prevention plans that have been formulated at the central and local levels.

However, the need to respond to more severe disasters due to climate change etc. is also an urgent issue.



Human Loss due to Natural Disasters in Vietnam (Dead and Missing)



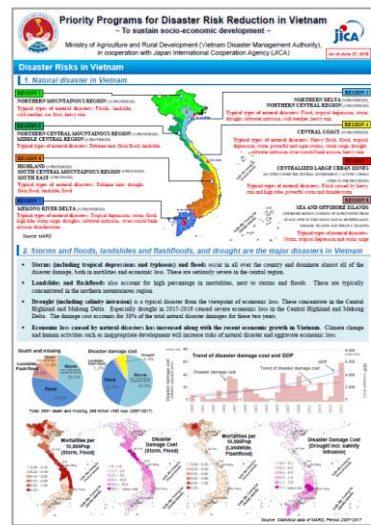
Property Loss due to Natural Disasters in Vietnam (Unit: Million USD)

Source: Ministry of Agriculture and Rural Development (MARD)

## Priority Programs for Disaster Risk Reduction in Vietnam

In light of the current situation and challenges, in the "Priority Programs for Disaster Risk Reduction in Vietnam", compiled by the Viet Nam Disaster Management Authority (VNDMA) (now the Viet Nam Disaster and Dyke Management Authority (VDDMA)) and JICA, the following six programs are to be promoted.

- (1) Establish practical disaster information management
- (2) Complete the institutional arrangement for better coordination
- (3) Develop DRR plans at all levels and prioritize investment based on the plans
- (4) Implement comprehensive DRR relating storm, flood and drought
- (5) Implement measures against landslide and flashflood
- (6) Transform production and livelihood for sustainable Mekong Delta development to adapt climate change



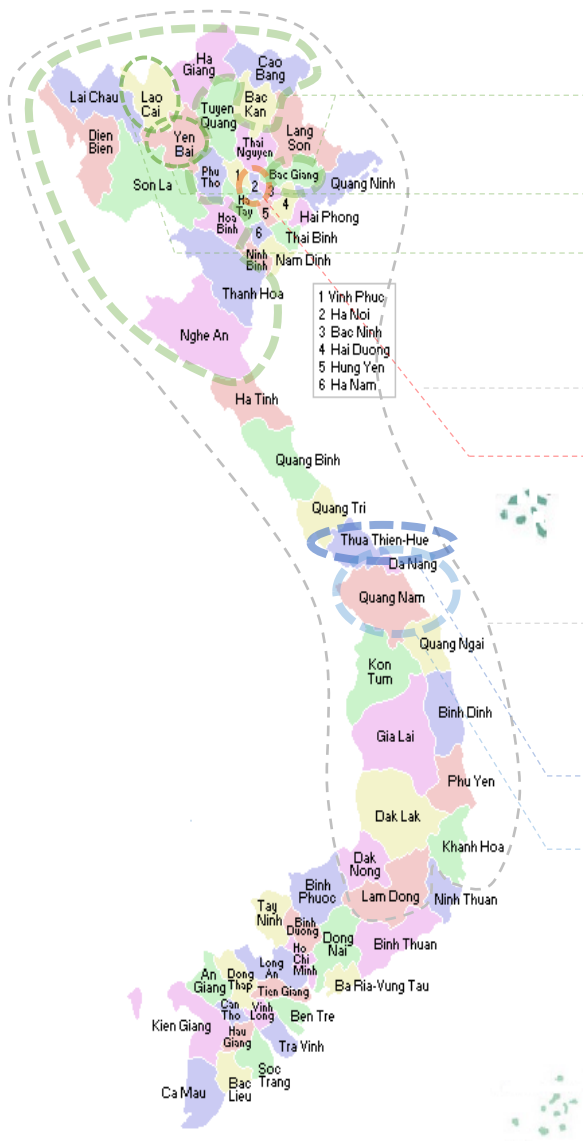
For more information including disaster risks and issues in Vietnam, please see the brochure.

JICA's strategy in the field of disaster risk reduction is summarized in the following document, "Global Agenda No. 20 Disaster Risk Reduction through Pre-disaster Investment and Build Back Better".

Please refer to.  
<https://www.jica.go.jp/english/activities/issues/disaster/>



# Recent Projects at a glance



## (Northern Mountainous Region)

- Strengthening the capacity to cope with and minimize damages caused by flash floods and landslides for the northern mountainous region of Vietnam [page 9]
- ◆ Solutions to Prevent Landslide Disaster in Vietnam [page 11]
- ◆ Capacity building of local community for slope disaster risk reduction [page 12]

## (Northern Region)

- Project for Disaster and Climate Change Countermeasures Using Earth Observation Satellite (1), (2) [page 16]
- ◆ Confirmation and Verification of the Interest for Abnormal Weather Risk and Needs of Countermeasure for Weather Risk in Viet Nam [page 15]

## (Northern and Central Region)

- ◆ Disaster Prevention Technology of Earth Dams and Embankments by Applying Press-in Method with Silent Piler in Vietnam [page 17]

## (Central Region)

- The Project for Emergency Reservoir Operation and Effective Flood Management Using Water related Disaster Management Information System [page 6]
- Project for Flood Damage Restoration and Formulation of a Flood Prevention and Control Master Plan in the Central Region [page 8]

## (Nation-wide)

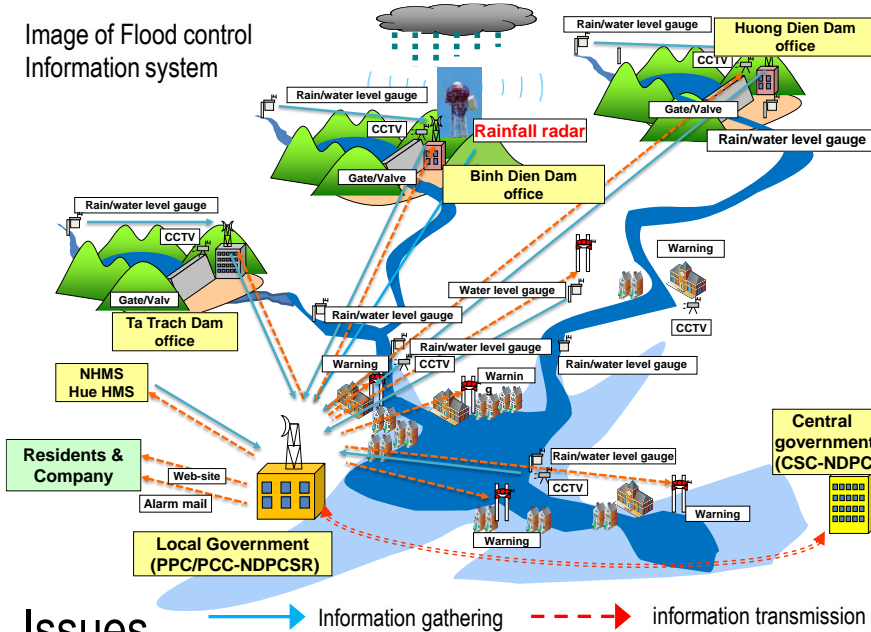
- The Project for Strengthening Capacity in Weather Forecasting and Flood Early Warning System [page 13]
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	Observation, Early Warning	Surveying / Planning	Implementation	Restoration and reconstruction
Flood	● The Project for Emergency Reservoir Operation and Effective Flood Management Using Water related Disaster Management Information System [page 6]	● Project for Flood Damage Restoration and Formulation of a Flood Prevention and Control Master Plan in the Central Region [page 8]		●
Landslide Flashflood	● Strengthening the capacity to cope with and minimize damages caused by flash floods and landslides for the northern mountainous region of Vietnam [page 9]	◆ Solutions to Prevent Landslide Disaster in Vietnam [page 11]		◆ Capacity building of local community for slope disaster risk reduction [page 12]
Weather	● The Project for Strengthening Capacity in Weather Forecasting and Flood Early Warning System [page 13]	◆ Confirmation and Verification of the Interest for Abnormal Weather Risk and Needs of Countermeasure for Weather Risk in Viet Nam [page 15]	●	
Others	● Project for Disaster and Climate Change Countermeasures Using Earth Observation Satellite (1), (2) [page 16]	◆ Disaster Prevention Technology of Earth Dams and Embankments by Applying Press-in Method with Silent Piler in Vietnam [page 17]		
General	● Advisor for Disaster Risk Management [page 18]			● Japan Disaster Relief (JDR) [page 19]

●: ODA Loans, Technical Cooperation, Grant Aid and others ◆: Projects proposed by Japanese companies, municipalities, etc.

# The Project for Emergency Reservoir Operation and Effective Flood Management Using Water related Disaster Management Information System

Image of Flood control Information system



## Issues

- ✓ In Vietnam, nearly half of the population lives in low-lying areas less than 5m above sea level, and the central region in particular is a storm-prone area, suffering wind and flood damage every year.
- ✓ Therefore, the prime minister has decided to secure flood control capacity and reduce flood damage by releasing water in advance from power generation dams etc. when heavy rains occur, but the effect has not been fully demonstrated, and problems of man-made disasters due to inappropriate water release and reduced power generation have also arisen.
- ✓ These problems are caused by inadequate hydrological observation and flood forecasting systems, and there is an urgent need to improve the information system.

## Objective

- ✓ In the Huong River basin, installing hydrological observation equipment for water levels and rainfall, and cameras, as well as a flood control information system incorporating flood forecasts, and establishing an information sharing structure for disaster risk reduction agencies, dams, and residents in Thua Thien Hue Province. In addition, setting up an information display function at the central organization in Hanoi for information sharing and instructions.
- ✓ Through these measures, effective management and operation of the three dams in the Huong River basin and river management would be carried out, which contribute to reducing flood damage in the entire Huong River basin.

### Project Type

Grant Aid

### Period

From Aug 2017 (ongoing)

\*Equipment provision was completed in 2022

### Implementing Agency

MARD - VDDMA, Thua Thien Hue Provincial People's Committee

\*Cooperating Agency: MONRE - VNMHA, VAWR

### Participating Company etc. of Japan

Foundation of River & basin Integrated Communications, Kokusai Kogyo Co., Ltd., Japan Radio Co., Ltd., Fujitsu Limited

### Target Area

Thua Thien Hue (Huong River Basin), Hanoi

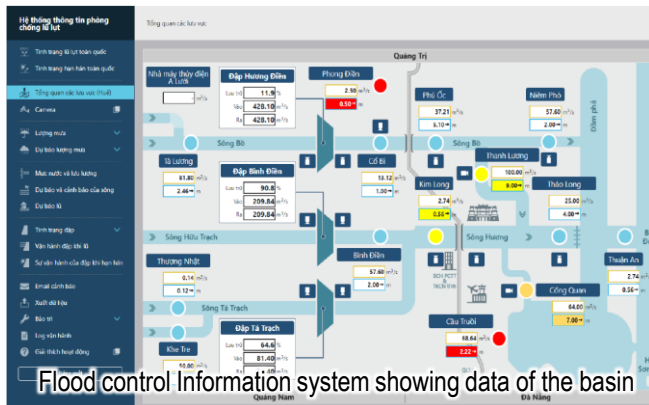
# Flood countermeasures

## What we do

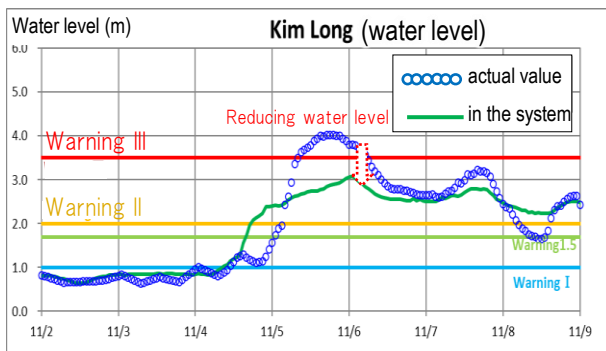
- ✓ Installing rainfall and water level observation equipment, including the first X-band MP radar in Vietnam.



- ✓ Installing an integrated dam management system that consolidates all relevant data in real time and predicts flooding and inundation up to 72 hours later to support optimal dam operation. Conducting aerial laser surveying of the basin for flood forecasting and hydraulic modeling using the RRI model. Conducting soft components (technology transfer) such as dam operation drills that simulate actual disasters.

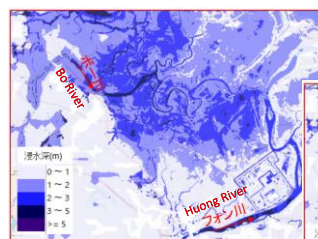


- ✓ Example of the system's effect: Verifying the effectiveness based on recent flooding data (November 2017 flood).

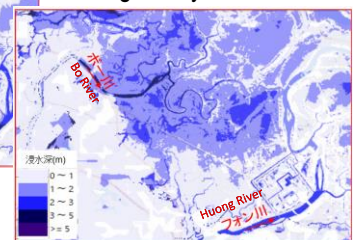


By utilizing this system, flooding from the Huong River would have been greatly reduced without exceeding Warning III, the flood level. It will also prevent unnecessary lowering of the water storage level and effectively secure the amount of electricity generated.

Actual Flooding Situation



Flooding situation during optimal dam operation using this system



The use of this system would have greatly reduce flooding from the Huong River and the Bo River, and decrease inundated area and depth.

# Project for Flood Damage Restoration and Formulation of a Flood Prevention and Control Master Plan in the Central Region

## Issues

- ✓ The central coastal region of Vietnam is regularly hit by storms and suffer flood damage every year. In addition, recent economic growth and urbanization have increased the risk of damage.
- ✓ In October and November 2020, storms hit the central region one after another, causing extensive damage with over 200 dead and missing persons.
- ✓ JICA has been supporting the preparation of master plans for Vietnam's major rivers since 2001, as well as the development of an Integrated Flood Management Plan (IFMP) for the central region, and since then Vietnam has made progress in developing IFMP. However, planning and implementation of risk reduction projects is an urgent problem.



## Objective

- ✓ The flood control plan will be developed for the Vu Gia-Thu Bon River, a major river in the central part of the country, utilizing Japanese technology and experience in flood control.
- ✓ Based on this plan, the Vietnamese government would implement the pre-disaster Investment for disaster risk reduction, thereby reducing the risk of flooding.



### Project Type

Technical Cooperation

### Implementing Agency

MARD - VDDMA

### Target Area

Da Nang and Quang Nam (Vu Gia-Thu Bon River Basin)

\*: Marco Gallo/Shutterstock.com

## What we do

- ✓ Installation of hydrological observation and disaster monitoring equipment.
- ✓ Flood risk assessment and IFMP development for the Vu Gia-Thu Bon River, as well as a pre-feasibility study on prioritized structural measures.
- ✓ Building the cooperation mechanism for implementation of flood control measures.



## Strengthening the capacity to cope with and minimize damages caused by flash floods and landslides for the northern mountainous region of Vietnam



### Issues

- ✓ In recent years, Vietnam has experienced numerous landslides and flashfloods caused by heavy rainfall.
- ✓ Especially in the northern mountainous region, flashfloods and landslides occur frequently due to topographical, geological, and weather conditions. More than 90% of the economic damage caused by flashfloods and landslides in Vietnam occurs in 14 provinces in the northern mountainous region.
- ✓ There are few examples of countermeasure works for flashfloods in Vietnam, and it is necessary to develop countermeasures and verify their effectiveness.

### Objective

- ✓ In the northern mountainous region, in addition to risk assessments, organizing countermeasure plans and priority measures, constructing an erosion control dam (sabo dam) and developing a landslide early warning system are carried out in pilot areas (Yen Bai and Son La Provinces).
- ✓ Through these activities, the project would contribute to risk reduction in the northern mountainous region by strengthening the organizational structure and capacity for flashflood and landslide countermeasures.

Flashflood in Son La, 2017



#### Project Type

Technical Cooperation

#### Period

From Sep 2021 (ongoing)

#### Implementing Agency

MARD - VDDMA

\*Cooperating Agency: MONRE, MOST, Yen Bai and Son La Provincial People's Committee

\*Technical supporting Agency: VAWR, VAST, IGS, VIGMR

#### Participating Company of Japan

Earth System Science Co., Ltd., Nippon Koei Co., Ltd

#### Target Area

14 provinces in the northern mountainous region  
(Pilot site: Yen Bai and Son La)

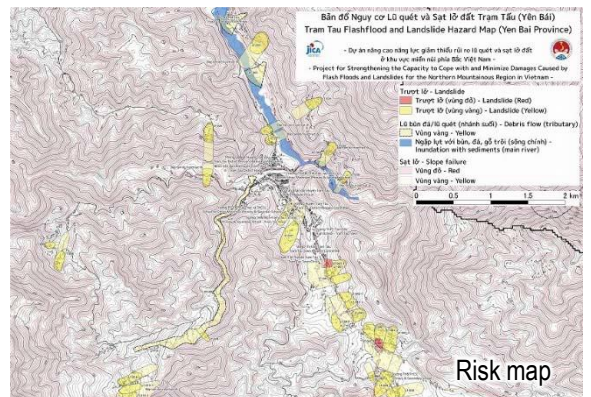
# Landslide and Flashflood countermeasures

## What we do

- ✓ In Son La Province, constructing the Vietnam's first erosion control dam (sabo dam) in accordance with Japanese technical standards. This pilot project would be used to establish technical standards in Vietnam.



- ✓ In Yen Bai Province, conducting landslide risk assessment and creating a risk map.



- ✓ In Yen Bai, installing a landslide early warning system. The system detects the movement of earth masses that may be signs of a landslide and notifies residents via SMS and sirens. Workshops and evacuation drills for residents are also held.



## SDGs Business Model Formulation Survey with the Private Sector for the Solutions to Prevent Landslide Disaster in Vietnam

### Issues

- ✓ In Vietnam, landslides and flashfloods occur frequently, mainly in the mountainous areas of northern and central region. However, Vietnam has not yet systematically implemented countermeasures against landslides and flashfloods.
- ✓ There is a demand for technology to grasp the situations of landslide disasters, monitoring, early warning system and engineering countermeasure for landslide disaster.

### Objective

- ✓ Proposing a "Solutions to Prevent Landslide Disaster" consisting of slope diagnosis, early warning system, and emergency response.
- ✓ Through this, aiming to reduce damage by slope disaster prevention, reduce costs compared to post-disaster countermeasures, and improve disaster prevention technology through technology transfer of preventive measures.

### What we do

- ✓ Confirming and analyzing the local suitability and business development potential of products and technologies related to slope diagnostics, early warning systems, and emergency response.
- ✓ Demonstration of early warning systems.



#### Project Type

SDGs Business Supporting Survey

#### Period

Jan 2020 - Feb 2023

#### Agency in charge

MARD - VDDMA

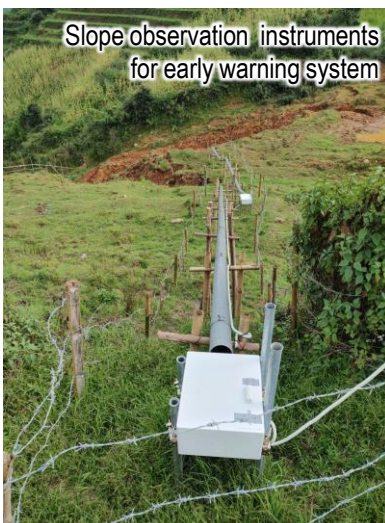
\*Cooperating Agency: Yen Bai Province - Department of Agriculture and Rural Development (DARD)

#### Implementing company of Japan

Okuyama Boring Co., Ltd,  
Osasi Technos Inc.

#### Target Area

Yen Bai (Mu Cang Chai and Tram Tau)



## Capacity building of local community for slope disaster risk reduction

### Issues

- ✓ In Vietnam, basic data such as disaster risk reduction maps are not yet available. Local capacity and organization for disaster risk reduction are weak.
- ✓ In particular, for residents of mountainous areas in Vietnam, where slope disasters occur frequently, there is an urgent need to build a disaster mitigation system that enables them to understand the area's vulnerability to slope disasters and activate their own disaster prevention activities, through such practices as making disaster risk reduction maps, so that they themselves can understand the risks and avoid disaster damages.



#### Project Type

JICA Partnership Program (JPP)

#### Period

Apr 2020 - Feb 2023

#### Agency in charge

Lao Cai Province - Department of natural disasters prevention and protection

\*Cooperating Agency: MOT - ITST

#### Implementing company etc. of Japan

Advantech Co., Ltd.,  
Kurihara City (Miyagi Prefecture)

#### Target Area

Lao Cai (Trung Chai, Sa Pa, Thanh Binh, Sa Pa, Phin Ngan, Bat Xat )

### Objective

- ✓ In the target areas of Lao Cai Province, assisting their understanding of the area's risk and awareness for evacuation, and enabling resident-led disaster risk reduction organizations to implement such plans as evacuation plans in cooperation with the government.
- ✓ In turn, the findings of this project would be provided to Japan, Lao Cai Province, and related ministries and agencies.

### What we do

- ✓ Developing disaster risk reduction leaders from local organizations by creating landslide topography maps and discussing based on them.
- ✓ Conducting patrol drills on maps and evacuation drills, using the maps.
- ✓ Supporting for community-led updating of maps and manuals and implementation of evacuation drills by the leaders.
- ✓ Creating picture story shows based on local characteristics and presenting them in communities and schools.
- ✓ Distributing picture story shows and pamphlets summarizing local disaster risk reduction tips.



## The Project for Strengthening Capacity in Weather Forecasting and Flood Early Warning System



### Issues

- ✓ Vietnam has been suffering from natural disasters caused by heavy rainfall every year.
- ✓ In addition, climate change is expected to increase the frequency of extreme rainfall and strong storms in the future.
- ✓ In order to improve the ability to respond to natural disasters, it is necessary to develop the capacity to maintain and manage meteorological observation equipment and to issue forecasts and warnings.
- ✓ In 2018, two weather radars were handed over by the Japanese government through a grant aid project, but Vietnam lacked experience in quantitative utilization of radar data.

### Objective

- ✓ The project improves (1) maintenance, inspection and calibration capabilities of weather observation equipment, (2) analysis and quality control capabilities of weather radar data, (3) monitoring and forecasting capabilities related to heavy rain and storms, and (4) information dissemination capabilities.
- ✓ Through these efforts, contributing to more accurate and immediate hydro-meteorological information being used for disaster risk reduction activities by related organizations and residents in Vietnam.



#### Project Type

Technical Cooperation

#### Period

From May 2018 (ongoing)

#### Implementing Agency

MONRE - VNMHA

#### Participating Company etc. of Japan

Japan Meteorological Business Support Center

#### Target Area

Nation-wide

## What we do

- ✓ Conducting technology transfer, including hands-on training on maintenance, inspection and calibration of weather observation equipment.

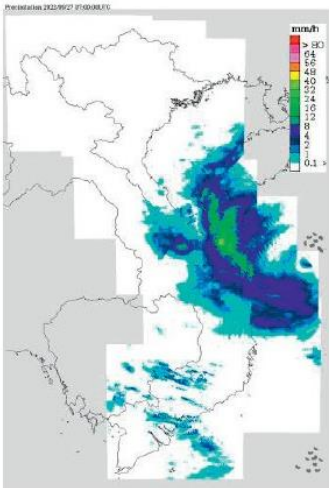


Practical training for maintenance and inspection of observation equipment

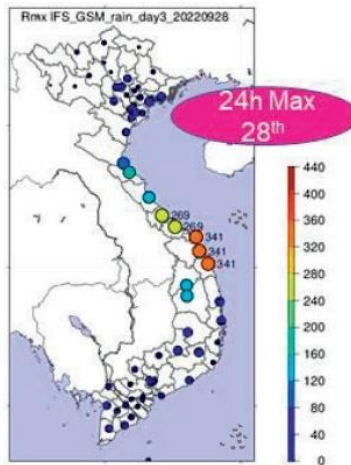


Practical training on maintenance and inspection of weather radar

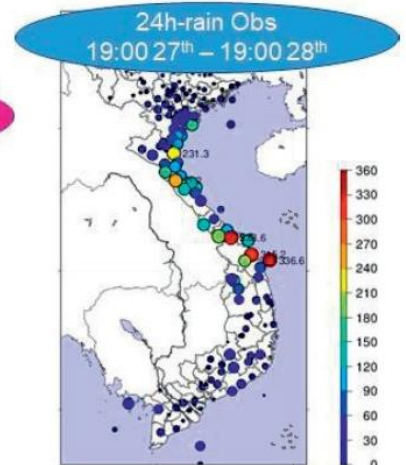
- ✓ Providing technical guidance and capacity building on quality control and analysis of radar data, its use for monitoring and forecasting heavy rainfall and storms, and preparation of weather forecast guidance.



1km mesh one-hour rainfall distribution

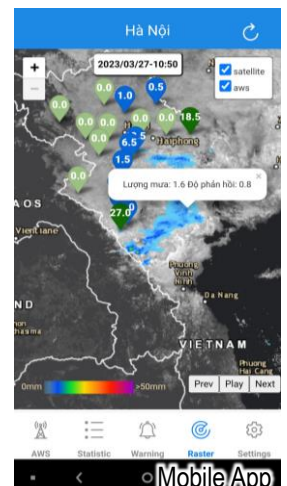
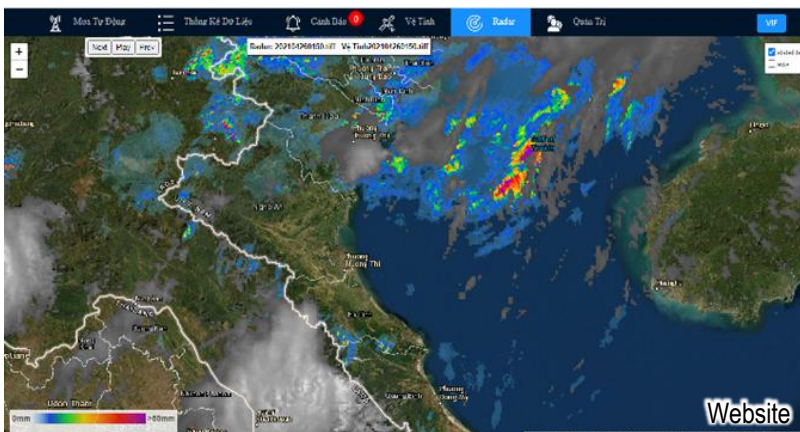


Maximum daily precipitation forecast for the next 3 days



Daily precipitation corresponding to the forecast

- ✓ Creating the website and mobile app to display heavy rainfall situation and weather warnings to improve accessibility of these information. (Website <https://jica.weathervietnam.vn> or download from Google Play or App Store: "Weather Observation Info")



## SDGs Business Validation Survey for Confirmation and Verification of the Interest for Abnormal Weather Risk and Needs of Countermeasure for Weather Risk in Viet Nam

### Issues

- ✓ As Vietnam undergoes rapid industrialization and economic growth, the country faces the challenge of responding to threats such as climate change.
- ✓ In particular, secondary industries (industrial parks, etc.) face the risk of business continuity due to flood by sudden torrential rains and lightning strikes.
- ✓ To ensure the stable operation of factories and industrial parks, we recognized the need for weather services with high forecast accuracy and real-time performance.

#### Project Type

SDGs Business Supporting Survey

#### Period

From May 2023 (ongoing)

#### Agency in charge

MONRE - VNMHA

#### Implementing company of Japan

Weathernews Inc.,  
Deloitte Tohmatsu LLC

#### Target Area

Hanoi

### Objective

- ✓ In response to the above issues in Vietnam, Weathernews Inc. would promote the development of weather services in major industrial zones in Vietnam to contribute to the stable operation of local industrial parks by providing weather forecast information and alerts on rain and lightning to industrial park management companies and resident companies and factories.

### What we do

Promoting the following activities to develop the above weather services.

- ✓ Construction of observation infrastructure and collection of weather information to provide real-time weather services with high forecast accuracy.
- ✓ Development and updating of applications with a view to providing alerts.

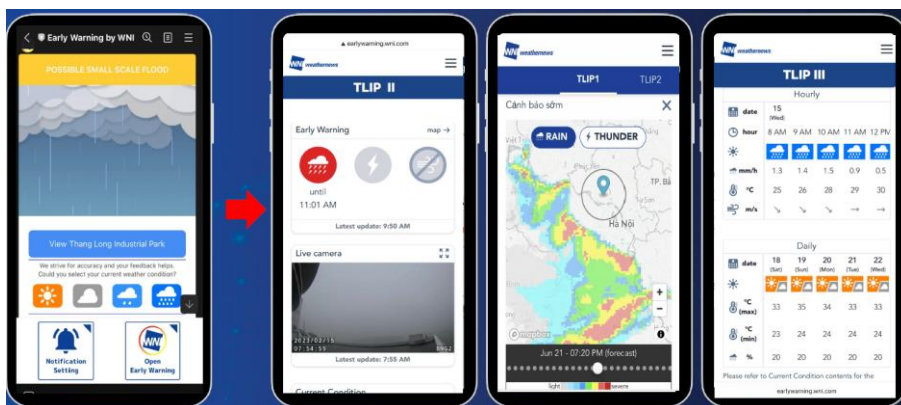
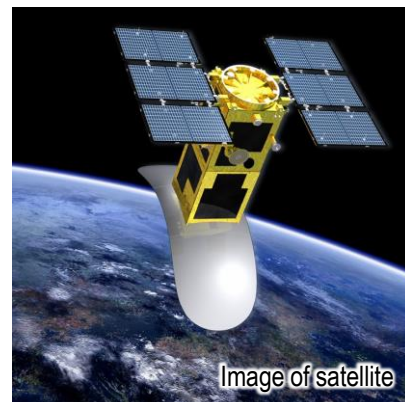


Image of the weather service to be promoted

## Project for Disaster and Climate Change Countermeasures Using Earth Observation Satellite (1), (2)

### Issues

- ✓ Vietnam is one of the most disaster-prone countries in the world, with frequent wind and flood disasters caused by storms and torrential rains.
- ✓ In order to prevent the loss of human lives and socioeconomic capital, it is urgent to promote emergency disaster response measures and disaster damage mitigation and prevention measures.
- ✓ There is an urgent need to strengthen the monitoring system using the country's own earth observation satellite in order to swiftly assess the damage situation when a disaster strikes.



### Objective

- ✓ Conducting procurement and maintenance of related facilities necessary for the development and utilization of an earth observation satellite, and human resource development for the utilization of satellite observation data at these facilities.
- ✓ Thus contributing to disaster mitigation in the country by strengthening planning and response systems for disaster risk reduction and climate change adaptation.

#### Project Type

ODA Loans

#### Period

From Nov 2011 (ongoing)

#### Executing Agency

Vietnam National Space Center (VNSC)

\*Line Agency : VAST

#### Target Area

Hanoi (Hoa Lac)

### What we do

- ✓ Conducting procurement of one earth observation satellite and human resource development on satellite development technology and satellite observation data application technology.
- ✓ Developing related facilities and installing equipment.





# SDGs Business Model Formulation Survey with the Private Sector for Disaster Prevention Technology of Earth Dams and Embankments by Applying Press-in Method with Silent Piler in Vietnam

## Issues

- ✓ Many of dams in Vietnam are small to medium-sized earth dams. At some of the dams constructed in the 1960s to 1980s water leakages have occurred due to aging, and they probably cause safety issues. Due to water leakages, 71 dam accidents have occurred in the past 10 years, affecting the lives of residents and the economy such as agriculture in that area.
- ✓ The Vietnamese Government has a plan to repair the dams, but there are some cases where the existing construction method cannot secure sufficient water stoppage performance. Therefore, construction method that could guarantee the water stoppage is required.



## Objective

- ✓ Surveying the applicability of water stoppage measures on earth dams and levees by Press-in Method (PIM) with Silent Piler<sup>(\*)</sup>.
- ✓ In the future, expanding to the PIM work for the purpose of water stoppage measures such as in rivers, harbors, and substructure of bridges.

(\*) : Method of constructing a continuous wall by grabbing several piles (steel sheet piles, etc.) that have already been pushed into the ground and using their extraction resistance as a reaction force to push the next pile in under static load by hydraulic pressure.

## What we do

- ✓ Surveying the situation and needs on the water leakages at earth dams and levees, the applicability of the PIM, and related guideline and technical standards.
- ✓ Surveying a candidate site and designing for a demonstration construction project.

**Project Type**  
SDGs Business Supporting Survey  
**Period**  
Dec 2021 - Feb 2023  
**Agency in charge**  
MARD - DWR  
**Implementing company of Japan**  
Ozawa Civil Engineering and Construction Co., Ltd.,  
HashimotoGumi Corporation  
**Target Area**  
Hanoi, Northern and Central Region (Pilot site: Bac Kan)



Site Survey



Meeting with Bac Kan Provincial People's Committee



Group photo at the on-site seminar

# Advisor for Disaster Risk Management

## Issues

- ✓ In Vietnam, damage from floods, landslides and floods occurs every year due to weather conditions such as frequent storms and heavy rainfall, as well as the topography conditions, which are mostly mountainous and have many rivers having steep gradients.
- ✓ Japan has similar conditions to Vietnam, and has reduced damage by constructing dams and levees, guiding land use, and providing evacuation information.
- ✓ Such experience and knowledge of Japan can be applied and needed to Vietnam. In addition, both Japan and Vietnam are facing the issue of more severe disasters due to climate change etc., and it is important to promote cooperation in disaster prevention.



## Objective

- ✓ Improving the disaster management capacity of the central and local governments by advising and sharing Japan's experience and knowledge in the field of disaster management to the Ministry of Agriculture and Rural Development (MARD).
- ✓ In addition, strengthening the collaboration between Vietnam and Japan in the area of disaster management.

## What we do

- ✓ The advisor is stationed at Viet Nam Disaster and Dyke Management Authority (VDDMA) to support the effective implementation of VDDMA and JICA's disaster management efforts on a daily basis.
- ✓ Providing support and advice on planning for countermeasures for flood, landslide and flashflood, and sharing Japanese policies, systems, and technologies.
- ✓ Promoting cooperation between Vietnam and Japan (for example, by matching the technologies of Japanese companies and other organizations with the disaster prevention issues in Vietnam).

**Project Type**  
Dispatch of Experts  
**Period**  
From Sep 2016 (ongoing)  
**Agency in charge**  
MARD - VDDMA  
**Target Area**  
Nation-wide



Discussion on flood control



## Japan Disaster Relief (JDR)

### Issues

- ✓ Large-scale natural disasters occur frequently in the world, claiming many lives.
- ✓ Many developing countries, including Vietnam, have weak economies and social infrastructures, making it difficult to provide adequate relief when disasters occur.



### Objective

- ✓ Japan Disaster Relief started in 1979.
- ✓ For example, providing emergency relief supplies to support relief and recovery activities in the affected areas. The six main items provided are tents, sleeping pads, plastic sheets (so-called vinyl sheets), blankets, polyethylene tanks, and water purifiers, according to the needs of the disaster-stricken areas.

#### Project Type

Japan Disaster Relief (JDR)

#### Period

After disasters

(Recently in Oct 2017, Oct 2020, in Vietnam)

#### Agency in charge

MARD - VDDMA

\*: Marco Gallo/Shutterstock.com

### What we do (recent examples in Vietnam)

- ✓ Having provided emergency relief supplies (plastic sheets, blankets, and water purifiers) in response to a request in October 2017, when heavy rains continued in northern and central Vietnam, resulting in flooding and landslides that affected many people.
- ✓ Having provided emergency relief supplies (plastic sheets and water purifiers) at the request of many victims of heavy rainfall caused by Typhoon Linfa, which made landfall in central Vietnam in October 2020.





**Cover Photo:** X-band MP radar provided by the Project for Emergency Reservoir Operation and Effective Flood Management Using Water related Disaster Management Information System, conducted at Huong River

**This photo:** Huong River flowing through Hue city

Huong River flows downstream through the ancient city of Hue, home to Vietnam's first World Heritage Site, the elegant Citadel of the Nguyen Dynasty. In the vicinity, urban development is also underway. Hue has frequently been inundated by floods, and the flood control measures on the Huong River supported by JICA are important for the protection of cultural heritage as a tourism resource and for the development of the city.



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