4th Asia-Pacific Water Summit

Kumamoto Initiative for Water Reference Materials

April 2022

Mobilizing all possible Climate Change Adaptation and Mitigation measures in the Water-Related Field

Challenges

- Need to solve regional water issues (for flood control and water utilization) fundamentally
- Reduction of greenhouse gas emissions

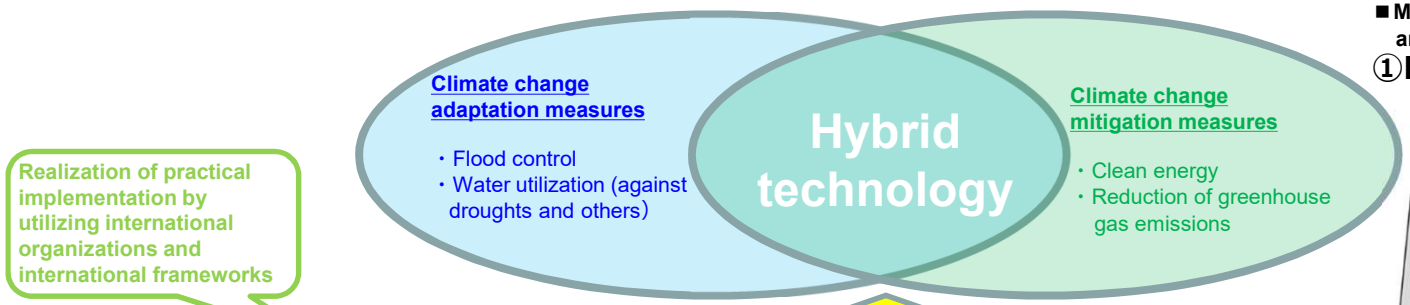
- Japan's superior technologies are not fully utilized to promote transition from R&D, human resource development to the practical implementation of measures in each country

Climate Change
Adaptation measures
(disaster control & mitigation)
Mitigation measures
(clean energy and others)

Responses

- Support by **mobilizing all possible climate change adaptation and mitigation measures**, in which Japan has know-how and technologies
- **Enhance cooperation through international cooperation frameworks** for **Japan's technologies** to contribute to the **practical implementation of measures** by the relevant organizations in each country

Japan will support "Quality-oriented growth" in the Asia-Pacific region by making technological contributions and fostering the development of infrastructures outside of the country



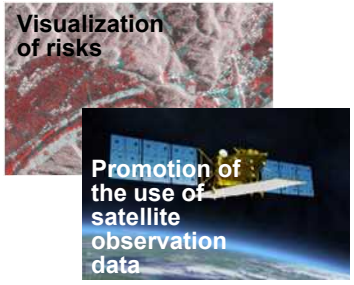
・**Promotion system** and **budgeting** in each country
・Not yet reaching the satisfactory level for transition from R&D and HR **development to practical implementation** in society

<Technological contribution> (Ref.: For water-related disasters)

Japan's superior technologies

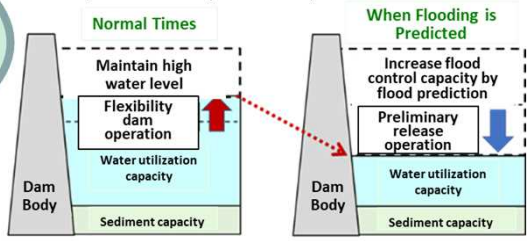
- **Water-related risk assessment & promotion of assessment**
- **Integration & analysis of water-related data**
- **Enhancement of the earth observation network**

■ **Scientific contribution (example)** (For water disasters)



■ **Mobilizing all possible climate change adaptation and mitigation measures (Example)**

①Dam (Upgrading of existing dams and operational improvement) Hybrid



②Sewage system Hybrid

(Equipped with flood control and renewable energy supply functions)

③ Irrigation & drainage system

(Greenhouse gas emission reduction by appropriate management of agricultural water, small hydroelectric power generation for mitigation of climate change, establishment of agricultural drainage facilities to prevent flooding, and maintenance and improvement of disaster control and mitigation functions for adaptation to climate change)

River Planning Division, Water and Disaster Management Bureau, Ministry of Land, Infrastructure, Transport and Tourism
https://www.mlit.go.jp/en/index.html

Mitigation of water-related disaster risks and enhancement of hydro-energy creation by the effective use of existing dams

Challenges

- Increased frequency of flooding that exceeds the flood control capacity of existing dams and increased demand for water and electricity
- Aging of existing facilities and inflexible operation rules of the water level

Dam raising, Spillways, Weather forecast, AI and IoT

Responses

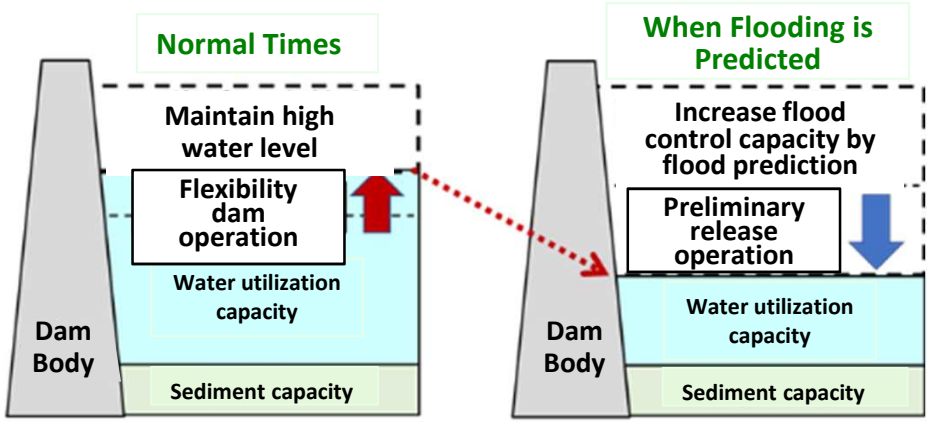
- Renewal of dams, operational improvement (preliminary release operation)
  →Improvement of functions for flood control and water utilization (Adaptation measures)
- Improvement of the hydroelectric power generation function and flexible dam operation
  →Increase in the amount of power generation (Mitigation measures)

Mitigate water-related disaster risks and create hydro-energy in a prompt manner, while reducing environmental impact

Renewal of an existing dam
Tsuruda Dam (in Kagoshima, Japan)

Add a new discharge facility while operating the dam

Operational improvement (Illustrative image)



River Planning Division, Water and Disaster Management Bureau, Ministry of Land, Infrastructure, Transport and Tourism
https://www.mlit.go.jp/en/index.html

Reduction of Urban Flood Inundation, Improvement of the Water Environment and Creation of Biomass Energy by the Development of Sewerage Systems

Challenges

・Concerns about increased urban flood inundation due to climate change

・Severe Water pollutions due to urbanization

・Decarbonization for Sustainable wastewater management

Efficient sewer construction technology, biomass power generation etc.

Responses

・Accelerating sewerage systems development
→Improvement of the drainage & treatment functions
Reduction of urban flood inundation and Improvement of the water environment（Adaptation measures)

・Utilizing sewage sludge for decarbonizatiojn
→Reduction of greenhouse gas emissions by biomass power generation (Mitigation measures)

Reduction of urban flood inundation, Improvement of the water environment, Creation of biomass energy
Development of sewerage systems for about 4 million people in 4 countries by 2030 (21 wastewater treatment plants)

Efficient sewer construction technology

Method to install sewerage pipes without excavating the road (left in the center of photo)

Biomass power generation

Steel tank in which biogas is generated from sludge and stored (back in the photo) and gas power generator (front in the photo)

Ministry of Land, Infrastructure, Transport and Tourism, Water and Disaster Management Bureau, Sewerage and Wastewater Management Department
https://www.mlit.go.jp/crd/sewerage/index_e.html

Contribution to Climate Change Countermeasures by fulfillment of the Multifunctional roles of Agriculture and Rural Areas

Challenges

- Acceleration of climate change due to greenhouse gases
- More frequent flooding due to torrential rains caused by climate change

Development of agriculture/rural areas through dissemination of water management knowledge/technologies and improvement of infrastructure in rural areas

Responses

- Maintenance and enforcement of disaster control and mitigation functions through the development of irrigation and drainage facilities
- Introduction of agricultural water management systems

Contribution to Climate Change Countermeasures by fulfillment of the Multifunctional roles of Agriculture and Rural Areas

Greenhouse gas emission reduction

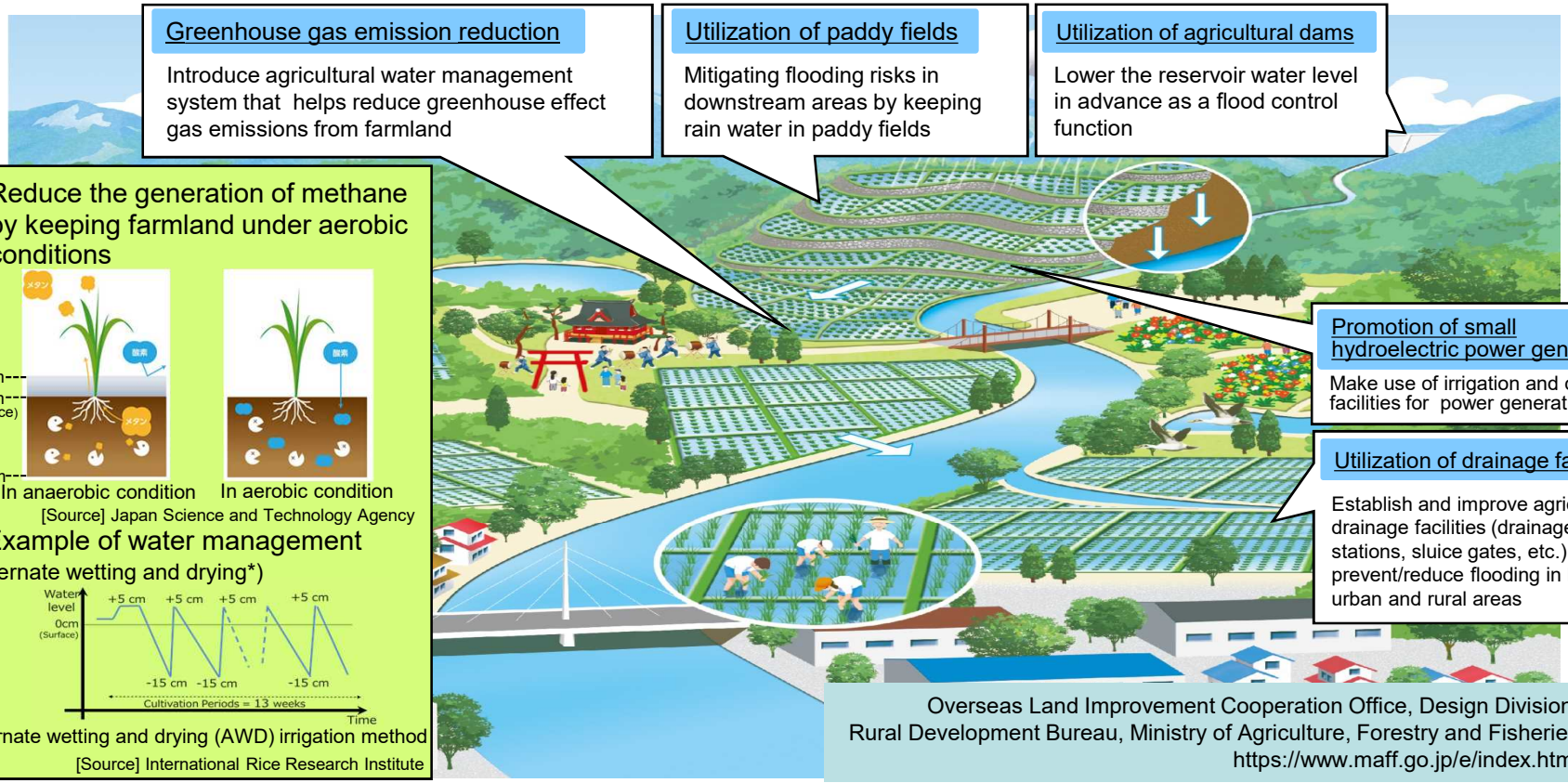
Introduce agricultural water management system that helps reduce greenhouse effect gas emissions from farmland

Utilization of paddy fields

Mitigating flooding risks in downstream areas by keeping rain water in paddy fields

Utilization of agricultural dams

Lower the reservoir water level in advance as a flood control function



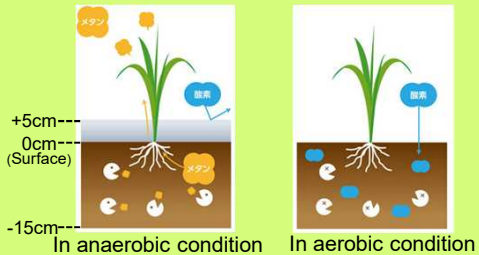
Promotion of small hydroelectric power generation

Make use of irrigation and drainage facilities for power generation

Utilization of drainage facilities

Establish and improve agricultural drainage facilities (drainage pump stations, sluice gates, etc.) to prevent/reduce flooding in both urban and rural areas

○ Reduce the generation of methane by keeping farmland under aerobic conditions



[Source] Japan Science and Technology Agency

○Example of water management (Alternate wetting and drying*)

*Alternate wetting and drying (AWD) irrigation method

[Source] International Rice Research Institute

Overseas Land Improvement Cooperation Office, Design Division, Rural Development Bureau, Ministry of Agriculture, Forestry and Fisheries
https://www.maff.go.jp/e/index.html

Provision of Satellite Observation Service in Response to Requests from National Meteorological and Hydrological Services

Challenge

- The Asia-Pacific region is prone to disasters, and there are concerns about the occurrence of more intense tropical cyclones and rain events.

Effective use of geostationary meteorological satellite "Himawari"

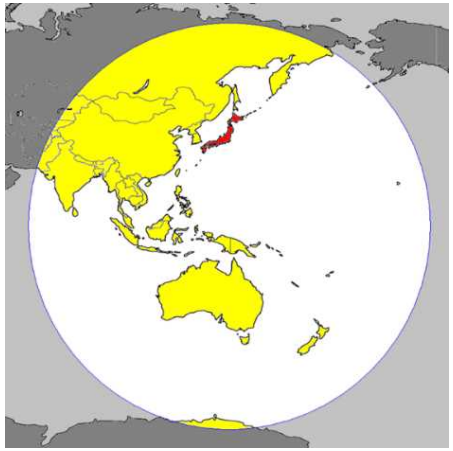
Response

- Make an international contribution by offering Target Area observation service in response to requests from National Meteorological and Hydrological Services ("HimawariRequests")

Contribute to reducing disaster risks in more than 30 countries in the Asia-Pacific region

Himawari observation service

Observation data from Himawari is used in more than 30 countries

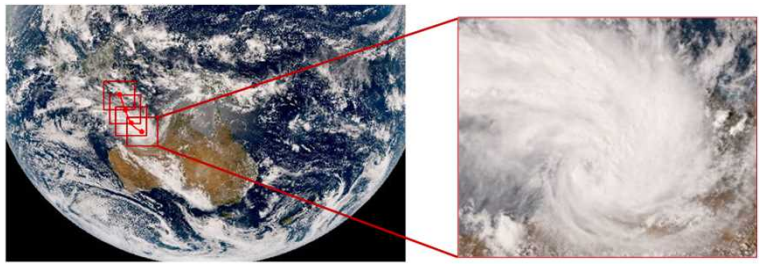


Special observation by Himawari-8 (in response to HimawariRequests)

Offered special observation service to Australia's Bureau of Meteorology in response to its request for the service, specifically for a tropical cyclone and large-scale bushfires (in Jan. 2020) and for a major volcanic eruption off the coast of Tonga (in Jan. 2022)

Tracking observations for tropical cyclones every 2.5-minute intervals are available (illustrative image).

A tropical cyclone making landfall in the northwestern part of Australia (Dec. 27, 2017)



Satellite Program Division, Japan Meteorological Agency
https://www.jma.go.jp/jma/jma-eng/satellite/HimawariRequest.html

Human Resource Development for Implementation of Countermeasures for Water-related Disasters by Using Observation and Forecast Data

Challenges

- The need to implement measures against more intense and more frequent floods and other disasters caused by climate change
- Development of personnel who can make effective use of relevant data and technologies for the implementation of countermeasures for water-related disasters

- Observation data
- Research into climate change
- Effective use of DIAS*

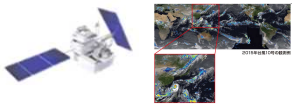
Responses

- An e-learning program on measures against water-related disasters, such as flooding
  ⇒ Development of personnel who can implement countermeasures for water-related disasters
- Joint research on climate change
  ⇒ Creation of on-site forecast data
  ⇒ Improvement of on-site research level

Accelerate countermearues for water-related disasters by making effective use of observation and forecast data

* DIAS (Data Integration and Analysis System): https://diasjp.net/en/

Earth Observation



Global Satellite Mapping of Precipitation (GSMaP)

Observation data

Research into Climate Change

Weather forecast data

A total of 30 researchers from six Asia-Pacific countries were invited.

Data integration and analysis system

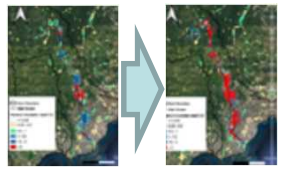
- Accumulation of observation/forecast data
- Analysis with a high-performance computer

Effective use of DIAS

e-learning program

- Real-time flood observation & forecasting
- Climate change impact assessment

Flood forecasting & alerts



Changes in flooded areas caused by climate change

Implementation targeting three countries in the Asia-Pacific region
(Sri Lanka, the Philippines and Indonesia)

Satellite Observation Technology for More Effective Use of Meteorological and Hydrological Data

Challenges

- Global increase in the frequency of water-related disasters due to climate change and other factors
- Increase in the needs for comprehensive disaster-related data among countries including those in the Asia-Pacific region

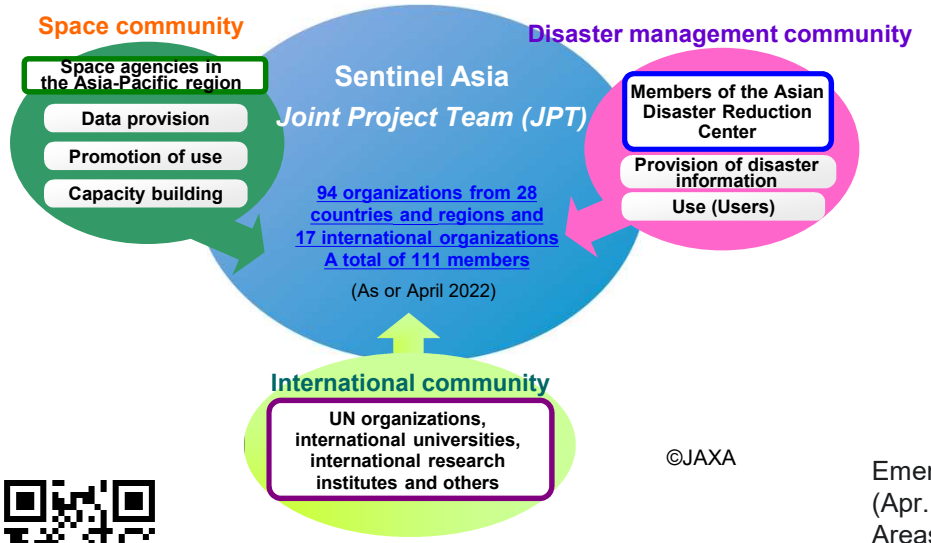
Satellite observation technology

Responses

- Establishment and operation of Sentinel Asia to foster cooperation with space agencies, disaster management organizations and others
- Sharing of disaster-related information (satellite images) on the Internet

Contribute to disaster management in the Asia-Pacific region

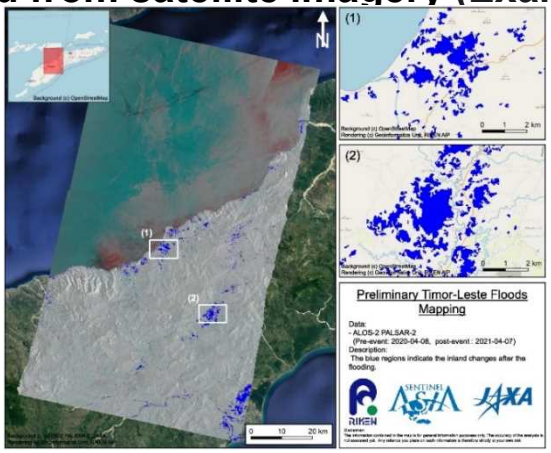
Framework for Sentinel Asia



©JAXA

Website of Sentinel Asia: https://sentinel-asia.org/

Sharing of disaster-related information derived from satellite imagery (Example)



Emergency support for recovery from damage caused by flooding in Timor-Leste (Apr. 2021) (Damage map provided by RIKEN based on data obtained by JAXA: Areas that are deemed to have been flooded are colored in blue)

Supporting the Reduction of Water Disaster Risks and the Formulation of Relevant Plans in Consideration of Climate Change Risks

Challenges

The following requirements should be met for developing countries that are vulnerable to climate change to reduce water disaster risks and formulate relevant plans:

- **Latest scientific findings and data**
- **Information about climate change risks**
- **Capacity building of administrative officials**

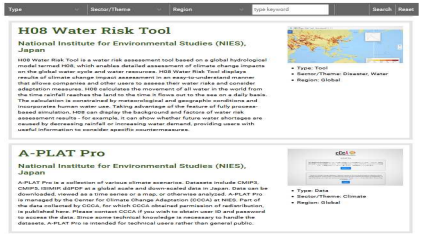
Freely accessible information platform (website)

Responses

- **Collection and sharing of scientific findings**
- **Provision of information about climate change risks**
- **Development of e-learning materials**

Contribute to the creation of a resilient local community by supporting the reduction of water disaster risks and the formulation of relevant plants in consideration of climate change risks through the Asia-Pacific Climate Change Adaptation Information Platform (AP-PLAT)

Providing climate and impact forecast data



ClimoKit

Visualizing climate change risk information

ClimoCast

Scientific findings

- Developing climate risk data, collecting, sorting, analyzing and providing existing information

AP-PLAT

Asia-Pacific Climate Change Adaptation Information Platform

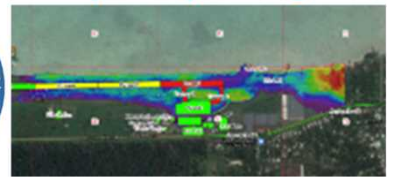
Tools

- Developing support tool kits for adaptation planning and adaptation actions. Sharing good practices and guidelines

Capacity building

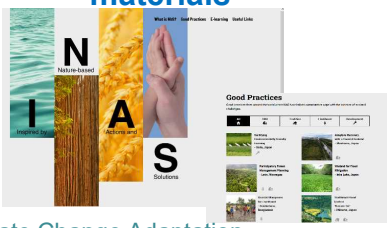
- Improving capability related to impact assessment, information management and adaptation action
- Matching scientific data with business needs

Provision of climate change risk information tools for infrastructure development planning



Coastal airport risk information tool (Example)

Developing e-learning materials



Center for Climate Change Adaptation,
National Institute for Environmental Studies,
Climate Change Adaptation Office,
Global Environment Bureau,
Ministry of the Environment
https://ap-plat.nies.go.jp/index.html

Improving the Water Environment in the Asia-Pacific Region through the Model Project for Improvement of Water Environment in Asia

Challenges

- Aggravation of water pollution due to increased population, economic growth and higher living standards
- Delays in measures for Goal 6 of the SDGs (Clean water and sanitation) due to COVID-19

Model Project for Improvement of Water Environment in Asia

Response

- Effective use of Japan's technologies and expertise built based on the experience of overcoming pollution problems

Further improve the water environment in the Asia-Pacific region

Model Project for Improvement of Water Environment in Asia

Solicitation for overseas projects using water treatment technologies

small- to medium-scale domestic wastewater treatment, industrial wastewater treatment, direct purification of water areas, water quality monitoring, etc.

Feasibility study (FS)

On-site pilot project

Verification of the project effect and the applicability of the business model

Support the creation of a range of business models in the Asia-Pacific region

Water Environment Division,
Environmental Management Bureau,
Ministry of the Environment
https://www.env.go.jp/en/index.html

International Cooperation in Water Supply

Challenges

- Existence of non-water supply areas and areas where safely managed drinking water services are not available
- Damage caused to water supply facilities by heavy rains, super typhoons and other disasters in recent years

Sharing Japan's technologies and know-how

Responses

- Matching the issues of developing countries with Japan's technologies through seminars
- Supporting to building candidate projects for implementation by Japan's ODA
- Making recommendations on the international cooperation from perspective of climate change mitigation and adaptation measures

Increase the water supply coverage rate and build a sustainable water supply system

Percentage of population with access to safe water service (2020)

Source: PROGRESS ON HOUSEHOLD DRINKING WATER, SANITATION AND HYGIENE 2000-2020, WHO, UNICEF

Seminar held in Cambodia

Water Supply Division, Pharmaceutical Safety and Environmental Health Bureau,
Office of Global Health Cooperation of International Affairs Division, Minister's Secretariat,
Ministry of Health, Labour and Welfare,
https://www.mhlw.go.jp/english/

Improve water supply services and support expansion of water utilities in response to urban expansion

Issues

- Challenges in water supply services such as supply time, pressure, and water quality.
- Lack of investment funds, and water supply system cannot keep up with urban expansion.

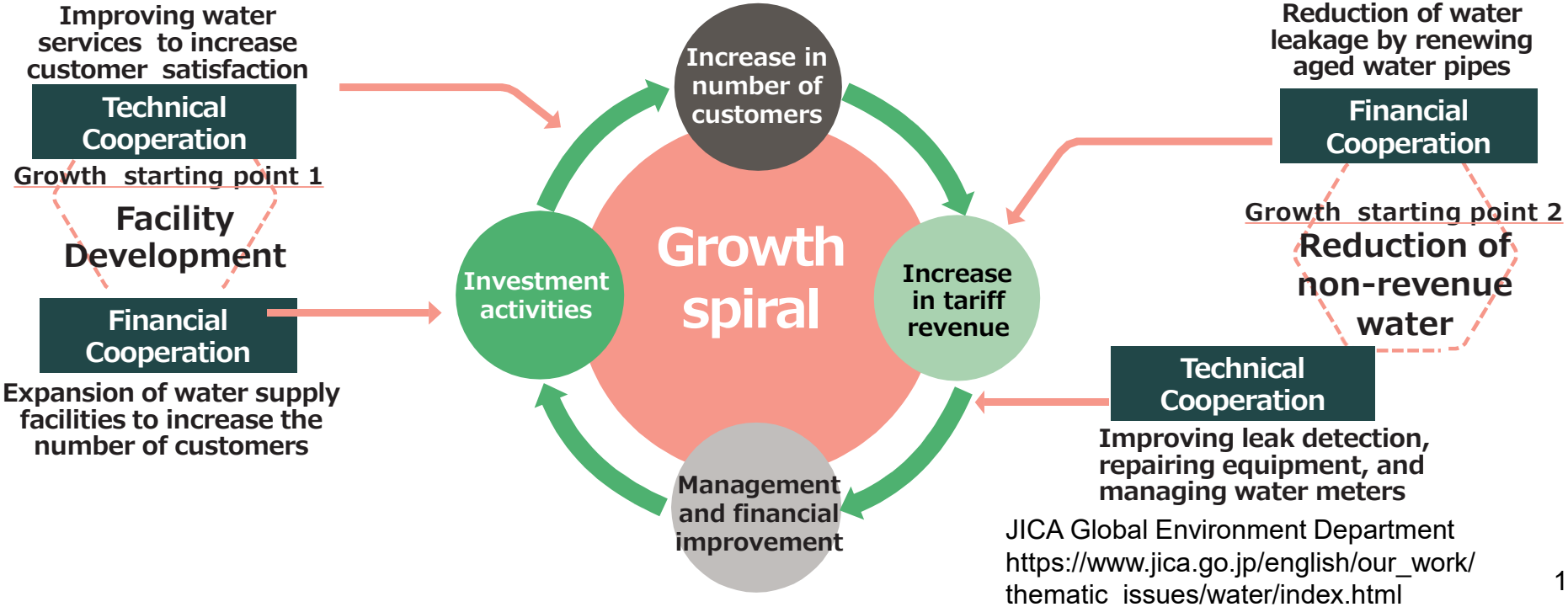
Facility improvement with financial cooperation

Capacity building through technical cooperation

Approaches

- Improve water service and increase public trust
- Improve management by optimizing water tariffs, reducing non-revenue water, etc.
- Mobilize finance

Develop "growing water utilities" that can raise funds and expand

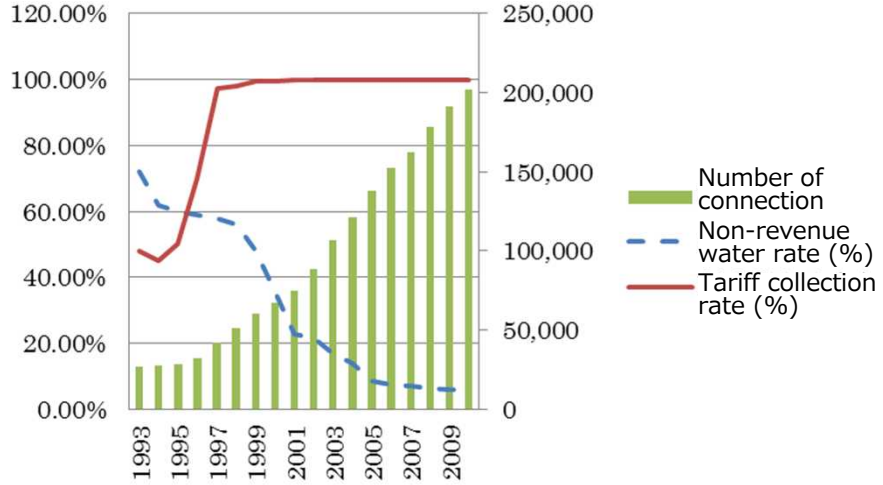


JICA Global Environment Department
https://www.jica.go.jp/english/our_work/thematic_issues/water/index.html

(Reference) "The Miracle of Phnom Penh," which realized a 24-hour drinking water supply from a tap

- In Phnom Penh, the capital of Cambodia, which has been devastated by civil war, a basic plan for water supply development was formulated, facilities were improved in collaboration with development partners, and capacity was strengthened through technical cooperation.
- Kitakyushu City and other local governments dispatched experts and provided water distribution management systems.
- Dramatic improvement and expansion of water services coupled with organizational reforms under the leadership of the Director General of the water utility has enabled 24-hour supply of drinkable water from the tap.
- Japanese assistance accounted for approximately 50% of development partner support and contributed to an increase in the number of people supplied with water by more than 720,000 people.

Performance Indicator	1993	2009
Coverage	25%	90%
Water quality	No standards	Meet WHO Guidelines
Supply time	10 hr/day	24 hr/day
Water pressure	0.2 bar	2.5 bar
Non-revenue water rate	72%	5.94%
Collection rate of tariff	48%	99.9%



Support for Sustainable Sanitation through Analysis of Current Situation and Planning based on Scientific Evidences

Issues

・3.6 billion people live without adequate sanitation facilities in the world, that affects human health

・Provision of facilities, development of human resources for operation and maintenance of such facilities and investment are necessary.

Provision of proper facilities through grant and loan aid & Capacity development through technical cooperation

Approaches

・Proper planning and financing for sewerage and onsite sanitation facilities

・Such facilities are operated and maintained sustainably

Healthy and Clean Cities through Sustainable Sanitation Systems

Technology/ Facilities	Lack of technology and facilities
Finance	Inadequate budget for planning, project implementation, operation and maintenance
Institutional Settings	Inadequate structure to execute administrative tasks
Laws and Regulations	Insufficient abilities to develop legal systems and rules and guidelines
Social Awareness	Insufficient cooperation and participation and compliance of citizens and corporations
Human Resources	Lack of expertise, skills and know-hows

1. Enhance the capacity to analyse and understand the current problems on sanitation

2. Develop plans and implement measures to improve sanitation based on scientific evidences

3. Strengthen the capacity to improve sanitation and promote investments on the sector

Environmental Management Group, Global Environment Department, JICA
https://www.jica.go.jp/english/our_work/thematic_issues/management/index.html

(Reference) JICA's Support to Improve Sewerage Facilities in Jakarta, Indonesia

- ✓ **JICA supported to revise a masterplan for wastewater management in Special Capital Region of Jakarta, which consists of short, medium and long term plans through technical cooperation.**
- ✓ **In this masterplan, priority areas were selected for feasibility study and then yen loan projects were formulated.**
- ✓ **For the proper operation, maintenance and management of the facilities, JICA has been conducting technical support and institutional capacity development through dispatching experts and a technical cooperation project.**

[Technical Cooperation]
Project for Capacity Development of Wastewater Sector through reviewing the Wastewater Management Master Plan in DKI Jakarta
7.2010 to 6.2012
Short, medium and long-term plans were made in 15 areas of Jakarta

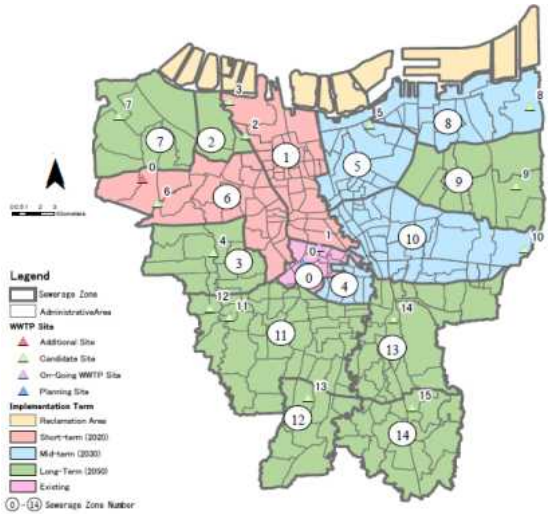
[Preparatory Survey]
Preparatory Survey on Central Sewerage Treatment System in Jakarta
Zone 1: 1. 2012 to 3.2013
Zone 6: 6.2012 to 3.2013

[Experts]
Sewerage Advisors
9.2014 to present

Technical Assistance

[Yen Loan]
Jakarta Sewerage Development Project
Zone 1: L/A signed in 3.2020
Zone 6: L/A signed in 7.2019
Construction of sewer pipes and treatment plants

[Technical Cooperation]
The Project for Improving Planning Capacity for the Sewerage System in DKI Jakarta
6.2015 to 3.2018



Sewerage treatment areas set in the masterplan