

Theme2-1

MANAGEMENT PLANNING

FORMULATING THROUGH COORDINATION AMONG SECTORS & REGIONS WITH LONG-TERM PERSPECTIVES



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- 2. National Development Plan and Water Resources Management Plan**
- 3. Development of River Systems that Require Water Resources Development over Wide Area**
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1. Introduction

How to conduct water resources management properly

- Water resources management is critical for achieving a robust, sustainable, and inclusive society and achieving quality growth.
- A long-term perspective is needed.
- Coordination with other sectors' development is necessary.

This theme describes

- How Japan positioned and coordinated the water sector in National Comprehensive Development Plan.
- How Japan promoted the project from a long-term perspective.
- Challenges for these measures.

2. National Development Plan and Water Resources Management Plan

(1) Consistency between National Development Plan and Water Resources Management

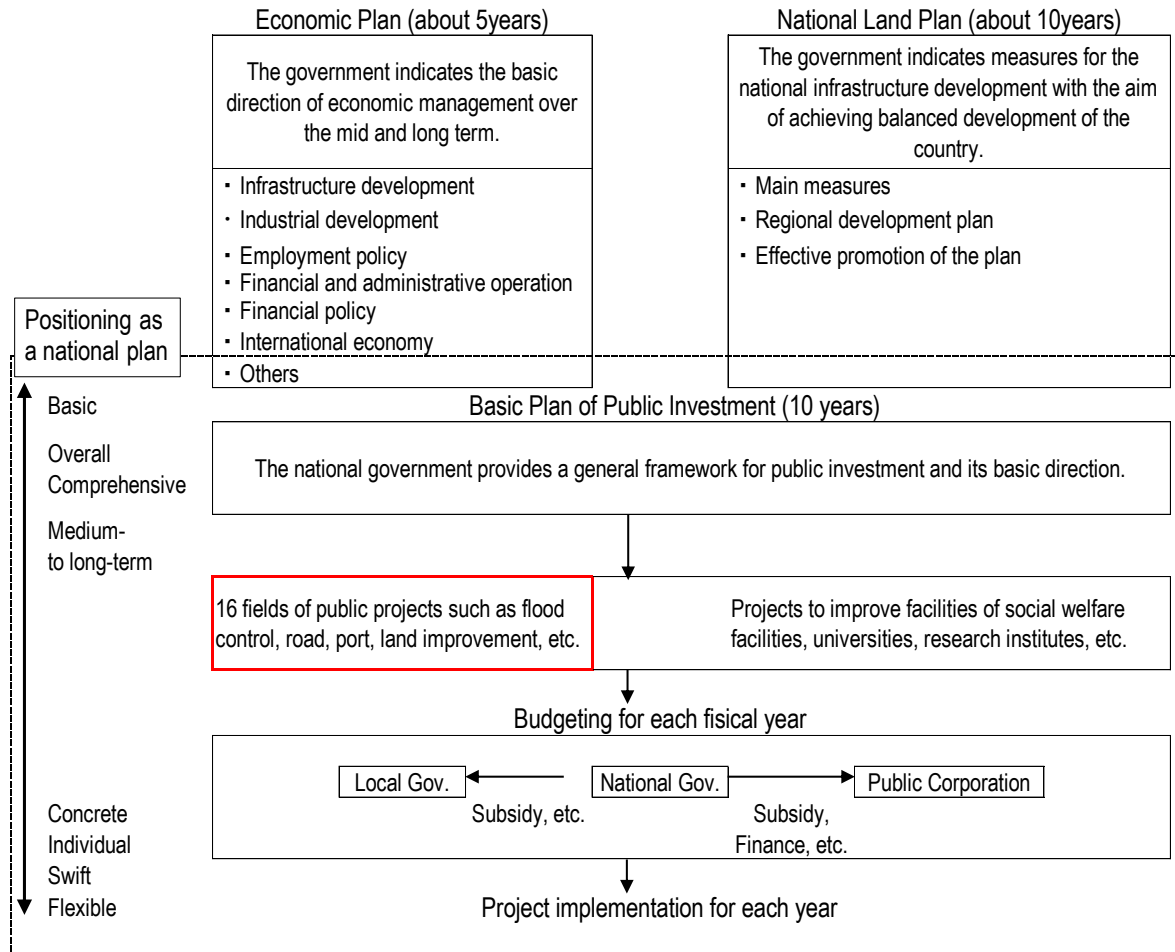
- Projects for water resources development and management require **a very long time** from **planning** to **construction** and **operation**.
- The **effects** and **impacts** are also **long-lasting**.



- Project plans should be **consistent** with **policies** such as **National Development Plans, SDGs, climate change strategies**.

2. National Development Plan and Water Resources Management Plan

(1) Consistency between National Development Plan (NDP) and Water Resources Management



Source: "Maintenance System of Social Infrastructure," Committee on Overseas Activities, Japan Society of Civil Engineers (Ed.), 1997

2. National Development Plan and Water Resources Management Plan

(2) Linkage with National Development Plans

- 1) Specific Regional Comprehensive Development Plans for Post-war Reconstruction
 - **Development of power, food and industry**
 - **Land conservation and disaster prevention**



- **The Council for the Study of Comprehensive River Development and surveys for 24 rivers**
- **The National Agricultural Water Use Project on 4 rivers**
- **The Specific Area Comprehensive Development Plan**

2. National Development Plan and Water Resources Management Plan

(2) Linkage with National Development Plan

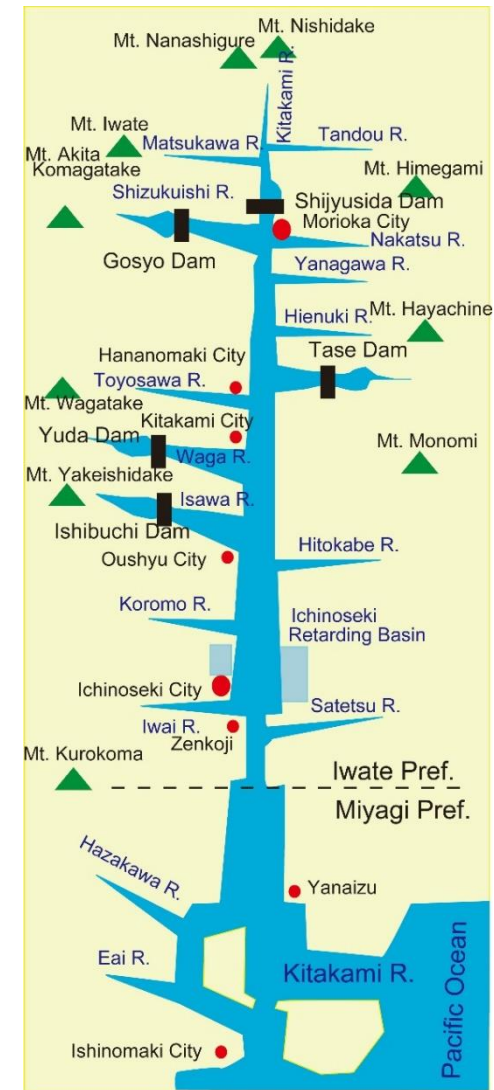
1) Specific Regional Comprehensive Development Plans for Post-war Reconstruction

The Kitakami River Development Plan

Needs for **flood protection** and **power generation**

Five multipurpose dam were constructed

- ✓ 40-50% of the prefecture's **electricity** in 1975-1984 supplied by hydropower
- ✓ **Expansion** of **farmland** and **increased food production**
- ✓ **Flood damage** was **reduced**
- ✓ **Land use** along the Kitakami River **increased**



Source: Prepared based on the website of Kitakami River Dam Integrated Management Office, MLIT

Location of Five Large Dams

2. National Development Plan and Water Resources Management Plan

(2) Linkage with National Development Plan

2) National Comprehensive Development Plan (NCDP)

Important issues for NCDP

- **Urban concentration of population** and **Urban-rural disparities in income**
- Balanced development in the country, National land safety, and Harmonization of socioeconomic activities and natural environment

Development goals

1. Building a national land structure

2. Ensuring equity

3. Reducing overcrowding

4. Efficient investment

5. Spatial support for industrial policy

6. Effective use of resources

7. National land conservation

2. National Development Plan and Water Resources Management Plan

(2) Linkage with National Development Plan

2) National Comprehensive Development Plan (NCDP)

- 1st NCDP (1962)
- New NCDP (1969)
- 3rd NCDP (1977)
- 4th NCDP (1987)
- Grand Design for the 21st Century (1998)

2. National Development Plan and Water Resources Management Plan

(2) Linkage with National Development Plan

3) Required Timing for the National Comprehensive Development Plan

- NCDP is required when **sustained or high economic growth is expected**, to prevent or mitigate **external diseconomies**:

External Diseconomies

Regional
disparities

Congestion

Resources and
environmental
conservation

2. National Development Plan and Water Resources Management Plan

(2) Linkage with National Development Plan

4) Long-Term Flood Protection Plan

since
1870s

- Flood protection projects based on modern flood protection plans

1910

- First Long-term Flood Protection Plan
- The Special Account for Flood Protection Fund was established

1921

- The Second Flood Protection Plan

1933

- The Third Flood Protection Plan
- Small- and medium-sized rivers were funded by government subsidies and bonds

1960

- The Erosion and Flood Protection Emergency Measures Act
- Long-term Flood Protection Plan
- The Special Account for Flood Protection

2008

- Special Account for Social Capital Improvement Projects

2. National Development Plan and Water Resources Management Plan

(3) National Water Resources Management Plan

1) Water Plan

The **National Comprehensive Water Resources Plan** (Water Plan) was developed **in line with the NCDP**.

a **guideline** for various comprehensive measures concerning water resources

Water Plan including:

1. The long-term water demand outlook for the nation
2. The basic goals for the development of water resources
3. The basic goals for the conservation of water resources
4. The basic goals for the use of water resources

2. National Development Plan and Water Resources Management Plan

(3) National Water Resources Management Plan

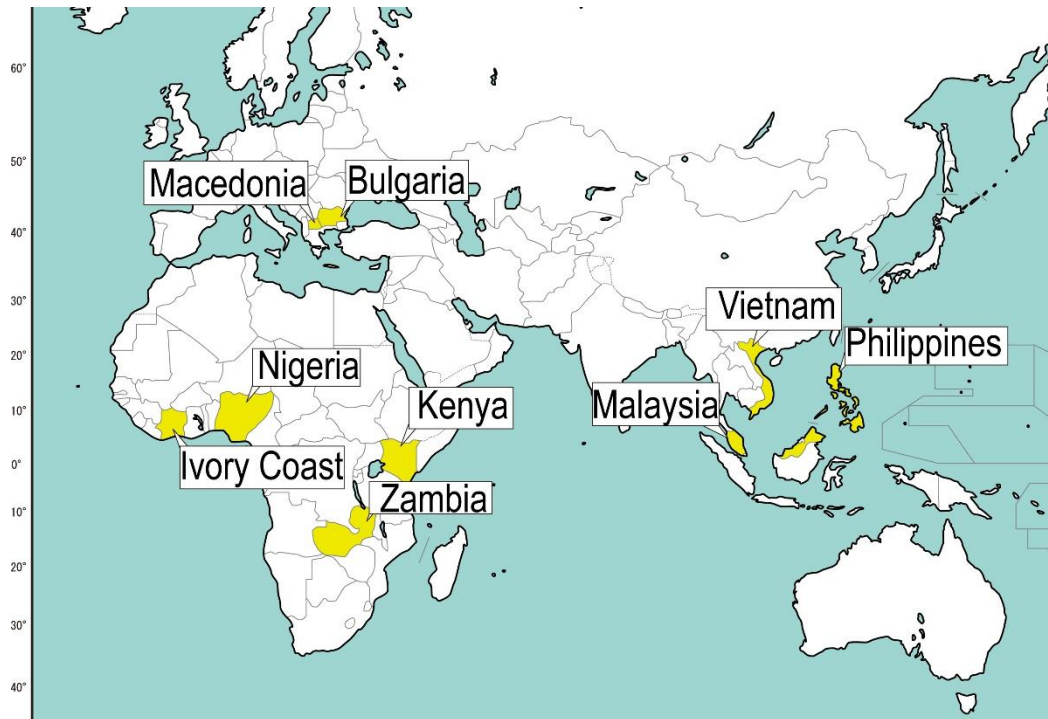
1) Water Plan

- Long-term Water Demand and Supply Plan (1978)
- Water Plan 2000 (1987)
- Water Plan 21 (2000)

2. National Development Plan and Water Resources Management Plan

(3) National Water Resources Management Plan

2) JICA's National Master Plans for Water Resources Development



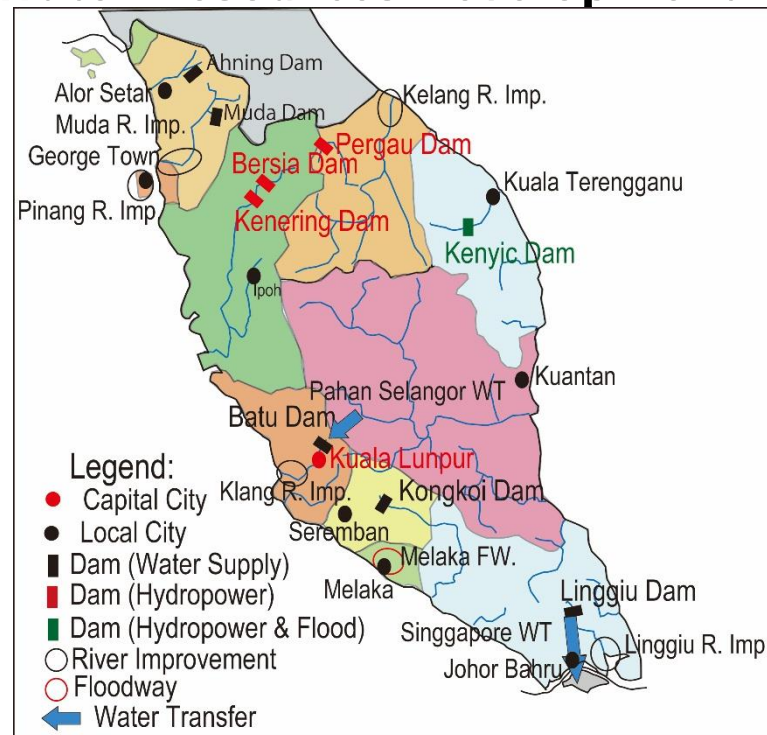
Target countries provided with National Water Resources Development Plans, prepared with JICA Technical Cooperation

2. National Development Plan and Water Resources Management Plan

(3) National Water Resources Management Plan

2) JICA's National Master Plans for Water Resources Development

National Water Resources Development Plan in Malaysia



Major Water Resources Facilities Developed in the Malay Peninsula

Source: Prepared based on "Study on Approach for Integrated Water Resources Management – Review of the JICA Master Plan of National Water Resources Management – Final Report," July 2011, JICA

3. Water- Resources Development Plans for Important River Basins

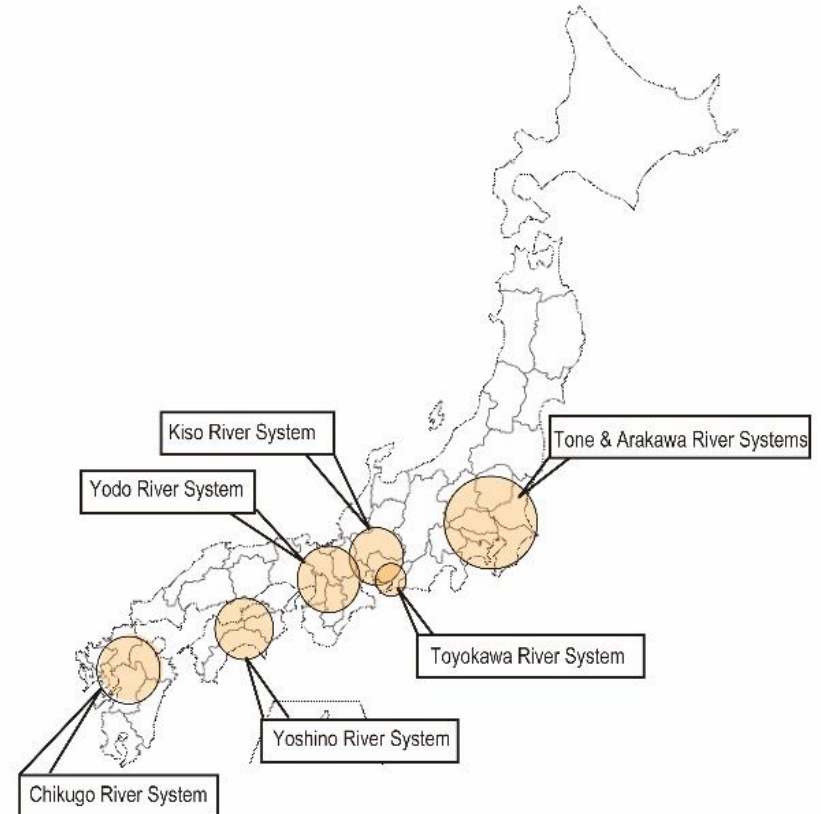
Background:

- Water supply measures are necessary in **wide area**.



Water Development Promotion Act:

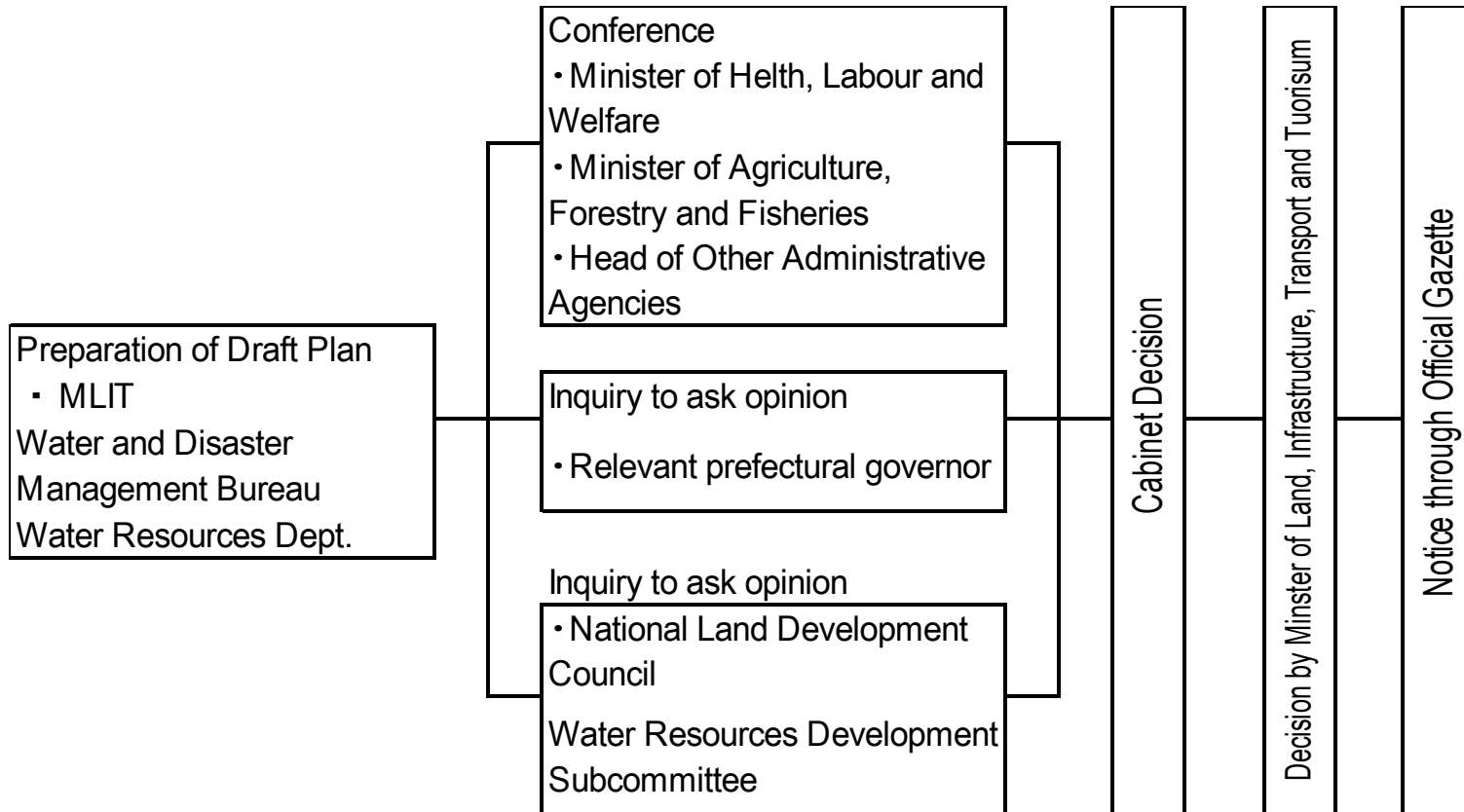
- The Basic Plan for Water Resources Development (the Full Plan) for designated river systems



Source: Prepared based on website of MLIT

Location of River Systems for Water-Resources Development over Wide Area

3. Water- Resources Development Plans for Important River Basins



Source: MLIT Website

Flow of Procedures for Formulating the Basic Plan for Water Resources Development

4. Adaptation Planning to Climate Change

(1) River Basin Disaster Resilience and Sustainability by All

Change of Rainfall, Discharge and Frequency of Flood due to Climate Change

Climate Change Scenario	Amount of Rainfall	Discharge	Frequency of Flood
At 2 degrees rise	About 1.1 times	About 1.2 times	About 2 times
At 4 degrees rise	About 1.3 times	About 1.4 times	About 4 times

Source: Proposal for Flood Protection Planning in the light of Climate Change, Revised Edition, MLIT, April 2021

A **comprehensive** and **multi-layered** approach for the **entire basin**



2020,7 “Water-related Disaster Measures in Light of Climate Change”



1) Three Important Points of Measures

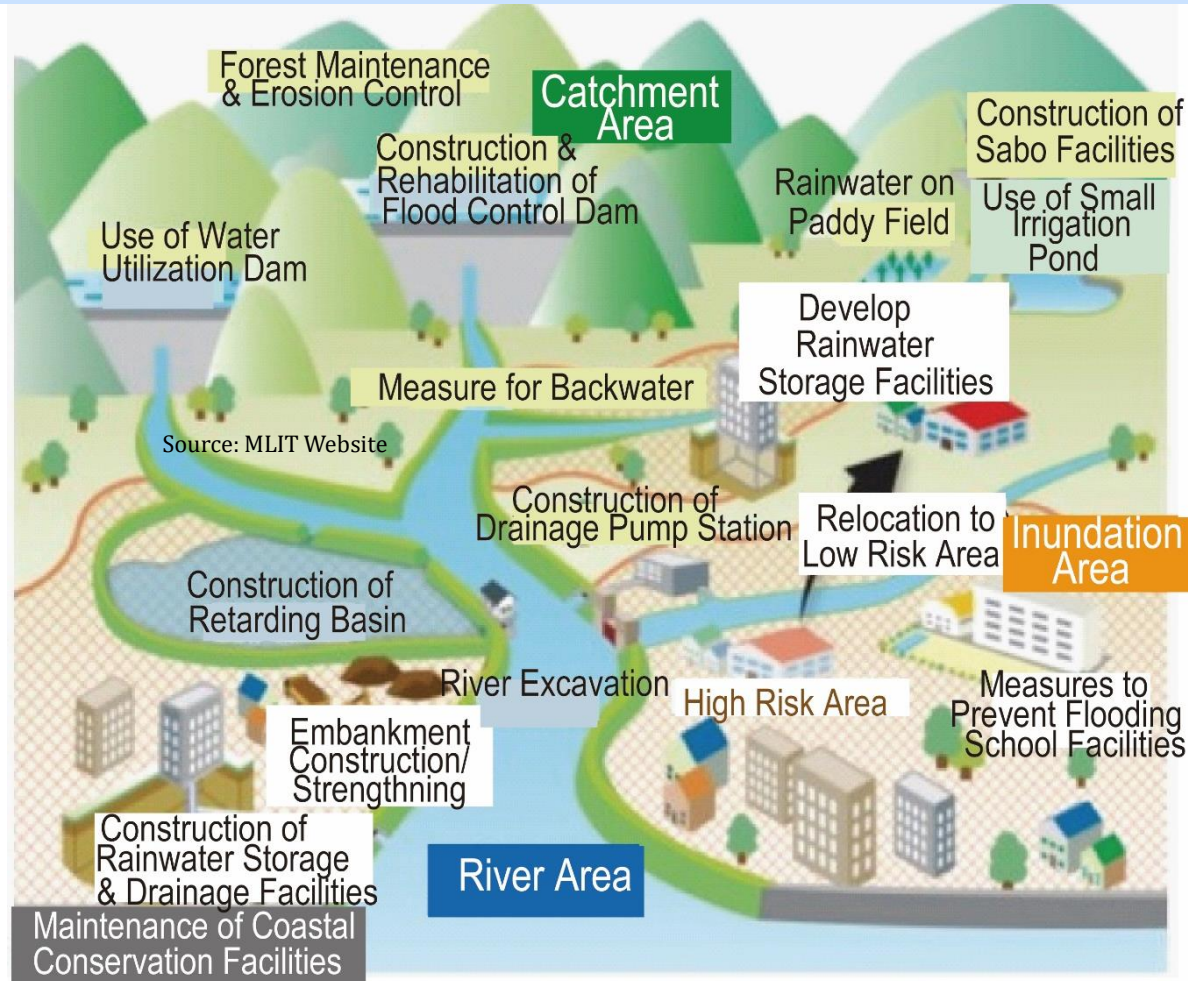
1. Resilience of the Land

2. Sustainability

3. Inclusivity

4. Adaptation Planning to Climate Change

(1) River Basin Disaster Resilience and Sustainability by All



Source: MLIT Website

4. Adaptation Planning to Climate Change

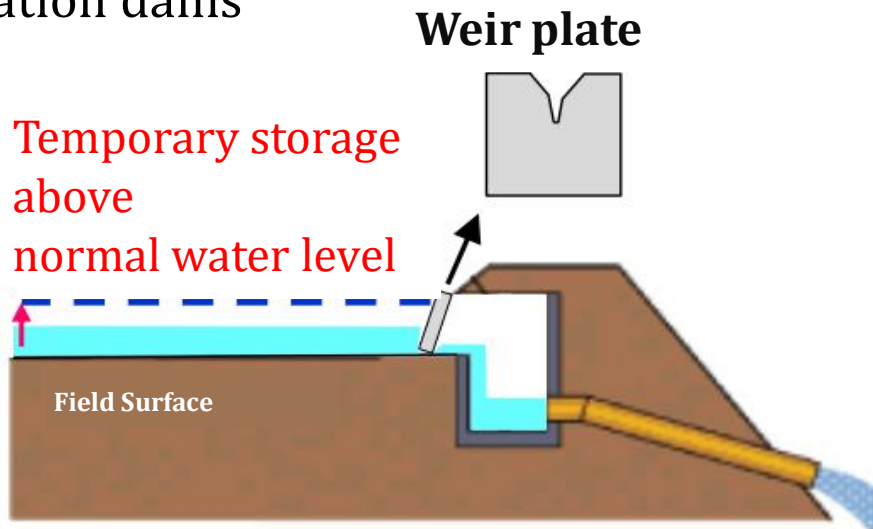
(1) River Basin Disaster Resilience and Sustainability by All

Example

- Use of Paddy fields (Rice field dams)
- Use of Water-utilization dams



Source: Cabinet Office



Rice Paddy Dam

4. Adaptation Planning to Climate Change

(2) Shift from Development Promotion to Risk Management

- The water resources policy is shifting from “Promoting water resources development” to “Stable water supply”.

Basic Principles:

- To manage risks surrounding water supply
- To comprehensively ensure the security level of water supply

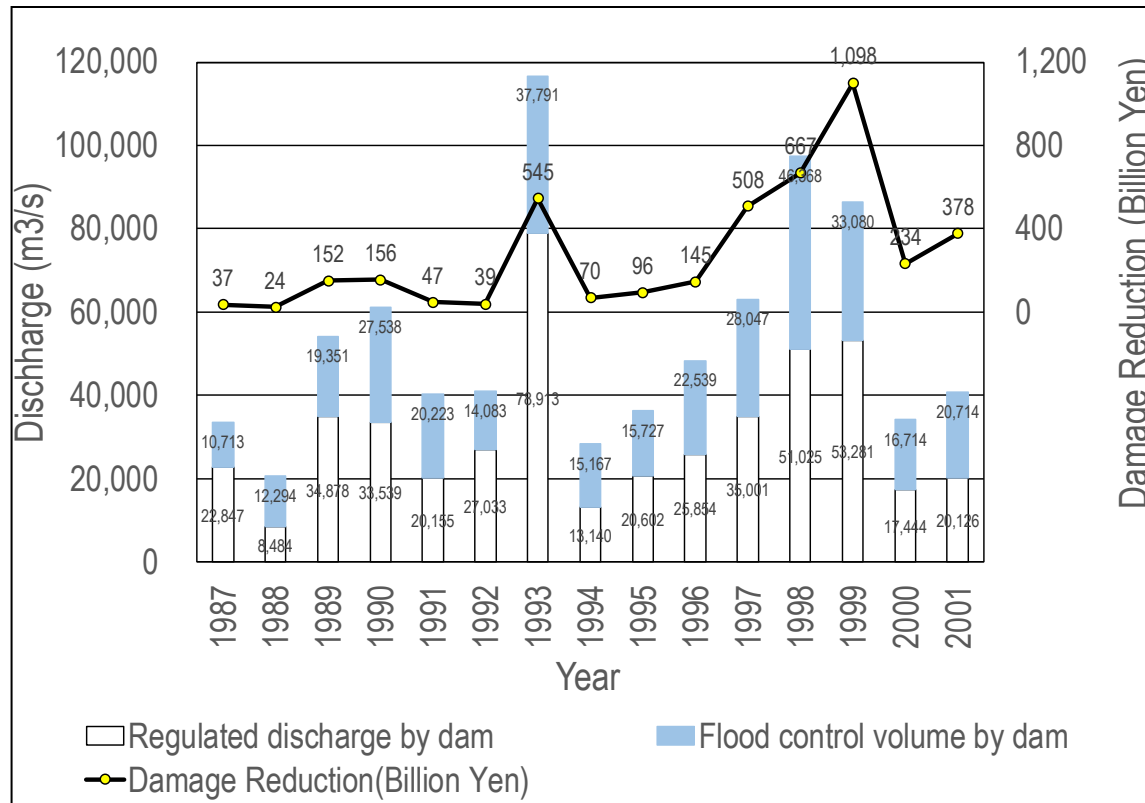
Method:

- To utilize existing facilities
- To coordinate hard and soft measures

5. Contribution to Society through Water Resources Development

(1) Effects of Water Resources Development in Japan

1) Flood Protection Effect



Source: Water resources in Japan (2008) MLIT

Actual Flood Protection by Dams and Estimated Damage Reduction

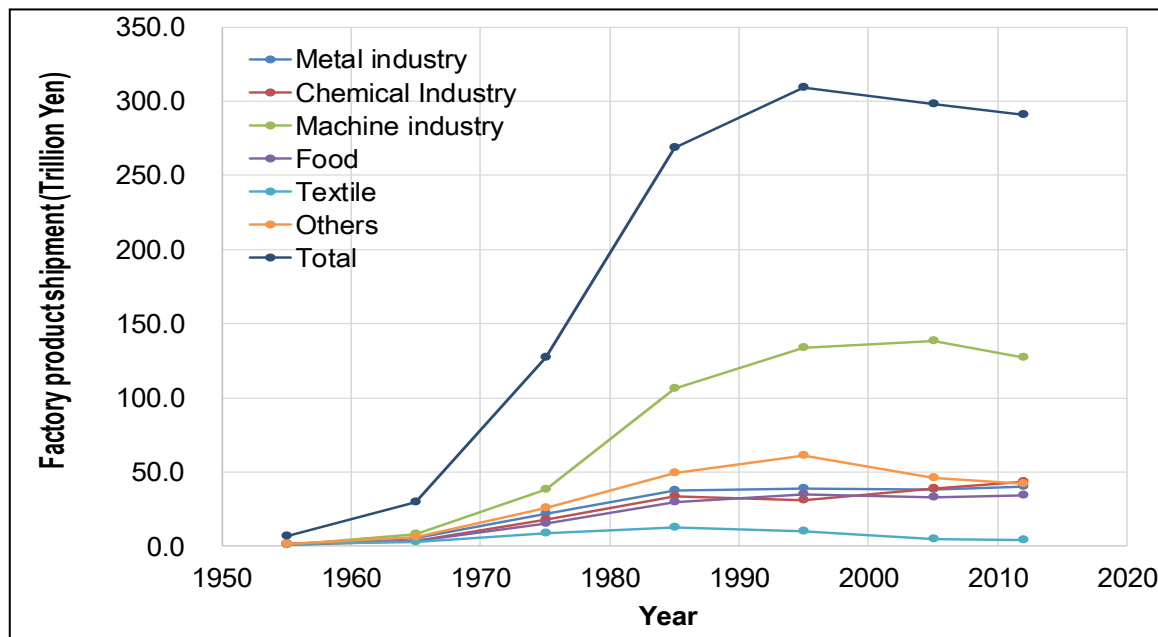
5. Contribution to Society through Water Resources Development

(1) Effects of Water Resources Development in Japan

2) Water Use Effect

Industrial Water

- Industrial water contributed to the large increase in the shipment value of industrial products.



Source: Industrial statistical survey

Growth of Shipping Value of Industrial Products

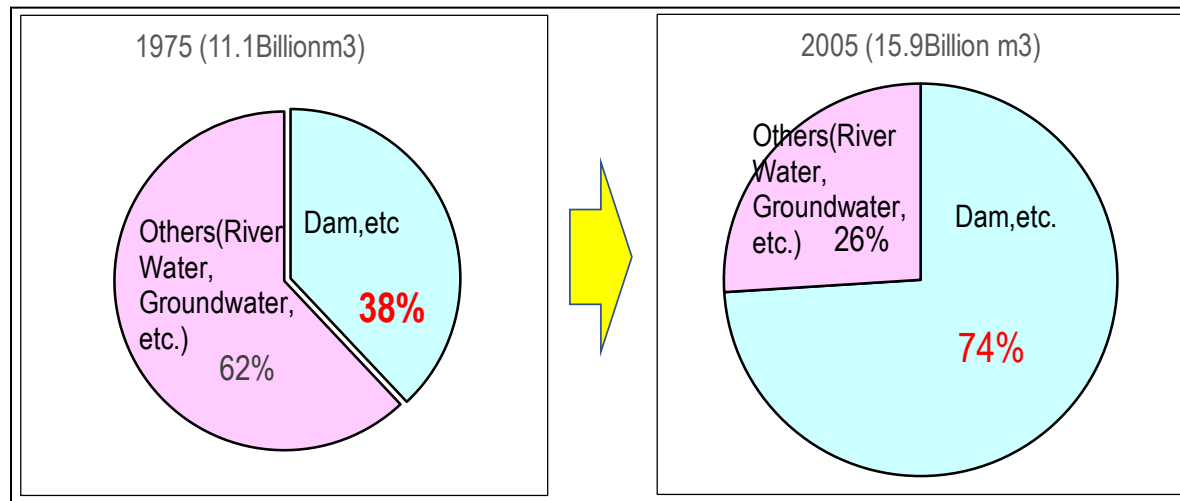
5. Contribution to Society through Water Resources Development

(1) Effects of Water Resources Development in Japan

2) Water Use Effect

Domestic Water Supply

- In 2005, 74% (15.9 billion m³) of the domestic water was supplied by dams and other water resources facilities.
- The supply from the dam is about 2.7 times the one in 1975



Source: "The Role of Dams and Hydropower" Japan Commission of Large Dam

Effect of Dams on Domestic Water Supply

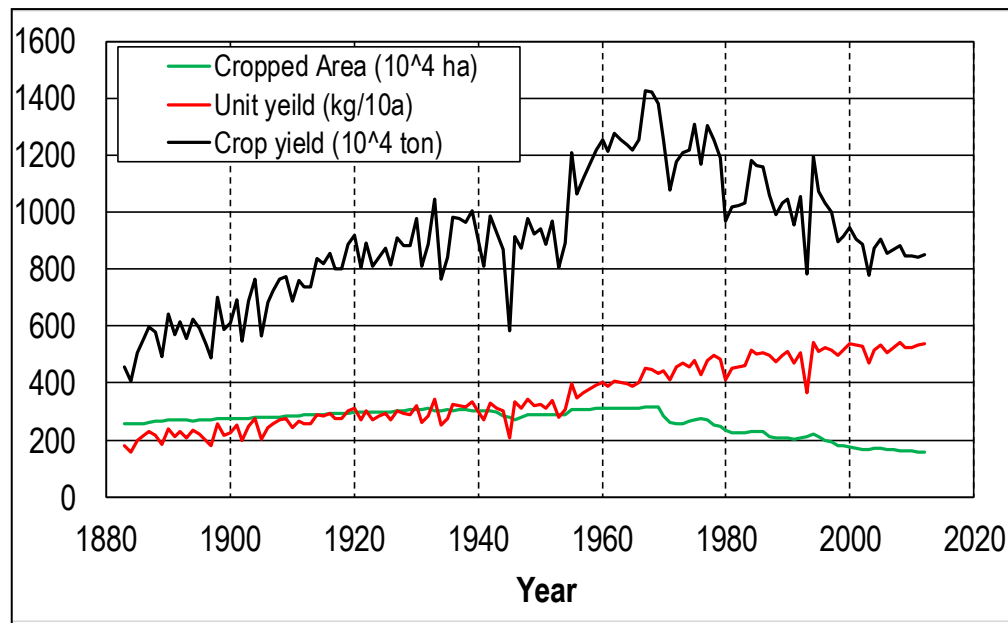
5. Contribution to Society through Water Resources Development

(1) Effects of Water Resources Development in Japan

2) Water Use Effect

Irrigation Water

- Cropped areas and rice harvests increased until around 1970.
- Irrigation water contributed greatly to the irrigation development.



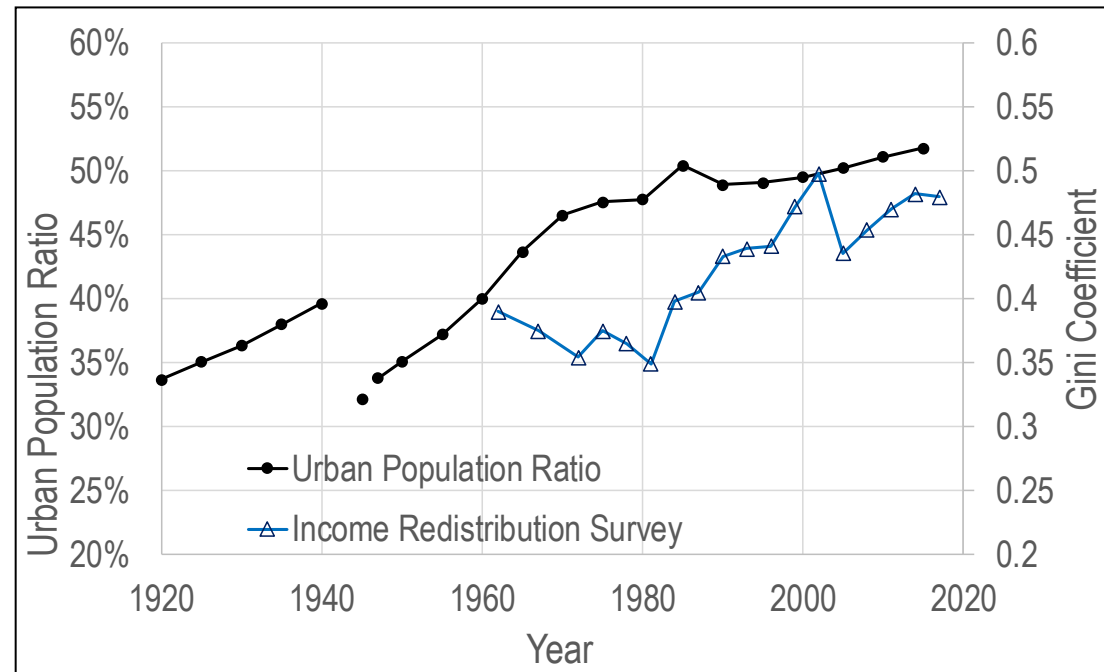
Source: Crop Statistics

5. Contribution to Society through Water Resources Development

(1) Effects of Water Resources Development in Japan

3) Reduction of Disparity and Poverty

- Urbanization rapidly progressed after WWII.
- Gini coefficient by “original income” rose in 1980-2000. It became stagnant after 2000.
- The one after the income redistribution remained almost constant at about 0.36-0.37, with no further change in income disparity beyond 2000.



Sources: “Population Census”, Ministry of Internal Affairs and Communications, “Income Redistribution Survey”, Ministry of Health, Labor and Welfare and data in “Income disparity in Japan – Factors for Increasing Disparity,” Yugami Kazufumi, JIL Labor Policy Report Vol. 3, 2003.

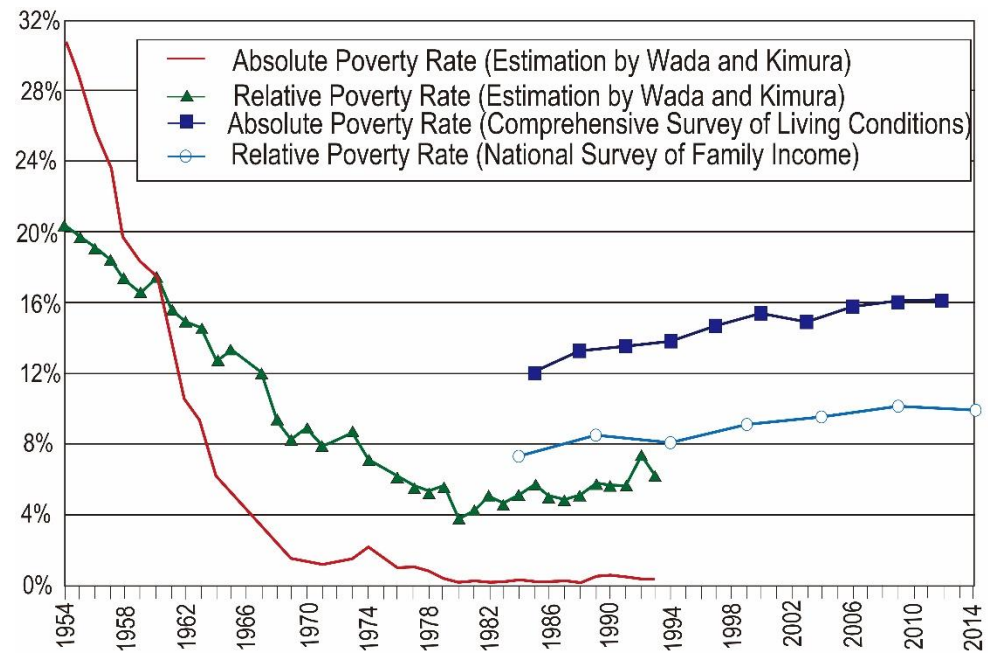
Ratio of Urban Population to Total and Gini Coefficient

5. Contribution to Society through Water Resources Development

(1) Effects of Water Resources Development in Japan

3) Reduction of Disparity and Poverty

- Disparity and poverty ratios in urban area were reduced and productivity in rural area was improved.
- Wada-Kimura's poverty line was set at average consumption per capita of welfare-recipient households in 1960.
- The other two surveys set the poverty line at 50% of the median of equivalized disposable income.



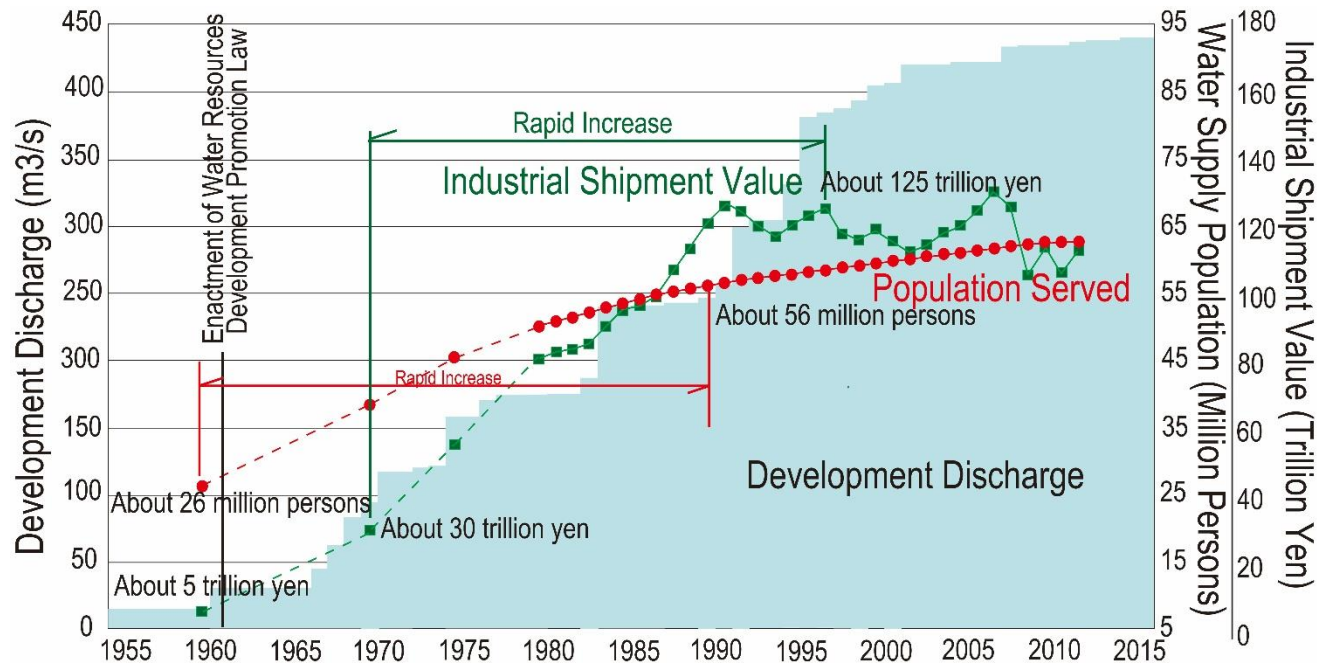
Source: Did Japan become an Unequal Society?: Japan's Income Disparity in Comparative Historical Perspective," Moriguchi Chiaki, Economic Studies Vol. 68, No. 2, Apr. 2017.

Lowering Trends in Poverty Ratios in Japan

5. Contribution to Society through Water Resources Development

(2) Development Effect in the River System under the Full-Plan

- Supported the growth of population and industrial shipments.
- The household income increased and per capita water use increased.



Source: "Explanatory material for the Concept for the Formulation of the Next Basic Plan for Water Resources," MLIT

Volume of Water Developed, Industrial Shipment Value and Population Served with Water in the Full-Plan River System

6. Lessons Learned (1)

- (1) Consistent planning could guide disaster risk reduction and water resource management, leading to quality growth.

Water resources management is essential in achieving resilient, sustainable, and inclusive quality growth. Poor management of water resources causes improper utilization and may exacerbate the risk of floods, droughts, and deterioration of water quality. This may affect the nation's growth. Japan could manage water resources effectively based on national land development plans, national water management plans, and long-term flood protection plans. The government should include water resources management in national development plans in coordination with other sectors. Also the governments should position water resources management plans above the ministry-level plans as a “higher-level plan”.

- (2) To address issues in the water sector, water resource management plans should be prepared based on scientific data, clarifying the goals, effects, and inputs.

To support the implementation of the water policy, the plans should be prepared based on sound evidence. If the plan looks a single list of projects, implementing agencies face difficulties in securing resources and budgets.

8. Lessons Learned (2)

- (3) To obtain commitment to the budget required to implement the water policy and planned projects, a long-term plan may be prepared to support implementation.

Since water resource projects are by nature long-term projects, a multiyear commitment is required to steadily promote projects rather than allocating budgets year by year. The Japanese government has formulated long-term plans for flood protection and water resource management. A special account for these projects was then established, independent of the general account.

8. Lessons Learned (3)

- (4) A review system should be created and maintained to continually review the relevance of projects.

Socioeconomic changes and technological progress may affect water demand and the relevance of planned projects. At the end of Japan's high economic growth period, the reuse of industrial water and water-saving efforts led to a large gap between predicted and actual demand. A long-term sector plan, like the flood protection plan in Japan, tends to cause rigid allocation of financial resources, which makes it difficult for the project to adapt timeously to economic trends and fiscal conditions.

8. Lessons Learned (4)

- (5) To cope with an increase in the flood flow due to climate change, a “River Basin Disaster Resilience and Sustainability by all” approach should be considered.

Conventional structural measures such as levees and dams alone cannot cope with the increasing severity of flood damage under climate change. Relevant organizations in the river basin should cooperate in reducing flood risks and be engaged in multi-layered measures, such as land use plans, relocation from risk areas, urban facilities, and storing flood water in paddy fields and irrigation ponds.