

# Theme1-2

## Water Rights

Establishing the Order of Water Use Based on Regional Practices and Characteristics



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- 3. Building a Water Use Order through the Water Right System**
- 4. Water Distribution during Drought according to Historical Practices in Each Basin**
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- 6. Lessons Learned**

# 1. Introduction (1)

Each country, region, and river basin has different water issues, distinctive and individual circumstances, and practices and history of water use. Thus, they should **build a water rights system** to establish an order for water use based on this background.

## Water Resources Utilization

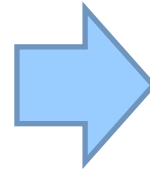
### Water use by human

- Irrigation, Domestic water supply, Industrial water supply, Hydroelectric power generation
- Navigation, Dilution of domestic wastewater, Recreation

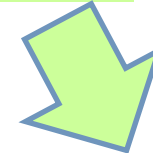
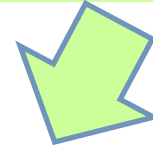
### Preservation of ecosystem

# 1. Introduction (2)

**Disorderly water intake by individual users**



**Water shortage**



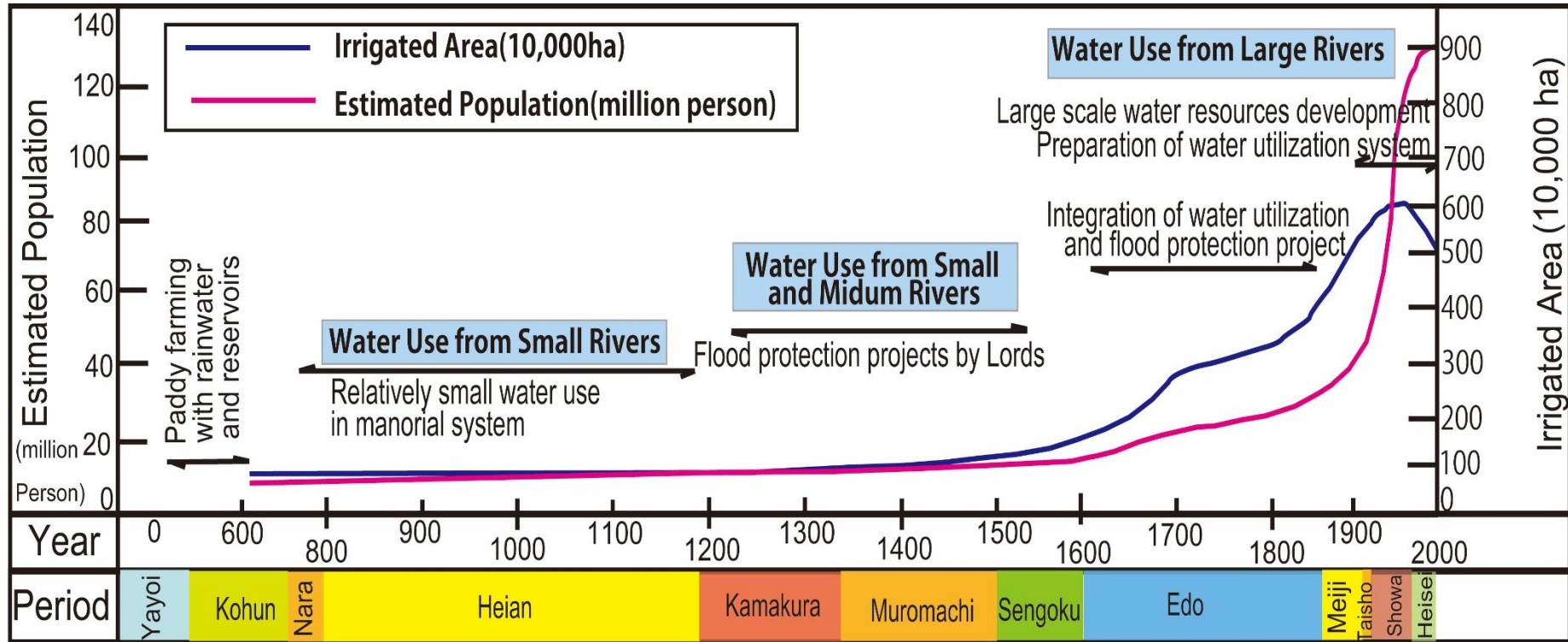
**Water does not reach downstream**

**Impact to ecosystem**

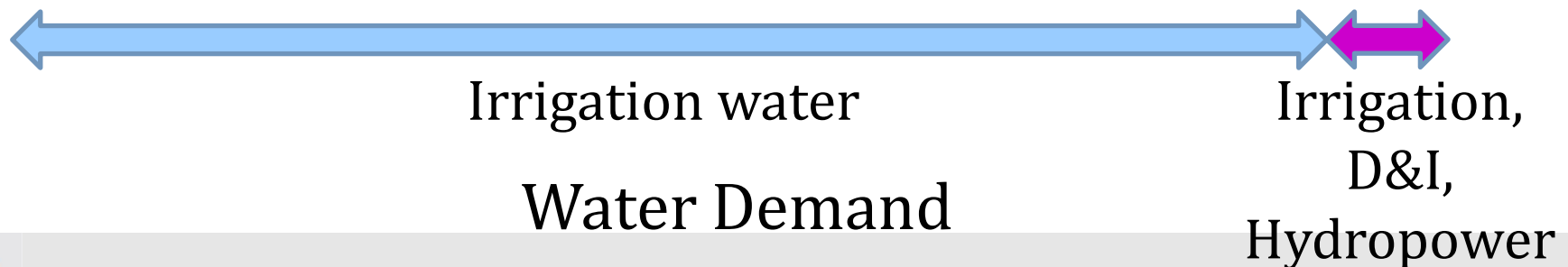


**Disorderly intake should be regulated to establish effective and appropriate use by controlling the amount of water intake**

## 2. The Change of Water Use (1)



Source: Partial excerpt and revision of "Farm Land and Water in Japan, Ministry of Agriculture, Forestry and Fisheries



## 2. The Change of Water Use (2)

**Before 19<sup>th</sup> century**

**Farmers and agriculture-based communities managed the irrigation water for a long time.**



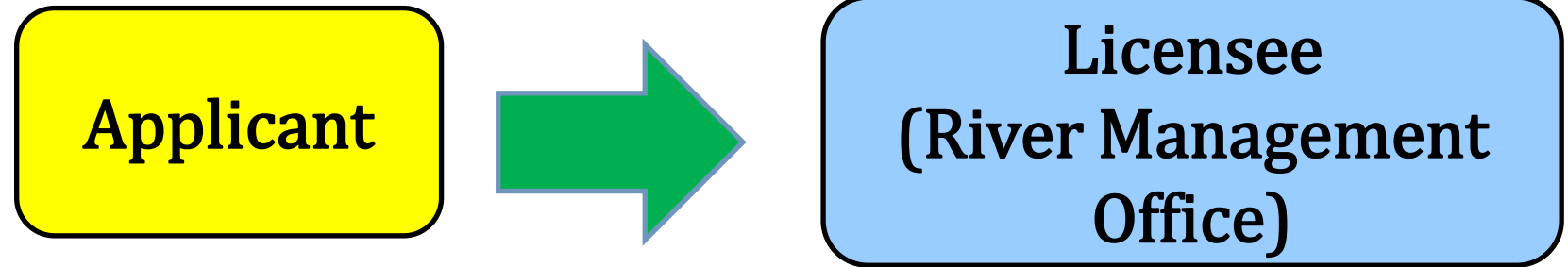
**Water right**

**1896 Old River Law**

**1964 New River Law**

### 3. Water Right System (1)

#### (1) Water Rights Licensing System



Submission of Required Documents

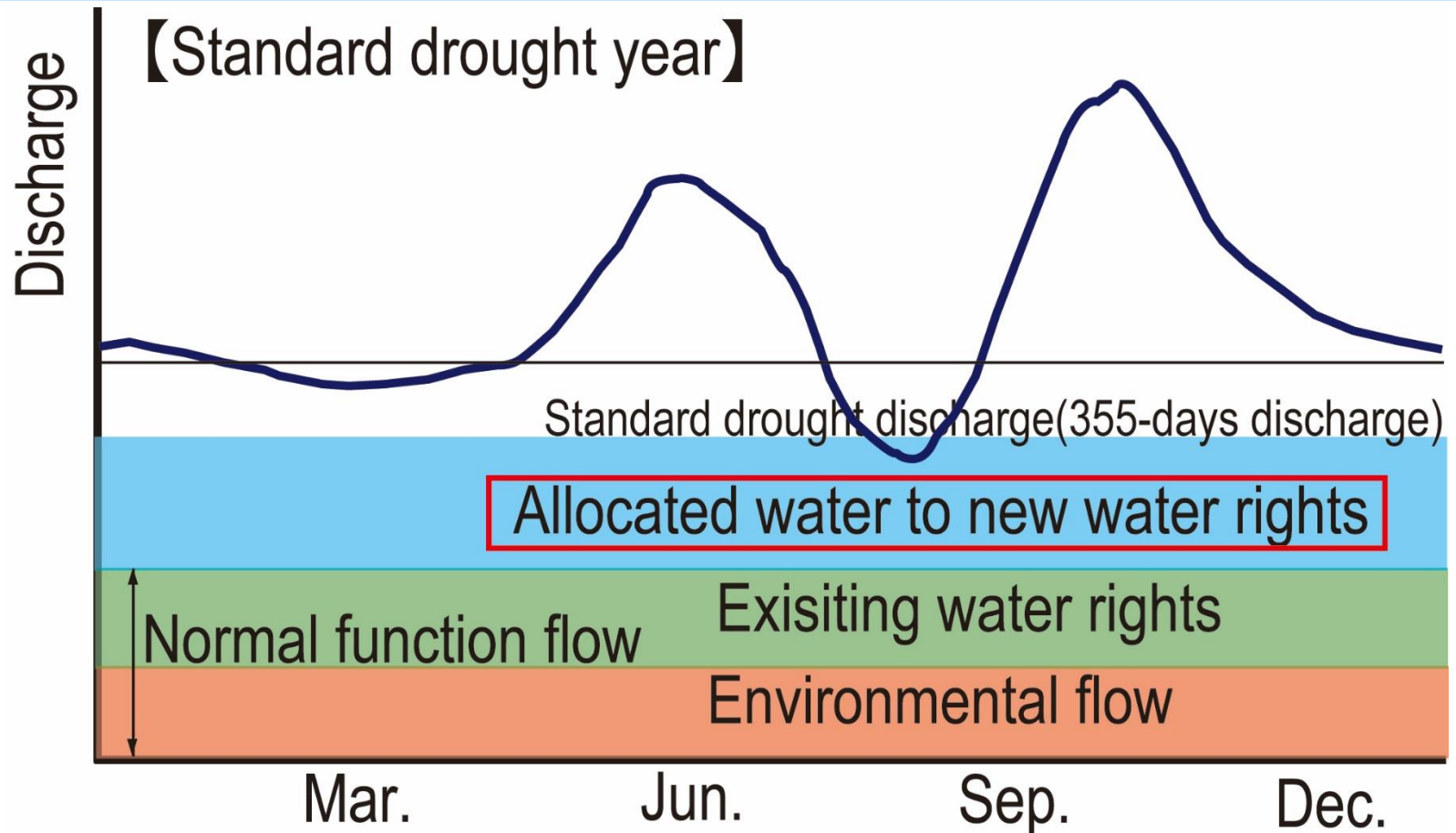
$(\text{Newly applied intake water discharge}) < (\text{Standard drought discharge}) - (\text{Normal function flow discharge})$



Applicant may take required water.

### 3. Water Right System (2)

#### (1) Water Rights Licensing System

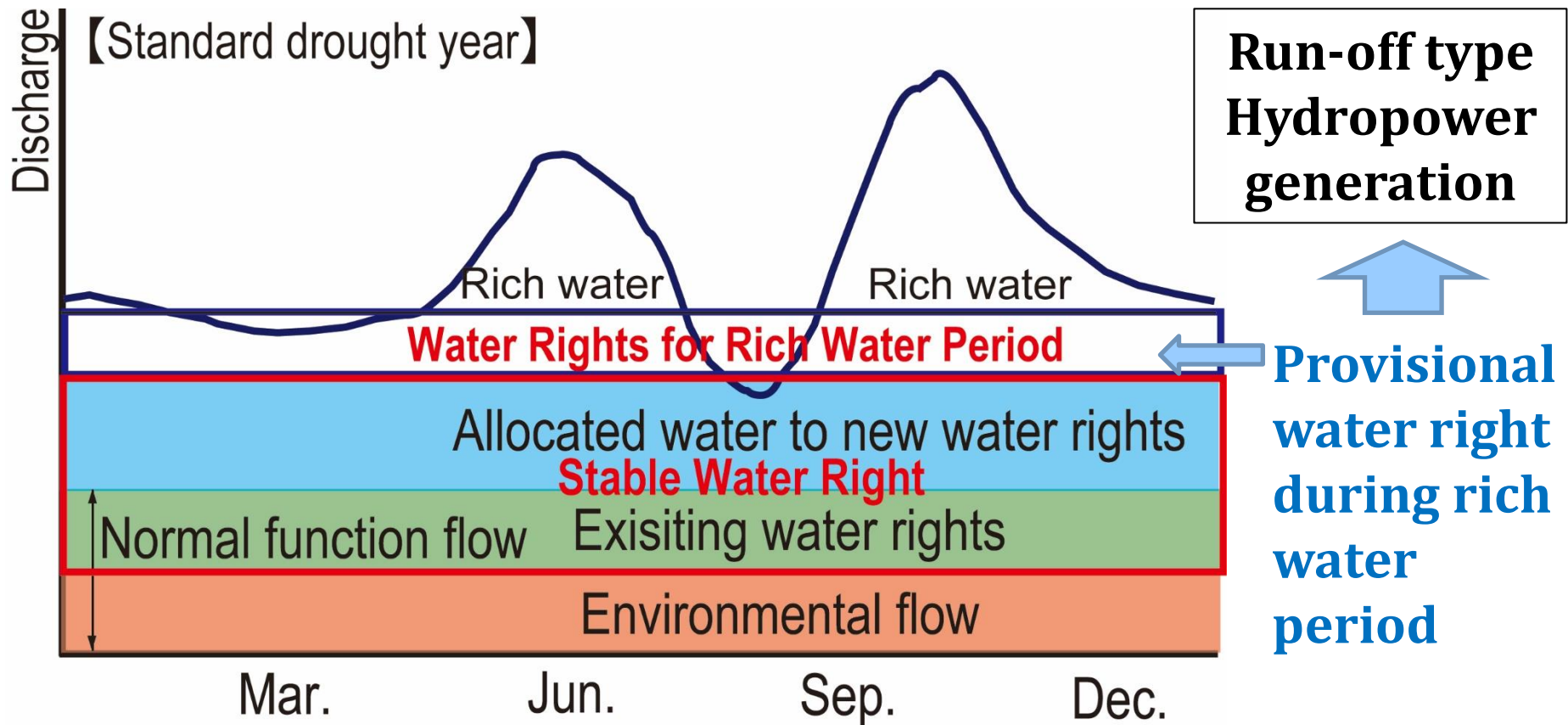




### 3. Water Right System(3)

## (1) Water Rights Licensing System

### 1) Classification of Water Right



Source: PRT

## 3. Water Right System (4)

### (1) Water Rights Licensing System

#### 2) Required Documents and Actions by the Applicant to Obtain Water Rights

Requirement: To obtain the consent of other river water users by taking measures as necessary

#### Application documents

- Outline of implementation program
- Evidence for water demands
- Evidence for the amount of water used from the river
- Records of river water level and runoff discharge for the past 10 years
- Explanation of the predicted impacts on other users and necessary countermeasures

## 3. Water Right System (5)

### (1) Water Rights Licensing System

#### Estimation method, if there is no record of actual discharge measurement

- The discharge was estimated using data from other river basins where topography, geology, and rainfall characteristics are most similar to those of the intake basin.
- If the discharge data are available in the river basin, where the rainfall conditions are very similar to the intake basin, simultaneous discharge observation at the existing observation point and the planned water intake point is carried out throughout the year.
- The discharge is estimated by applying a simulation model

## 3. Water Right System (6)

### (1) Water Rights Licensing System

#### 3) Criteria for Granting the Water Rights

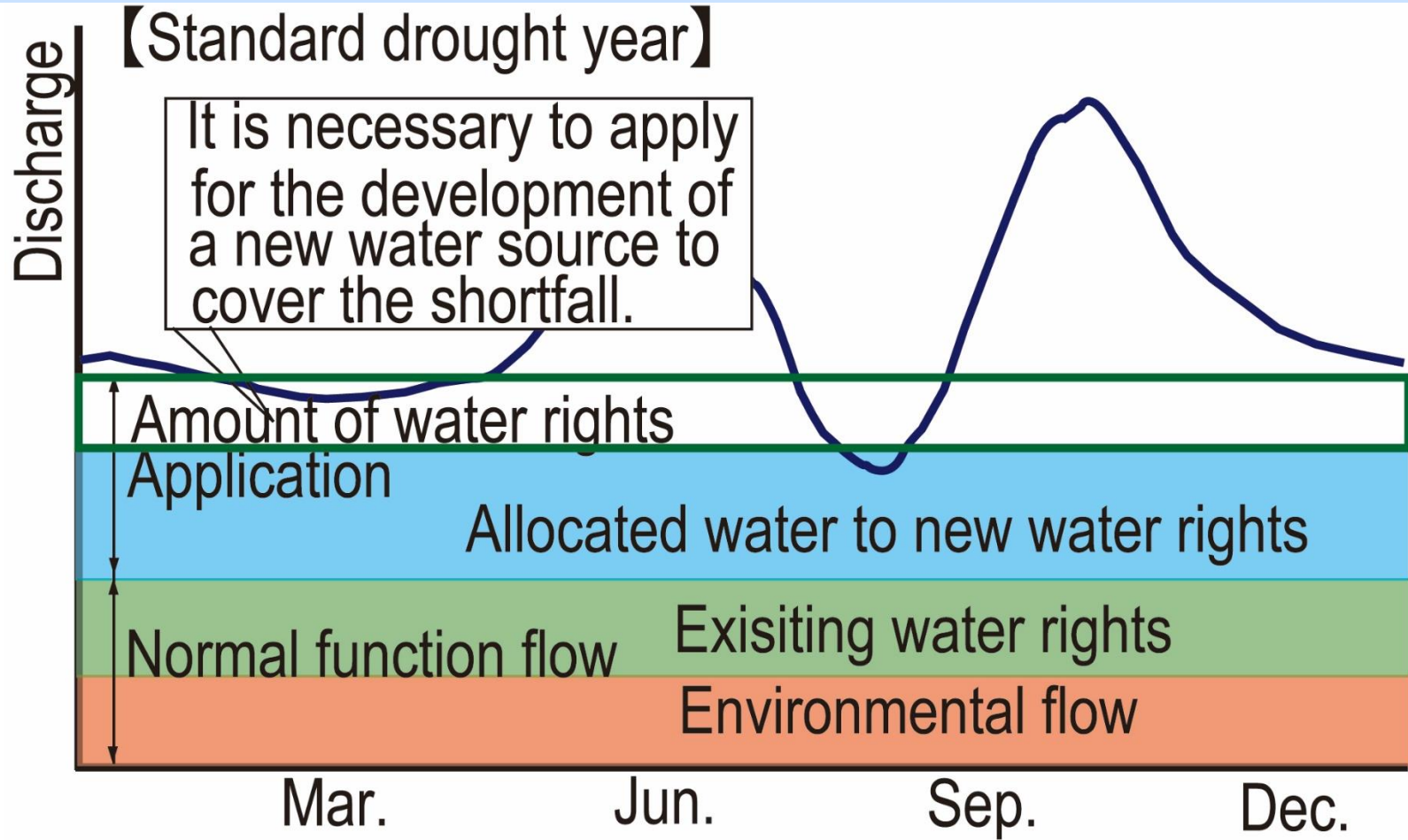
- Promotion of public welfare
- Certainty of execution
- Relation between discharge of river flow and water intake
- Hindrance to the public interest

#### 4) Valid Period of Permission

- Hydropower generation: approx. 20 years
- Other water use: approx. 10 years

### 3. Water Right System (7)

#### (1) Water Rights Licensing System

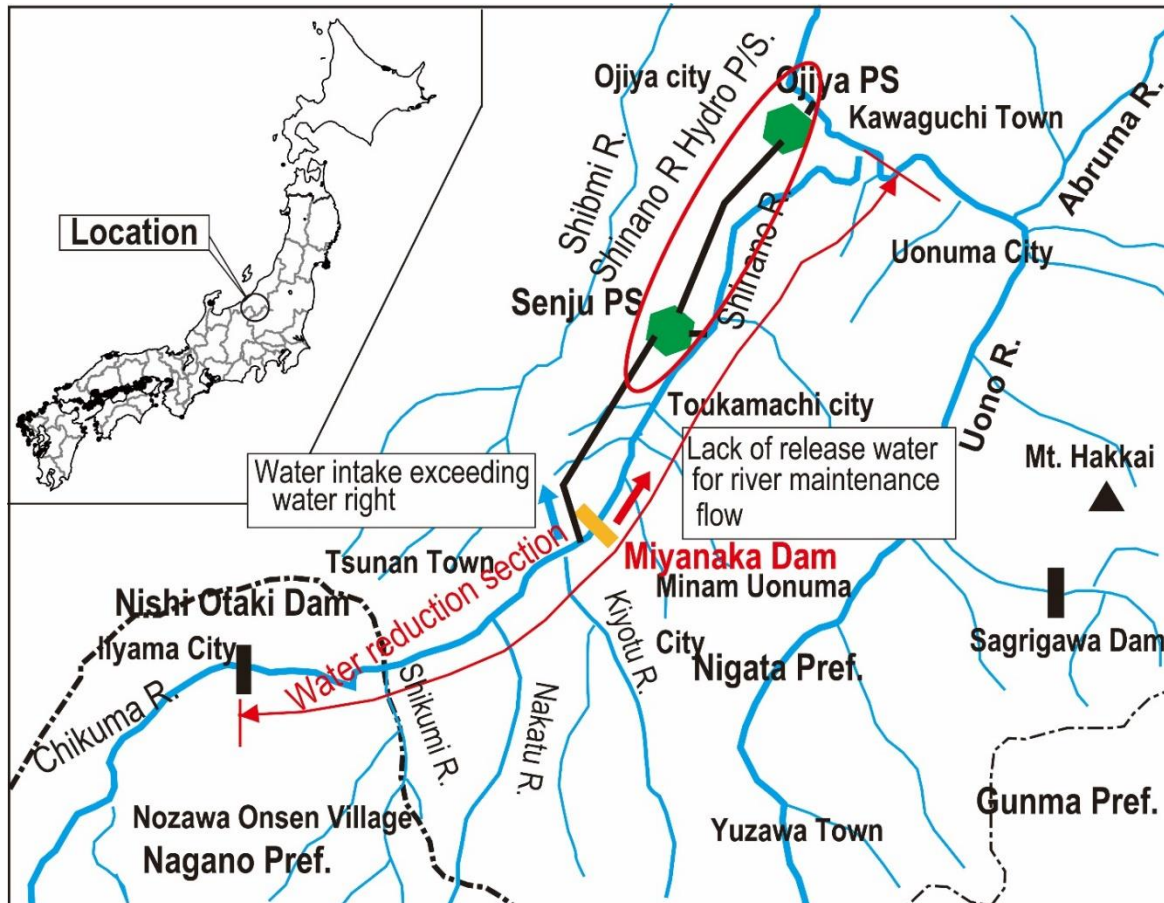


Source: PRT

### 3. Water Right System (8)

## (1) Water Rights Licensing System

### 4) Penalties for Illegal Water Intake



- Violation of
- 1) Water intake exceeding the water right
  - 2) Insufficient minimum environmental flow discharge released from Miyanaka Dam

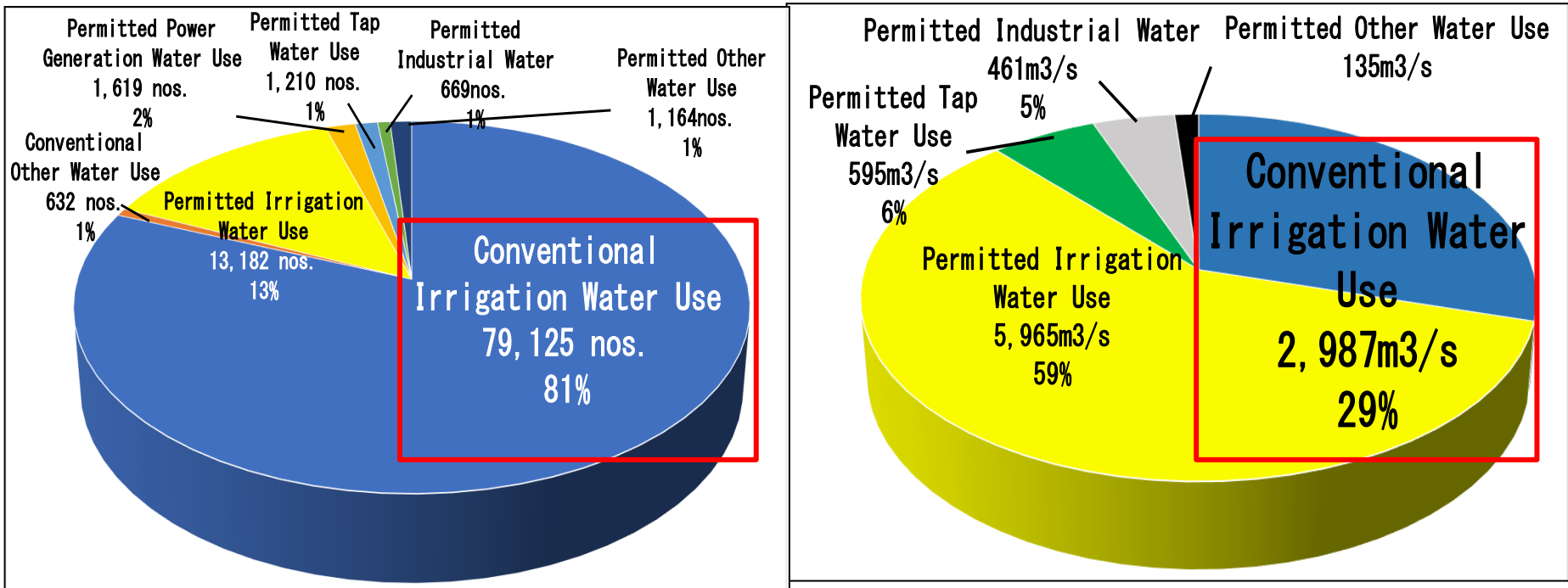


Revoking water right

### 3. Water Right System (9)

## (2) Prioritized Customary Water Rights

Japan has given the customary water rights to the traditional water uses made before establishing water right system.



Source: Fourth Study group on the sophistication of river use as a resource, Document No.2 Customary water right MLIT

### 3. Water Right System (10)

#### (3) Transfer and Trade of Water Rights

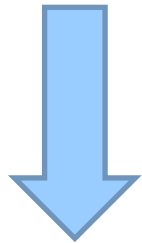
**Urbanization**

1965 to 2017: 78 nos. transfer water about 46m<sup>3</sup>/s

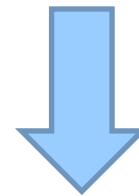
**Decreasing paddy field**



**Decreasing irrigation water demand**



To change land use



Domestic water allocates from irrigation water.

**Housing land and other lands**



**Increasing domestic water demand**



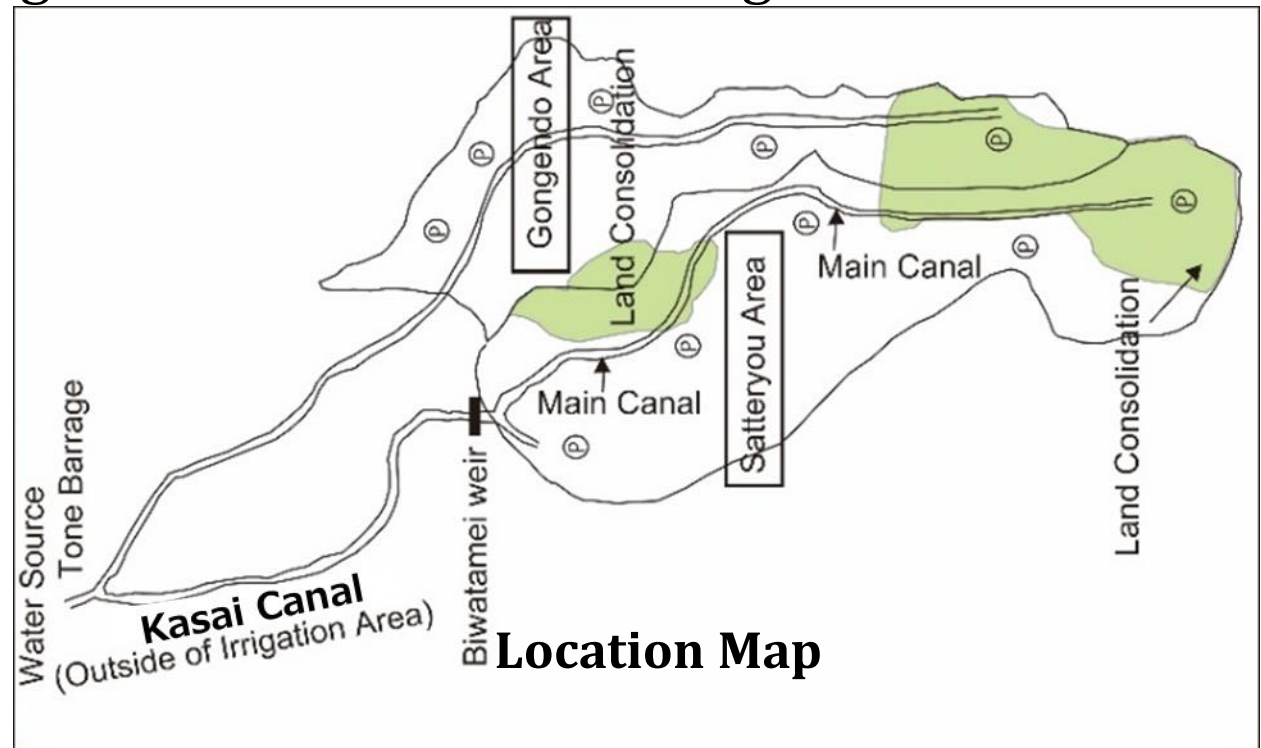
### 3. Water Right System (11)

## (3) Transfer and Trade of Water Rights

### Example: Irrigation Water Rationalization Project in Saitama Pref.

#### Renovation of Irrigation Facilities in the Gongendo-Satteryou Area

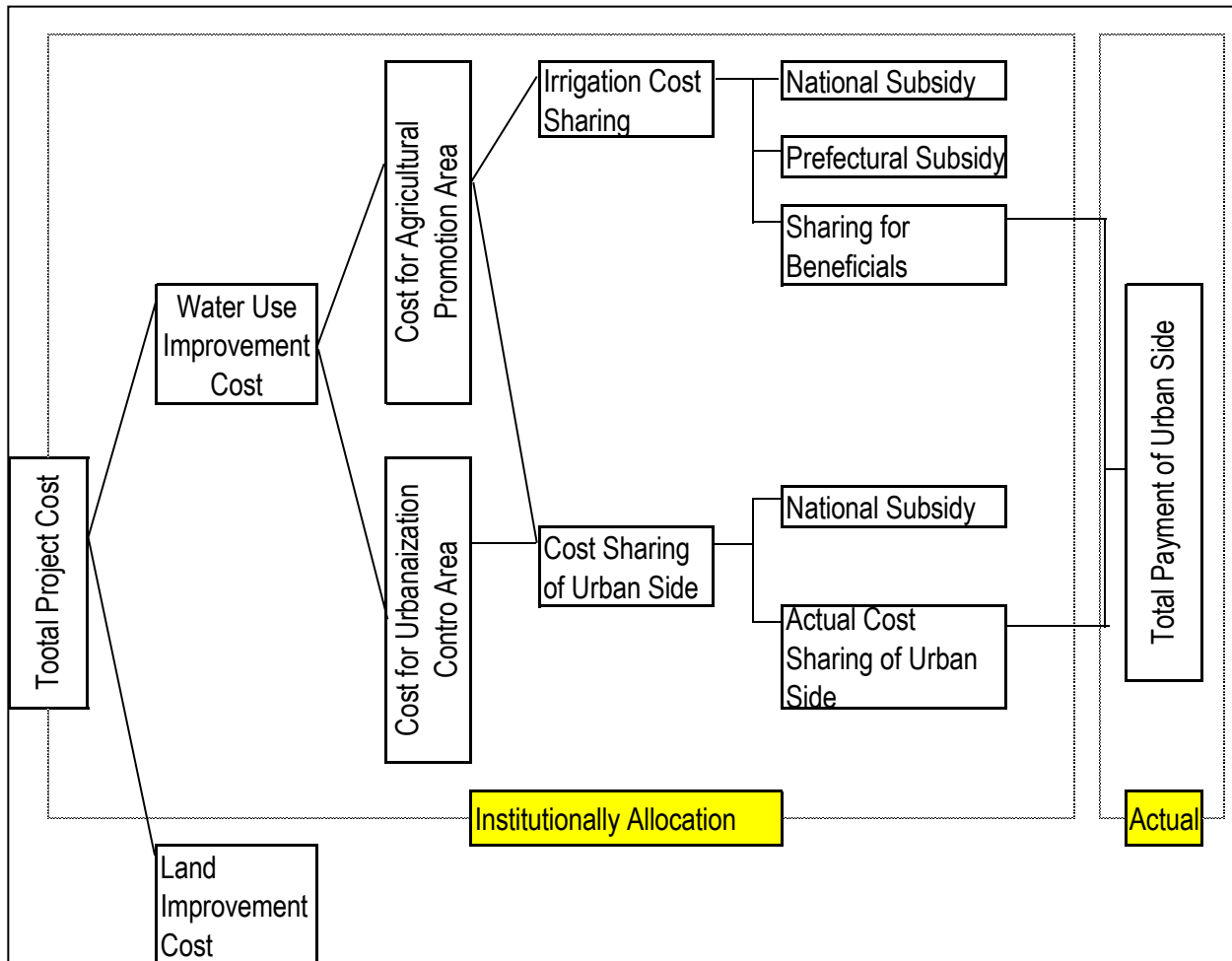
- Installation of Pumping Station
- Pipeline of irrigation water supply



Source: "Reallocation of water resources between water uses and cost sharing (I) -Case study on agricultural water rationalization project in Saitama Prefecture" Takeda Mari, Water Science

# 3. Water Right System (12)

## (3) Transfer and Trade of Water Rights



### Allocation of Costs in Irrigation Water Rationalization Project and Actual

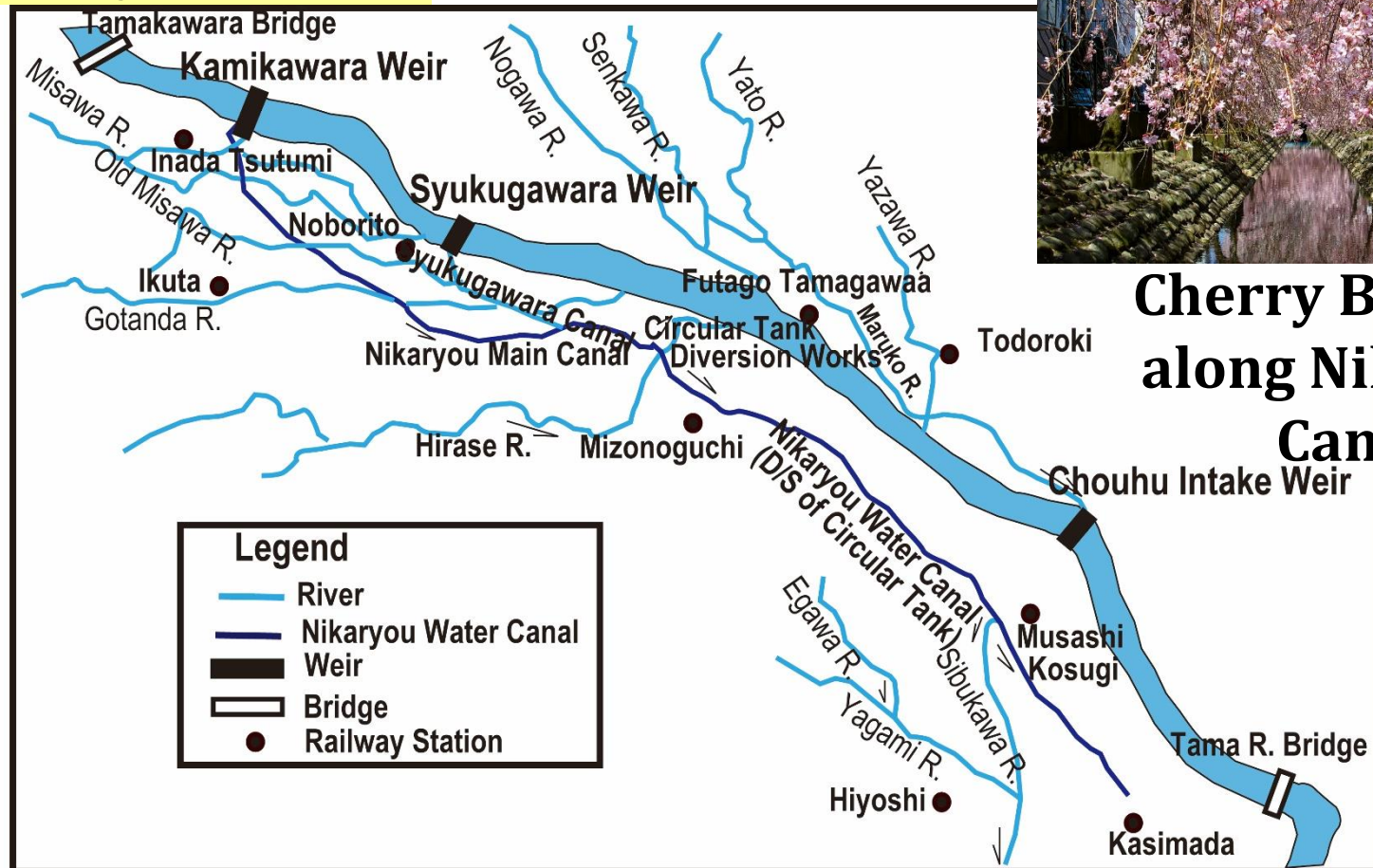
# 3. Water Right System(13)

## (3) Transfer and Trade of Water Rights

### Nikaryo Canal



Cherry Blossom along Nikaryou Canal



Location Map of Nikaryou Water Canal

## 3. Water Right System(14)

### (3) Transfer and Trade of Water Rights

#### Nikaryo Canal

#### Changing Water Intake (Unit: m<sup>3</sup>/s)

Year	Industry	Irrigation	Environment	Total
1957	0.00	9.35	0.00	9.35
1958	2.35	7.00	0.00	9.35
1982	2.35	3.50	0.00	5.85
1991	2.35	1.30	0.00	3.65
1995	2.35	1.30	1.40	5.05

Source: Corrected location map of History of Nikaryou Canal from agricultural water to environmental water from the viewpoint of water quality survey Takagi Masahiro, Komazawa Geography No.47”

## 3. Water Right System (15)

### (3) Transfer and Trade of Water Rights

#### Nikaryo Canal (Lessons Learned)

- Water resources development facilities are valuable community assets that can contribute to society by changing their roles, and the environment in the midst of social changes.
- The transfer of water rights for irrigation use and required coordination among related stakeholders were promoted by ensuring the order of water use.
- Short-term measures such as the use of irrigation canals for roads and sewers do not always lead to long-term benefits
- Community participation is essential for improving and protecting the water environment.

### 3. Water Right System (16)

**Local governments (prefectures) collect water rights fee from hydropower generation and industrial water.**

- Hydropower generation: MLIT established a calculation formula for water right fee.
- Water right fee of industrial water are decided by each local government.

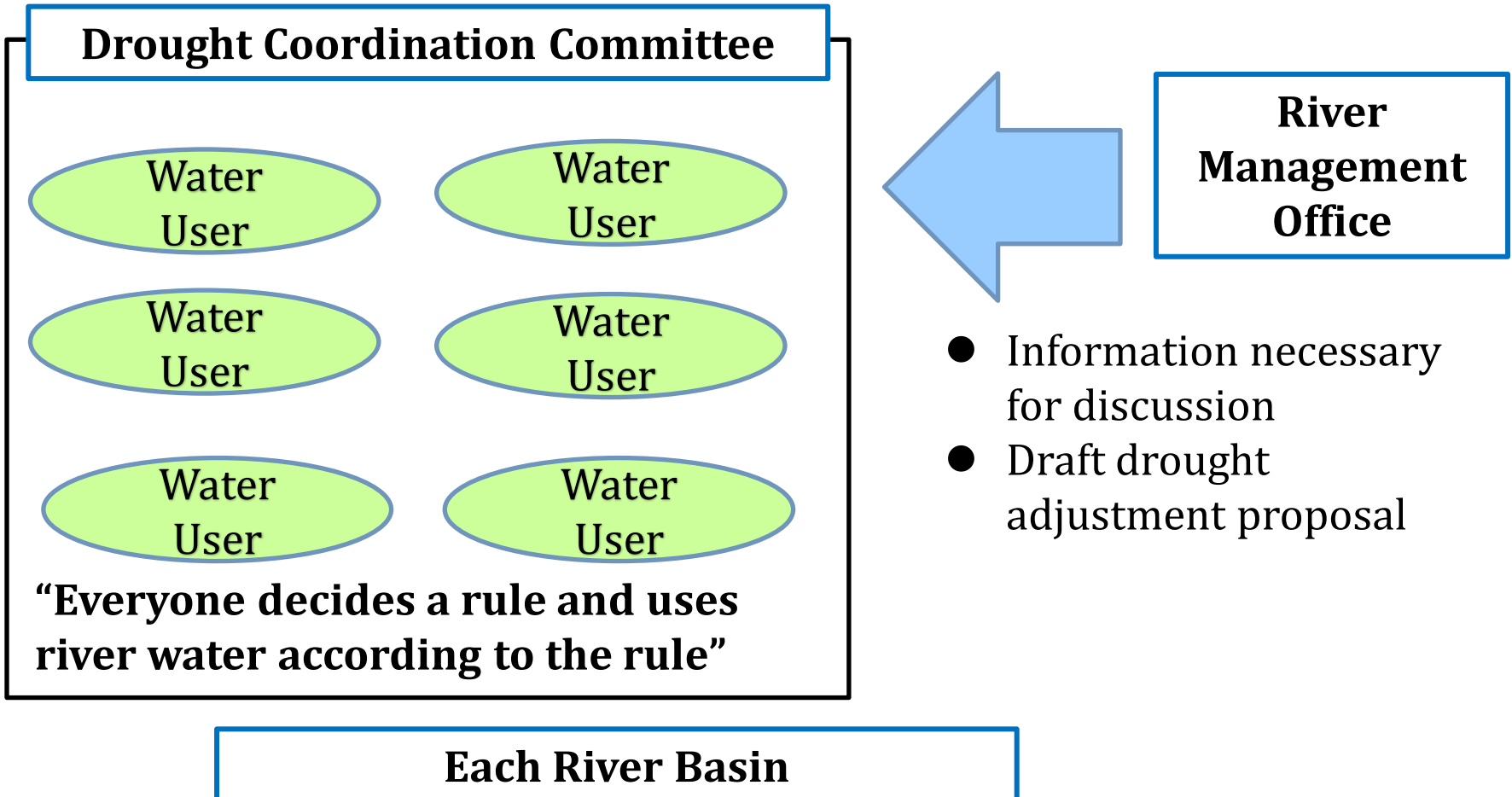
#### Industrial Water Fee

Local Government	Tokyo	Nagano	Saga	Fukui	Tochigi
Unit Price (Japanese Yen) per liter/s)	6,288	3,900	1,550	2,970	3,800

Source: The River Law Enforcement Ordinance at each prefecture

# 4. Water Distribution during Drought (1)

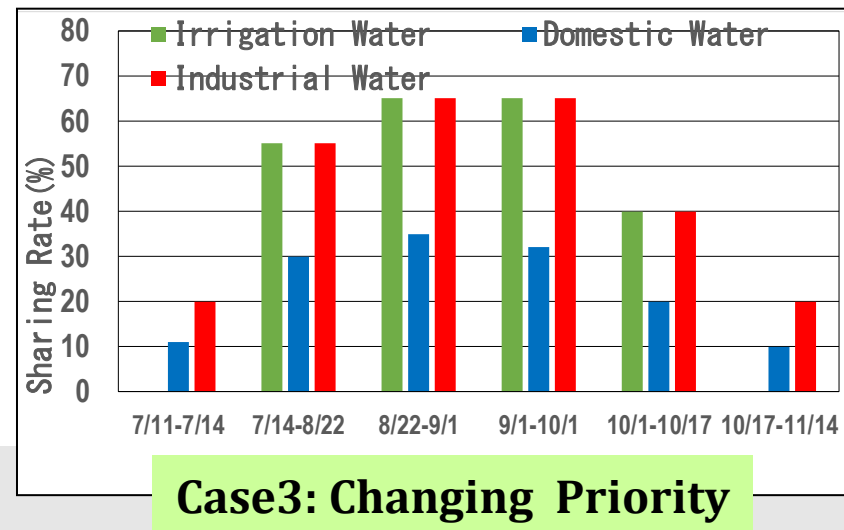
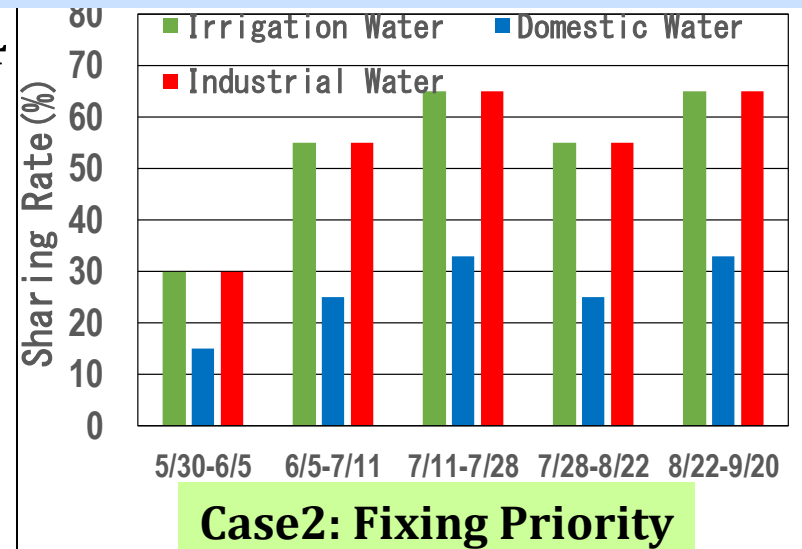
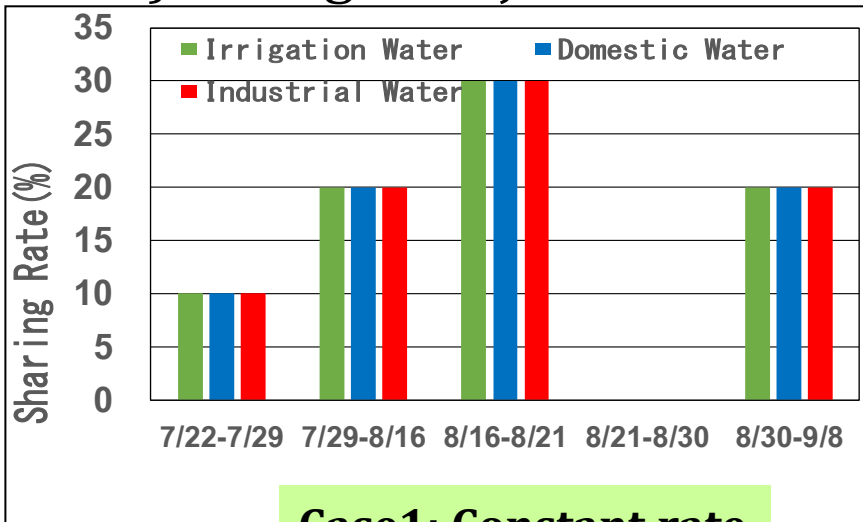
## (1) Drought Coordinating Committee



# 4. Water Allocation during Drought (2)

## (2) Example of Drought Adjustment

### 1) Drought Adjustment in 1994



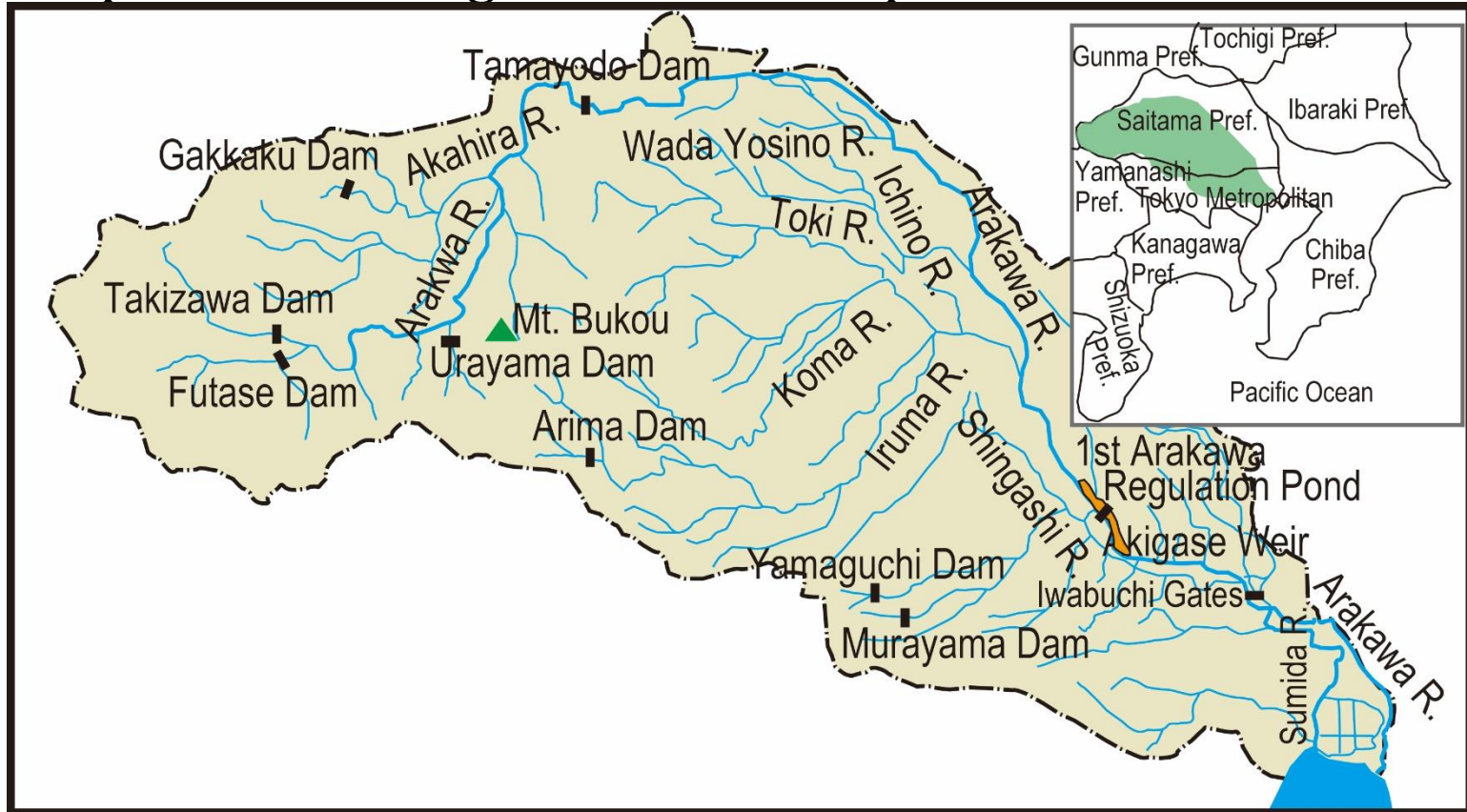
Source: a table in “Agricultural Water Management during Abnormal Drought, especially the Actual Condition of Water Distribution-Case of Drought in Western Japan in 1994” Nakagiri Takao, Ando Taichi, Hirayama Syusaku, Ishikawa Sigeo, Mauyama Syoich, Journal of Japan Society of Hydrology and Water Resources Vol.12, No.3(1999)



# 4. Water Allocation during Drought (3)

## (2) Example of Drought Adjustment

### 2) Response to Drought in the Metropolitan Area in 2017



Source: Prepared from "Outline of Arakawa River Basin and Rivers," MLIT

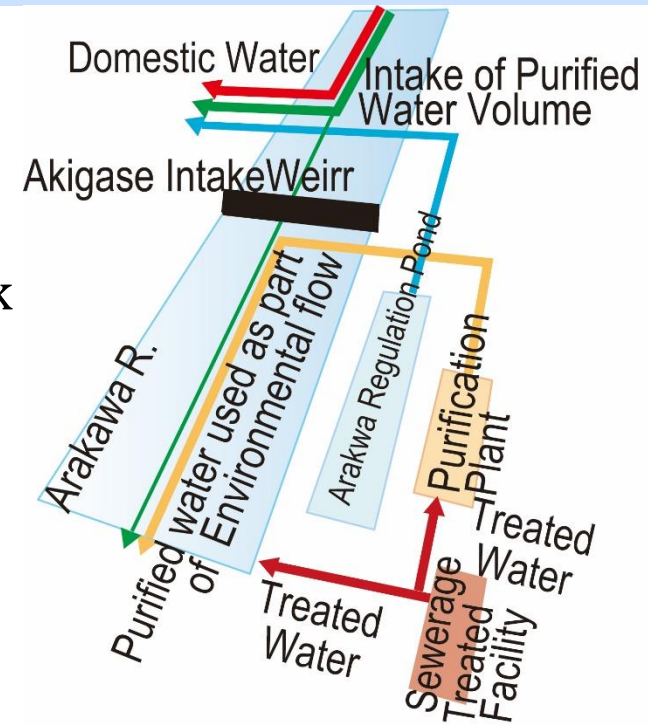
**Arakawa River is located at Tokyo and Saitama**

# 4. Water Allocation during Drought (4)

## (2) Case Study of Drought Adjustment

Countermeasure for Drought

- Operation of purification facility
- Increasing amount of stored water (4.7 times)
- Multiplex of water sources by wide area network (Tone River, Tama River)
- PR to promote water saving (Dam Card, Banner, display board, public car, TV show)



Source: Prepared based on “Outline of Arakawa Reservoir MLIT”

### Operation of Purification Facility



Display Board



Dam Card

## 6. Operation and Maintenance of Irrigation Facility (1)

### (1) History of Irrigation Water Management

Edo Era

Irrigation Association



- 1) Management of irrigation water distribution
- 2) Maintenance of Irrigation facilities

After 1908

Irrigation Association based on Irrigation Association Act.



Execution of Irrigation and flood protection projects

After 1949

Agricultural Irrigation Area Improvement and Management Association based on Land Improvement Act



Management of irrigation water distribution



O&M of irrigation canal

Agricultural Irrigation Area Improvement and Management Association: 5,040 nos. (2010)

## 6. Operation and Maintenance of Irrigation Facility(2)

### **(2) Operation and Maintenance of Irrigation Facilities and Water Distribution by the Farmers' Association**

- To manage Irrigation facilities
- To perform facility and maintenance and renovation
- Member: farmers in the irrigation area
- Required Cost: Levy from the members
- Projects by the Farmers' Association: subsidies from governments and some cost pay by farmers
- Tax exempted due to highly public organization

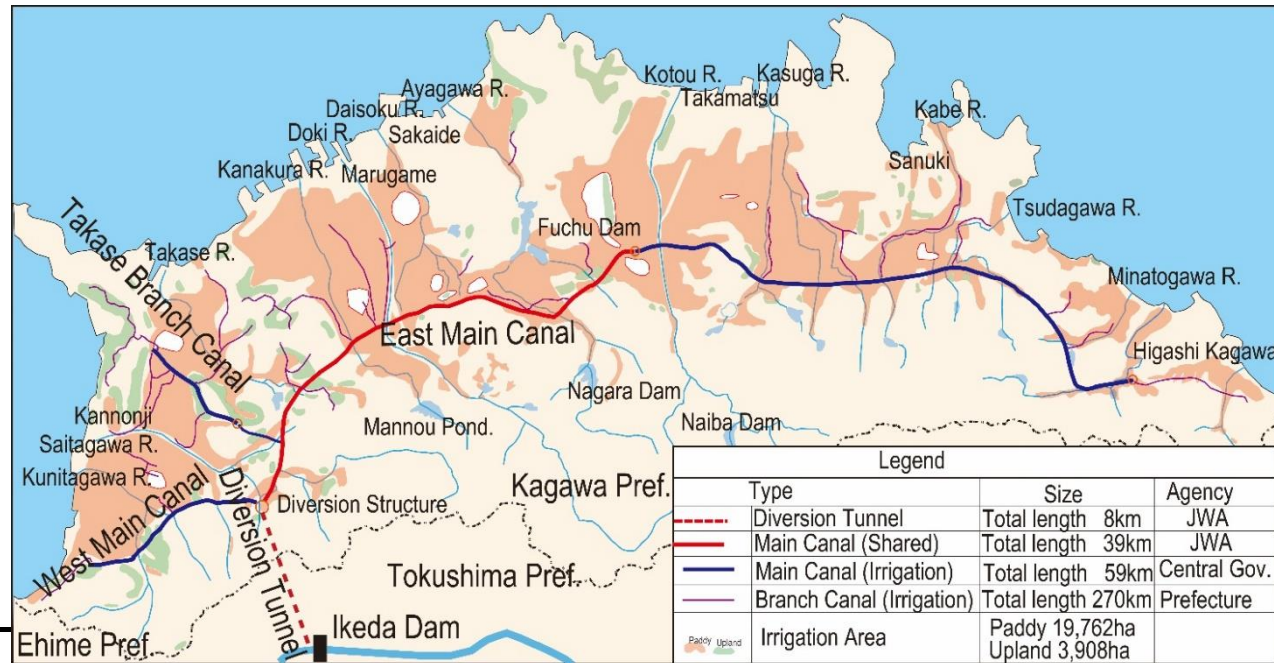
## 6. Operation and Maintenance of Irrigation Facility(3)

### (3) Distribution of Irrigation Water

#### Example: Farmer's Association of Kagawa Canal

Role :

- 1) Maintenance of Levy system
- 2) Collection of Levey
- 3) Water distribution management
- 4) Facility management
- 5) Implementation of contracted projects
- 6) Coordination of state-owned land improvement project



Source: Project Research Team prepared based on “Yoshino River Comprehensive Development, Location Map of Kagawa Canal, Kagawa Prefecture”

### Location Map of Beneficiary Area of the Kagawa Canal

## 6. Operation and Maintenance of Irrigation Facility(4)

### (3) Water Distribution of Irrigation Water

#### Example: Farmer's Association of Kagawa Canal

- Management area is a wide area and number of patrol staff is not enough.
- ➔
- Patrol system was introduced in 2007 (Provision of information from residents)  
Registered Patrol group: 17 groups  
(164 local residents, 12 agricultural civil engineering design associations, 5 fire-fighting organizations)

## 7. Lessons Learned (1)

(1) To ensure an orderly water use based on the history and practices of water resource management, each country should establish a water rights system.

Water distribution could induce an increase in tension and conflict between areas and users. In the past, Japan had experienced violent disputes over the distribution of irrigation water. At the time of the establishment of the modern legal system, the government recognized irrigation water as a customary water right and permitted it continue as before. A new licensed water right was granted according to the potential of the water resources. If new water is not available, development of a storage facility is required to acquire new water rights.

## 7. Lessons Learned (2)

### (2) Institutions should be developed to manage the water rights.

It is ideal for one organization to manage the water for the entire river basin. Management organizations must formulate procedures, criteria, and guidelines for permitting water rights. The organization also needs to monitor licensed water intake. The Minister of Land, Infrastructure, Transport and Tourism and prefectural governors are responsible for managing water rights in Japan.

### (3) Governments should manage the water rights for water use that change over time.

Water use changes by increasing domestic and industrial water due to urbanization and industrialization and by decreasing irrigation water. In addition, people's concerns have changed from development to environmental conservation. Governments must revise policies to respond to these changes.



## 7. Lessons Learned (3)

(4) Water resources can be used effectively by establishing a system for the transfer of water rights.

The demand for irrigation water is decreasing, and urban water use is increasing as the economy develops. Water rights can be transferred from irrigation users to urban users, expecting the efficient use of water resources. Water rights trading with financial compensation is not practiced in Japan because river water is treated as a public good.

(5) To adjust water intake during drought, coordinating mechanisms are required.

In Japan, a coordinating committee composed of water users was established for each river basin. This committee determines the rules of intake reduction rates for every user based on the consensus formed among water users with the spirit of mutual concession. The rules vary by river basin, depending on the history and practices of water management. River management offices can provide the necessary information on meteorological and hydrological data and storage facilities, as well as facilitate discussions among water users.

## 7. Lessons Learned (4)

(6) Farmers' associations are indispensable to distribute irrigation water and maintain irrigation facilities.

Members of farmers' associations decide the rules for water distribution in the irrigation area and carry out maintenance and management activities independently in Japan. Farmers' associations also spend their money on maintaining and developing facilities, in addition to subsidies from the national and local governments.