

# Outline of Tone Canal Project



The views expressed in this presentation are the views of the author and do not necessarily reflect the views or policies of ADBI, the Asian Development Bank (ADB), its Board of Directors, or the governments they represent. ADBI does not guarantee the accuracy of the data included in this presentation and accepts no responsibility for any consequences of their use. Terminology used may not necessarily be consistent with ADB official terms.

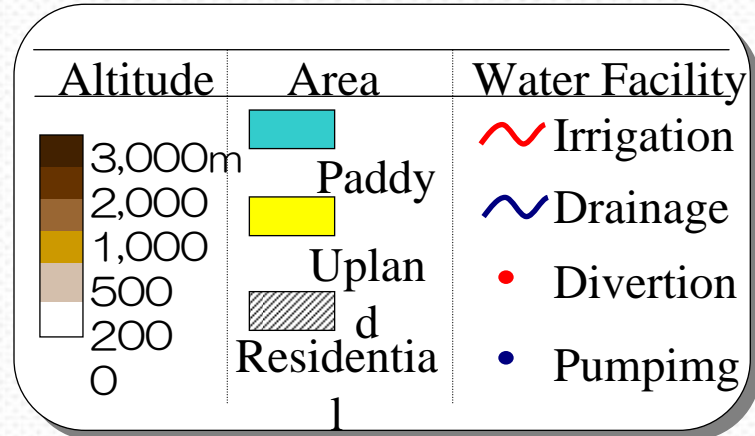
# 1. Outline of Project

# Location Map (Kanto plain)

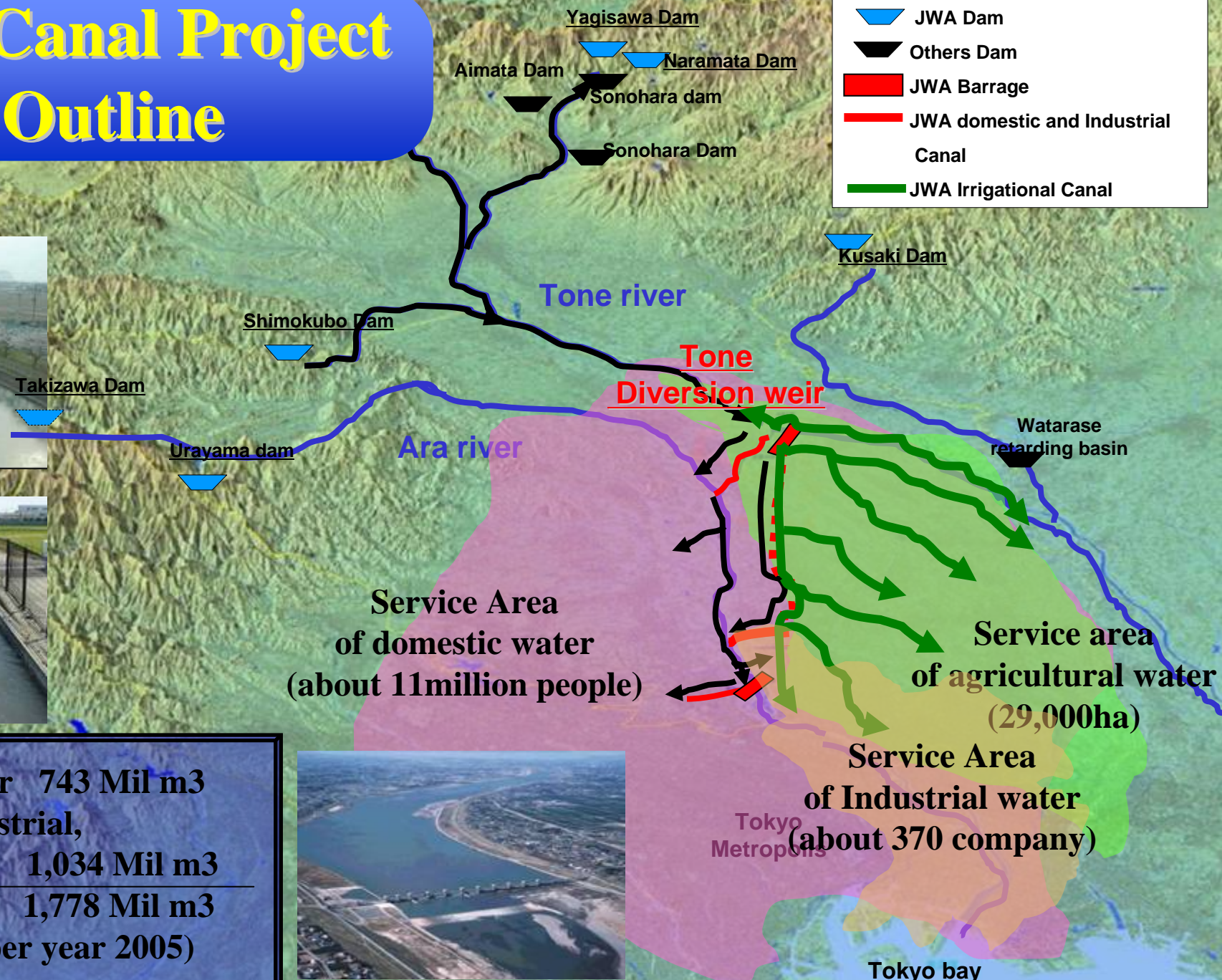


**Tone Canal  
service coverage  
of agri.(29,000ha)**

**Tokyo  
Metropolis**



# Tone Canal Project Outline



Industrial water	743 Mil m3
Domestic, Industrial, or etc water	1,034 Mil m3
<b>TOTAL</b>	<b>1,778 Mil m3</b>
	( per year 2005)

# Outline of the Tone Canal Project

- **Tone Canal Project was carried out during 1963 to 1968.**
- **Intake water quantity from Tone river was max 138m<sup>3</sup>/s ( 134m<sup>3</sup>/s, nowadays).**



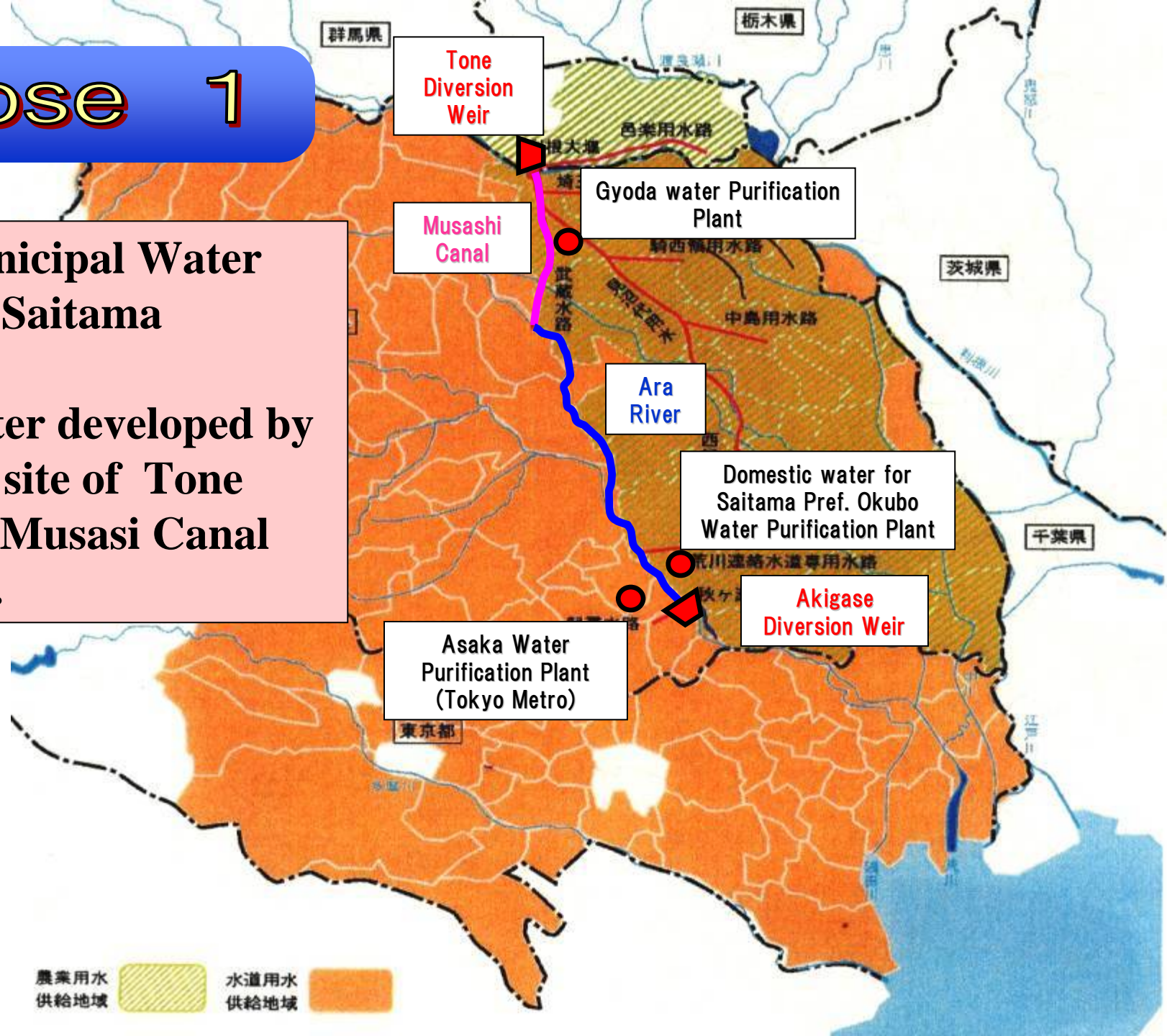


# 3 Purpose of the Project

- ① **To supply Municipal Water for Tokyo metropolitan, Saitama and Gunma prefecture, developed by dams in upper site of Tone River and Ara River.**
- ② **To supply Irrigation Water stable for 29,000ha paddy field in Tone River middle reach.**
- ③ **To supply Purging Water for Sumida River.**

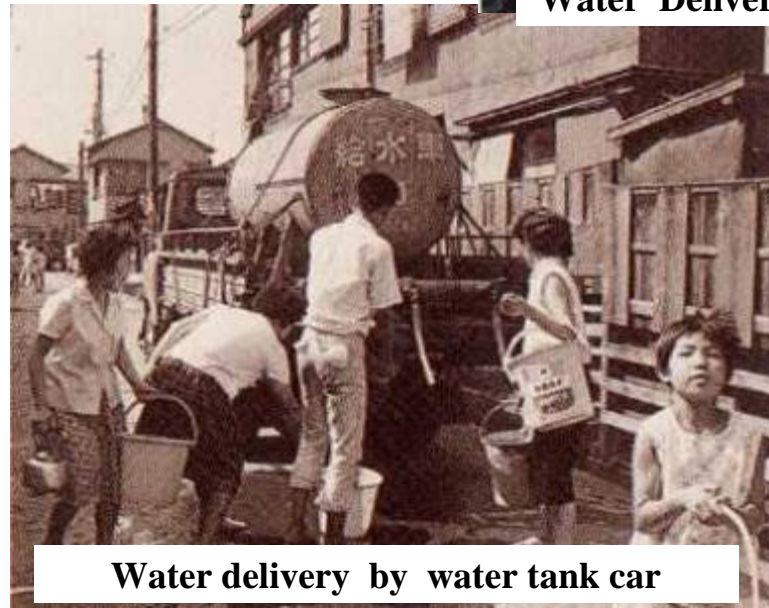
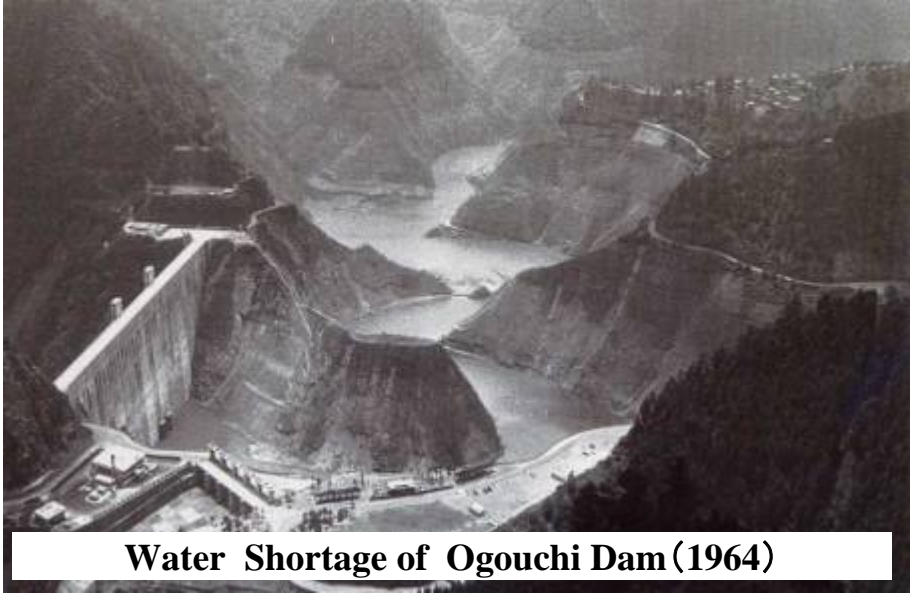
# Purpose 1

To Supply Municipal Water for Tokyo and Saitama prefecture.  
We convey water developed by dams in upper site of Tone River through Musasi Canal and Ara River.



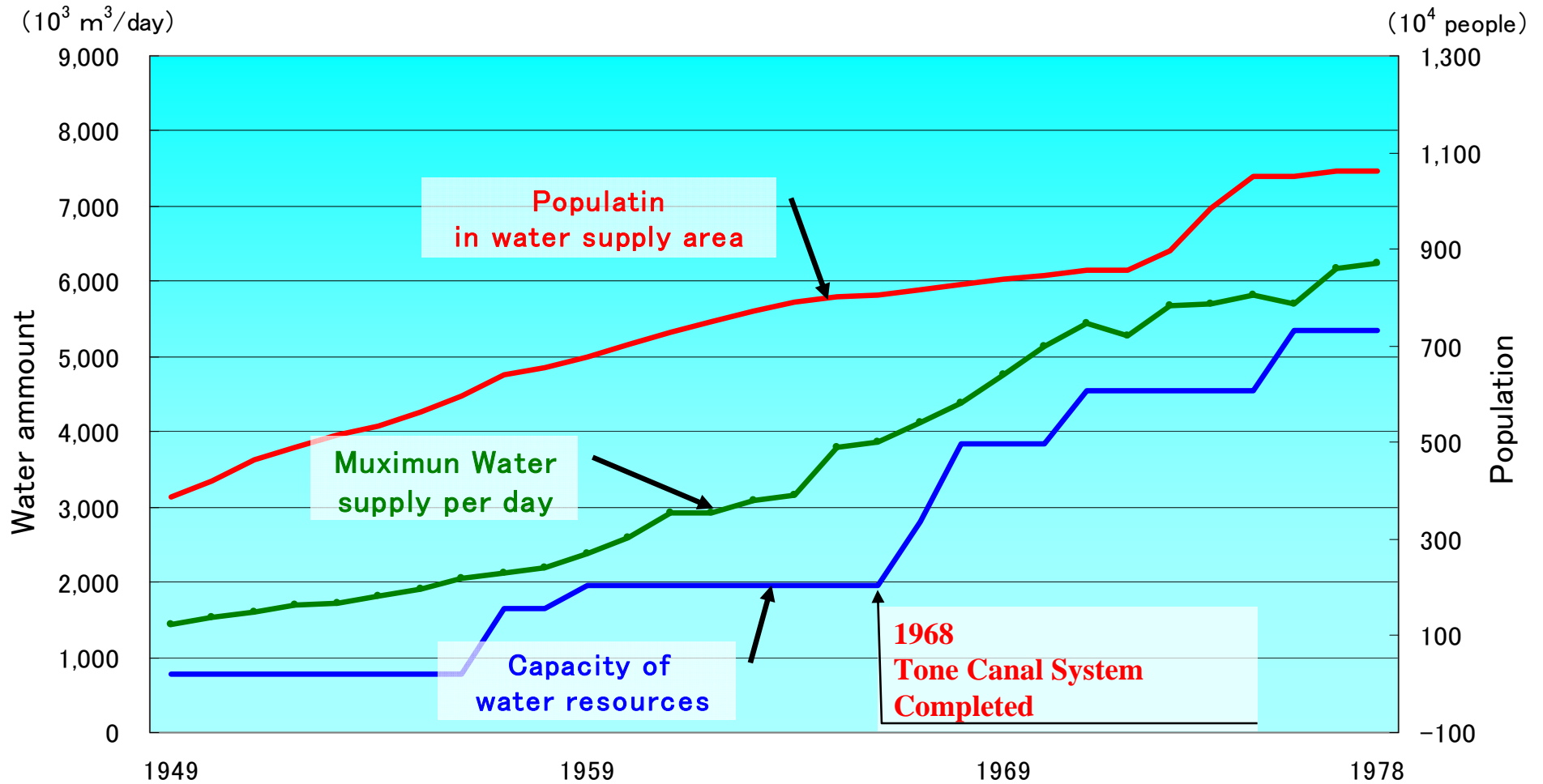


# “Tokyo Desert” or “Olympic Drought” in 1964



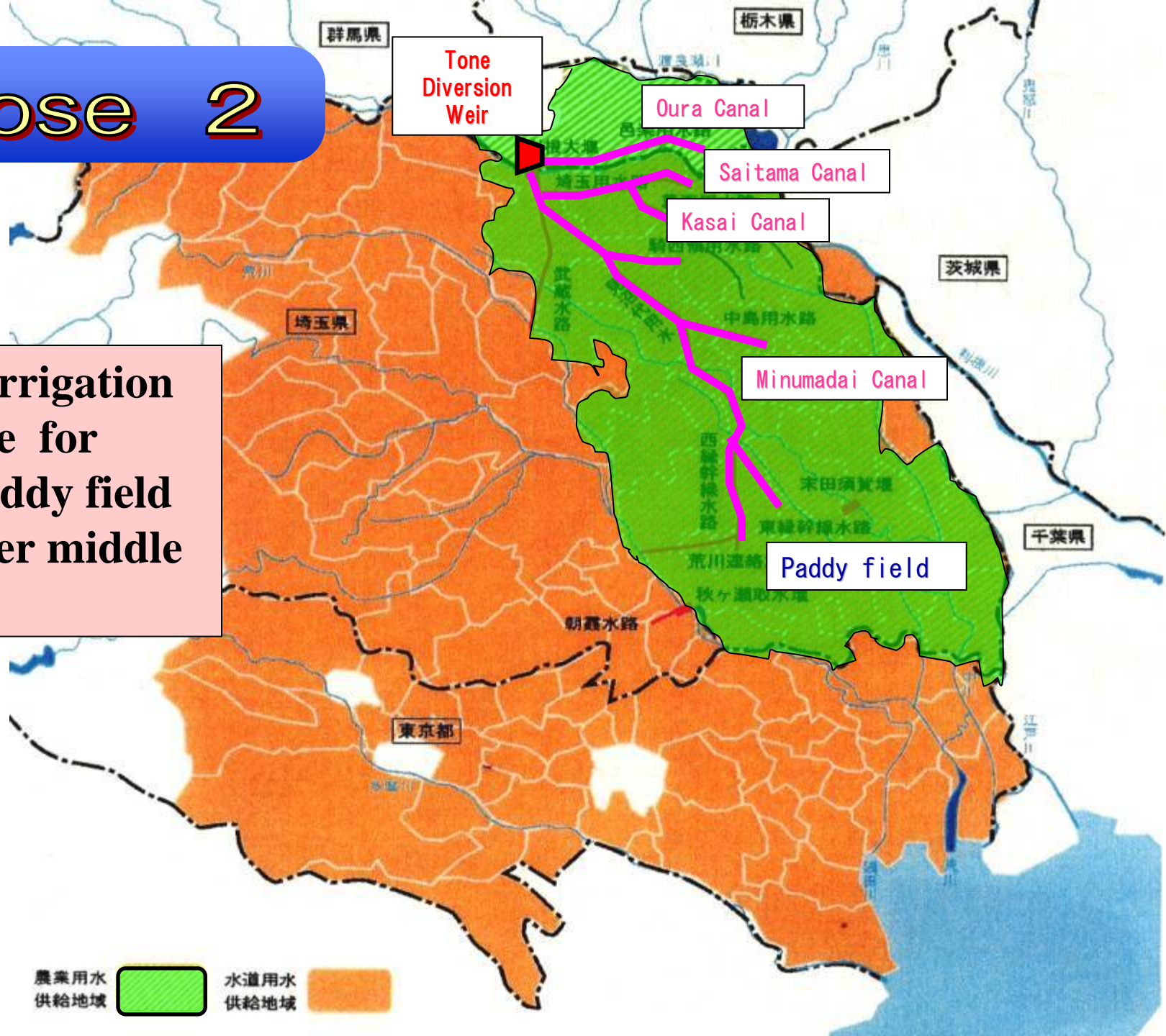


# Population growth and Water supply capacity in Tokyo



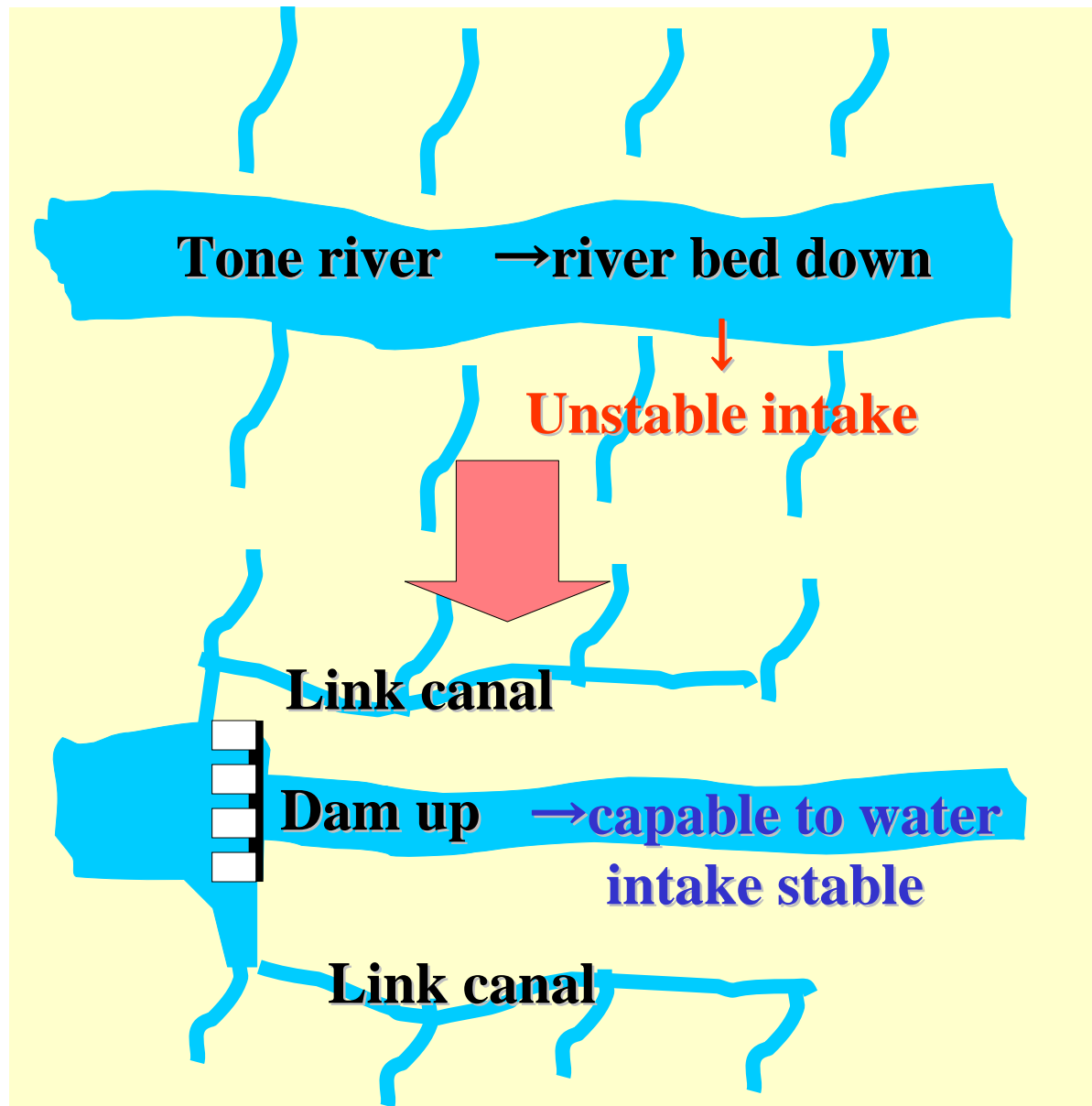
# Purpose 2

To Supply Irrigation Water stable for 29,000ha paddy field in Tone River middle reach.



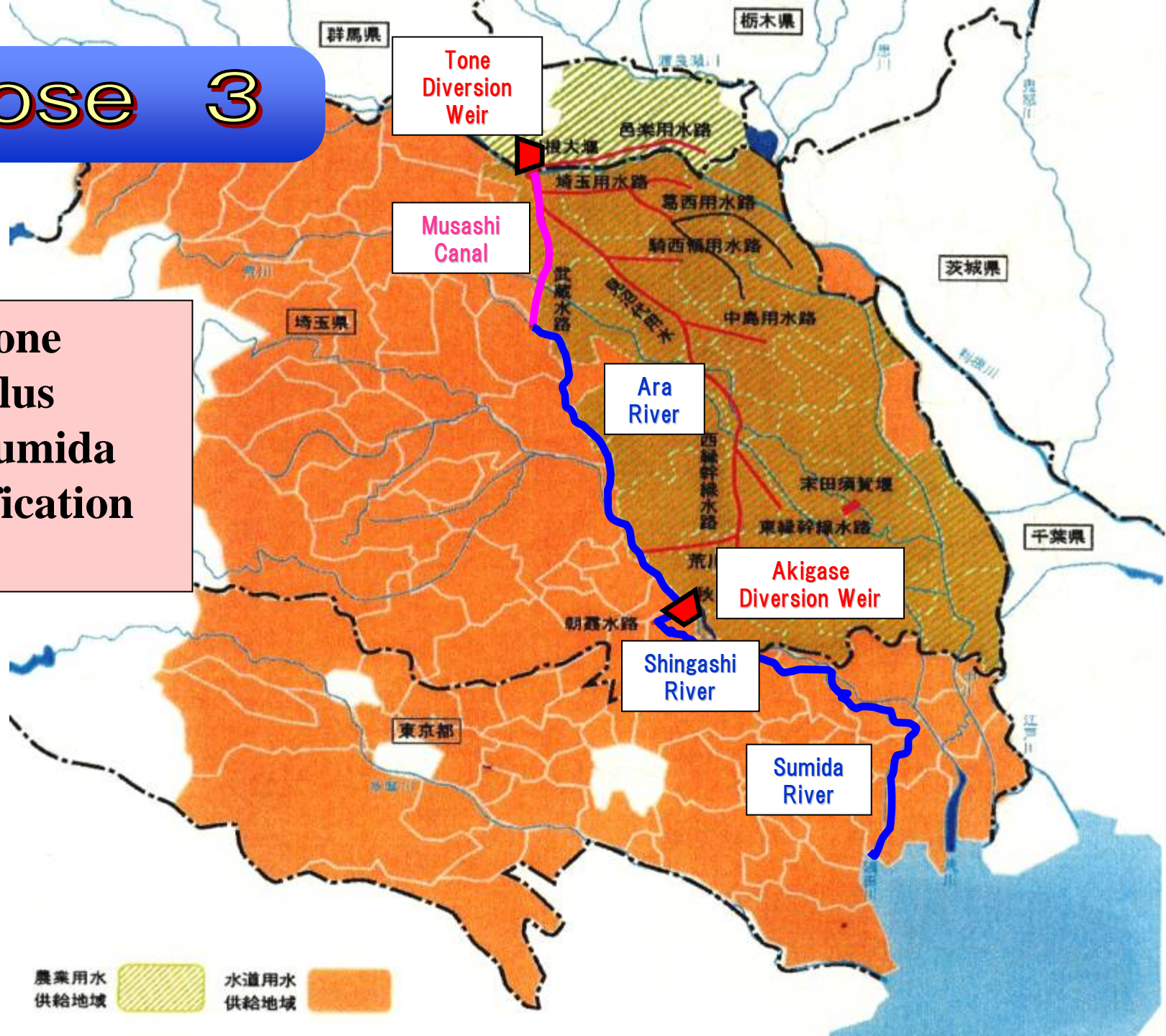


# Irrigation water's Intakes Unification



# Purpose 3

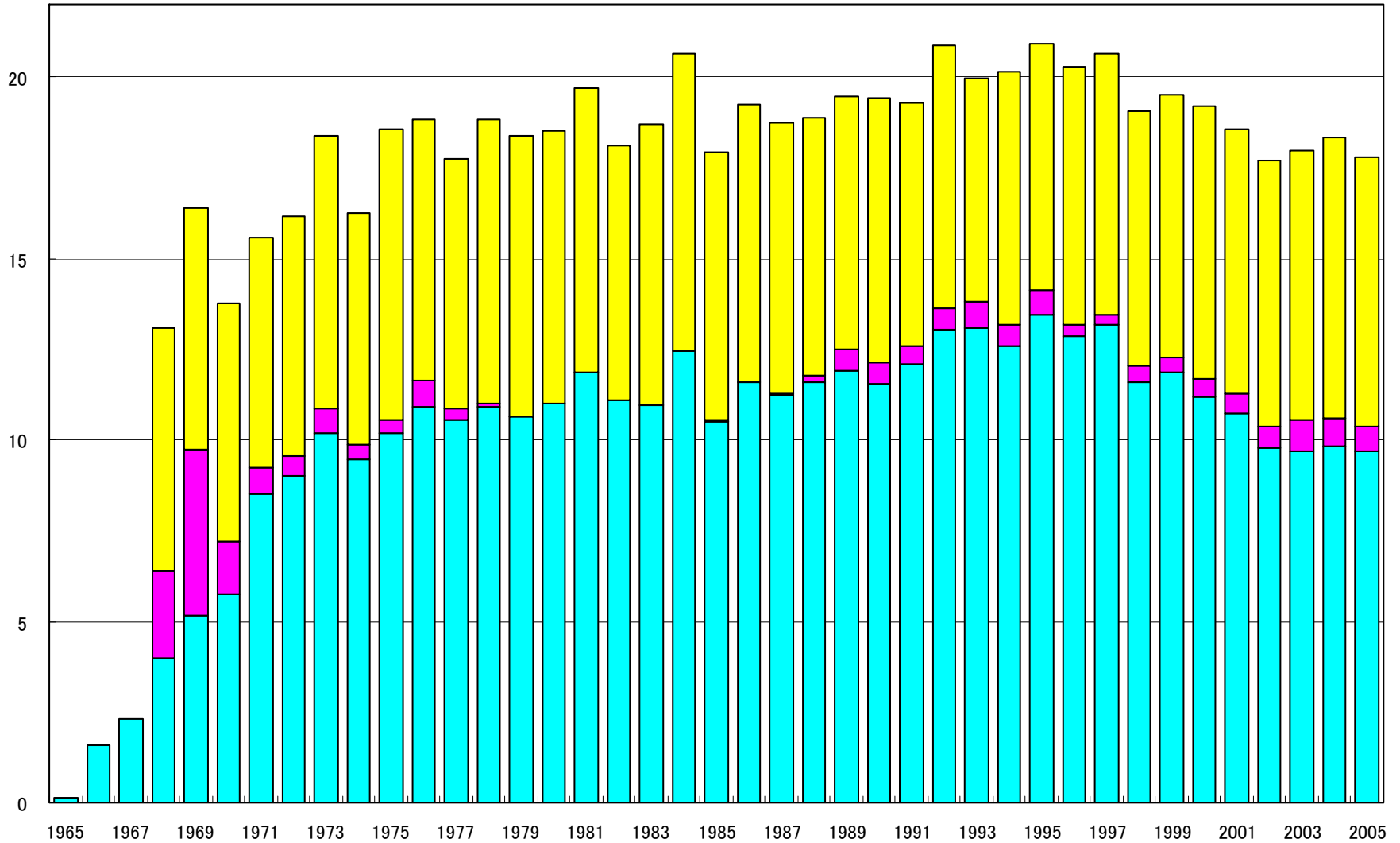
To Supply Tone River's Surplus Water for Sumida River's purification water.



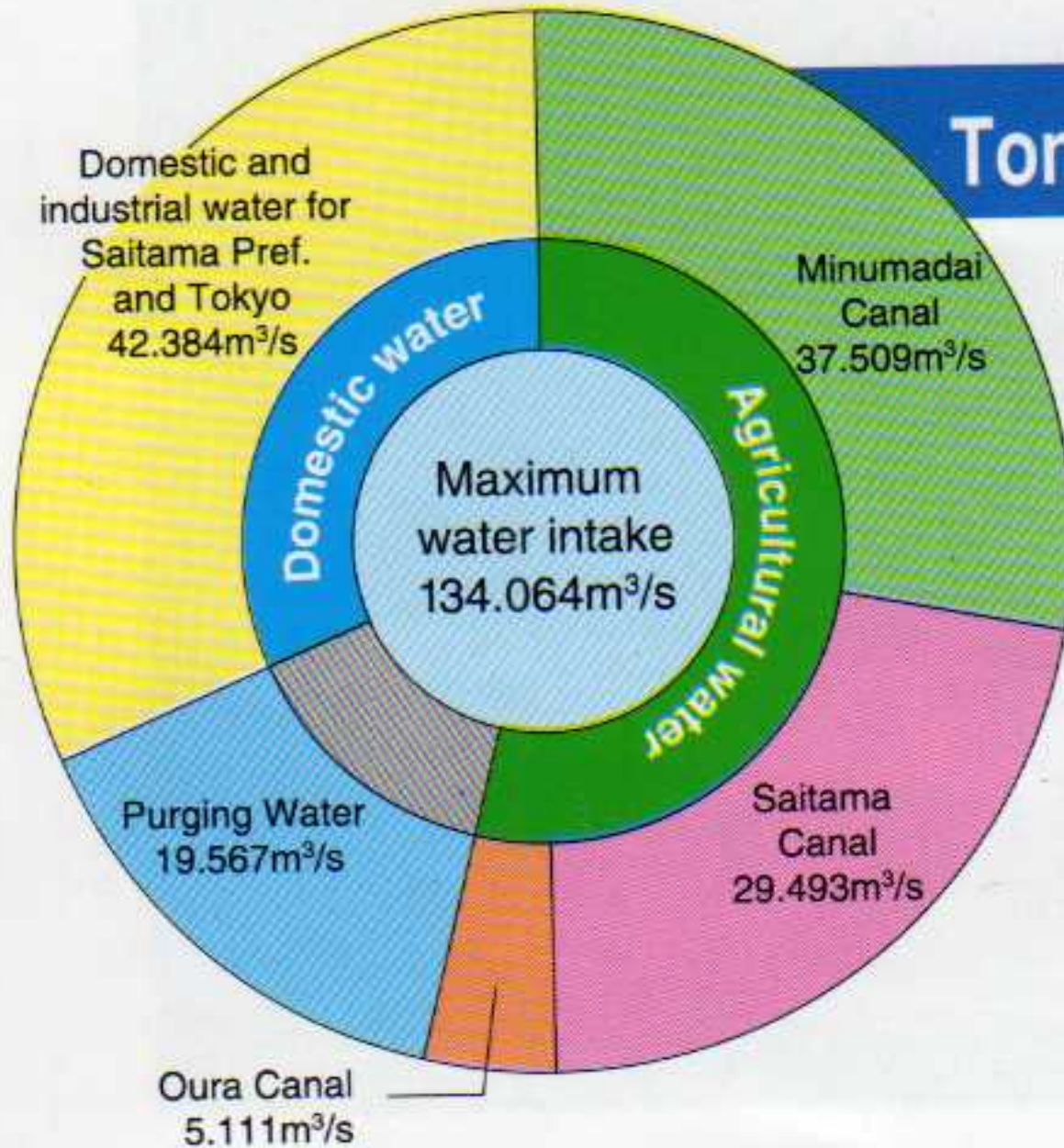


# Volume of Water Intake from the Tone Barrage per year

100million m<sup>3</sup>/year    ■ : Municipal    ■ : Purging    ■ : Agriculture



# Tone Diversion Weir



Domestic water: 42.384m<sup>3</sup>/s

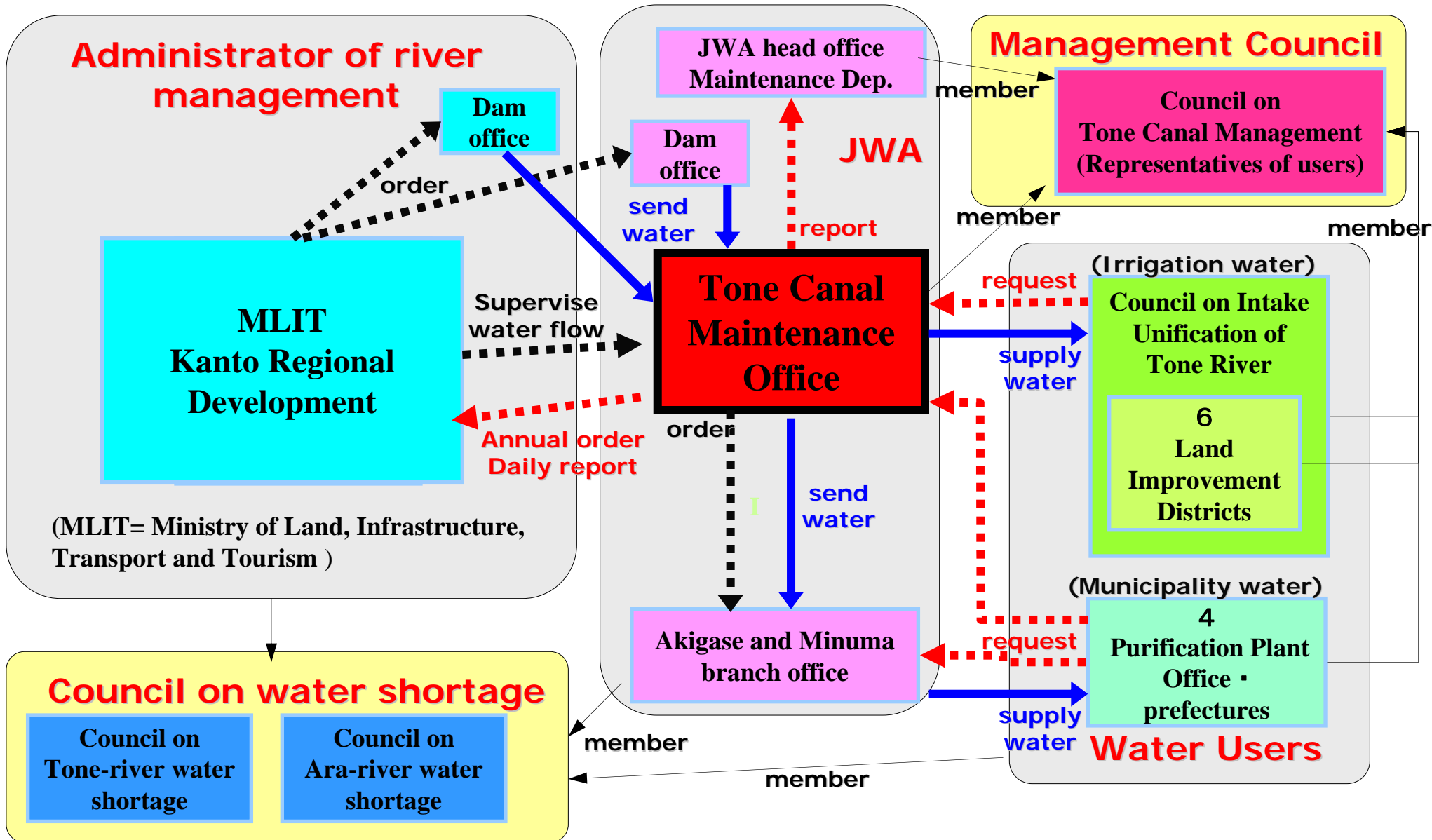
Breakdown;

{ Tokyo 26.593m<sup>3</sup>/s  
Saitama Pref. 15.791m<sup>3</sup>/s  
(Includes 4.815m<sup>3</sup>/s water for Gyoda Water Purification Plant)

Indus

## **2. Activities**

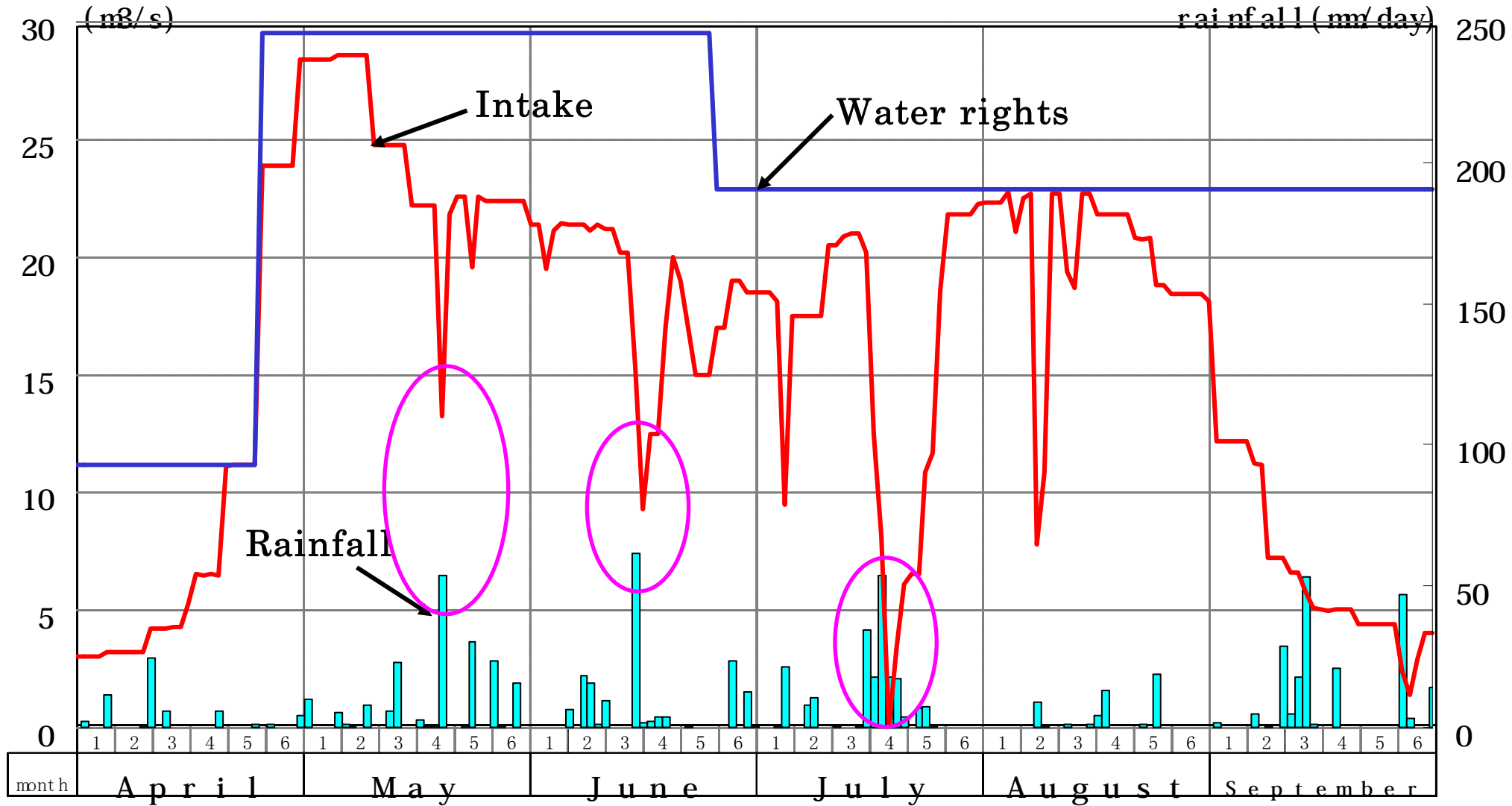
# Relationship of JWA, Water users, and Administrator







*Saitama Canal (Water amount of intake (m<sup>3</sup>/s), 2006)*



**Annual Amount of water 248,310,000m<sup>3</sup>**

# Supplying water for users properly, safely, stability



Refusing dusts in canal



Canal Gate Operation & Patrol



Inspecting gates



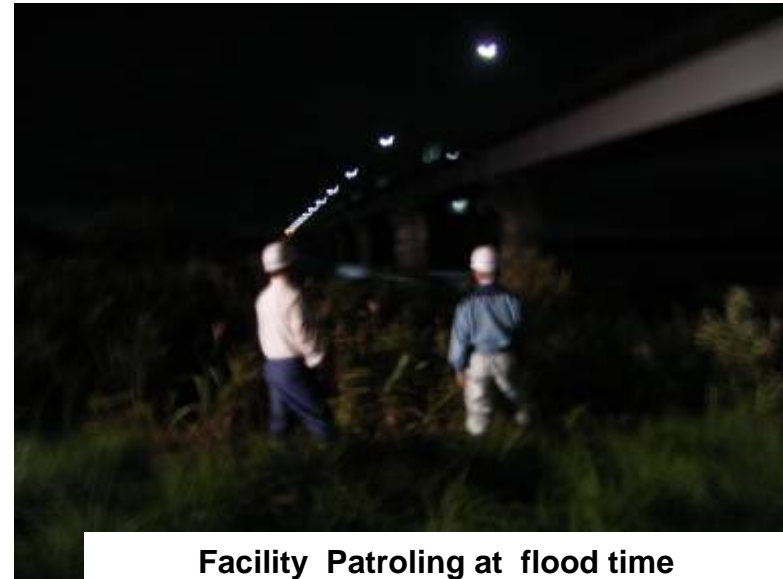
Operation-room (Monitor & Operation)



Inspecting Information equipment

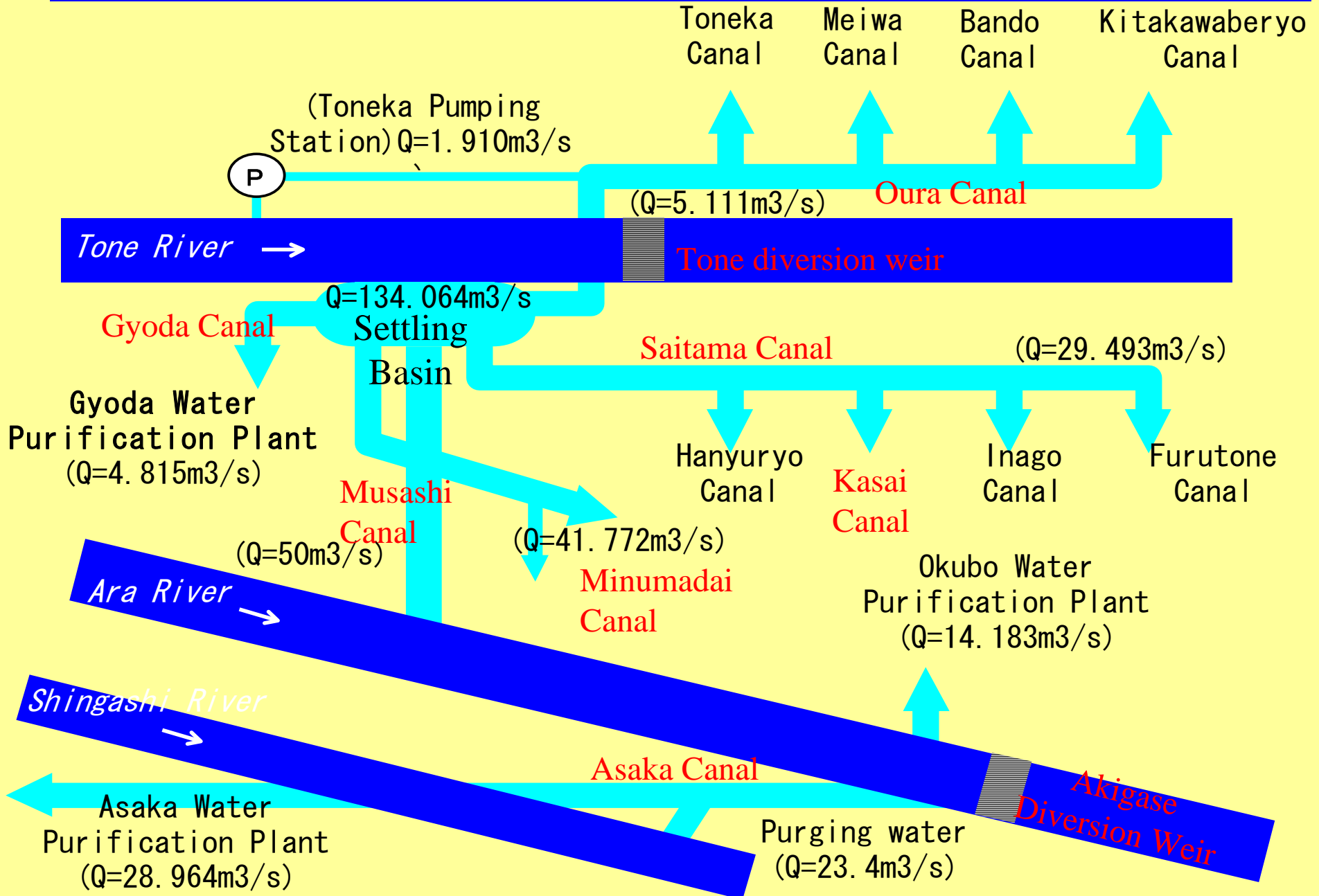


# Maintenance on preventing disaster

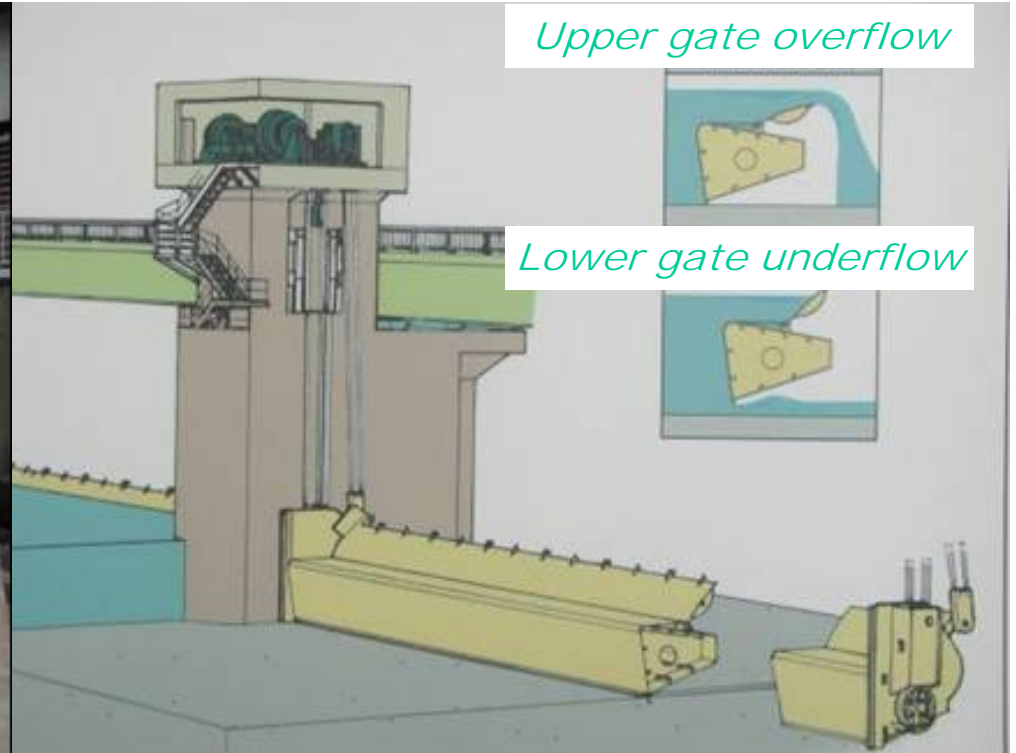


# **3. Facilities**

# Overview of the Facilities



# Tone Diversion Weir



*To intake water stably, we maintain upstream water level stably by using Regulating gates.*

# Suka Sluiceway crossing of the Levee



*We intake expected water stably by using the sluice gates.*



# Settling basin



*The very wide Settling basin plays a very important role to maintain water level stable to divide water properly.*





# Musashi Canal for City Water



*Musashi canal convey city water to metropolitan area.*





## Oura Pumping Station

$Q_{\max}=5.11\text{m}^3/\text{s}$   
pump  $\phi 900\text{mm} \times 2$



## Toneka Pumping Station

$Q_{\max}=1.91\text{m}^3/\text{s}$   
pump  $\phi 700\text{mm} \times 2$

# Irrigation Water (Oura Canal)



*We convey irrigation water and divert by natural water flow. So, we have check gates to maintain water level proper for diversion.*

# Facilities of Irrigation Canal



Diversion works and Branch canal.



Small diversion works



# Operation room



*Graphic panel in the control room helps the operator to monitor the intake condition and the water distribution of the canals.*

*We can tell-control each gate of main points of facility.*



# Information processing equipment room



*The computer system captures, stores, processes and displays a large amount of data, such as water levels, gate status, and flow volume, which are gathered at and transmitted from observation points.*



# Radio room



*Radio system send and gather data to the relative bodies and from each observation points.*

Radio steel tower



# Water control device







Gate of Canal

Gate control,  
water level-flow  
observatory



# **4. Activities for environment and ecology**

**( Improvement fishways of Barrage)**

**Tone Diversion Wier**



洪水吐

群馬県

調節

土砂吐

**No.3 Fishways**

取水口

**No.2 Fishways**

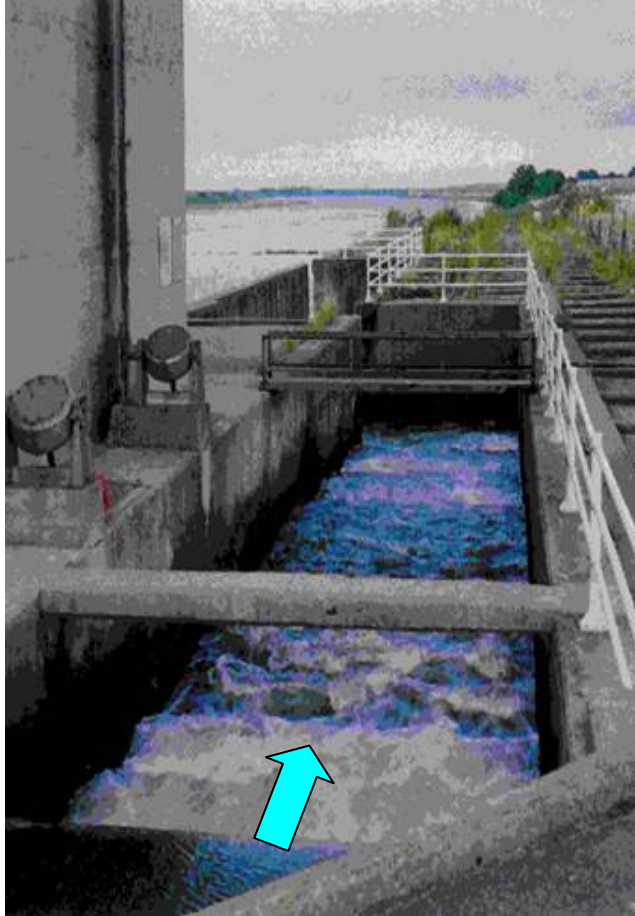
**No.1 Fishways**

**Downstream  
bed protection works**

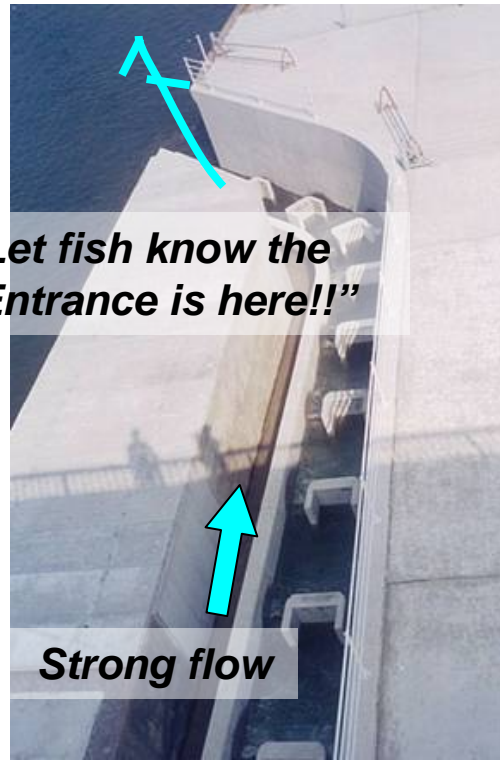
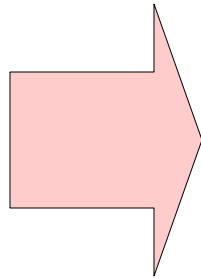


埼玉県

# Improvement of fishways



**Old Type**  
**(Too rapid for fish to swim up the flow)**



**After Improvement**



# Main Target Fish

**Ayu** ... a migratory species indigenous Japan



## Salmon

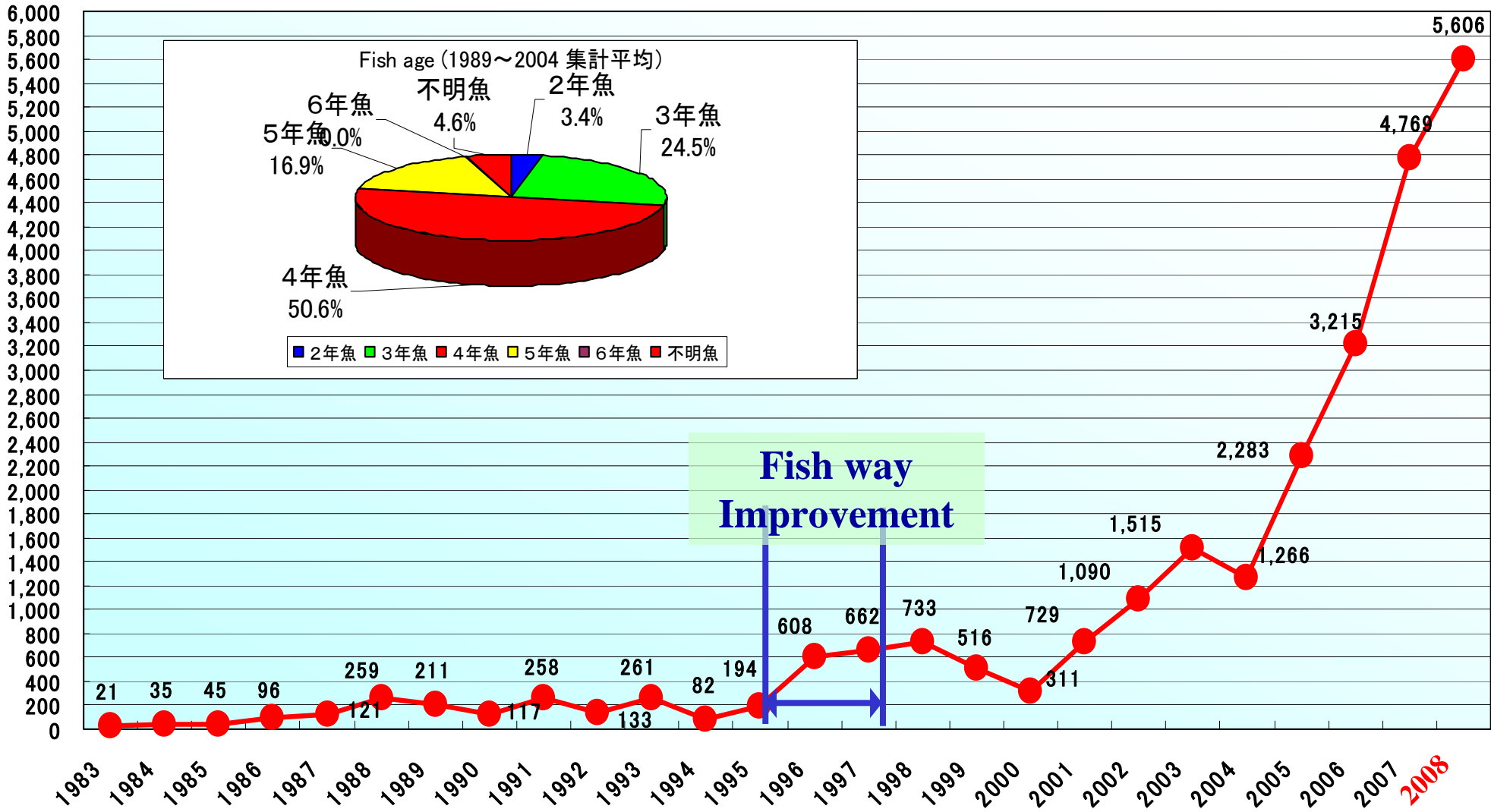






# Number of Salmon by years through fishways of Tone Wier

遡上数





# Tone Diversion Weir

Water level-flow  
observatory

Gunma Prefecture

Flood gate    Regulating gate    Sediment flushing gate

No.1 fishways

Saitama Prefecture

## Tone Diversion Weir

Weir crest length:691.7m

No.of gates:12

To intake water stably,we maintain  
upstream water level stably by using  
Regulating gates.

## Intake crest

Intake crest length:124.8m

Max.water intake:

134.064m<sup>3</sup>/s

(Municipal Water,Irrigation  
Water,Purging Water)

## Suka Sluiceway

No.of sluiceways:3main,3sub

Sub-flood gates of Sluiceway  
are automatic control to  
regulate water level of  
settling basin.

# Settling basin

## Oura Canal

Oura Canal is about 16.6km length and supplies agricultural water to a 2,000 hectare of land..

## Saitama Canal

Saitama Canal is about 17km length and we divide water to Kasai Canal on the way.

## Musashi Canal

The Musashi Canal is approximately 14.5km in length. It was created to divert water from the Tone Diversion Weir to the Ara River.

## Minumadai Canal

Minumadai Canal is about 61.3km length. The Canal supplies agricultural water to a 15,400 hectare of land and domestic water to Saitama and Tokyo.

## Radio steel tower

The various information on situation of river upstream and Tone canal are exchanged with the external organization using radio equipment.

## Gyoda Canal

Saitama Canal

Extending from the left bank (Gunma side) of the Tone River, this canal provides water from the Diversion Weir.

## Settling basin

Entire length 245m, effective length 127m, 100m wide, water 4.5m deep, settling 1m deep, average flow rate 0.4m/s  
The very wide Settling basin plays a very important role to maintain water level stable to divide water properly.

## Main diversion gate

Water for the Minumadai Canal, Saitama Canal and Musashi Canal is taken in through the intake gate and passed through the settling basin to the main diversion gate.

## Gyoda Canal intake Gate

Gyoda Canal is diverted directly from the settling basin.

