Contributing to NARBO with Japan's Technology and Experience in Integrated Water Resource Management

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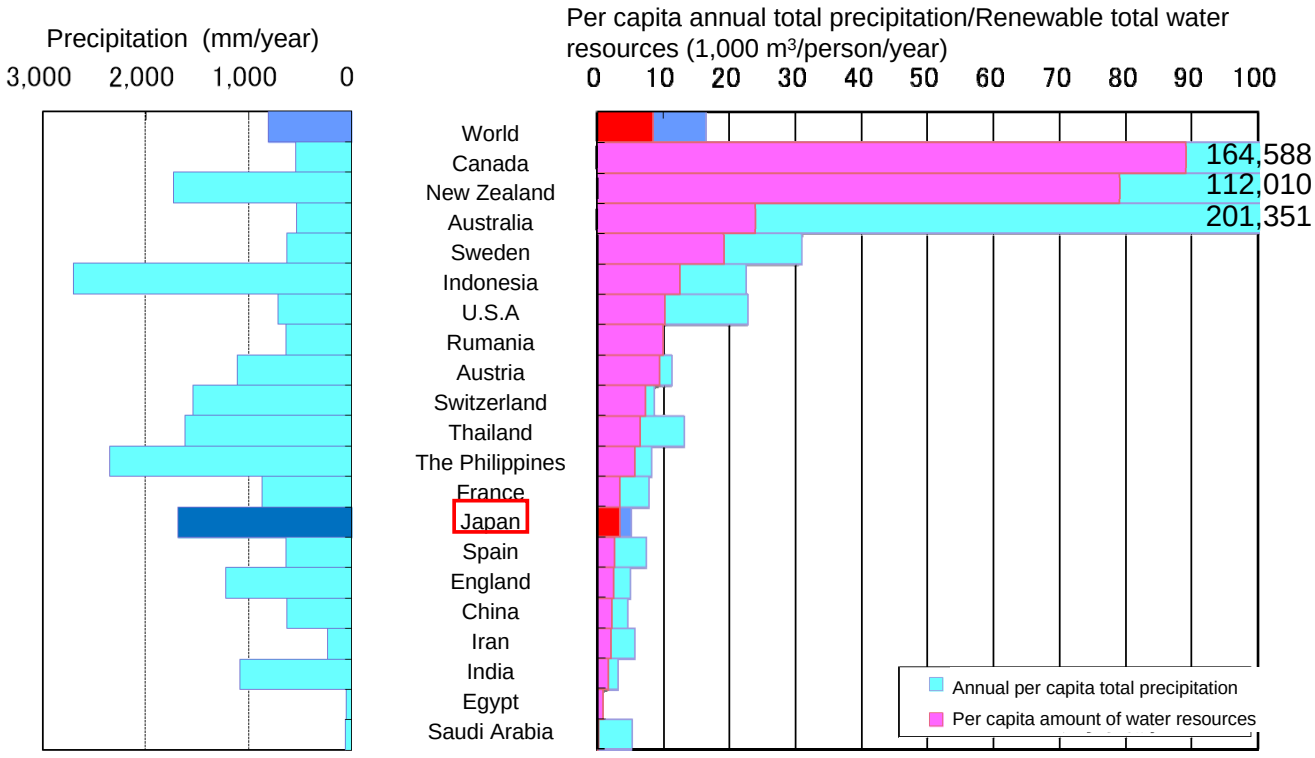
May 18, 2013

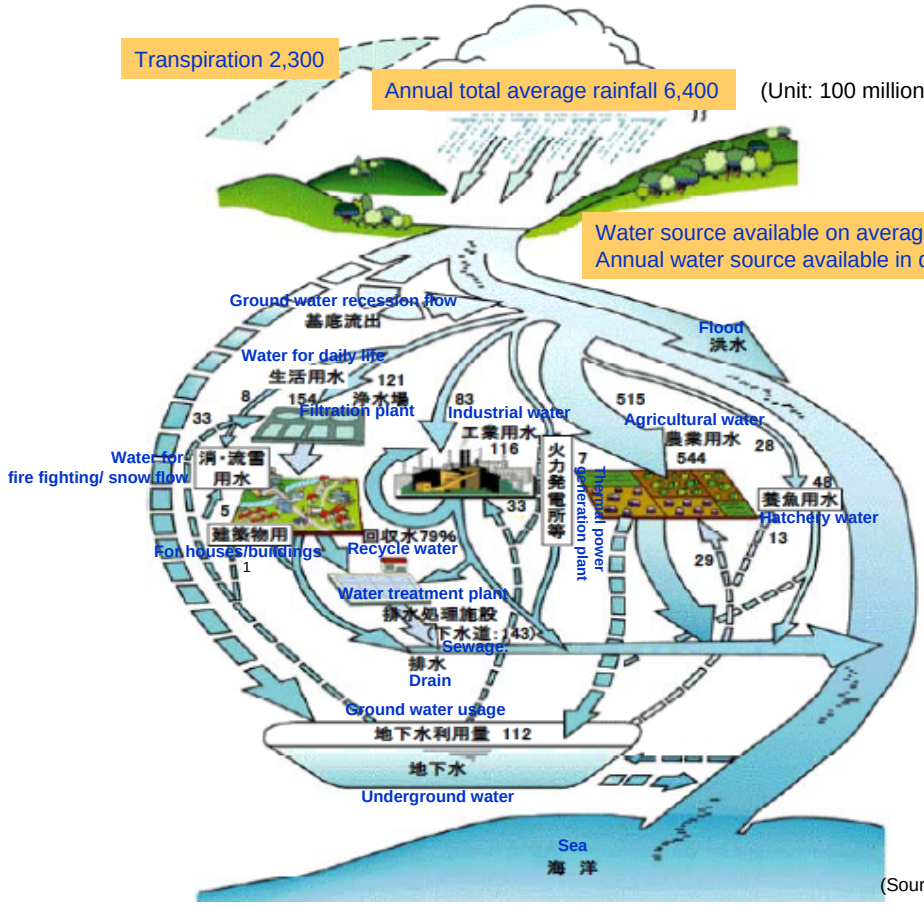
The Amount of Available Water Resources

MLIT



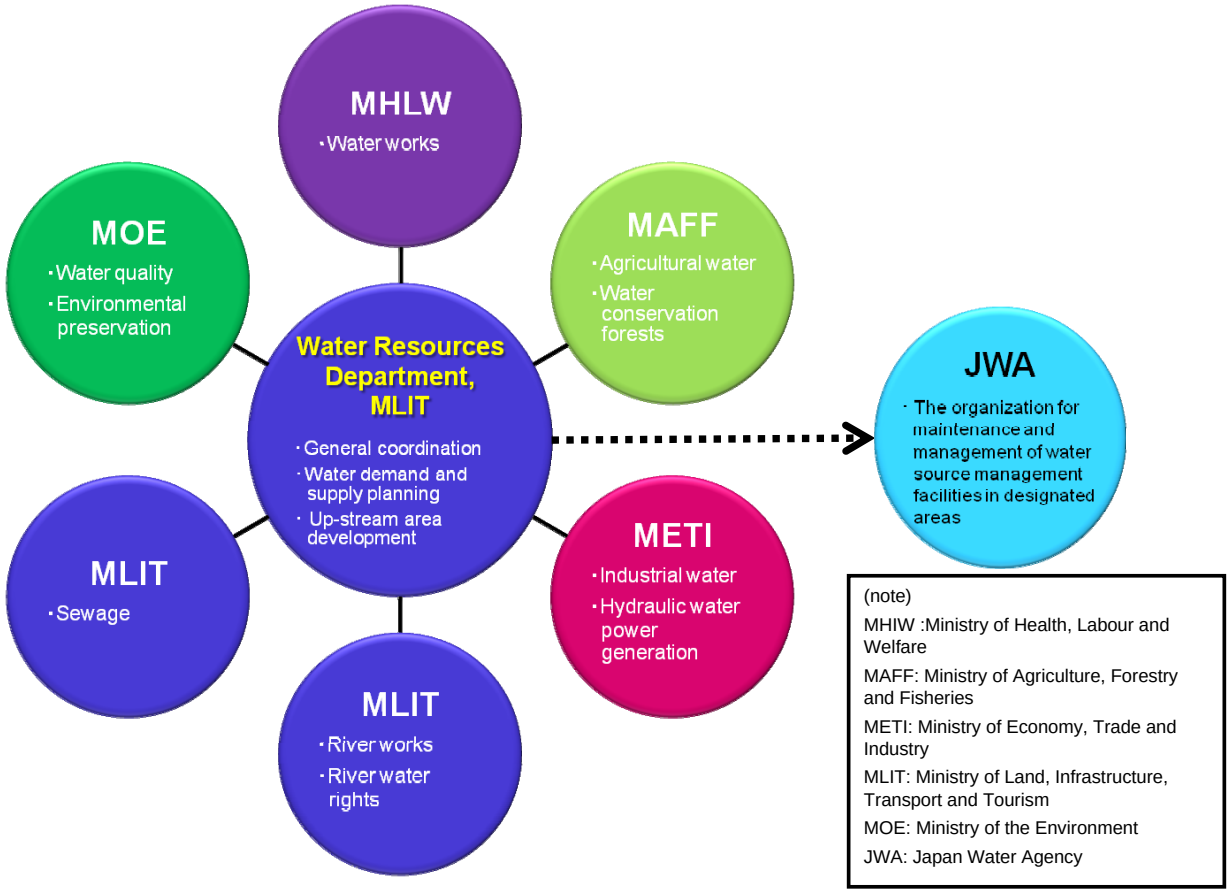
1. The above was prepared by the Water Resources Department of the Ministry of Land, Infrastructure, Transport and Tourism, according to "AQUASTAT" by the FAO (Food and Agriculture Organization of the United Nations).
2. "Amount of water resources" is derived from a calculation the amount of flow from other countries and added, and the flow subject to accords and treaties are deducted from the "amount of available water resources." Japan's population refers to "Census" (2005) by the Statistics Department of the Japan Ministry of General Affairs . The average rainfall and the amount of water resources are the average of the period from 1976-2005, as prepared by the Water Resources Department of the Ministry of Land, Infrastructure, Transport and Tourism.

Japan's Water Balance



(Source) Water Resource in Japan 2011

Organizations and Roles of Japanese Government Administration for Water Resources



(note)

MHIW :Ministry of Health, Labour and Welfare

MAFF: Ministry of Agriculture, Forestry and Fisheries

METI: Ministry of Economy, Trade and Industry

MLIT: Ministry of Land, Infrastructure, Transport and Tourism

MOE: Ministry of the Environment

JWA: Japan Water Agency

■ Since 1950
○ Fast development of industries
○ Sharp increase and concentration of urban population
○ Improvement of water quality for living

○ Sharp increase of water demand
○ Adverse water shortages

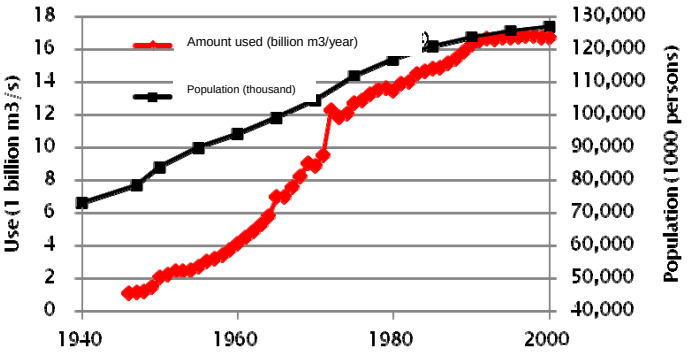
○ To secure constant water supply
○ Integrated management and efficient development of rivers
○ Timely funding

The Water Resources Development Promotion Law (1961)

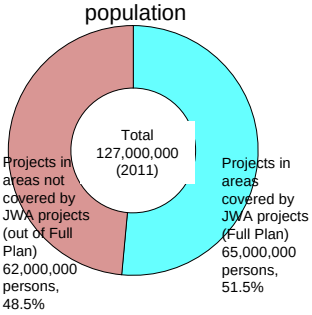
- **Basic policies for integrated development and use of water resources-**

○ Designation of wide area under policy (to designate rivers running through multiple prefectures)
○ National government's "Basic plan for water rights of rivers nationwide" to facilitate achieving consensus among stakeholders

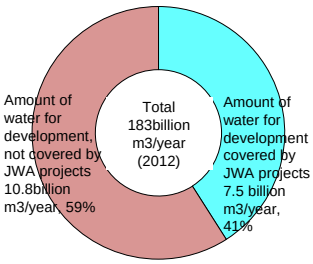
Population increase and water demands (tap water)



Ratio of the projects managed by Japan Water Agency to national population



Ratio of the amount of water for development projects managed by Japan Water Agency to the amount of water development for urban areas



Trends in New Water Policies

○ Current situation of water resources

Water resources development to cope with increased water demand

- Effective use of existing facilities
- Addressing new and emerging issues

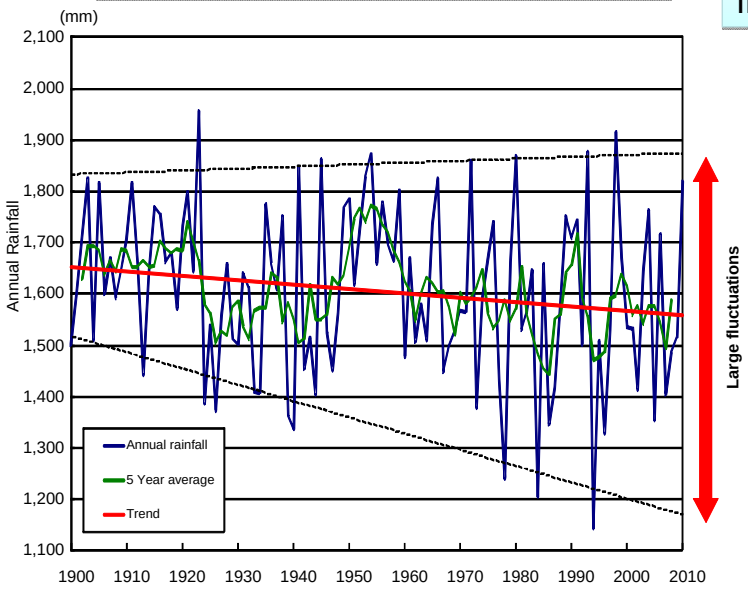
○ Trends in new water policies

- Risk management against adverse impacts from global warming
  Countermeasures against global drought caused by global warming
- Effective use of water resources
  Control ground settlements → effective use of ground water → visualize water cycle
- Development of healthy water cycle
  Necessary to achieve a sustainable society

○ Action: Integrated water resource management

Actions against Global Warning

Change in Annual Rainfall Over Time

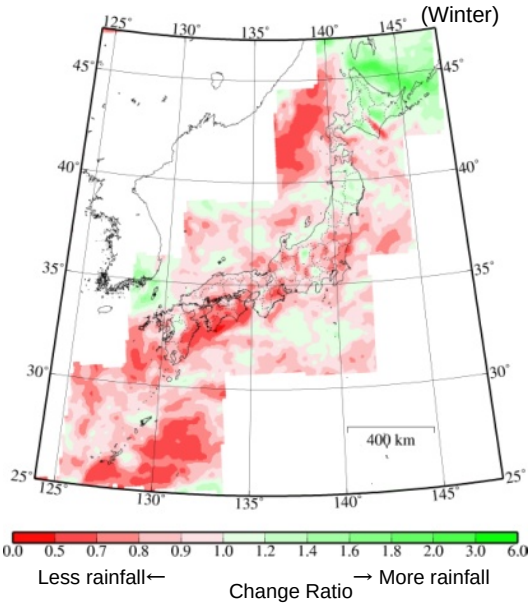


(Note)

1. Prepared by the Water Resources Department of the Ministry of Land, Infrastructure, Transport and Tourism based on the Japan Meteorological Agency database.
2. Calculated average of 51 locations of Japan nationwide.
3. The trend is per regression curve.
4. The number of observation points varies due to lack of data

(Source) Water Resources in Japan 2011.

Prospected Change Ratio of Rainfall, In 100 Years Time

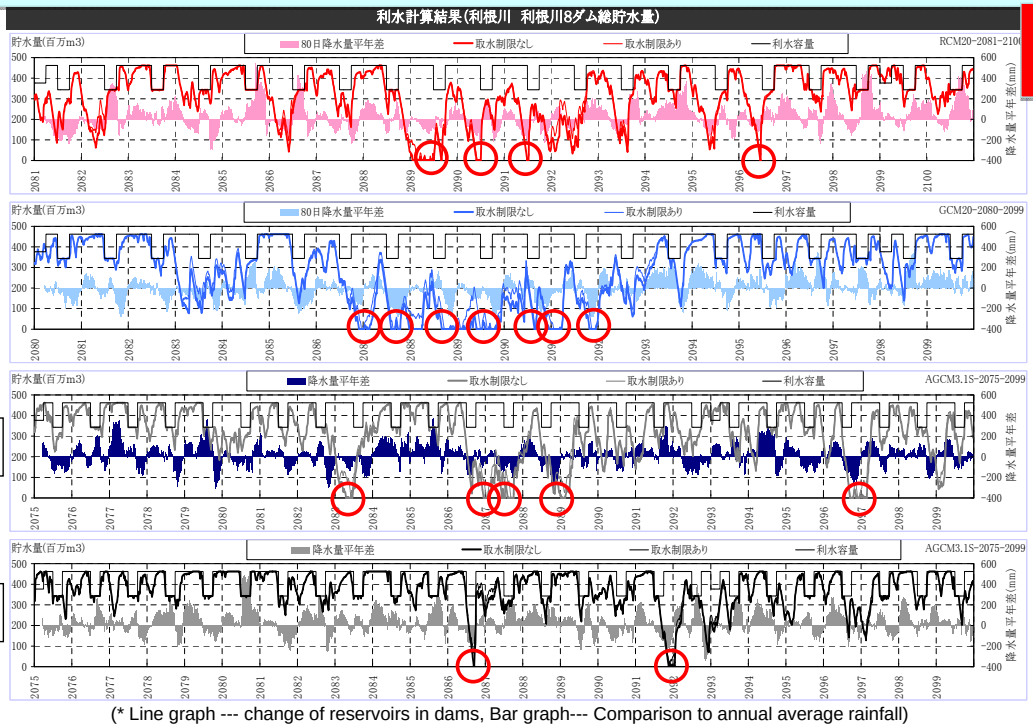


(Note) 1.
Change Ratio
= Future Rainfall per Period/Current Rainfall per Period

Studies on the Impact of Global Warming on Water Resources

Future Vision of Impacts of Global Warning on Water Reservoirs of Water Sources (8 Dams) in Tokyo Metropolitan area from 2075-2100

The following models show a significant drought (0 reservoirs)
: (GCM20 model shows 7 times in 20 years)



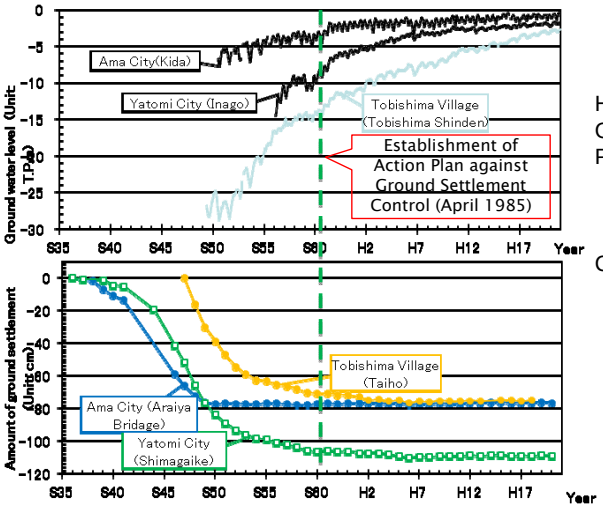
	Occurrence of drought (0
RCM20 (2081～2100)	4 times
GCM20 (2080～2099)	7 times
AGCM3.1S (2075～2099)	5 times
AGCM3.2S (2075～2099)	2 times

(* Line graph --- change of reservoirs in dams, Bar graph--- Comparison to annual average rainfall)

Potential Use of Ground Water

Damage to ground settlement

Nobi Plain: ground water level and ground displacement



High Growth Period

(Phenomenon of ground water) → (Social issues) → (Actions Taken)

Large collection of ground water → Occurrence of ground settlement → Enforcement of regulations on ground water collection

Current

Restoration of natural ground water level → Ground settlement controlled → Sustainable use

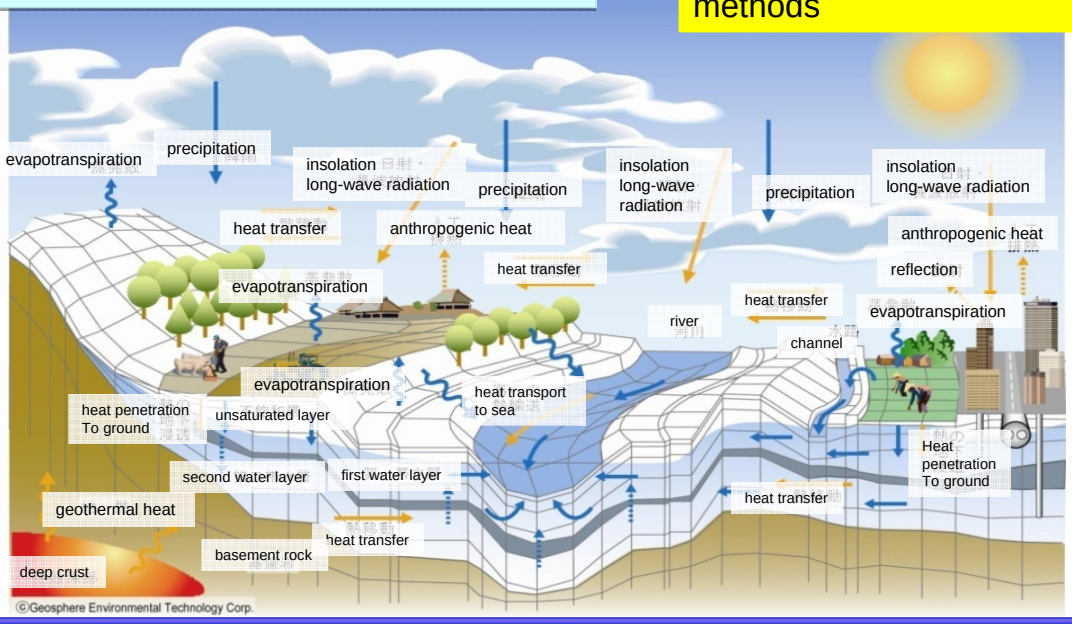
Ground settlement to occur once it goes over a limit.

Water Management Standards
For appropriate management of ground water level (collection).

Visualization of Water Cycle

Difficult to properly manage water: because it was hard to see conditions in a target area

→ "Visualizing model" to indicate water resource management methods



Water Cycle Visualizing Model
- A computer-based visualizing model to show water cycle around basins which were once concealed under the ground, including ground rivers
- The model enables a 4-D simulation for the future forecast of the ground water conditions, showing the surface and ground waters spatiotemporally

Example: The model shows a condition of ground water around a certain area, to see if it would be easily restored after a certain amount of water is collected. Such information can be the basis for decision-making for actions.

Establishment of Healthy Water Cycle Systems

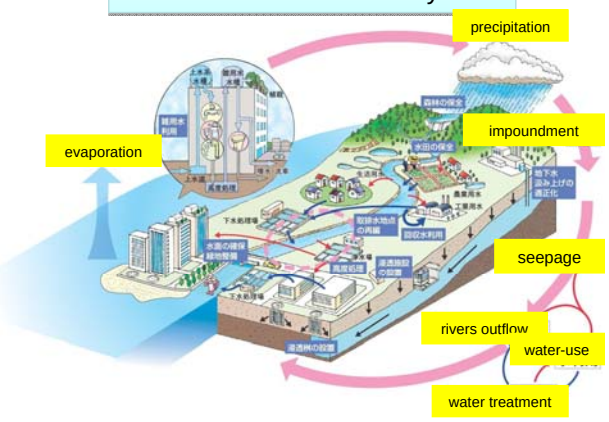
Impact factors on Water Cycle Systems

- Increase of impervious surface areas due to urbanization
- Decrease of rice paddies and forests
- Increase of water flow speed in case of floods due to redevelopment of river/down-stream areas
- Urbanization of communities
- Bypass to watershed leakage
- Collection of a large amount of water from rivers for agricultural use
- Delays in development of sewage systems and use of septic tanks
- Increase of amounts of water for treatment at water treatment centers
- Dependence of urban water on outer areas

Issues for Water Cycle Systems

- Higher risk of floods
- Deterioration of river environment
  - Decrease of river flow in a normal state
  - Deterioration of water quality in dry seasons
- Deterioration of water environment in basin areas
  - Loss of quality natural environment
- Basin areas vulnerable to drought

The first priority is to establish a healthy water cycle system to create a sustainable society.



Healthy Water Cycle System

Natural use of water along human's life

Well balanced

Water essential for preservation of the environment

Integrated water resource management

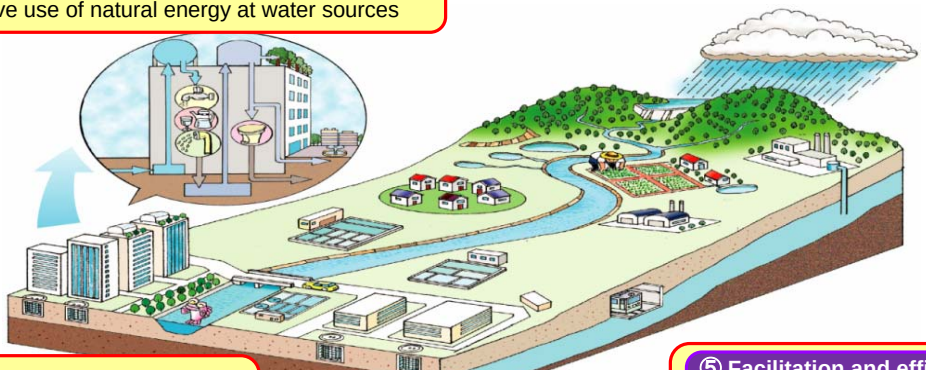
Actions Taken for Integrated Water Resource Management

Establishment, Operation. Maintenance and Management Facilities

- Refurbishment and maintenance of existing facilities
- Efficient operation of water resource facilities
- Establishment of new facilities
- Risk management against earthquake disasters and water quality accidents
- Effective use of natural energy at water sources

② Preservation of Basin Areas

- Proper management of forests
- Proper preservation of agricultural land



③ Integrated management of water flow/quality

- Secure water for wherever necessary, whatever the quality and amount required with lower costs and energy

④ Preservation and use of ground water

- Use ground water under a proper standard on preservation and management

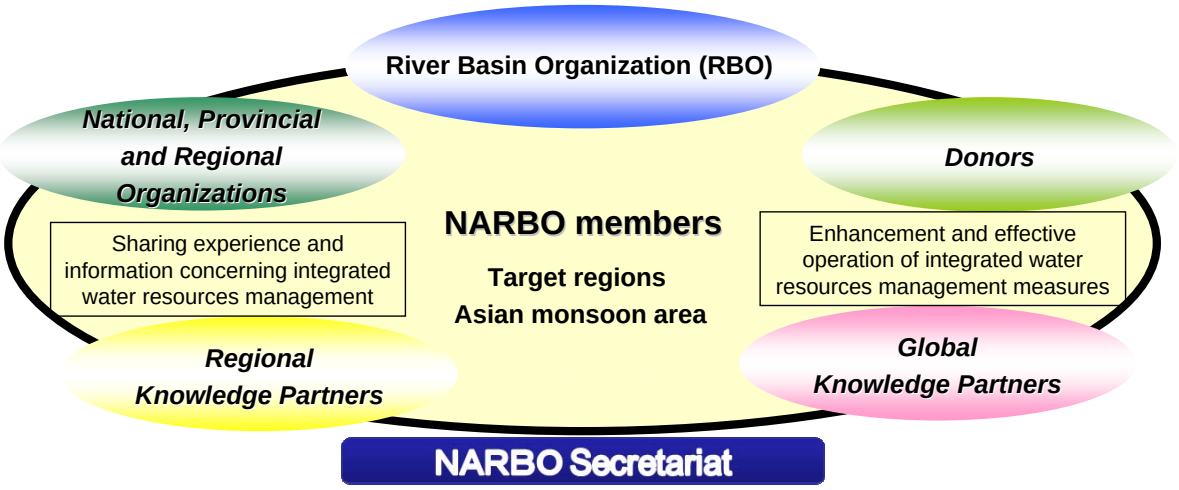
⑤ Facilitation and efficient use of water

- Control the use of water
- Promote the use of rainwater
- Promote the use of recycled water
- Take actions against the risk of drought

Japan Water Agency was established for integrated water source management for the development of water sources, and its facility operation and maintenance for basin areas.

Contribution to designing a sustainable society in basin areas

Japan's Commitment to NARBO



The 3rd Water Forum Memorandum of Association Signing Ceremony

General Assembly for Foundation (Indonesia)

Summary

- It is important to promote an integrated water resource management policy to cover various water resources, including surface water, ground water and rainwater in basin areas, against potential risks from global warming and water shortages.
- Countries in the Asian monsoon region, in particular, share common issues including the impact of monsoon weather due to their location, which make the situation for water use more complicated
- The River Basin Organization (RBO) has a mission to contribute to create a sustainable society in basin areas as a center to manage the overall policies for the areas.
- It is essential to maintain an efficient network of RBOs for sharing technology and experience in integrated water resource management, as well as for the development of human resources, to implement the policies to solve their common issues. The Ministry of Land, Infrastructure, Transport and Tourism Japan intends to continue to support NARBO.
- We expect NARBO to further extend their activities for the development of Asian monsoon region.