Water Environment Management in Japan

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Japanese rapid economic growth

- The average real economic growth rate marked 9.1% through 1950’s, 60’s and early 70’s in Japan

Transit of the economic growth rate in Japan

<table>
<thead>
<tr>
<th>Year</th>
<th>The average real economic growth rate (%)</th>
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<tbody>
<tr>
<td>1953-1973</td>
<td>9.1%</td>
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<tr>
<td>1974-1990</td>
<td>4.2%</td>
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<td>1991-2009</td>
<td>0.9%</td>
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</table>
Four Major Pollution Issues

- Niigata Minamata Disease
- Itai-Itai Disease
- Minamata Disease
- Yokkaichi Asthma
Serious Damage by toxic substance

• Minamata Disease
  ◆ Found in Minamata city, Kumamoto in 1956
  ◆ Causality:
    “Methyl Mercury” contained in effluent from chemical factories
  ◆ Main symptoms:
    Paresthesia of limbs, ataxio, narrowed visual field, auditory disorder,
    disorder of equilibrium, language disorder
  ◆ Victims certified in law: about 3,000 person
  ◆ Estimated Damage
    (Health, Fishery etc)
    $4,510 million (estimated)

• Same damage founded in Niigata

※ $1 = 84 Japanese yen
Source: Website of Minamata City
Serious Damage by toxic substance

• Itai-Itai Disease
  - Found in Jintsugawa river basin in Toyama Prefecture in 1955
  - Causality: “Cadmium” contained in untreated effluent from Mines
  - Main symptoms: Kidney damages and softening of bone caused by consumption of food contaminated by Cadmium
  - Victims certified in law: about 200 person
  - Estimated Damage (Health, Agriculture etc): $603 million (estimated)

Source: Yomiuri Newspaper

※ $1 = 84 Japanese yen
Deterioration of water in public water body

Sumida river in early 70's (Tokyo)

Dokai bay in ‘60s (Kitakyushu city)

Tama River in ‘70’s (Tokyo)
Basic law for environmental pollution control (1967)

※ Replaced by the basic environment law in 1993

- Establishment of Environmental Quality Standard (EQS)
  - EQS for the protection of human health (Health Item)
  - EQS for the conservation of the living environment (Living Environment Item)

Water Pollution Control Law (1970)

- Overcoming “Follow-up” approach
  - From designation of regulation area to national uniform regulation
  - Unified national effluent standards + more at local level, if needed

- Tightening of regulations for compliance
  - Direct penalty for non-compliance of effluent standards

- Unification of law system in principle
  - Unification of effluent standards for all business (with some exceptions)
Water Environment Quality Standards (EQS)

**Water Pollution**

**Toxic substance**
- Mercury, Arsenic, Chlorinated organic compound, etc

**Organic Pollution etc**
- Dirtiness and muddiness of water
- BOD/COD, DO, SS etc

**Nutrient salts**
- Causality of eutrophication
- Nitrogen, Phosphorus

**Water Environment Quality Standards**

**Health Item**
- Nationally uniform
- 27 substances designated
- Monitored substances
  (No standards for them, but needed to collect scientific data)

**Living Environment Item**
- Designed to conserve the properties as well as the fauna and flora closely related to the living of people
- Set targets by categorizing into classes in accordance with water bodies

**Effect on people**
- (Drinking/seafood intake)

**Effect on aquatic life**
## How the Water Pollution Control Law Works

<table>
<thead>
<tr>
<th>Pre-regulation</th>
<th>Report installation or change of specified facility</th>
<th>Order to Change Plans</th>
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<tr>
<td>Regular Regulation</td>
<td>Measure and log pollution status of effluent</td>
<td>Order remedy</td>
</tr>
<tr>
<td></td>
<td>On-site inspections &amp; Reports collected</td>
<td>Order suspension</td>
</tr>
<tr>
<td></td>
<td>Effluent regulations</td>
<td>Penalty</td>
</tr>
<tr>
<td></td>
<td>Prohibition of water containing substances classified as toxins infiltrating into groundwater</td>
<td>Order to take measures related to purification</td>
</tr>
<tr>
<td>Emergency Measures</td>
<td>Water Pollution due to abnormal water shortage, etc</td>
<td>Order to take emergency measures</td>
</tr>
<tr>
<td></td>
<td>Emergency measures &amp; report of accidents</td>
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### Nationwide regulations of factories or commercial facilities

- **Pre-regulation**: Report installation or change of specified facility. 
  - Order to Change Plans
- **Regular Regulation**: 
  - Measure and log pollution status of effluent. 
  - On-site inspections & Reports collected.
  - Effluent regulations. 
  - Prohibition of water containing substances classified as toxins infiltrating into groundwater. 
  - Order remedy. 
  - Order suspension. 
  - Penalty. 
  - Order to take measures related to purification.
- **Emergency Measures**: 
  - Water Pollution due to abnormal water shortage, etc. 
  - Emergency measures & report of accidents. 
  - Order to take emergency measures.

### Water Quality Monitoring at Public Water Area

- Measurement Program by prefectural government.
- Announcement of monitoring results.
- Implementation of regular monitoring.

### Domestic Water Control

- Designation of important areas by prefectural government.
- Establishment of plan for promotion of implementation of domestic wastewater measures by municipalities.

### Total pollutant load control in enclosed coastal seas

- The government’s “Fundamental Policy for Reduction of Total Pollution Load” by prefectural governments and regulations.
WATER QUALITY MONITORING
Water Quality Monitoring

Purpose

• Getting a full understanding of the status of water pollution in public waters and underground water, and implementing control measures for the prevention of water pollution in appropriate ways.

Monitoring System

Continuous Monitoring of Water Quality (Prefectures, etc.)

• Monitoring the pollution of water in the environment plays a very important role in getting the basic data for the planning of water environment administration.
• It should be carried out throughout the country uniformly and with accuracy. The national government is required to implement this task with responsibility.
• However, the continuous monitoring of water quality is delegated to prefectural governors, as it is appropriate to conduct it based on the understanding of the local conditions and with mobility.
• It is conducted on the basis of the uniform idea shown by the nation

Monitoring of Effluent

• (to be Implemented by Specified Establishments on their own)
[Reference] Examples of Officially Disclosed Data
DOMESTIC WASTEWATER CONTROL
Night Soil Treatment and Domestic Wastewater Treatment Systems in Japan

Sewerage system

Rural sewerage system

Jokkasou system

Tandoku-shori jokkasou

Night soil storage tank

Wastewater treatment facility

Night soil treatment facility
Treatment plant for treating collected night soil and jokkasou sludge.

Night soil treatment and organic waste recycling center
Treatment plant for treating and recycling collected night soil, jokkasou sludge, and other organic wastes.
For efficient construction of wastewater treatment facilities in each region, a construction plan for wastewater treatment facilities has been formulated based on comparison of economic efficiency, etc., considering the characteristics of each wastewater treatment facility.
Population Trends for domestic wastewater treatment

Self-management night soil area

Night soil collection

Sewerage systems

Johkasou

Population Trends for night soil treatment and domestic wastewater treatment
MEASURES FOR CLOSED WATER AREAS
Measures for Environmental Conservation for Closed Water Areas

Total Pollutant Load Control System

Objective:
To reduce the total amount of the pollution load that flows into sea areas in order to improve the water quality of closed sea areas (Tokyo Bay, Ise Bay & Seto Inland Sea) for a set period (5 years)

Object sea areas: Tokyo Bay, Ise Bay & Seto Inland Sea

Object item: COD (1st -), nitrogen, phosphorus (5th -)

The 6th Total Pollutant Load Control (with Y2011 as the target year) has been completed, and the 7th Total Pollutant Load Control is currently under consideration.

Basic Policy for Total Load Reduction
The Minister of the Environment determines the five year reduction goal for each target area

Plan for Total Load Reduction
Prefectural governor formulates the plan for the target amount of reduction according to source categories and for measures for reduction, etc., and acquires the agreement of the Minister of the Environment

Measurement and Control of the Pollutant Load by the Standards for the Total Load Reduction
(Factories and Establishments with 50m3/day or more)
Responsibility to measure & record the pollutant load, order to improve measures against the possibility of exceeding the pollutant load

Guidance, Advice & Recommendation for the Reduction of the Pollutant Load
(Small-scale establishments, livestock raising, aqua-farming, agriculture, ordinary households, etc.)

Implementation of Projects such as Construction & Upgrading of Sewerage, Septic Tanks, Etc.
Measures for Environmental Conservation for Lakes

System of the Law concerning Special Measures for the Conservation of Lake Water Quality

This system takes special measures for designated lakes in addition to the regulation by the Water Pollution Control Law.

Basic Policy for the Conservation of Lake Water Quality by Cabinet Decision
(Covering Lakes in General)

The Cabinet decides designated lakes at the request of the prefectural governor
(10 lakes such as the Lake Biwa and Kasumigaura have been designated as designated lakes)

“Plan for the Conservation of Lake Water Quality” for each Lake
Prefecture formulates, but the agreement of the Minister of the Environment is required through the Conference on Environmental Pollution Control.

Pollutant Load Control
Controlling the daily load in addition to the concentration control based on the Water Pollution Control Law

Implementation of Projects
Construction of sewerage & septic tanks, dredging, etc.

Designation of Lakeside Protection Areas
Protection of lakeside plants with purification function
(System to notify action in lakeside area)

(When still needed) Total Load Control

Structural & Usage Control for Small-Scale Livestock
Raising and Aqua-Farming within the Lake

Designation of the Area for Effluent Measures
Implementation of measures for plane sources

Guidance, advice & recommendation to persons of facilities that are not control objects
Water Quality Improvement in Sumida River, Tokyo

- Sumida river has relived as Tokyo’s representative landscape by effluent regulations, sewerage construction, dredging of contaminated sediment, and diversion of water for purification.
Water Quality Improvement in Dokai Bay, Kitakyushu

- A miracle city recovering from the “Dead Sea”

“Dead Sea” where fish cannot live

Dokai Bay has recovered

Monitoring data in Dokai bay

Illegal construction along a river

A river as a symbol of the city with water-attracting space

Water quality in Murasaki River and Sewerage coverage ratio

Source: Web site of Kitakyushu city
Water quality in Tama river has been improved by the progress of sewage construction, resulting in creation of good water environment.
State of Achievement of Environmental Standard

- **Health Items**: Achieved Environmental standard almost over the country

- **Living Environment Items**: Improvement tendency as a whole, but still low achievement rate in enclosed water area such as lakes and inland seas

Trends in achievement of BOD/COD environmental standard
# Economic loss without Consideration of the Environment

<table>
<thead>
<tr>
<th>Case of pollution</th>
<th>Economic loss ( $ / year )</th>
<th>Expenditure for pollution control ( $ / year )</th>
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<tbody>
<tr>
<td>Minamata Disease</td>
<td>150 million</td>
<td>1.2 million</td>
</tr>
<tr>
<td>Itai-Itai Disease</td>
<td>30 million</td>
<td>7.1 million</td>
</tr>
<tr>
<td>Yokkaichi Asthma</td>
<td>15.5 million (without any countermeasures taken 250 million)</td>
<td>175 million</td>
</tr>
</tbody>
</table>

※The above values are 1989 price of equalized values of economic loss and actual pollution control expenditure with assumption that maturity period is 15 to 30 years.

Source: Japan’s experience

※ $1 = 84 Japanese yen
Toward “Green Growth”

- Low Carbon & Sound Material-cycle Model for Asia
- Develop economically while living in harmony with the environment to build a sustainable society
Thank you for your attention