River Administration in Japan
(Integrated Flood Management)

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River Administration

1) **Flood management**
   - River improvement
   - Flood control (operation of facilities)
   - Flood warning (observe river water level)

2) **River water use management**
   - Administration of water use right

3) **River environment management**
   - Monitoring the river environment
   - Conservation and re-naturalization
Outline of River Law during 100 years

- Birth of modern river administration system

1896
- Introduction of integrated river system management
  - Enactment of water-use regulations

1964
- Improvement and conservation of river environment
- Introduction of plans reflected by public opinions

1997
- Establishment of systematic framework for flood control and water use
  - Introduction of integrated river system management system
  - Enactment of water-use regulations
  - Establishment of comprehensive river administration system for flood control, water use, and environmental conservation
    - Improvement and conservation of river environment
    - Introduction of river improvement planning system designed to incorporate the opinions of local residents

Process of amendment of the River Law
Water Resources Development

Weirs enable withdrawal of river water

Developing lakes to use as reservoirs
Management of Water Rights

Water right: Rights to continuously and exclusively draw water from rivers

River administrator centrally controls water rights.

Coordination water intake during droughts
Environment Conservation and Re-naturalization

Before improvement
(December 1992)

After improvement
(October 1995)
The purpose of the study on river ecosystem is to understand the characteristics of rivers from an ecological viewpoint, and explore ways to create proper rivers. In order to achieve this purpose, surveys are being conducted under collaboration of ecologists, engineers, and the national and municipal governments.
Administration at each River System

Class A river system

Class B river system

Others

National Government

Local (Prefecture) Government

City
<table>
<thead>
<tr>
<th>No. of River Systems</th>
<th>No. of Rivers</th>
<th>Length (km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A :</td>
<td>109</td>
<td>14,000</td>
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<tr>
<td></td>
<td></td>
<td>10,500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>77,000</td>
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<tr>
<td>B:</td>
<td>2,722</td>
<td>7,100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>113,000</td>
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</tbody>
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Total length 123,500 km
Budget for river management

RSNG: River section administrated by National G
RSPG: River section administrated by Prefecture G

In 2005
RSNG : ¥ 814 Billion ($ 6.8 Billion) 53 %
RSPG : ¥ 729 Billion ($ 6.1 Billion) 47 %
Total : ¥ 1,543 Billion ($ 12.9 Billion)

* $ 1 = ¥120
Composition of Budget

Ratio of National Government Expense
For river improvement
  for RSNG : 2/3
  for RSPG : 1/2, 1/3 (Subsidy)
  for Big project : 3/4

For maintenance for RSNG : 5.5/10
MLIT has approx. 100 River Administration Offices.

47 Prefectures
Each Prefecture Government has approx. 10 Infrastructure Administration Offices.
Total approx. 500 Offices.
Tasks of River Administrator

1) Flood management
2) River water use management
3) River environment management

Activities of River Administration Offices

- Observe rainfall, river water level, river water quality
- Research the environment of river and river basin
- Study river improvement and environment
- Plan, design and construct river structures
- Patrol to observe problems of structures, illegal acts
- Administrate use of river area
1) **River improvement**
   - Channel improvement (embankment, dredging)
   - Dam, Retarding basin, Floodway

2) **Operation of Flood Control Facilities**
   - Dam, Sluice gate, Pumping station

3) **Warning of flood**
   - Observation of rainfall and river water level
   - Estimation of river water level

4) **Provide the information for damage mitigation**
   - Publication of Hazard Maps
System for Planning River Improvement 1

Basic River Management Policy

Social Infrastructure Council

- Basic policy on flood control measures, water use and environment conservation
- Unregulated peak discharge on target level
- Design flood discharge

River Improvement Plan (for 20 ~ 30 years)

Persons experiences or academic standing

Reflection of local opinions through public hearing

Governor of local government

- Flood control facilities (Dam, Retarding Basin)
- Embankment, bank heightening, river widening, dredging, bank protection, pumping station, etc.
River Improvement Plan of each project implemented by local government

- Local governments discuss plans with MLIT
- MLIT approves the plan

- Flood control facilities (Dam, Retarding Basin)
- Embankment, bank heightening, river widening, dredging, bank protection, pumping station
Changes in Run-off Flow due to Changes in Land Use
Comprehensive Flood Management Measures

River improvement, Damage mitigation measure and Runoff Control in Basin

**Retention areas**
- Maintenance of controlled urbanization districts
- Conservation of nature
- Construction of reservoirs and regulating basins
- Installation of permeable pavements and seepage sumps

**Detention areas**
- Preservation of urbanization control zones
- Control of landfill
- Promotion of conditions favorable to agricultural activities

**Low-lying areas**
- Development of drainage facilities
- Construction of storage facilities
- Encouragement of use of flood-proof buildings
Concept of Comprehensive Flood Control

- Depression storage
- On-site storage and infiltration
- Rain
- Infiltration
- Natural detention
- Detention basin
- Between-building storage
- Regulating reservoir
- Runoff
- Basement storage
- Floodway
- River channel
In order to avoid hindering flood control capacity, the piloti method (elevated-floor style) has been incorporated in the construction of the Yokohama International Sports Stadium.
Example of Implementation 2

River Basin Measures

Outflow Control Facilities

The Kirigaoka during Flooding

The Kirigaoka Regulating Reservoir

The storage function of the adjusting pond and the filtering of the well serve to both control outflow and process the drained water.
Example of Implementation 3

- River Basin Measures

Piloti Style (Elevated-Floor) Construction

The piloti method (elevated-floor style) is used to minimize damage even if the building is inundated.
Rainfall Radar System
Estimation of Water Level

Graph showing water levels and distances.
Provision pictures of flood situation
Dissemination of River Information by Mobile Phones

- Provide various information to the general public
- Speed up flood control activities

- Movement of rain band based on the radar-rain gauge measurements
- Level of river water
- Rainfall
People who have seen hazard maps start evacuation about one hour earlier than those who have not.
Activities of Flood Fighting bodies

Mayer → Flood Fighting bodies

order

temporarily bank protection

3,250 bodies  950,000 people
Restoration works

Municipalities, Prefectures and MLIT survey of damaged structures

- report the estimation of restoration cost to MLIT
- MLIT reports the estimation to MOF

- MLIT & MOF assess the estimation
- MOF set up the supplementary budget
Integrated Flood Management

1) River improvement
2) Cooperation for runoff control in basin
3) Operation of Flood Control Facilities
4) Warning of flood
5) Provide the information for damage prevention
6) Flood Fighting

In Japan
River administration Offices
Staff of them work as River Administrator