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The historical development of paddy fields

Paddy areas expanded as technology progressed, to make effective use of limited water and land. As this graph shows, the area of paddy land and the population grew in tandem. This enabled Japan to feed its burgeoning population.
Network of irrigation and drainage channels formed throughout the small area of Japan

- Major channels 45,000km
- Total length including blanch channels 400,000km
  (10 times the earth’s circumference)

<table>
<thead>
<tr>
<th>National highways</th>
<th>21,441km</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class-A rivers</td>
<td>10,541km</td>
</tr>
<tr>
<td>Railways</td>
<td>20,059km</td>
</tr>
</tbody>
</table>

Irrigation channel

Drainage channel
Customary water use is established through repeated water disputes

The customary rule of water use was established through repeated water disputes.

During the periods of drought, bitter water disputes were common between up-stream and down-stream users. During the flood period, not only up-stream and down-stream users but also right and left bank farmers fought over where to discharge flood waters.
Land Improvement Districts (LIDs) are farmers’ associations founded on communal and territorial bonds and established with the approval of the prefectural governor and in accordance with the Land Improvement Act of 1949.

**16th to 19th century**
- Further expansion into the large river basin development
- Inheritance of the water management system

**After World War II**
- The Land Improvement Act conferred legal status to water users’ associations as Land Improvement Districts (LIDs)
Institutional Framework of LIDs

Procedures until establishment of LID

- Farmers’ proposal
- Preparation of a plan outline
- Acquiring consent by a two-thirds majority
- Preparation of a plan
- Application / decision on appropriateness / inappropriateness
- Lodging of objections
- Approval
- Implementation of construction
- Facility management

National LID Federation

- LID Federation of prefecture
- LID Federation
- LID
- Municipality, etc.

Farmers

Number of LIDs: 6354 bodies
Members of LIDs: 4.15 million
Organization of LID

Land Improvement District

Decision Making Function

General Meeting

Board

Director General

Director
5 or more

Executive Function

Auditor
2 or more

Members of LID

Commissions and Subcommissions

Secretariat

Representative’s meeting (the top decision-making body)

Board of directors
Operations of LIDs

The following operations can be undertaken by LID as stipulated in the Land Improvement Act (any operation not listed here are prohibited)

1. Implementation of Land improvement projects
   - Construction of new irrigation/drainage facilities, and construction involved in land consolidation, etc.
   - OMM of irrigation/drainage facilities
2. Associated projects
3. Application to set operation national/local government projects
4. Flow of dues for national/local government projects
Irrigation and drainage facilities managed by LIDs, etc

The LIDs managed about 2/3 of major irrigation and drainage channels constructed by the national government. The management is performed with the public sectors, LIDs, farmer’s groups, and each farmers, sharing a role.

The ratio of management body of facilities

- National Government: 0.5%
- Prefecture: 2.8%
- Others: 0.3%
- Municipality: 35.4%
- Land Improvement District: 61.1%

Major facility operated by experts of LID

Blanch channel cleaned by farmer’s group
Land improvement districts work to conserve water in the event of a drought.

The agricultural sector can save water and offer a part of its water to other sectors during severe dry spell.

1. Water distribution by taking turns
2. Repeated utilization
3. Water supplementation
4. Sacrifice fields

(2) Repeated utilization

(3) Water supplementation

(4) Sacrifice fields
LIDs play a leading role to keep multifunctionality with local residents (Example)

- Maintenance by members’ share (Levying charges)
- Facility operation, development and repair
- Stable agricultural water supply
- Sustainability of multifunctionality
- Activity involving local residents

Channels grass cutting, removal of algae, sand and soil etc.

Providing labor

Member of LID

Providing labor
LIDs play a leading role in keeping multifunctionality with local residents (Example)

As a result of promoting the ground water cultivation function of paddy fields, Kumamoto city decided to support farmers who put water in paddies.
The multi-functional roles of agriculture

The Role of Japanese Agriculture

- Flood preservation
- River flow stabilization and recharge of water resource
- Preservation of biodiversity
- Prevention of landslides and soil erosion
- Water purification and breakdown of organic waste
- Purification of the atmosphere and temperature reduction
- Stable food production
- Future security
- Transmission of cultural values and advancement of local community
- Revitalization of human spirit through hands-on experience and education
- Formation of green space and pleasing natural landscape
- Preservation of distinctive Japanese scenery
Mitigating damage by Flooding (Example)

Flood peak runoff is reduced by 37% by water storage facilities for agriculture.

Inflow and Outflow in the Matsuzawa-ike pond (13 July 1997)
Recharging groundwater aquifers (Example)

Around 95 million cubic meters of water per year are irrigated to 7,500 ha for rice production.

Half the amount of the water used in paddy fields recharges groundwater, of which 22-29 million cubic meters annually is used industrial water downstream.

Eigenji dam in Shiga Prefecture
Preserving ecosystems and bio-diversity

Appropriate intervention in the natural environment by farming has resulted in the habitation and growth of many species.

Example: Aquatic creatures in paddy fields in Japan

<table>
<thead>
<tr>
<th>Group</th>
<th>Species in all of Japan (A)</th>
<th>Species in paddy fields (B)</th>
<th>Endangered species in paddy fields</th>
<th>Ratio of inhabits (B)/(A)</th>
<th>Number of survey points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish</td>
<td>Approx. 300</td>
<td>93</td>
<td>9</td>
<td>31%</td>
<td>2498</td>
</tr>
<tr>
<td>Frogs</td>
<td>17</td>
<td>11</td>
<td>--</td>
<td>65%</td>
<td>698</td>
</tr>
</tbody>
</table>

Oryzias latipes, Japanese killfish, is listed in red-data in 1999.
Educational and recreational role

An irrigation channel modified into a recreational site for children.
Minumadai-yosui, Tokyo, Japan

Biotop and paddy field

Open school using rice paddy to learn the natural environment
Providing domestic water for local residents
Fire prevention
Melting and flushing snow is a function of irrigation canal in northern Japan.
Merit of PIM (participatory irrigation management)

Merits for Farmers

- Benefit of self-management
  - Self-restrain in illegal action of farmers
  - Good order of water use
  - Reductions payment by farmers
- Less water conflicts
- Leading to higher productivity

Merits for Government

- Less Government expenditure on operation, maintenance and management (OMM) of irrigation facilities
- Fewer Government staff to OMM
- Sustainable management of facilities and water resources as well as preservation of multifunctionality
- Leading to Higher productivity
Japan assists the introduction of PIM

Japanese Government assists following countries:

- Indonesia
- Thailand
- Egypt
- Dominican Republic etc. (Project for PIM as of June 2004)
- Establish water user’s association considering local history, culture, religion, etc.

- Utilize our experiences and knowledge about Land Improvement Districts

General meeting of farmer’s water management organization (Thai)  

Construction of waterway with the participation of residents (Laos)
Thank you for your attention