Contents of Technical Cooperation

“Participatory Irrigation Management Organizations in Japan”

Digest Version

February 2012

Tsukuba International Center
Japan International Cooperation Agency (JICA)
Introduction

Land improvement districts (LID) in Japan are participatory irrigation management organizations in which beneficiary farmers conduct water management and facilities management under the “Beneficiaries-should-Pay Principle (BPP).” It can be said that water management centering on the LID is an accumulation of valuable experiences and knowledge pertaining to the ideological and philosophical system of water management that has developed centering on paddy field irrigation, including the historical circumstances related to the origin of the LID.

The Japan International Cooperation Agency (hereinafter referred to as "JICA") supports irrigation projects in developing countries using various schemes. For many developing countries, the realization of measures to ensure the sustainability of irrigation and drainage projects, including operation and management (O/M) of irrigation facilities after their construction, transfer of management of irrigation facilities to organizations of beneficiary farmers, fair, impartial and democratic operation of irrigation organizations, improvement of irrigation water efficiency and payment of O/M costs by beneficiaries, is a common and urgent problem.

Against this background, the technical cooperation contents “Participatory Irrigation Management Organizations in Japan” (hereinafter referred to as the “Original Version”) was developed in February 2011 for the purpose of maximizing the effects of training in Japan’s LID (system) not only by improving the efficiency and standardizing the implementation of the training but also through knowledge creation and independence of the projects, bearing in mind the adoption and application of the LID system in developing countries and taking into consideration its wide application.

Therefore, for the purpose of effective utilization of the Original Version, we decided to develop a digest version by extracting the characteristics and outline of LIDs in Japan. In addition, this digest version was compiled with the following points in mind:

- The users of the digest version are participants of training on general agriculture and agricultural development (cultivation, irrigation, policies, etc.), and the contents shall be focused on their gaining understanding of the characteristics and outline of Japan’s LIDs (including irrigation associations).
- Various data are not carried in the digest version because it is possible to reference them in the Original Version, which has been published.
- Explanations from the historical and legal system viewpoints shall be provided regarding factors enabling smooth operation and management of land improvement districts in Japan.
- The digest version shall also include contents presuming irrigation projects in developing countries estimated to be in units of tens of hectares to several hundred hectares.

Those seeking more detailed information on the technical cooperation contents “Participatory Irrigation Management Organizations in Japan” should see the “Original Version” (in Japanese and English only) carried on the JICA-Net website.

(URL of site from where the Original Version can be downloaded: http://hdl.handle.net/10410/767)
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Chapter 1: Purpose of Enactment of the Land Improvement Act (LIA)

1.1 Background of the Enactment of the Land Improvement Act

After World War II, an agrarian reform was enacted to dissolve the pre-war landowner system as well as to breakup of the military clan and zaibatsu. Large-scale landowners were no longer existent as independent petty tenant farmers rose and major transformations in the qualifications and structure of the members of the irrigation management organizations occurred. The business of the routine irrigation management was, however, carried out by the farmers living in the villages even under the landowner system, and the management was succeeded by the farmers even after the postwar period.

With this change in scene, the related pre-war laws regarding the establishment of the agricultural production base (construction of irrigation facilities specific to irrigation projects) and the enforcement of irrigation facility management were abolished, and the Land Improvement Act was enacted to organize a new land improvement project structure.

1.2 Purpose of the Land Improvement Act

The Land Improvement Act was enacted in 1949 and derived from the democracy that became the postwar national policy. The major aim was to establish the agricultural base (farmland base) that is indispensable in realizing the expansion in the options in agriculture (transformation and diversity in the type of crops) and income parity (income equal to other industries).

Thereafter, the principle to be considerate to the environment and maintain harmony was added to be the main subject of the projects and was extended to be the base of the rural community. Furthermore, it was used to secure versatile functions in agriculture and rural communities, and to implement a sustainable development in agriculture.

The LIA is basically a mixture of the Construction Projects Act (on projects to construct infrastructure, such as irrigation and drainage facilities), the Act on the Organization of Small and Medium-sized Enterprise Associations (on establishment and operation of associations such as LIDs and facility management projects implemented by LIDs) and the Replotting Procedure Act (mainly in farmland development projects).

Chapter 2: Land Improvement Projects

2.1 Characteristics of the Land Improvement Act and Land Improvement Projects

Among the projects for establishing agriculture and rural communities, the projects that

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1 Land conservation, recharge of ground water sources, conservation of the natural environment, creation of good landscapes, inheritance of culture, etc.

2 A Land Improvement District is a corporate body established in accordance with the Land Improvement Act for the purpose of implementing land improvement projects in a designated area. It is a type of public organization.
organize the rural community base are called land improvement projects, which are implemented under the Land Improvement Act.

Here, the construction of an irrigation facility, which is one of the land improvement projects, will be used as an example to introduce some of the special issues.

(1) Application-oriented

A land improvement project (construction of an irrigation facility) is a project that is generally based on an application and an approval (so-called application-oriented) format, where the application is submitted by the beneficiary farmers who established areas such as the LIDs.

This is not compulsory and is a voluntary plan carried out by the farmers themselves. However, the applicants must satisfy the conditions stipulated in the Land Improvement Act. (Please refer to the following Supplement 1.)

[Supplement 1: Regulations for Applicants and Organizations where the Applications are Directed]

(1) Regulations to Applicants (Article 3 in the Land Improvement Act: Qualifications in Participating in Land Improvement Projects)

Over fifteen (15) qualified persons based on Article 3 (in principle farmers [beneficial owners]), LID, city, town and village, agricultural cooperatives, and corporations of farm owner rationalization.

(2) Organizations where the Applications are Directed (Article 49 in the Land Improvement Act Enforcement Order)

The application is submitted to different organizations (national or prefectural government) according to the beneficial area of each land improvement project.

For example, in the case of a newly built irrigation facility, if the beneficiary land is in total over 3,000 ha, the application should be submitted to the national government (a national project), and if it is in total over 200 ha, the application should be submitted to the prefectural government (a prefectural project). In case, however, it is a land without an existing irrigation facility or in case the purpose is to reclaim paddy fields, if it is in total over 1,000 ha, it should be submitted as a national project.

(2) Public-Private Cooperation

To enforce construction projects of irrigation facilities (new, updated, or improved), it would need to be enforced by a public administration such as the national and prefectural government as a public work project because it would be difficult for the project to be implemented by the beneficiary farmer (such as a LID) only.

Furthermore, it is valid and vital to have cooperation from the public sector in starting up the applied project, drawing up the outline of the land improvement project plan.
(business plan) when making the application, and describing the project to the beneficiary farmers.

This is one of the reasons why the Participatory Irrigation Management (PIM) is successful under the public-private cooperation in Japan.

(3) Compulsory Participation
In principle it is required to have a voluntary participation by the farmers when establishing and operating a land improvement project (irrigation facility construction project) in the LID by the applicant, however, the remaining concerned parties can be forced to cooperate in the project by having over two thirds of the approvals of the parties (beneficiaries) in the region related to the project (Article 11 in the Land Improvement Act).

To prevent a project that will bring benefits to the whole region due to the objections from a minority, if over two thirds of the farmers within the region approve, by law all of the farmers must participate including the remaining one third who are against this project.

In fact to obtain approval from all the farmers related to this project, meetings to describe and discuss the project are held and the applications are based on having the approval from the majority of the participants.

(4) Compulsory Collection
The LID that was established by the beneficiary farmers must reflect its public nature by assigning a compulsory collection of expenses and under a certain procedure dues can be collected from the members to subsidize the expenses required for the land improvement project (Articles 36 and 39 of the Land Improvement Act).

(5) The Implementing Body of the Land Improvement Project
The operating entities of the land improvement project are the national or prefectural governments according to the scale of the project (beneficiary farm land) and the degree of technical complexity.

(6) Subsidies for the Land Improvement Project
The land improvement project has economic effects to the people by providing a stable and appropriate price of food by improving production. It also has effects on a regional level by encouraging the regional economy.

Thus depending on the main body or the type of project, the national or prefectural government will bear the project costs as stipulated elsewhere. The remaining amount is covered by the farmers, or the city, town, and village will assist by applying part of their subsidies. Therefore the project is covered by public grants and from the farmers’ own
pockets.

Chart 1.1 Operating Body and Cost Distribution by Project (Example)

<table>
<thead>
<tr>
<th>Operating Body</th>
<th>Scale of Project</th>
<th>Percentage of Cost Allocation (%)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Government</td>
<td>Prefecture</td>
<td>City, Town, and Village</td>
<td>Beneficiaries of LID (Farmers)</td>
</tr>
<tr>
<td>National Project</td>
<td>(Rice paddy)</td>
<td>66.6 (2/3)</td>
<td>17.0</td>
<td>6.0</td>
<td>10.4</td>
</tr>
<tr>
<td></td>
<td>Over 3,000 ha</td>
<td>Note 1</td>
<td>Note 1</td>
<td>Note 1</td>
<td>Note 1</td>
</tr>
<tr>
<td>Prefectural Project</td>
<td>(Rice paddy)</td>
<td>50.0 (1/2)</td>
<td>25.0 (1/4)</td>
<td>10.0</td>
<td>15.0</td>
</tr>
<tr>
<td></td>
<td>Over 200 ha</td>
<td>Note 1</td>
<td>Note 1</td>
<td>Note 1</td>
<td>Note 1</td>
</tr>
<tr>
<td>Organizational Project</td>
<td>Overall over 5 ha</td>
<td>The subsidy percentage is lower than the above projects</td>
<td>Note 2</td>
<td>Note 2</td>
<td>Note 2</td>
</tr>
</tbody>
</table>

Note 1: In case of land without agricultural irrigation facilities or in case the purpose is for rice paddy reclamation, the land must be over 1,000 ha. For regions that require large scale facilities such as dams and diversion weirs, efforts have been made in response to the demand in national government-scale projects for the construction of key irrigation facilities. The selection requirements have been deregulated so that the nation can directly do the construction by broadening its range.

Note 2: The implementing body of the land improvement districts can conduct small-scale projects that do not meet the area requirements for nationally or prefectural run projects. Both in name and reality, there are cases where the LIDs construct the facilities themselves. However, in case the irrigation facility is mid-size and smaller than the government project conditions (nationally owned subsidiary), it is carried out as a prefectural project, and in many cases, smaller irrigation constructions for organizational projects are carried out by the LIDs.

Furthermore, there are many cases where small-scale channels (smaller than tertiary lateral channels) are established with farm roads and drain ditches under a separate plan in the land consolidation projects with the collectivization of farms.

(7) Management Administration after the Completion of the Facility

The irrigation facilities and the right to water use constructed by the national land improvement projects is managed by the Minister of the Ministry of Agriculture, Forestry, and Fisheries (MAFF) (Article 94 of the Land Improvement Act).

As MAFF, however, can consign the management to the prefectural government or LIDs, in general the prospected manager (LID) conducts the management as it complies with the scheduled management method when applying for a national project (Article 94-6 of the Land Improvement Act).

Furthermore, the law states that unless it does not hinder the original use or purpose, the facility can be used for other purposes and usages to generate profits (Act 94-4 of the Land Improvement Act). Simply, it states that it belongs to the national government.
However, the LIDs can generate income by having other concerned parties use it for purposes other than irrigation.

(8) Paying One’s Operating Costs based on Beneficiaries should Pay Principle (BPP)

Management expenses after the irrigation facilities are completed are different from construction projects that are given public subsidies. Based on the Beneficiaries should Pay Principle (BPP), the LIDs (farmers) must cover the expenses and are not allowed to receive any public funding.

2.2 Implementing Bodies and Managers

The Land Improvement Act and other ordinances regulate the organizations that can become the implementing body of the land improvement project or the owner and managers of the facilities that were built for the project. The following is a diagram showing the relationship between the implementing body, the owner and the management body of the land improvement project (irrigation project).

Fig. 1.1 Diagram of the Relationship between Major Organizations involved in Land Improvement Projects (Irrigation Projects)

1. Conditional conveyance (relevant act: Article 94-3. LIA)
2. Conveyance by by-laws (relevant act: Local Autonomy Act)
3. Direct management (relevant act: Article 85. LIA)
4. Entrusted management (relevant act: Article 94-6. LIA)
5. Entrusted management (relevant act: Article 94-10. LIA)
6. Management by developer (relevant act: Article 57. LIA)

2.3 Implementing Irrigation Projects

This is to introduce the actual procedures from the application to the commencement of the construction for the land improvement projects that are carried out by the central and
prefectural governments.

(1) Survey of the projects and drawing up the plans

MAFF is constantly endeavoring to manifest irrigation projects focused on the survey office set up in each region. The designing of the project plans is carried out in the following stages.

(a) Survey for plans to establish wide area infrastructure: Surveys to draw up plans for wide area infrastructure
(b) Survey to review the regional establishment: Survey to inspect the regional establishment of areas selected for the survey for plans to establish wide area infrastructure
(c) Regional survey: A survey to draw up a project plan (draft) in regions where national land improvement projects are expected to be carried out and inspect the technical and economic validity

The total survey expenses for (a) to (c) will be covered by the central government (MAFF) thus the beneficiary farmers do not need to bear any costs.

On the other hand, when carrying out the legal procedures for the project application stated in the latter half of (2), the beneficiary farmers will need to cover the costs of the total execution design expenses to officially draw up the required land improvement project, as with construction projects.

(2) Project Application

Over fifteen (15) qualified union members will apply the land improvement projects carried out by the national or prefectural government to the Minister of MAFF or to the governor (Article 85 of the Land Improvement Act).

In this case, a letter of consent of over two thirds of the beneficiaries, a draft of the land improvement projects (project report), and the basic items regarding the manager and management methods of the facilities built by these projects (management plans for the land improvement facility) must be attached.

(3) Selection of Projects

In case the execution of the said projects is approved after the Minister of MAFF examines the outline of the project plan, the project can be inaugurated after it has gone through procedures such as official announcements, general inspections and lodging objections.

(4) Execution of Construction
Based on the project plans, the contractor will construct the building based on the specifications stipulated in the agreement and design documents after measuring, designing, calculating the construction costs, bidding, and finalizing agreement procedures.

(5) Management

After the completion of the building, the proposed manager, stated in the project plan when applying for the project, will manage the irrigation facility. Generally the LID will consign the management. The project of the irrigation facility by the LID aims at distributing water in a fair and impartial manner to the irrigated rice field belonging to all of the beneficiary union members (farmers).

Illustration 1.2 shows the details of the survey of the national project, its selection, execution, and the collection of the expenses.

Fig. 1.2 Project implementation workflow (example of a national government project)
Chapter 1: Types of LIDs

The Land Improvement Act is a law that dissolved the development of the pre-war arable land readjustment law, irrigation union law, and the Hokkaido Land Refinement Labor Union Law and was revised to suit the new post World War II conditions. With the arable reforms the petty tenant farmers irrigated their own land and the previous petty farmers became union members of the LID that was established under the same law. Nevertheless, they actually continued to use the irrigation facilities that were succeeded to them from the previous organization, and the channels below them that were not directly under the management of the LID were normally managed by the previous local organization below them.

In other words, other than the fields that were irrigated after the war, there were not many rain-fed paddy fields (fields) in Japan that established new irrigation facilities, as could be seen in developed countries. Therefore, regarding the actual status of the irrigation facility construction projects, many of the existing irrigation facilities were updated, repaired, revised, or reconstructed buildings. In many cases the LID and the regional irrigation facilities below them were actually succeeding the pre-war unions. There were many examples where the pre-war unions were inheriting the modern irrigation facilities and organizations that were established from before.

From this historical, social, and administrative background, it is easier to explain the situation using the paddy field irrigation case studies to appropriately and convincingly introduce the experience of the Japanese farmer participatory irrigation management (PIM) organization and methods so that it would benefit the technical transfer in developing countries. Therefore, the following is a description of the LID aimed mainly for paddy field irrigation.

<table>
<thead>
<tr>
<th>Box1 District and Name of Union</th>
</tr>
</thead>
</table>

The similar preceding pre-war organizations were called land consolidation unions or common water supply unions and the name was not used for districts but for unions. In case of unions, the union members were landowners of the irrigation beneficiary paddy field and belonged to the organization, whereas for districts, the members were the concerned parties within the district and the land belonged to the organization. Within the Land Improvement Act enacted after World War II, the members of the LID were given priority to farmers who irrigated the borrowed land than to farmers who owned the land so as to abolish ownership and to prevent the revival of this system. The

3 Management organizations and local agricultural cooperatives specified by the LID
regulation of the Land Improvement Act states that landowners can only become members when the tenants gave their permission. Nevertheless, as the result of the arable land reforms, the petty tenants irrigated their own land and as the landowner is actually not the farmer, this regulation no longer had any significance. As a policy was aimed at abolishing land ownership, however, it was said that the irrigation management organization should not be for the person but for the land and to cite the existing examples in the U.S., the LID name was adopted. In addition, in the provisions in the Land Improvement Act, the members are called union members.

Chapter 2 Establishment of LID

2.1 Procedures for Establishing Land Improvement Districts

The Land Improvement Act stipulates that to execute an irrigation project, which is one of the land improvement projects, a LID must be established. The procedures are as follows.

Furthermore, the same procedures must be taken in case applications are made to update and improve the irrigation facilities by the existing LID.

(1) Preparations for Establishment

As an objective to enact the land improvement project, over fifteen (15) of the beneficiaries in the district of the project must receive approval from the governor to establish a LID (Article 5 of the Land Improvement Act).

When applying for the permission, the outline of the land improvement project plan, the backbone of the articles of agreement and other matters must be officially announced and over two thirds of the qualified members must approve this project (Article 5-2 of the Land Improvement Act).

[Supplement 2: Duty to Approval]

The approval of the procedures of the LID that is being applied for the construction of an irrigation facility is specifically binding to the following two items.

(1) Refund of the beneficiary funds for the irrigation facility construction project costs

(2) Cooperation in tasks that the LID decided (such as payment of union fees, services, cooperation in distributing water)

(2) Application for construction approval

When over two thirds of the members approve of the expected benefit, applications can be carried out for the approval of the land improvement project plan, the articles of agreement, and others.
When doing so, it is possible to seek assistance from a prefectural engineering specialist (Article 7-5 of the Land Improvement Act). In practice, however, the Japanese government actively cooperates according to the state of affairs.

[Supplement 3: Legal Positioning of the Facility Management]

Article 57 of the Land Improvement Act stipulates that in case there is a land improvement facility resulting from the completion of the land improvement project in the LID, the LID must manage that facility.

Therefore, when managing the facility, a land improvement facility maintenance and management plan must be drawn out separately but this also requires an approval of over two thirds of the members.

Actually, when obtaining the approval of the land improvement project plan, it is normal to obtain the approval of the management plan at the same time.

(3) Inspection of the establishment, an official announcement and its content

With the application of approval, the prefectural governor will inspect and approve the survey report written by an engineering specialist. In case there are objections to the content of the official announcement within fifteen (15) days from the last day of the official announcement and its reading under the approval by the governor, based on the opinions of the engineering specialist, the governor will make a decision within sixty (60) days after the last day of the reading (Articles 8 and 9 in the Land Improvement Act).

(4) Changes after the establishment

In case there are changes in the major items such as changes in the purposes of the project and the expansion or downsizing of the beneficiary land (merging, etc.), the general assembly (or a general meeting of representatives) will change the articles of agreement.

After the establishment, the qualifications of the union members may change due to inheritance or trading.
2.2 Size of LIDs

The tables below show statistics on LIDs in Japan. Table 2.1 includes not only LIDs for irrigation but also those for field improvement and drainage projects, and land consolidation projects, thus, include cases where the same farmers belong to two or more LIDs.

Table 2.1 Land Improvement Districts (as of March 31st, 2009)

1. Number of LIDs by area (Total number of LIDs: 5256)

<table>
<thead>
<tr>
<th>Area under management (ha)</th>
<th>&lt; 50</th>
<th>50~ 500</th>
<th>500~ 1000</th>
<th>1,000~ 2,000</th>
<th>2,000~ 3,000</th>
<th>3,000~ 5,000</th>
<th>5,000~ 10,000</th>
<th>10,000&lt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of LIDs</td>
<td>1,480</td>
<td>2,615</td>
<td>542</td>
<td>305</td>
<td>126</td>
<td>116</td>
<td>54</td>
<td>18</td>
</tr>
<tr>
<td>(28.2%)</td>
<td>(49.8%)</td>
<td>(10.3%)</td>
<td>(5.8%)</td>
<td>(2.4%)</td>
<td>(2.2%)</td>
<td>(1.0%)</td>
<td>(0.3%)</td>
<td></td>
</tr>
</tbody>
</table>

2. Number of LIDs by number of members (Total number of members: 3,876,622)

<table>
<thead>
<tr>
<th>Number of members</th>
<th>&lt; 200</th>
<th>200~ 300</th>
<th>300~ 1000</th>
<th>1,000~ 5,000</th>
<th>5,000~ 10,000</th>
<th>10,000&lt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of LIDs</td>
<td>2,206</td>
<td>664</td>
<td>1,467</td>
<td>813</td>
<td>81</td>
<td>25</td>
</tr>
<tr>
<td>(42.0%)</td>
<td>(12.6%)</td>
<td>(27.9%)</td>
<td>(15.5%)</td>
<td>(1.5%)</td>
<td>(0.5%)</td>
<td></td>
</tr>
</tbody>
</table>

Source: Data collected by MAFF

Chapter 3: Organization and Operations of LIDs

An explanation is given below of the organization and operation of the LIDs provided or assumed in the LIA.

In this Chapter, an ideal conceptual LID model with 5,000 ha of paddy fields benefiting from irrigation and 7,000 members (farmers) is adopted as teaching material and practical explanations and discussion are provided based on this model.

A scale of 5,000 ha is larger than the average actual LID. However, a LID of this scale usually has all the functions of a LID, such as an Assembly of Representatives and employment of permanent workers of a LID. Therefore, this scale was adopted for the main model in this Chapter.

3.1 Democratic Operation of LIDs

LIDs, which have been established by farmers in beneficiary districts, must be operated democratically as stipulated in the LIA.

Therefore, there should be no discrimination based on status, sex, wealth, ethnic origin, religion, or language with regard to various decision making and selection of project plans, etc. In principle, such procedures must be conducted by one-person one-vote and secret balloting. In addition, the possibility for recall is also a requirement for a democratic organization. The decision on and approval for the selection of projects is made by majority vote, and once a decision is made, opponents must comply with the decision. In
addition, in the event that it is difficult to conduct discussions or make decisions, a representative system is adopted.

For example, in the case of an LID that has adopted a representative system, members are assured of the right of a one-person one-vote balloting in elections of representatives, and all important matters such as project guidelines, the budget and account settlements are decided at the meeting of the General Assembly or the Assembly of Representatives as the supreme decision making body.

**[Supplement 4: Operations of Predecessor Organizations]**

In ordinary irrigation associations and land consolidation associations which implemented irrigation projects before WWII, each member had a voting power proportionate to the size of beneficiary area they owned, like voting rights of shareholders of joint-stock corporations that depended on the numbers of shares they own.

In irrigation projects under the LIA after World War II, each member has one vote. This is indeed the realization of equality, which is the principle of democracy.

### 3.2 Organizational Structure and Obligations

An LID generally consists of an organization that serves as a secretariat in charge of accounting and a technical organization in charge of facilities management, in addition to an organization in charge of making decisions on the LID’s operations.

(1) General Assembly/Assembly of Representatives

The General Assembly of an LID is composed of all its members. In reality, however, direct discussions with all members gathered at the same time is impossible in this model. Therefore, an “Assembly of Representatives,” which is equivalent to an assembly in a parliamentary democracy, is established by holding an election to select its members. With regard to extraordinary matters, decisions are made by having all members directly express their intentions, but ordinarily, the Assembly of Representatives serves as the supreme decision making body.

In addition, with the signatures of at least 1/3 of the members, the recall of a representative may be requested. With the consent of more than half of the members in the recall vote, the representative concerned will lose his/her seat (Article 24 of the LIA).

(2) Executives (Directors, Auditors)

An LID must elect directors and auditors as its executives. To that end, the Assembly of Representatives holds an election to select executives (directors, auditors) from among the candidates. It is also possible to appoint non-members as “external executives” as necessary. However, the appointment of external executives requires approval by the Assembly of Representatives.
A board of directors consisting of elected directors serves as the executing organ for routine businesses.

In addition, a director general of the board is elected from among the directors.

(3) Secretariat

In a large-scale LID as in this model, there are many cases in which LID personnel are hired to carry out the operations of the Secretariat. The organizational compositions of the Secretariats in various LIDs differ depending on the needs of each LID. In order to facilitate serving as a reference for technology transfer the Secretariat in this model consists of sections in charge of General Affairs, Financial Affairs, Water Distribution, and Engineering.

![Diagram of LID Organizational Chart]

- **Members**
  - Farmers in the district (In principle, those who have the right to gain profits from the use of farmland)

  - Decision making body consisting of all LID members or all members of the Assembly of Representatives)

- **Board of Directors**
  - Board of Directors: Consultations and decisions on operations

  - Board of Auditors: Auditing of business operations, accounting, etc.

- **Secretariat (Accounting, General affairs, Management)**
  - Carries out various businesses such as accounting and water distribution

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**[Supplement 5: Stipulations related to organization, etc.]**

(1) Membership of Assembly of Representatives

The quota (minimum number of members) for the Assembly of Representatives is stipulated by the LIA.

<table>
<thead>
<tr>
<th>Number of members</th>
<th>Quota for Representatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1,000</td>
<td>At least 30</td>
</tr>
<tr>
<td>1,000 - 5,000</td>
<td>At least 40</td>
</tr>
<tr>
<td>5,000 - 10,000</td>
<td>At least 60</td>
</tr>
<tr>
<td>10,000 or more</td>
<td>At least 80</td>
</tr>
</tbody>
</table>

(2) Election of Representatives

Elections are held under the management of the prefectural or municipal election administration committee in accordance with the principle of direct, equal, and secret balloting (Article 23 of LIA). Constituencies may be established, in accordance with the provisions of the statutes, for elections for the Assembly of Representatives. (Article 4, Order for Enforcement of LIA) In such case, quotas should be provided for each constituency.
(3) Quota for Executives
There should be at least five directors and two auditors. No one may hold more than one of the following posts at any one time: director, auditor, and staff member.

(4) Election of Executives
In principle, elections are held in the General Assembly by one-person-one-vote secret ballot. However, if otherwise provided by statutes established with the consent of at least 2/3 of the members, an election may be held outside the General Assembly.

(5) Term of Office
The term of office of Representatives and Executives is four years, and re-election is possible.

3.3 Major Duties
(1) General Assembly of Assembly of Representatives
In many LIDs, assembly meetings are held twice a year, in spring and fall (before and after the period of paddy field irrigation) to hold discussions and make decisions on important matters such as fiscal project plans, the budget, and account settlements, as listed below.

Decisions (approval) of the following matters: a) Changes in statutes and land improvement facility maintenance/management plans; b) methods of procuring funds; c) account settlement and budget; d) levies (special and ordinary); e) project plans; f) project reports; g) account settlement statements; and h) inventory of property.

Fig. 2.2 Conceptual drawing of General Assembly (Assembly of Representatives)
(2) Board of Directors and Board of Auditors

The Board of Directors holds consultations and makes decisions on important matters related to the management of LIDs. Usually, the Board meets once a month.

Meanwhile, the Board of Auditors audits the status of management of the LID’s duties, accounting, and property, and reports the results to the Board of Directors and the General Assembly (Assembly of Representatives).

[Supplement 6: Extraordinary Meeting of the General Assembly (Assembly of Representatives)]

Directors can convene an extraordinary General Assembly (Assembly of Representatives) meeting whenever they consider it necessary. In addition, if a member seeks the convening of the General Assembly (Assembly of Representatives) by submitting a written request citing the purposes and reasons for the meeting, along with the consent of at least 1/5 of all LID members, a General Assembly meeting must be convened within 20 days of the submission of the request (Articles 25 and 26 of LIA).

(3) Secretariat

(a) General Affairs/Financial Affairs

The office responsible for general affairs handles all general administrative issues, including the election of representatives and executives, preparations for meetings of the Assembly of Representatives and the Board of Directors, personnel affairs, project applications and liaison work.

The office responsible for accounting handles financial work including preparation of draft of budgets and settlement of accounts, levy of membership fees and payment of redemption money.

Only the Director General who works full-time receives a salary; all other executives and representatives only receive allowances for attending meetings and assemblies. Full-time employees receive monthly salaries.

(b) Water Distribution

The Board of Directors makes decisions on the targets for practical management of the basic irrigation facilities (diversion works and trunk channels) for water distribution, and the staff members implement the decisions.

The staff members responsible for water distribution change the system of water distribution when it becomes impossible to draw the water right discharge from the river.
because of the shortage of river discharge even with supplementation flow released from reservoirs in times of extraordinary drought. The Board of Directors makes the decision on the change in water distribution system and the staff members operate turnouts of the trunk channels in accordance with the pre-determined rules.

(c) Engineering

The personnel responsible for engineering are responsible for the construction of irrigation facilities such as small-scale channels on a scale too small to be approved as a national or prefectural land improvement project. If the LID implements a “corporate-run” construction project, it can receive public subsidies, though at a rate lower than that for national or prefectural projects.

In this way, the LID sometimes constructs irrigation facilities whose beneficiary paddy fields are too few to be considered as a national or prefectural project.

The engineering staff implements the maintenance work on irrigation facilities, whose maintenance/operation is entrusted to the LID. The LIDs also carry out appropriate maintenance and repairs (small scale) of major irrigation facilities. Work such as removing sediments and cutting grass at branch channels is done through labor provided by LID members.

In the case of relatively large-scale repairs that cannot be handled as small-scale repairs, a new application for a land improvement project (irrigation facility construction project) must be submitted so that the repairs concerned are implemented as a land improvement project.

3.4 Subordinate Organizations of LIDs

The LIA assumes that management of irrigation facilities initiated on the basis of the application for an LID is, in principle, entrusted to the LID and that the LID manages the facilities. In reality, however, there are subordinate organizations, including management organizations established by the LID and associations of local farmers at each level of the channel network, such as primary branch channels and secondary branch channels, and it is these organizations that manage the branch channels downstream of the basic facilities (diversion works and trunk channels, etc.).

Chapter 4: Membership fees (Water Charges)

4.1 Levy for Expenses

The LID may levy money, labor, or goods on the land within the project area and on
the members concerned, in order to pay the expenses of projects as provided in the statutes.

The levy shall take into consideration the benefit received by the land concerned from the said project, calculated from the area of the land, water usage, and other objective indicators.

In accordance with Article 36 of the Land Improvement Act, an LID may entrust the collection of levies to a municipality, with payment of a commission (4% of the collected amount). In the case of non-payment, the LID will request collection by the municipality and the municipality will penalize the delinquent in the same way as it penalizes tax delinquents (Article 39, LIA). However, most LIDs penalize delinquents themselves. In other words, levies can be collected almost as forcibly as taxes.

4.2 Ordinary and Special Levies

The LID levies two types of membership fees on its members: ordinary and special levies.

The ordinary levy is collected from members for the cost of organizational operations and management costs of irrigation facilities of the LID.

When an LID carries out a construction project such as building anew, renewal, reform, etc., and the public subsidies provided for the project do not cover the entire project costs, special levies are collected from the beneficiaries (members = farmers) to cover the balance.

4.3 Criteria for the Levies and Methods of Levying

The official LIA manual recommends levy collection per beneficiary or discharge, which is objective, credible and justifiable.

The ordinary levy is usually charged in proportion to the beneficiary area. The amount of the ordinary levy differs significantly among LIDs. In the conceptual model (7,000 ha), it is around 50,000 yen/ha/year, which corresponds to about 5% of the yield.

In contrast to the ordinary levy, there are many cases in which special levies (for repayment of the cost of constructions projects) are charged at different rates depending on benefits received from the project and the related cost of the construction project.

However, the levy on management costs (ordinary levy) after the LID begins supplying irrigation water, is often charged in proportion to the beneficiary area. This is the same for renewal projects, etc.

[Supplement 5 Revenues other than Membership Fees]

There are revenues, as shown below, that can be obtained other than from membership fees.

(1) Profits
Chapter 5: Small-scale Irrigation Organizations

Thus far, explanation has been about the organizational structure and functions of a typical LID, using a large-scale LID (with an area of irrigated farmland of 5,000 ha or more, and 7,000 or more members) as a teaching material. However, this kind of large-scale LID, adopted as a national project by the Ministry of Agriculture, Forestry and Fisheries, is the kind of project where the planning, design and execution is implemented directly (such as the large-scale improvement of facilities and projects covering a wide area, etc.). As a large-scale LID, various activities such as large-scale water intake facilities (diversion works and pumps) for water intake from rivers as well as the management of large-scale water transmission channels are carried out by full-time employees of the LID. However, management of the branch channels (secondary, tertiary and quaternary) is carried out by local organizations of each beneficiary area and each local organization operates by levying a membership fee and labor on its members.

Many farmers’ irrigation organizations in developing countries are on a small scale (between 100 ha and 1,000 ha). Such small-scale irrigation organizations as these (e.g. LIDs) in Japan, are branch organizations of large-scale LIDs, and are thus irrigation organizations for each of the multilayered branch channels. Their beneficiaries are involved in all aspects of irrigation management and operate by implementing so-called Participatory Irrigation Management (PIM).

In small irrigation organizations like this, as there is no need to have a full-time employee or set up an office for deskwork such as in large-scale LIDs, the farmer members together carry out the various duties involving irrigation management themselves. However, in this case, the farmers are not volunteers but members of the irrigation organization. As well as having the right to receive a supply of water for irrigation, they must pay the necessary membership fees and always must be aware of their obligation to provide their services (labor) for carrying out the various jobs of irrigation management and water distribution. From ancient times, Japanese farmers’ irrigation organizations have carried out irrigation management by creating multilayered organizations, which are based on communities called “villages,” the smallest unit of society.
Chapter 1: Irrigation Facilities

1.1 Water Sources

Water resources generally mean fresh groundwater and river water.

In Japan, almost all irrigation schemes use river water as a water source and use of groundwater for irrigation is rare. (There are cases where groundwater is used for industrial and domestic use.) This is a characteristic of irrigation water in Japan.

Both surface water that flows in river channels and “underflow” linked with surface water that flows in the ground below the riverbed are considered legally and administratively as river water in Japan as in many other countries.

1.2 Irrigation Facilities

There are many types of irrigation facilities from the water source to the end of the irrigation ditches. Such facilities are explained as follows.

(1) Water Storage Facilities

Water storage facilities increase the divertible capacity of the river by augmenting the natural discharge.

In addition to dams/reservoirs, they include facilities that exert a water storage function by controlling the water level in lakes, facilities that exert a function similar to reservoirs by controlling the water level in the backwater area of estuary weirs, and facilities that exert a function similar to that of reservoirs by developing freshwater lakes through double-dyke reclamation.

Multi-purpose dams are constructed by MLIT and the Japan Water Agency. Dams exclusively for agricultural use are constructed by MAFF and the prefectures and are often managed not by LIDs but by public institutions.

(2) Diversion facilities

Diversion facilities include diversion dams and irrigation pumps for water-intake from rivers.

Diversion works are often referred to in Japanese as “toshuko” (head works) by MAFF and “shusuizeki” (diversion dam) by MLIT and the Japan Water Agency.

[Supplement 6: Terminology for diversion facilities]

As terms used in English (as an internationally common language) there exist “head works” as well as “diversion dam/diversion weir/barrage,” which are used in different contexts, so attention
must be paid to make sure there is no misunderstanding.

(3) Canal Facilities

Canal facilities mean accessory facilities including canals for water transmission, water distribution, check gates, sluices and spillways (wasteweirs). Canals are either open or piped. Tunnels and reverse siphons belong to canal facilities.

In Japan, large-scale trunk (primary) and branch (secondary) canals are constructed in land improvement projects, which are usually implemented as national or prefectural projects.

Small-scale irrigation canals at the farm level are not always included in the scope of irrigation projects. They are often constructed in land consolidation project schemes.

(4) Sophisticated irrigation facilities for paddy plots

In Japan, on some farm, pipelines, instead of open channels, are installed adjacent to the paddy fields as irrigation canals when land consolidation projects are implemented. Irrigation water is supplied to paddy fields equipped with these pipelines through taps which look like house taps.

In order to save labor in water management, some paddy fields are equipped with water-level control systems that automatically maintain a set water level in the paddy fields.

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4 Collectivization of small-scale paddy fields and construction of small-scale irrigation channels, drainage channels, and farm roads adjacent to each paddy field
Chapter 2: Irrigation Management at the Basin Level

2.1 Distribution of river water resources

Water resources from rivers are usually diverted and used by multiple bodies, including LIDs and municipalities that diverted water for domestic use. In Japan, the river administrator (River Bureau, Ministry of Land, Infrastructure, Transport, and Tourism (MLIT)) that manages river water resources uses the approved water right system to decide how to distribute river water to those who have expressed an interest in using it.

With regard to water rights volumes, a “stage-specific” system has been introduced in which the volume of required water-intake during the irrigation period is set for each growing stage of wet-paddy rice.

[Supplement 7: Water right discharge for paddy field irrigation]

The water right discharge for paddy field irrigation was represented only by the daily maximum before WWII and even during some years after WWII.

However, demand for water use increased rapidly with the development of urban areas and industry. In addition, it became necessary to implement drought supplementation from multipurpose dams, as was once seen in the TVA in the United States. If the water right for paddy field irrigation, which diverts a large amount of water, is controlled by the maximum value alone in such circumstances, it will be impossible to control low-water discharge from the river. Therefore, a system of dividing the irrigation period into shorter stages and establishing the approved water-intake discharge for each stage was adopted. These stage-specific allowable discharges and the total volume of water that can be diverted from a river in one year are defined as the gross discharge approved.

2.2 Time of normal discharge and time of extraordinary drought

Although the river administrator (River Bureau, MLIT) manages and supervises river water use in accordance with the water right system, water right holders are allowed to divert water freely from rivers within the allowance of the water right as long as the river discharge is sufficient for such diversion.

However, in times of drought when the diversion of river water at water right discharge becomes impossible, an emergency system known as drought coordination is adopted.

The river administrator puts the drought coordination into effect when the river discharge has actually become or is feared to be less than the diversion of water rights discharge.

When drought coordination is put into effect, the water right holders (water users) hold consultations on countermeasures, and on the basis of the agreement they reached, adjustments are made by having each water right holder reduce his or her intake volume. If consultations among the water users fail, the river administrator shall conduct intermediation and/or arbitration on the matter. In most cases, however, the matter is settled through water users’ negotiations based on the information.
Chapter 3: (Direct) Irrigation Management by LIDs

3.1 Water channels managed by the LID

As the method of managing irrigation facilities after their completion is stated in the “Land Improvement Facility Operation/Maintenance Plan (O/M Plan),” which is submitted at the time of applying for projects, the Ministry of Agriculture, Forestry, and Fisheries and the prefectural governments generally entrust the management of the irrigation facilities, excluding special facilities, to the LIDs.

LIDs that possess several thousand hectares of irrigated paddy fields are entrusted to manage (or operate) not only diversion facilities (diversion dams, etc.) and trunk channels, but also the branch channels and channels at the lower portion end of the irrigation networks.

Actually, however, the operation and maintenance conducted by the LID (personnel) only consist of distributing water to the trunk channels at the uppermost level and branch channels as in the prewar and early modern times (17-19th century). The reality is that a hierarchical irrigation organization established at each irrigation channel level is responsible for the daily operation and maintenance of the channels at its level.

In the figure at the lower left, the layout of the channels in actual LIDs in Japan with an area of several thousand hectares is idealized and then conceptualized in order to make the hierarchical structure of the system easy to understand visually. In a beneficiary area in which water is distributed from the same water-intake source as in this figure, a hierarchical subordinate organization exists at each of the different channel levels (multiple number of levels). In order to operate and maintain all the facilities in the beneficiary area appropriately, an organization to govern these subordinate organizations is required.

As shown in the figure at the lower right, a prototype of this mode of irrigation management – a hierarchical irrigation management organization established at different levels corresponding to those of the irrigation channels taking responsibility for managing irrigation through the channels at its respective levels – was already established in the 17-19th century. In particular, in the management mode actually conducted in the postwar era, the LIDs function at the top of the hierarchy, while the subordinate organizations have nearly completely inherited the system established in the 17-19th century.
It was only in the Meiji Period (1868~1911) that modern property ownership was established in Japan. Before the Meiji Period, the assessed yield of rice was used as the basis for the assessment of taxes imposed upon farmers. Evaluation of soil fertility in the broad sense including location, shape, size, soil fertility, availability of irrigation, and drainage of each paddy plot was incorporated in the assessment yield.

A levy system was practiced in which all the members of a community paid a levy imposed on the community (the social unit at the bottom of the social structure, formerly called a “mura” or “village”) at an assessed amount, collectively, as their communal and collective responsibility for tax.

The obligatory tribute payment system was implemented with the landowner serving as joint surety.

A prototype of a mode of irrigation management, in which a hierarchical irrigation management organization is established at different levels corresponding to those of the irrigation channels taking responsibility for managing irrigation through the channels at its respective levels, was already established in the 17-19th century.

3.2 Maintenance

The LID carries out the work required for appropriate maintenance of the main irrigation facilities. Maintenance of the branch channels (dredging and mowing) is done with the labor contributed by its members.

In principle, public subsidies are not provided for ordinary O/M costs. However, for renewal and repair of deteriorated or broken-down “medium”-scale irrigation facilities and in cases where it is difficult to rectify the situation by ordinary O/M, subsidies may be...
provided by the central and/or prefectural government through a scheme called “rationalization project.” Repainting of large gates is an example of renewal/repair of medium-scale irrigation facilities.

3.3 Operation

The volume of water diverted from the diversion works and trunk channels, which are directly managed by the LID, is usually controlled by the LID.

The LID operates the irrigation facilities to enable fair and equal water distribution to the plots of irrigated paddy fields of all the beneficiary members (farmers).

(1) Normal periods

During ordinary and normal periods, irrigation water is usually distributed to all paddy fields simultaneously and continuously.

(2) At times of extraordinary drought conditions (shortage of irrigation water sources)

In the event of extraordinary drought, the water shortage is tackled by dividing irrigation districts into a number of blocs and switching to a system of distributing the water sequentially (called “bansui” in Japanese.)

If this system is adopted, it is possible to distribute water to all the beneficiary members (farmers) fairly and equally and eliminate the possibility that unfair water distribution for members in the upper reaches having an advantage in water-intake will lead to conflict between the members in the upper reaches and those in the lower reaches and complaints from members in the lower reaches.

However, successful implementation of the bansui system requires the sound existence of a relationship of mutual trust and human relationships (social networks) between the LID and the beneficiary members (farmers) and hierarchical subordinate irrigation organizations.

The irrigation canal network is composed of canals at different levels, i.e. trunk channels and primary, secondary, tertiary …. branch canals. At each level, canals spread like the branches of a tree and there are many division points operated and managed by irrigation organizations at different levels. What deserves particular attention in this network is that each irrigation organization in the hierarchic of irrigation organizations should be able to operate and manage the irrigation facilities under its responsibility in such a way that water is distributed to each end-user/farmer in a fair and equal manner.

In other words, it is necessary for all the irrigation organizations in this hierarchic structure to have the capacity to respond to emergent and to distribute water fairly and equally. The inheritance and maintenance of this hierarchy of local irrigation organizations with the LID at the top of the hierarchy as social capital might be the basis
of the success of PIM in Japan.

(3) Conditions for an appropriate water distribution system

Fair and equal water distribution to all beneficiaries, instead of the unfair practice of giving an advantage to beneficiaries in the upper reaches of the irrigation system, and guarantee of water distribution to all paddy pots could be realized by an appropriate water distribution system by irrigation management organizations. Advantages given to beneficiaries in the upper reaches or unfairness imposed by force will cause water management by the irrigation management organization to become unstable.

As mentioned earlier, management of the volume of water diverted from the diversion works and trunk channels is conducted through the Board of Directors of the LID. However, there are cases in which a council, etc. is set up to conduct liaison and coordination related to water distribution between the LID and subordinate organizations. In addition, there are cases in which municipalities (governments) and other LIDs participate in the council.

Fig. 3.4 Example of a liaison and coordination organization

3.4 Irrigation Management by Small-Scale LIDs

Small-scale LIDs have particularly close connections with hierarchic subordinate organizations, which will be explained in the next chapter. These subordinate organizations are organizations that have been formed with villages as a unit, and in many cases, they have built up traditional facilities and water management systems. Consequently, such work as removal of sediments that have accumulated in channels and cutting of grass have been done by the organizations themselves as a part of community association activities or joint operations that have been practiced traditionally.

It can be said that farmers’ operation and maintenance activities in the backdrop of the social norms that evolved in rural communities in Japan where paddy rice cultivation has been practiced from the past are one of the factors that have supported small-scale LIDs.
(1) Stock management

Revision of the system of renewal of civil engineering facilities such as irrigation facilities is in progress. Instead of the conventional way of renewal at the end of the life of the facilities, long-term overall cost-saving on O/M and renewal by conducting inspections as the need arises and by small-scale renovation and repair in accordance with a pre-determined timetable and use of new technologies is sought after. Such a system is called “stock management.” The practice of paying attention to the functions of irrigation facilities and maintaining the functions at a certain level by the most appropriate method has become increasingly popular as a new trend in Japan.

(2) Project for conservation and improvement of Farmland, Water, and the Environment

By the urbanization and economic growth after World War II, changing to part time farming, farm retirement and aging were progressed. Therefore it is becoming difficult to maintain irrigation facility with only the old farmers’ organizations. Meanwhile, amid growing concern about environmental issues, began to be appreciated multiple functions of village (natural environment and landscape conservation and formation etc) by the public.

Against this background, there was also requested of assistance from non-farmers and urban residents. In order to support the collaborative activities with farmers and non-farmers, the Ministry of Agriculture started the "Project for conservation and improvement of Farmland, Water and the Environment" and funded grants to support collaborative activities for the organization to meet the requirements.

Chapter 4: Organizational Structure and Shared Functions of Hierarchic Irrigation Management Systems

4.1 Organizational Structure

In an ID, each member has one vote in electing representatives, directors, etc. Hierarchic irrigation organizations mentioned earlier that manage branch channel networks below branch channels also elect the representatives of each level who are in charge of operations of the organization through indirect elections, such as meetings.

As shown in Fig. 3.5, the typical structure of irrigation management organization is as follows. A representative at the tertiary channel (community) level is appointed from each community. The representatives at each tertiary (community) level join the irrigation management at the secondary channel level, and one of the representatives in the secondary channel is elected from among the representatives to be sent as a representative to manage irrigation at the level of the primary channel, the higher level.
While water channel organizations are totally formed in a bottom-up style in such a way, the right to make final decisions is delegated to the representatives of each level after the representatives have been selected, and management operations such as the distribution of water during extraordinary droughts and routine maintenance work are all done in a top-down style.

Although they can be referred simply as organizations for the operation and maintenance of irrigation facilities, they from a hierarchic structure ranging from the decision making organ at the top level to the organizations at the lowest level that actually do the work. In paddy field irrigation in Japan, the water management system has been maintained because the farmers at the lowest levels have faithfully performed water distribution, etc. determined by the LIDs.

4.2 Management of Branch Channels

(1) Management

The role of the organization is the maintenance and operation of fair and equal water distribution as well as the maintenance and operation of facilities based on the principle of cooperation and deployment in water-saving activities. The establishment and maintenance of social norms among members who comprise the organization play an important role in the execution of operation and maintenance through such collaborative work.

In the case of traditional irrigation organizations in Japan, there have existed “shuraku” (villages or communities), which serve as the basis of the formation of organizations, as mentioned earlier. As seen in examples of the obligation to pay tributes as a collective responsibility or penalties (ostracism) for violations in the 17-19th century, social norm were established and maintained by incorporating the principle of equality and restraints on personal profits into the community system. In addition, with regard to water distribution and intake in compliance with practices at the field level, order was gradually established through conflicts among the communities over water. After being in existence for a long time, irrigation practices came to be established based on tacit approval among
surrounding communities.

This historical background has led to the establishment of the operation and maintenance of facilities through collaborative work.

(1) Levy on expenses

Different systems of levying for expenses are adopted according to LIDs. There are cases in which an LID may collect the levy on expenses required for management, as well as cases in which it may levy money or labor to pay for the expenses on its own under an independent account.

![Diagram of irrigation management](image)

**Figure 3.6. Management of facilities by LID and subordinate irrigation management organization (example)**

(Supplement 8: Predecessor organizations and villages)

Possession of small farmland mixed in a jigsaw fashion with those owned by other farmers can be cited as a characteristic of agricultural land use in Japan.

Under this form of land utilization, paddy fields are connected with each other in terms of irrigation, preventing individual farmers from using irrigation water freely. Therefore, it became necessary to jointly manage and control irrigation water. Agricultural communities (*shuraku*) were the local groups for that purpose.