

A case study of Japanese Irrigation Association as a model of PIM

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ABSTRACT

This article examines irrigation management conduct within Japanese Water Users Association (WUA), named as Land Improvement District (LID). LID is regarded as a successful case of Participatory Irrigation Management (PIM), in which there are few conflicts over water between farmers, so that it attains high social cost performance. However, management system of LID still remains obscure. We threw light on this system assuming the existence of "rule of fairness". As a result of field survey, we found that farmers operate irrigation facilities in a self-serving way and have their own rule of fairness, such as upstream superiority, based on the long-term experiences of irrigation system. Then we defined such rule of fairness into two components. Finally we remarked that the approach of LID staffs is the essential factor to satisfy the farmer's criteria of fairness and maintain peace. These lessons would be expected to be helpful for future PIM projects.

Keywords: water user's association, Land Improvement District (LID), farmers' participation, operation and maintenance, fairness,

1. INTRODUCTION

1.1 Background

As the world's population increases, the demand for food is rising sharply every year. The introduction of irrigated farming is recognized to be one of the most effective solutions to rising demand, as it has the potential of doubling or tripling food production (FAO, 1996). Participatory Irrigation Management (PIM) has moved from the periphery to center stage in irrigation management, replacing facilities construction. The purpose of PIM is to involve farmers themselves in irrigation operation and maintenance (O&M). The merits of PIM include a decrease in wasteful use of water, enhanced durability of irrigation facilities, reduction of government burden, facilitation of cost recovery, and achievement of equitable water delivery. Some countries, such as Turkey and Mexico, have succeeded in establishing PIM-based projects, while other countries, especially in monsoon Asian countries, have not achieved good performance yet.

It is important, but difficult, to have farmers take initiative in the management of

Water Users Associations (WUA). The Japanese WUA system has been praised by the World Bank as a successful example of farmer-led WUAs (EDI, 1997). However, only the fact that Japanese water users associations are farmer-led is mentioned; the World Bank reports do not discuss how Japanese WUAs succeeded, which is important as well. To administer an association in a sustainable way and distribute water fairly is as important as the establishment of farmer participation. Japanese experience in setting up such organizations, which has not been focused on before, can be expected to have some lessons for other countries that are establishing Participatory Irrigation Management.

1.2 Historical review of WUA in Japan and aim of this study

Until the end of World War II, irrigation was operated and managed by water users associations based on village communities. During that time, there were a number of conflicts over irrigation water between WUAs; such conflict was often between an upstream WUA and a downstream WUA because, due to the nature of rivers, an upstream WUA can take water freely without regard for downstream users. This kind of overuse by upstream WUA is generally called upstream superiority. For downstream WUAs, upstream superiority was a serious problem, and it often led to conflicts. However, in 1949, the enactment of the Land Improvement Law transformed the system of irrigation management; Land Improvement Districts (LIDs) were established, and the rights of irrigation management were transferred to LIDs from each WUA.

Under the definition in the Land Improvement Law, a Land Improvement District is an organization created for the purpose of undertaking the construction, improvement, and management of irrigation/drainage facilities and land improvement projects including farmland consolidation within the boundaries of the district. The establishment of an LID should in principle be based on the initiative of more than 15 farmers and requires the consent of more than two-thirds of the farmers affected by the project. After the establishment of the LID, all the costs are shared by the affected farmers (Land Improvement Law, 1949).

Some LIDs took over the organization of a former WUA in toto, and some were formed by consolidating several former WUAs; in either case, most LIDs preserved the former WUA organizational structures and made use of them. As a result, the number of conflicts within an LID decreased, although conflicts between LIDs continued. On the whole, peace has been maintained, and O & M has been conducted smoothly despite the change in organizational structure. There has been discussion of water distribution conflict and competition between LIDs and between the agricultural sector and the industrial sector. However, there has not been sufficient discussion of LIDs' internal behavior, and the reasons that O & M within an LID is managed relatively peacefully are not yet clear.

So in this study the authors investigate the O & M inside an LID and try to identify and describe the system that maintains public order in irrigation.

2. MATERIAL AND METHODS

2.1 Study area

The authors plan to compare their study area in Japan with a study area elsewhere in Monsoon Asia in the future, so the study area was selected to meet the following conditions: a system of rice-centered farming, an open-channel irrigation system, a modest amount of rainfall, and an area of cultivated acreage that is not too small regarding to cultivated acreage (most Japanese farm holdings are very concentrated and small compared to those in other countries). The Fukuokazeki Land Improvement District (FLID) was selected as the study area.

FLID is located in Ibaraki Prefecture, 50 kilometers north of Tokyo (see Fig. 1). Although FLID is being urbanized gradually under the influence of the Tokyo Metropolitan area, it is still an agriculture-oriented area; 3352 ha out of 6320 ha is covered with paddy field, most of which has already undergone fundamental land improvement in various forms, including paddy consolidation. Cultivated acreage per household is approximately 1.1 hectare; however, more than 90% of the farmers are part-time farmers who hold non-agricultural jobs on weekdays.

The irrigation channel system of FLID was established in the 17th century, and the basic channel structure remains essentially unchanged: Fukuokazeki headworks, the only water intake structure in FLID, takes water from the Kokai river; irrigation water is split into two primary channels and then distributed to each field via secondary, tertiary, and quadric channels. The process of irrigation is illustrated in Fig. 2 and Fig. 3. Irrigation channels and drainage channels have been completely separated since the land improvement project conducted in the latter half of the 20th century.

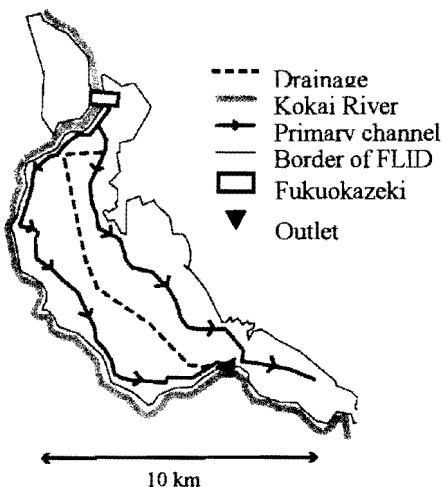


Fig. 2 Macroscopic irrigation system of FLID

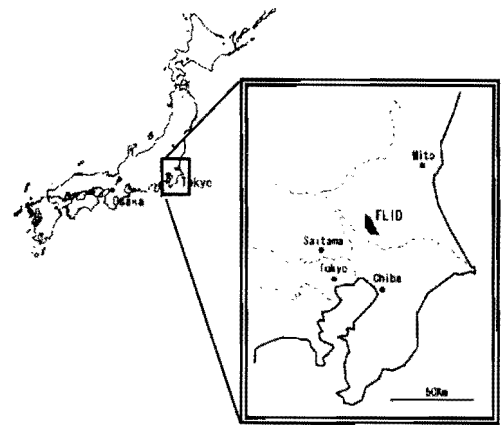


Fig. 1. Location of FLID

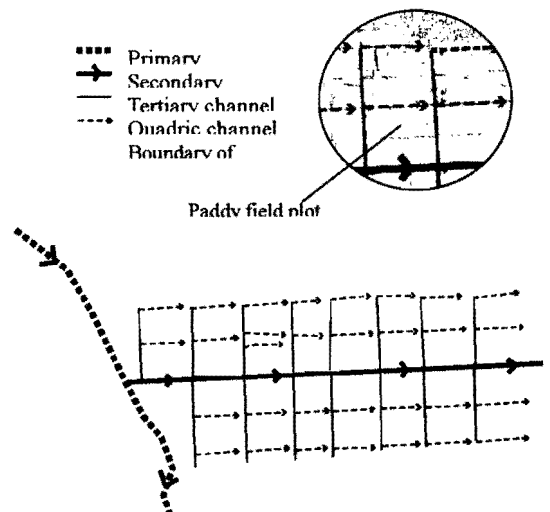


Fig.3 Microscopic irrigation system in FLID

2.2 Methods

All the data were collected from (1) a field survey, including interviews with FLID staff and farmers, and (2) a review of the literature. Field surveys were conducted five times between July 2001 and April 2002

- (1) In the field survey, the authors walked around the study area and grasped the layout of the irrigation facilities, their physical conditions, and the distribution mechanism. Three FLID officials were interviewed: the chairman and two staff members of the operations and maintenance department. In addition to interviewing them indoors, the authors accompanied the FLID staff members on their work. For sampling interviewee farmers, two steps were taken. First, target villages were selected, taking care to include both upstream villages and downstream villages in the sample. Then interviewee farmers were selected at random from each target village. Each farmer was interviewed at least four times, because many farmers are so shy that they rarely reveal the actual conditions of their lives in the first or second interview.
- (2) The literature review was conducted mainly based on the local historical irrigation records kept by former WUAs and by individual farmers. Other data sources were books and papers focusing on other WUAs and LIDs.

3. OPERATION AND MINTENANCE WORK IN FLID

O & M work is essential to achieve smooth water distribution. In FLID, the entire process can be classified into three categories: (1) water distribution management, (2) facility maintenance, and (3) facility repair.

- (1) Conceptually, water distribution management can be achieved only under central control; however, in practice it involves a great dead of effort by individual farmers: channeling water into the paddy fields, pumping water with engine-driven pumps, and damming up the channels so as to lead more water into the paddy fields, which decreases the flow to downstream paddy at the same time. The FLID, village unions, and villages regulate the water distribution management performed by various subordinate organizations.
- (2) Facility maintenance creates an environment that facilitates smooth water distribution; compared with other parts of irrigation management, it is relatively indirect. The main work is mowing around the channels and dredging channels. Without this work, grass and algae cover the ground and the channel, and mud piles up on the channel so that the flow of water is blocked.
- (3) Facility repair is the repairing of channels, division works, and so on. These facilities are often damaged by long use or accidents.

3.1 Organizational structure of FLID

The actors involved in irrigation O & M in FLID form a pyramidal structure, as shown in Fig. 4. The organizational structure of FLID is illustrated in Fig. 5. FLID mainly consists of two bodies: the governing board, a decision-making body, and the secretariat division, an executive body. The members of the governing board are delegates elected from among the farmers; there is an election every four years. The governing board holds a general assembly every year to decide on the budget, policy, and so on. The Secretariat consists of full-time employees who are engaged in administration and O & M. Apart from these two bodies, there are two small departments.

There are two village unions in FLID. Both are very similar. They were created voluntarily to promote cooperation among the villages in the Irrigation District. So far they are evaluated as functioning well by the FLID.

The village has been an important administrative unit throughout Japan's history, and villages have existed for centuries. The village as an official administrative unit has been abolished by law, but villages are still deeply important in people's lives in Japanese rural areas. A village has one leader who is prestigious and trusted by the other members of the village community. Where irrigation is concerned, a leader serves as a negotiator between villages, an arbitrator between farmers, a messenger connecting the FLID and individual farmers, and a manager of village facilities.

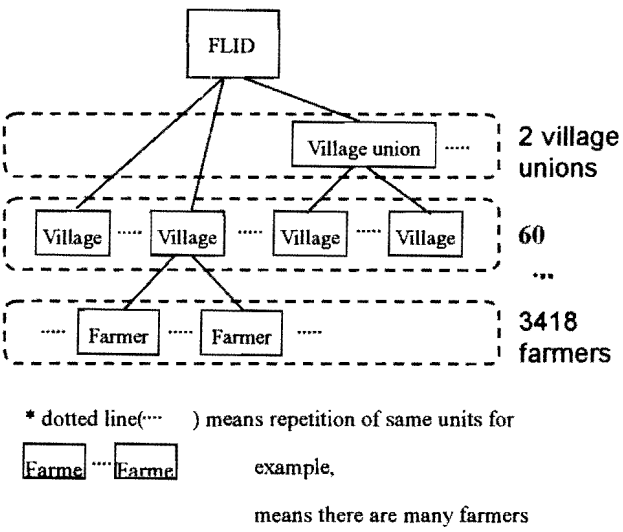


Fig.4 Image of the structure of actors involved

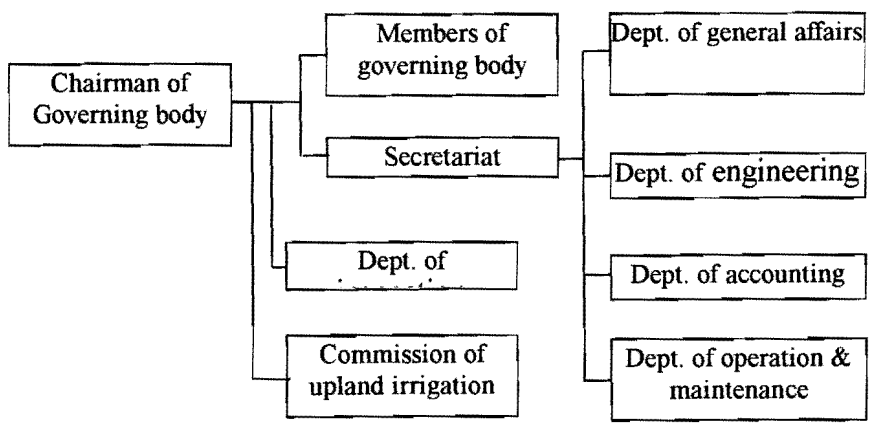


Fig.5 Organizational structure of FLID

3.2 The assignment of O & M work

Operation and Maintenance (O & M) work is assigned to each actor: FLID, village unions, villages, and farmers, based on the level of the channel that is being maintained. This assignment is prescribed in the FLID O&M Rulebook, and the details of assignments are listed in Table 1. FLID deals with macroscopic management, while individual farmers deal with microscopic

management issues. For facility maintenance in secondary and tertiary channels, each village is allocated its area of responsibility by FLID and cleans up the area twice a year. Cash rewards for the work are paid to the villages by FLID.

Table 1. Assignment of O&M work in FLID

		Level of water channel			
		Primary	Secondary	Tertiary	Quadric
Work	Water distribution management	FLID/Village union		Village/Farmer	Farmer
	Facility maintenance	Village committed by FLID		Farmer	
	Facility repair	FLID			farmer

4. THE RULE OF FAIRNESS

Traditionally, farmers in Japan have their own customary rules developed on the basis of longstanding experience. As a result of field survey, it proved that such rules also apply to irrigation: people have their own sense about how irrigation should be managed. Such customs are unwritten and difficult for outsiders to grasp; however, they have a strong influence on farmers, and acknowledging them is crucial for the success of Participatory Irrigation Management. In this study the authors narrow the scope and focus attention on the rule of fairness regarding irrigation. Some aspects of the rule of fairness can be seen from the farmers' behavior described below.

4.1 Upstream superiority

The superiority of upstream farm plots is an idea that has been existed for a long time. The concept has taken root in farmers' minds until it has become customary; farmers have almost given up any pretense of abolishing it. It comes to the fore especially during puddling season: the upstream farmer banks up the channel and monopolizes the water for his own paddy fields; after the completion of puddling in upstream fields, the downstream farmers can finally access the water and puddle their own paddy fields. Thus water is used in turn by farmers in order from upstream to downstream. Enforcing perfectly equal distribution of water in violation of this custom may even seem unfair to the downstream farmers themselves. Moreover, the customary practice is rational from the scientific point of view: if upstream

paddy is irrigated ahead of downstream, the linkage water from upstream flows downstream through the ground and is absorbed by downstream fields; this increases the efficiency of the overall irrigation process.

4.2 Balance between contribution and payment

There also is a unique rule for collective work. Farmers strictly observe a balance between what they contribute and what they receive as payback. As explained above, primary, secondary, and tertiary channel facilities are maintained by villages under the supervision of FLID. Village leaders urge village members to participate. Decades ago all the residents used to participate in the cooperative work, and the cash reward was contributed to the village's budget; however, these days not all the members are able to work due to urbanization and changes in the farmers' lifestyles and viewpoints in this region. Therefore the use of a cash reward from FLID has also changed: rather than being contributed to the whole village, it is spent on a party for participants so that absentees cannot benefit. In other collective work projects, penalties are imposed on those who do not cooperate with the village.

5. FLID'S SUCCESSFUL MANAGEMENT PRACTICES

The FLID system itself has some lessons to teach about maintaining fairness and peace in irrigation.

5.1 Assignment of O&M work

Before the establishment of FLID, there was no official actor to undertake the O & M work on higher-level, primary or secondary, channels, which have such a great influence on water distribution in the whole area. Every farmer could, and did, participate in the O & M of higher-level channels and contribute to the division work in a self-serving manner. As a result, unending conflicts broke out among villages or among users. However, after the introduction of the Land Improvement District system, O & M work was assigned by FLID, and the management of higher-level channels came under the purview of FLID. As an administrator of irrigation facilities, FLID is more appropriate as the operator of higher-level channels than farmers in the sense that the purpose of FLID is to achieve fair water distribution among the entire population of farmers, while the goal of individual farmers is usually the success of their own individual farm. FLID staff members control the division of primary or secondary channels with the goal of distributing water fairly to the whole area, and they control access to the facilities. As a result, the number of trivial quarrels over the control of higher-level channel has decreased, and farmers are also highly satisfied with the result.

5.2 Neutral attitudes

FLID staff members are very sensitive about maintaining neutrality toward each farmer. FLID often acts as arbitrator of even trivial quarrels, though mediation of disputes between farmers is supposed to be the responsibility of village leaders. When mediating quarrels between farmers, FLID tries not to directly control the water balance but just stands between the parties concerned and observes their dialogue. Only when an action of one of the parties is unfair does FLID invoke its power and compel the farmers. This attitude of FLID has two aims. One is to respect the local customary rule: getting involved in local management without due consideration would disrupt the balance in relationships among local farmers. The other aim is to maintain impartiality toward all the farmers: if FLID supports one party to a quarrel, the other party sees this as favoritism. So FLID tries not to intervene in disputes so long as the matter under dispute is not of vital importance to the whole LID. Rather, FLID staff members make use of the villages' system of self-governance. This not only reduces the work of FLID but also impresses farmers with the principle that FLID is impartial to all the farmers.

5.3 Transparency in facility repair

Facility repair -- except at the quadric channel level -- is funded by FLID. Farmers apply to FLID for the sites that they want the district to repair. However, there are so many applications every year that the budget of FLID cannot cover all the requested repairs. So some of the applications have to be rejected; and, in the natural course of things, rejected farmers feel some dissatisfaction. To avoid such dissatisfaction and persuade farmers, FLID has introduced a new method for decision-making. FLID staff members visit each of the ten blocks within the District and, in the company of all the village leaders in the block, assess the situation of all the requested sites. They decide which sites to subsidize with the participation and approval of all the leaders. This method has much higher transparency than one based on the FLID officials' judgment alone; and the process is seen as fair and democratic by the farmers.

6. CONCLUSION

The success of irrigation projects depends upon the farmers' cooperation. This study has shown that, as criteria for making judgments concerning irrigation, farmers attach importance to local customs and fairness. One major principle of local custom is 'upstream superiority' (see discussion above).

We could say that there are two kinds of fairness: one is "fairness of outcome"; the

other is “fairness of procedure”. This classification is based on the socio-psychological theory of Tom R. Tyler (Tyler, 1998). It holds true also in irrigation. Fairness of outcome means the reasonableness of the balance between the payout and the reward; in irrigation, payout means money, labor, and time for labor; and reward is irrigation water itself and other types of compensation for water, like facility construction and repair. However, farmers value not only the outcome but also the process by which the outcome is produced. Fairness of process is typified by impartiality, consistency, and representation. Farmers are more satisfied if they see the outcome as having been reached in a fair manner.

However, the rule of fairness, criteria of fairness in other words, practically differs from person to person, or village to village. As the result of this study, we found two critical parameters which affect the rule of fairness: one is shared value and the other is degree of individualization. Shared value is facts, relationships, conditions shared by the member of the community, usually village, and sense of value formulated as a result. Degree of individualization is literally how much the person’s way of thinking is urbanized, which means how much the person lost the notion of communalism. These two are key determinant factors of the rule of fairness. To make it clearer, we can describe as below

$$F=f(s, I)$$

where **F** is the sense of fairness, **s** is the shared value, and **i** is the degree of individualization.

In addition, as the operation and maintenance works are divided vertically by each actor such as FLID, village and farmers, the rule of fairness also differs in each level.

The case of FLID shows some examples of ways to satisfy farmers and to reduce conflicts between farmers. FLID's impartial attitude to all the farmers enhanced its perceived reliability, and this has enabled FLID to manage more smoothly. However, one question comes up: how is the fairness of the FLID staff maintained? The answer is that FLID, as well as other LID, was originally established by the farmers themselves, though today it is staffed by professionals. Their wages are paid from the water fees collected from each farmer. Water charges are uniform per acreage, so staff members feel a sense of responsibility to provide services impartially to all the farmers. Moreover, there is a governing body which is separated from the secretariat. The members of the governing body are selected from the community, so that farmers' voices are reflected in FLID's management. Thus each system contributes to building up confidence and order in FLID.

Finally, as lessons for future PIM projects, we can say that (1) due to the nature of farmers, unregulated farmers participation causes rather disorder; division of responsibility among each actor is necessary, (2) meticulous attention to the rule of fairness of local farmers is essential to gain their cooperation, (3) LID staffs management technique explained above has good prospect for application to other cases.

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