

8. River Resources Allocation and Participatory Irrigation Management in Japan today

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1. Introduction

Japan's experience will be introduced as one of the basis for the comparative discussions on the subjects mainly focused here, which are river water resources allocation and Participatory Irrigation Management.

Rice-paddy irrigation for small farms in the monsoon area in the tropical region is the main target here. As the control for comparative discussions, some categories or classifications are considered; such as humid(H) vs semi-arid(A), tropical(Tr) vs temperate(Tm), small farm(S) vs large farm(L), diversion(D) vs tank-fed(T), and natural river flow(N) vs reservoir-fed(R).

Each participating country's presentation in the seminar belongs to the categories mentioned below;

Afghanistan(Af)	A,Tm,S,D, N
India(I)	H,Tr, S,T,R
Thailand(T)	H,Tr, S,D,N
Cambodia(C)	H,Tr, S,D, N
Philippine(P)	H,Tr, S, D,R
Korea(K)	H,Tm,S,D,R
Japan(J)	H,Tm,S,D,R
Australia(Au)	A.Tm,L,D,R

Main Subjects discussed here are two as follows;

- 1) River water resources allocation
- 2) Participatory Irrigation Management in Japan today.

2. Characteristics of each kind of available water resource

There are two kinds of water resource. Their characteristics are;

- 1) Ground water: private property (a land owner's property) stable but less availability in quantity
- 2) River water: public property (national property) fluctuating but more availability in quantity

That is why irrigation water source is not ground water but river water in Japan.

3. Water Rights System in Japan

River water resources allocation are managed, and river flow conditions (both floods and low flow) are controlled and regulated by the Ministry of Land and Transportation in the National Government.

Government Permission is indispensable for water users' diversion of river water.

Buying and selling, borrowing and lending between users are forbidden, because river flow water are "national" or "public" water, which cannot be owned by any juridical person as a person's property.

River water resources allocation among water users in sectors such as farmers' organizations for irrigation, cities or municipalities for urban or domestic water supply, manufacturing factories for industrial water and hydroelectric power generation, in Japan today is administered by the National Government through the legal systems, "Water Rights" since 1896.

Existing diversions, almost most of which were for irrigation of rice-paddy, were regarded as already "permitted" water rights.

Principles of river water resources allocation are "Appropriative Right" or "First in time- First in Right".

Procedure is that potential water users shall apply to the National Government.

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A complete application shall include:

- The name and address of the applicants
- The nature and the proposed place of use
- The proposed place of diversion
- The location and description of the proposed head works and other works
- The amount of the use
for irrigation of rice-paddy, the applied amount of the use changes against stages such as nursery bed~/ puddling and transplanting~/ growing~ etc. and only in a irrigation (summer) season, not in a off-season
- others

Application and Permit fee are not charged in reality.

The Government gives permission to an applicant, when no protests based on alleged injury to prior rights

4. “Standard” “Normal” Low Flow:

“Standard Low Flow” or “Normal Low Flow” technically defined by the Government is a basis or criteria of regulation and control of low flow in river channels in drought.

The definition of standard low flow or normal flow is:

low flow discharge with 90% exceeding probability in a river channel, or

10% risk probability=90% safety probability (occurrence: once-in-ten-years as average)

“Standard low flow” discharge minus “Maintenance flow” discharge is available to diversion of river flow by an applicant.

“Standard low flow” should be more than or equal to Maintenance flow discharge and all of prior right discharges.

- “Maintenance flow” is in-stream flow discharge for environment conservation and others such as navigation, dilution of polluted water etc

River flows are controlled and regulated by administration of the Government

If available waters are not enough for a new applicant, a reservoir should be constructed to release water as supplement to extreme low flow in river channels in drought by an applicant’s pay at the order of the Ministry.

In drought, the Ministry officials administer to release stored water in a reservoir or reservoirs to augment low flow in river channels to augment

natural river low flow discharge to keep flow conditions to satisfy maintenance flow and prior rights.

When emergent drought occurs, and river flow discharge becomes less than standard low flow, river water resources could be temporarily reallocated by conference of all of water right holders, sometimes not in proportion of water rights in quantity.

5. Participatory Irrigation Management (PIM)

Principles or philosophy built in the setting behind the concepts of PIM proposed by staff of the World Bank are as follows;

1) farmers (stake holders)(water users) should participate in Operation, Maintenance and Management (OMM) of Irrigation Systems to establish “democratic” organization (association) of “Water Users” (WUA) of the farmers, by the farmers, for the farmers.

2) Market mechanism:

Beneficiaries should Pay Principle (BPP), in other words no public subsidy for OMM costs But public subsidy at construction costs is permissible as an exception internationally.

6. Land Improvement District (LID)

= Japanese farmers’ irrigation association = Japanese water user-farmers’ association

LIDs were, are and will be established based on Land Improvement Act enforced in 1949. to replace “(Land owners’) Irrigation and Drainage Association” or “(Agricultural) Land Consolidation Association” before the War II, and has got a reputation as the most successful organizations of PIM by their performance

Organizational structure and functions of LIDs are briefed by using the typical model of a LID shown here for your understanding.

Suppose, a typical LID has 6,000 member-farmers, 5,000 ha beneficial rice-paddy fields.

Procedures of management are;

- 1) 6,000 farmers elect 300 “representatives” among them by secret voting one person, one vote. equity! (no discrimination: rich/poor, gender etc. democracy!)
- 2) 300 representatives elect 10 directors 3 auditors

- among them, who form the Board of Directors
- 3) The Board of Directors can invite some experts as non-member directors
 - 4) A Director General is elected by elected directors
 - 5) The Board employs some staff in its office, who are in charge of Operation, Maintenance and Management (OMM) works
 - 6) Every activities are discussed and decided by the assembly of representatives
 - 7) the Board of Directors conducts administrative works of OMM on a basis of policies approved by representatives

Major functions of LIDs are;

- 1) Application of a construction project to the MAFF
MAFF=Minister of Agriculture, Forestry and Fishery
so-called "construction project" in Japan embraces many different kinds of projects such as construction, reconstruction, replacement, upgrading, rehabilitation.

- 2) Repayment for Construction Cost, 80~90 percentage of which is subsidize (the other 10~20% will be levy on member-farmers)

Typical Subsidy Ratio is shown below;
project conducted by

	National G.	Local G.	Municipality (city/town)	LID (%)
National Government	2/3	1/6	1/12	1/12
Local Government	1/2	1/4	1/8	1/8

- 3) OMM of constructed irrigation facilities such as a diversion dam, irrigation canals, pump(s) etc, OMM of which are handovered/transferred from the Government to a LID without "official" public subsidy
cf. Before and since foundation of WUAs

before the War II, OMM has been done by land-owner- or tenant-farmers by their own pay and labor, paying land tax or tenant fee.

rf. Cost of major repair originated from severe natural disaster such as an earthquake and floods are fully subsidized by National Government

- 4) Charge membership fee (water charge) on his/her paddy fields on area basis

7. Income of a LID

- 1) membership fee (typically ¥50,000= US\$450/year/ha-rice paddy=3~5 % of the yield)
rf. typical paddy yield: 7~8 tons/ha/year(one crop)
- 2) charges, rent etc. upon persons for their using LID's operated facilities such as canals for their sewage and runoff drainage
- 3) "detour" public subsidy for OMM costs of a LID

8. Typical diversion requirements for rice-paddy:

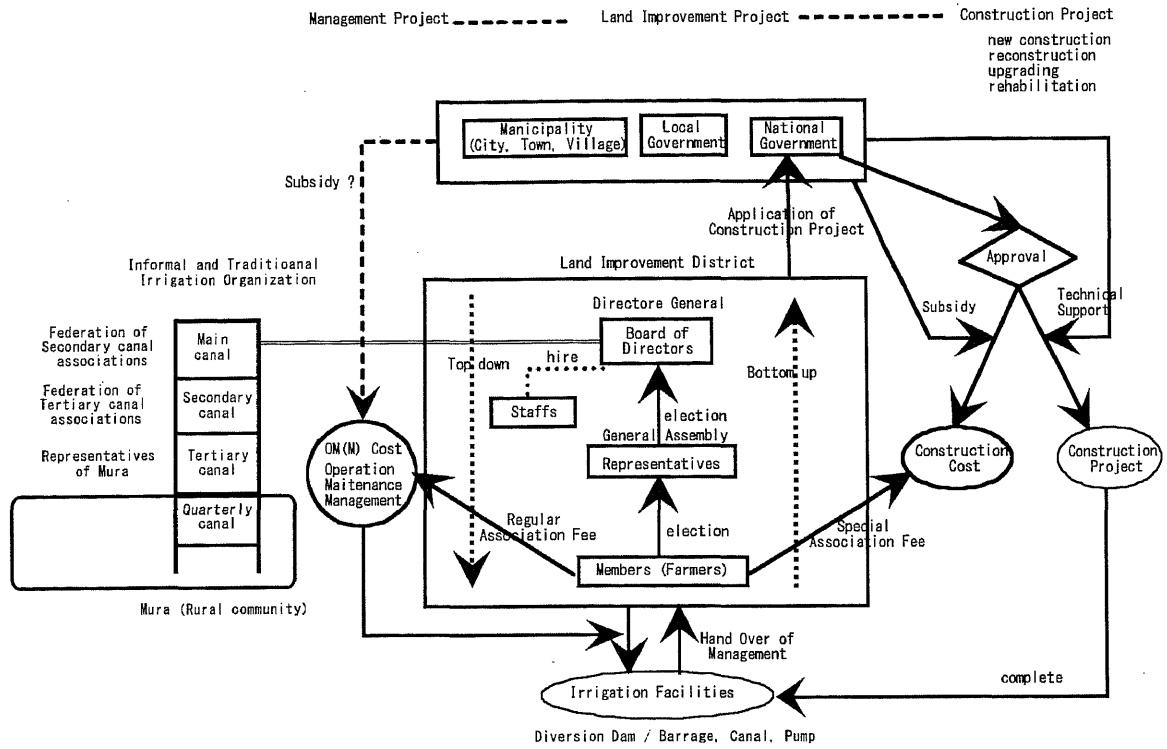
For predominant river flow diversion systems;
20~30 mm/day

For few tank-fed systems; 10 mm/day

9. Irrigation rate

The irrigation ratio for rice-paddy in Japan is almost 100 %.

In contrast to it, the irrigation rate for non-paddy crops such as other cereals, vegetables, fruits, flowers and meadow was 0 before the World War II and is still only 20 % of total fields today.



AFGHANISTAN Discussion:

Question: What is the highest priority activity in terms of water resources management in Afghanistan?

Answer: The highest priority in terms of water resource management in Afghanistan is to overcome the water shortage for domestic and irrigation purposes.

Question: Are there any programs that are encouraging individuals and farmers to better understand key aspects of water quantity and quality management?

Answer: The Ministry of Mines and Industry has launched a program regarding these matters.

Question: Any future competition for water for non-agricultural water sector? Is there any possibility that the agriculture sector will suffer? Are there any water policies for the country?

Answer: Presently agriculture is the major water consumer in Afghanistan. There is a balance between the present water consumption and potential water availability in the country. In case the water from the surface run-off is under control and only that amount of water is discharged out of the country in accordance with the commitments to the neighboring countries, the surplus water would be sufficient for the non-agricultural requirements to the level of two times the present consumption.

AUSTRALIA Discussion:

Question: How will the water use efficiency respond to further water use reduction? Over the years, is there any change in crop that use less water?

Answer: I think the key issue is to get people to understand the need to increase water productivity in terms \$/ML or yield in tonnes/ML. You can have water efficiency that is high but productivity is low. If productivity can be raised per ML then individuals have opportunities to use less water and sell excess water for environmental purposes or to other high value crop producer elsewhere. There has been limited attention in increasing water use efficiency in irrigated crop varieties compared with dry land crops. As in all agricultural systems water productivity and water use efficiency increases have often arisen from atten-

tion to all aspects of production i.e. varietal selection, husbandry, weed and disease control and good soil water management.

Question: Is there a case of "private water shortage" in Australia? If so the owners have rights to use shortage don't they?

Answer: Yes, most state governments allow water to be diverted into farm dams as long as it does not exceed a set proportion of catchments run-off. However, farm dams are shallow and relatively have high surface area to volume. We estimate that up to 70% of storage is lost to evaporation so they are very inefficient.

Question: CAP on water extraction appears to be a good idea. But what happens when the water demands exceed the CAP because of some natural causes like drought?

Answer: Water allocations are generally separated based on "security of supply" (e.g. town water is high security). Lower security allocations are varied on a yearly/seasonal basis based on the amount of water held in storage.

Question: Is there any study on the impact of recycled water usage on agricultural products quality?

Answer: Yes, the Australian Natural Resource Ministerial Council and Environment Protection and Heritage Council have released a draft National Guidelines for Water Recycling. These are based on current scientific knowledge. CSIRO and the Cooperative Research Center for Water Quality have undertaken a number of studies on the risks from organic and inorganic wastes entering water supplies both for drinking and irrigation water.

Question: To address the issue of water scarcity, Australia is now initiating/ implementing reforms process focusing on the roles and commitments that the state and federal governments should plan, in as much as agriculture is the largest consumer of water, what is the involvement or participation of the private sector (being operators of agriculture industry) in the reform process?

Answer: The reform process enhances both water governance and water management. The latter is focused on the needs of all user of water, private and public. Measures include development of methods to improve water productivity, reduction of water losses in storage and conveyance and encouragement of water markets and

trading. Ensuring benefits are expected to flow to private users and the environment.

CAMBODIA Discussion:

Question: How was the introduction of high yielding variety of rice, extension of fertilizer application and irrigation, as these major components are important to realize higher yield than before?

Answer: The government and the non-government agencies have introduced to the farmers a new variety of rice that was developed by CARDI (Cambodia Agricultural Research and Development Institute). Also we have some seed companies responsible for the production of seeds and then the produce are sold to the farmers. About the fertilizer we train our farmers on how to make organic fertilizer for their farm. We are not encouraging them to use so much chemical fertilizer. Some farmers have changed their cultivation practices using a new variety of rice and using organic fertilizer. Other farmers still prefer to use the traditional variety as they think it is more suitable for their areas and that this traditional variety of rice has a very good quality and that it can be sold at a high price.

Question: Will your farmers be able to pay the water fees for maintenance and operation of the irrigation systems?

Answer: Within the rule and regulation of Farmer Water User Community (FWUC), the farmers must pay the water fees to the committee. The community can use the collected money for repairing the water canal, pay for diesel of pumping machine and others. This money is not enough to cover all expenses or support all the activities of the community but can contribute some and this is the method that government tries to delegate the responsibility to the community and let farmers think that they are the owner of the water irrigation system, let them protect and take care of the irrigation system. Community still need more support from government and other donor agencies to support the activities of the community.

Question: How was the Farmer Water User Community (FWUC) formed? Was it due to external donor pressure? How will they collect the 100% charge?

Answer: The Ministry of Water Resources And Meteorology (MOWRAM) is responsible for introducing and forming the FWUC to the farmers that are living in the areas that have irrigation system. We form FWUC only in areas where government or non-government organization have constructed or repaired the water system already. This is not really due to the pressure of the external donors, but the government tries to make the decentralization of responsibility to the community. After 5 years, the government will not support any more the water fees. The farmers need to pay full 100 % of the water fee to the community. This is a small amount of money that is not enough to support all the activities and expenditures in the community. The community still needs more money to support the operation and management activities of the community.

Question: From your presentation it was understood that there is less number of female with high school education, while the women are actively taking part in agricultural activities. There might be a tendency to keep females away from attending school to be able to work in agriculture. Is there any governmental or national policy to change the situation? If yes, what kind?

Answer: Yes, if we look at the figure of my presentation we can see that more female farmers are non-educated people or have only attended the primary school. This is due to the following reasons:

- Cambodia has been through the problem of civil wars for a long time, so farmers have no time to study, particularly the women.
- Parents find it very difficult for girls to go far away from their home. Some villages did not have schools at all. Some poor families can allow only the boys go to school, girls must stay to keep working at home and in the farm.
- Some people have been educated in primary school, but unfortunately their education was forgotten because they never pursued it.

Now the government of Cambodia addresses this problem by its commitment to the policy of "Education for all". It means that Cambodian people should have equal access to education from the government (from the 1st class up to 9th class). Government tries to construct the schools at the community level.

Question: You recognize the FWUC as impor-

tant in the operation and maintenance of irrigation systems, but in your recommendations this seem to not have been considered. What future role you would like to pass on the FWUC for their active participation in the O&M of the irrigation systems?

Answer: Yes of course, FWUC is very important for organizing and managing the water resources. I should recommend that the government should continue to introduce and establish FWUC in Cambodia. But when I wrote this paper I think our government has a policy to continue to increase the FWUC already, so I only recommended something that is related to my University responsibility.

Question: It appears to me that the yields in Cambodia can often be low and yet water may not be limiting. What steps are being taken by the government of Cambodia to look at other factors that may increase crop production and to identify critical intervention points?

Answer: To increase the rice yield of Cambodian farmers the government has started to pursue the following:

- They introduced a new rice variety to the farmers
- Find ways to improve the soil quality,
- Manage the irrigation system
- Recommend to the farmers to change from traditional method of cultivation to use the new method such as SRI (System of Rice Intensification).

Question: What kind of water rights laws do you have, example permission law, traditional law, domestic rule etc. that would solve the problems with regards to water use?

Answer: As you know Cambodia is a country that starts from zero after the civil war, so we need a lot of law and regulation for managing and controlling the natural resources as well as water resources. At the present MOWRAM has developed the Law on Water Resources Management and National Policy on Water Resources Management. Under this law we have some more sub-degrees and regulations.

INDIA Discussion:

Question: Is there any benefit-cost analysis on tank irrigation and is this analysis being com-

pared with other irrigation methods? Second one what is the prospective on sustainability of tank irrigation systems in India?

Answer: There are in fact benefit cost analyses of tank rehabilitation. As such no benefit cost analysis of tank irrigation as tanks are centuries old and hence benefit is more visible than costs. There are studies that compared tank investment with other irrigation methods like canal and well irrigation.

Question: What are the prospective on sustainability of tank irrigation in India?

Answer: Given the constraints imposed on canal and well irrigation in expanding the future irrigation potential, sustaining the tank irrigation is possible and will cover more scope of usefulness. If we consider the social benefit, then the tank irrigation offers more scope of benefits.

Question: Basically there are rules between the tank owner (holder) and water user (farmer). Are the rules of tank management common or different in each tank or system? Who decide the rules?

Answer: As such tank owners are either the irrigation department (for big tanks) or local village (Panchayat) for small tanks and water allocation pattern is prescribed in all tanks. The type of rights/rules governing the use of tank water are more or less common. The other benefits derived out of the type of rules/rights for fishery, forestry etc, are more or less common among the PWD/PO tanks. There are far exceptional cases such as temple tank where sharing of the benefits is different but vary among such tank types. Officially the rules are defined in the tank records (mamool nama). The local community decides the informal rules (unofficial rules) regarding the management of the tanks but this vary across tanks.

KOREA Discussion:

Question: Korea is renowned for its innovative physical management and monitoring of its water resources. Therefore it was a bit of a shock to see that it is lagging behind many countries with respect to water quality. Does this impose either a public health risk or a potential risk to Korea's food exports?

Answer: The overall agro-chemical application rates may be greater than other countries. At the

same time, stricter quality controls are being applied to vegetables and fruits, which are eaten raw. Organic farming is a typical way of farming applied especially for exporting vegetables to meet the high standards of consumer' preferences in importing countries. Environmentally Friendly Agriculture Act mandates organic farming products to be publicly assured by an authority. One more comment on ESI ratings is that wastewater treatments were not considered to rank the pollutant loadings from agricultural sectors.

Question: What is the trade off between the area planted to rice and area planted with other crops such as vegetables/cash crops? Is rice still an economical crop to cultivate?

Answer: Paddies have better infrastructure for farming. Farm-roads, flat ground levels, ditches are arranged. Green house farming becomes the most viable income source for many farm households. Yet rice is still the most important farm income. I think the trends of vegetables/cash cropping encroach to paddies but rice remains to be the major crop in Korea.

Question: After the water cleaning, when water reuse has been done and water rights have been renewed who governs the water, the farmer or someone else?

Answer: All the water is public domain and reclaimed wastewater should remain to be a public commodity. Ministries of Agriculture and Fishery (MAF) and Environment (ME) have promoted the wastewater reuse projects. They are not charging water fees beyond the existing levels, though the costs for wastewater reclamation would be more than other water resources.

Question: The domestic consumption in Korea was shown as more than the industrial consumption; while presently Korea is an industrialized country. Is the per capita water consumption high in Korea or other factors are involved?

Answer: That is because of population density, I think that about 390 liter per capita is now being used for domestic purposes. It is surely higher than in many countries. It has something to do with cooking, as compared with the Japanese per capita water consumption. Domestic use per capita is recently decreasing.

Question: What is the level of community contribution with regard to water conservation in Korea, aside from governmental regulations and

policies?

Answer: Efforts for water saving are being promoted by the environmental activities in the forms of NGOs. Local water associations are also pushing for lesser water usage since they will pay sanitary fees more proportionally to the amount of water use. Such market oriented payment policy may help conserve water.

PHILIPPINES Discussion:

Question: What is the level of farmer participation in the operation and management of irrigation facilities and whether there is an agreement on this between your organization and farmers towards this effect?

Answer: Under the irrigation management transfer program, the NIA retains management of the head works/dam/intake and the main canal. On the other hand, IA takes care of the laterals, sub-laterals and turnouts and other facilities down the main canal level. By management we mean, water distribution, maintenance and repair and ISF collection. All these arrangements and other conditions of turnover are clearly written in the contract signed by NIA and the IA.

Question: What percentage of the irrigated area comes under IMT?

Answer: Around 25-35%.

Question: How does NIA payment of 2400 pesos/m is equivalent to the irrigation fees paid by the farmers to the irrigation fees paid by the farmers on a per ha basis?

Answer: The irrigation service fee (ISF) rates
Per Ha. Type of Irrigation System

	Dry crop	Wet Crop
Diversion	2,500 P	2,000
Reservoir	3,000P	2,500
Pumps	dependent on the O/M costs	

Question: Does the pump irrigation system also come under IMT?

Answer: Yes

Question: Any evaluation of the participatory approach done?

Answer: Yes a book dealing on evaluation of participatory approach was written. With respect to this the World Bank and ADB did other evaluation studies.

Question: Were there rain-fed and or irrigated rice paddy before implementation of irrigation

facilities.

Answer: NIA undertakes both rehabilitation of existing irrigation system and introduction of irrigation facilities to previously rain-fed areas.

Question: NIA previously received subsidy from national government up to 1983. Since then, NIA has to earn its own income to finance its own operations even then the amount that NIA collects is barely enough to cover actual O/M costs (2400 pesos per hectare)

Question: Are there incentives for IA s, are they ample, but what are the effective incentives for upstream farmers in each turnout group to really solicit their cooperation?

Answer: Whatever the incentive the IA gets, is apportioned among the member, turnout service group (TSAG). As much as possible, the leaders implement rules/regulations that will equitably distribute the benefits among all members from water allocation to cash incentives.

Question: What is the result of evaluation of PAP on irrigation efficiency especially the coverage of targeted irrigation area?

Answer: There were previous studies on PAP but focusing more on the acceptance of the concept rather than its effects on irrigation efficiency and expansion of area coverage.

Question: Are there related laws or rules on the participatory management, calling name, full name at the present? What about the history of regulations, since when it was amended, why and briefly discuss the procedures?

Answer: Yes, Section 2 of the Presidential Decree 552 signed in 1974 specifies that, the management of the operation and maintenance of irrigation systems or portion of it shall be delegated to farmer association or cooperatives. Also, Chapter 4 of Agricultural and Fisheries Modernization Act of 1997 provided that: NIA shall continue to manage the main systems (dam and main canal) while management of secondary canals and facilities shall be transferred to the IA s

The history of Philippines dates back to the "Zanjeras" of Northern Philippines where rules and regulations were promulgated and followed. Based on these experiences of the Zanjeras which, are indigenous groups, NIA had adopted some for the modern-day irrigators associations (IA s).

The Irrigators Associations have internal by-laws

and while these were initially introduced by NIA, the IA s overtime, amend/change some provisions to suit the actual needs and situations. The procedure to amend is through democratic majority rule concept.

THAILAND Discussion:

Question: How do they solve the problem of water shortage in drought season or in rainy season? How about the crop rotation?

Answer: They use the system of water-rotation this system has different approaches in dealing with allocation and distribution, for example the big scale/ large- scale irrigation system. They rotate the water use by allocating the time and day of release of water, example, 3 days-8 days for the lower part of the irrigation and same length of day for the upper part of the irrigation. In cases of the small-scale irrigation they allot 1 day 1 night for the upper part and 1 day 1 night for the lower part. Concerning the crop rotation, they also have the scheme of selecting the crop pattern that would be suitable or applicable depending on the amount and volume of water available. When there is less water they select a crop (upland crop) that does not require so much water and in lowland areas where there is enough water they can grow the second rice crop in the dry season.

Question: Are there examples from small-scale community schemes that the government can adopt to improve the management and maintenance of the large-scale government irrigation schemes?

Answer: Yes, the government accepts success stories of successful irrigation management systems by the people or the so-called small-scale people irrigation system in northern Thailand. The government tries to use the lessons learned to improve the system of management of the national scheme at farm level as mentioned earlier. They encourage the farmers' association to take responsibilities in taking care of the irrigation system. They divide the responsibilities into small-scale and large-scale system. The small-scale irrigation systems are to be managed by the people and the large-scale irrigation system by the national level. In the farm turnout area they use the management system of the people and

then the national level duplicates that.

Question: Thailand produces and exports a lot of rice, is the bulk of this produced by the National Projects or People's Projects?

Answer: The bulk comes from the National Projects, which are mostly in the Central plains.

JAPAN Discussion:

Question: In Japan all water consumer groups, domestic and agriculture and industry shall be competing with each other. How is this competition being managed?

Answer: Due to Appropriate Water System, there were no disputes. In cases of extreme drought negotiation among water users usually solves the scarce water re-allocation problems.

Question: I am interested to learn whether there have been many studies in Japan that have defined ecological/environmental assets in rivers and whether those have been the basis for the definition of maintenance flow?

Answer: The Government set "Maintenance Flow" with first priority in river flow management to conserve the environment.

Question: Given the stable groundwater, can the supply be increased?

Answer: It is possible, but in reality it is not for irrigation.

Question: Since demand for water in irrigation sector maybe declining, can this facilitate easy management of the system without much conflicts/sharing?

Answer: Water right holder (LID) almost always keep water right as it was because they can not get any gain under the current water right systems.

Question: How are the rules governing the water allocation in tanks different from canal or big systems?

Answer: When tank irrigation associations divert water from a river flow it should apply the water right system otherwise if it is not necessary then there is no need to apply the system.

Question: How can a new project be developed in an area where there is no existing LID?

Answer: In such a case, then a new LID can be formed. There should be at least 50 members with 2/3 of the members agreeing to the project.