Efficient and Sustainable Water Use to Address Poverty Alleviation and Food Security

Report of the Virtual Meeting¹

(21 August – 8 September 2006)

This report gives an account of the Virtual Meeting organized by INWEPF during the three-week period of 21 August to 8 September 2006. The Virtual Meeting was based around a Background Statement and four sets of issues outlined in a “Baseline statement”. Each of these issues formed the topic of a “Meeting Room”. The Virtual Meeting (VM) consisted of comments posted by the VM participants in these four meeting rooms.

Following the introductory section, this report is divided into four chapters, corresponding to the four VM meeting rooms. Each chapter begins with the baseline statement for the meeting room concerned, which served as the framework for the discussion within that meeting room. This is followed by a summary of the comments posted in that meeting room, grouped according to topic. Some of the issues proposed in the Baseline Statement were not addressed by any participants, and in some cases the participants introduced topics not anticipated in the Baseline document. Personal editorial comments from the moderator are given in [brackets].

Background Statement. The theme of "efficient and sustainable water use" in paddy-based agriculture is the first and most comprehensive of the four themes identified in the INWEPF Strategic Action Plan for 2005-2006 (See the INWEPF website for the full text, http://www.maff.go.jp/inwepf/en/about/sap2005.htm).² The words, "Efficiency" and "sustainability" are used so often, and in so many different contexts, that they have lost some of their original power as concepts fundamental to irrigation management. The Virtual Meeting offered an opportunity to examine what these words mean in the specific context of paddy-based agriculture in Monsoon Asia. Each of the four "Meeting Rooms" focused on a different set of issues related to efficiency and sustainability.

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² The other themes are: Multiple Use and Ecosystem Functions of Paddy Fields (Theme 2); Better governance (Theme 3), and Promoting farmers' participation (Theme 4).
Meeting Room #1

Efficiency and Sustainability of Irrigation Systems

Baseline Statement

What have we learned about efficient and sustainable irrigation technologies, infrastructure, cropping systems, and management systems? To what extent are the objectives of efficiency compatible with sustainability? For example, herbicides and pesticides may help shorten the time and reduce the water required for land preparation, but there may be some long-term costs to soil health, or to the health of fish, ducks, and other productive resources linked to the paddy field. Issues discussed in this meeting room will include:

- What technologies give the best (efficient and sustainable) results in paddy-based agriculture? Technologies could include software for irrigation scheduling, automatic gates, water measuring devices, land leveling equipment, as well as mechanical technologies for land preparation, planting, harvesting, etc.
- How does infrastructure enhance labor and water productivity, economic efficiency and sustainability? Infrastructure could include canals, pipes, control structures, roads, as well as access to seeds, marketing, extension information, etc.
- What cropping systems and associated agricultural practices are most efficient and sustainable? Farmers face many options ranging from the choice of rice variety and cultivation practices (e.g., rotational wet-dry vs. continuous wet), to dry-season rotations with vegetable and pulse crops, to incorporating livestock (cows, goats), fowl (ducks, geese) and aquaculture (fish, eels, frogs) into the rice-based farming system.
- How do the management and governance arrangements affect the economic returns or long-term sustainability of the irrigation system? What can be done to attract young farmers to continue farming as a profession?

Summary of Discussion

This Meeting Room attracted much discussion on issues of participatory management and empowerment of local communities, and specifically, farmers. The discussion is summarized here under the major topics offered by the VM participants.

1. Reinforcement of Local Communities First

Toru Kumagai – “the top priority for most regions seems to be reinforcement of local communities which have been in charge of maintenance and management of existing irrigation systems. In order to achieve such target, policies should be aimed at encouraging the local talent, promoting discussions on the future regional plan and
tentative project implementations by local initiatives. This is the basis of efficient and sustainable irrigation systems.”

Hiroshi Okudaira – We need more flexible irrigation systems first (before farmers can manage them).

Taira Kazufumi - “It is essential to change water users’ ideas of irrigation, giving them incentives for efficient water use.” [This concept was also echoed by Uch Hing]

Pich Maly – “Mostly, farmers are women in ASEAN countries. So, we must focus on women’s roll, responsibility, motivation and incentives in water use and management.”

Sok Korn – Citing the case of Cambodia, he notes, “We are promoting farmer’s discussion system for making the tertiary and delivery canal.” [This case is described in a recent JICA publication, On-Farm Irrigation Development and Management: Lessons Learnt in Monsoon Asian Countries, 2006: http://www.jiid.or.jp/jp/06library/06overseas/english_ver.pdf]

Groenfeldt – If farmers become too effective at promoting their interests, this can lead to inefficiencies, as in diverting the entire flow for irrigation, without recognizing other important uses such as environment, etc.

Shigemitsu Tsukamoto – In developing countries, it is necessary to invest in infrastructure before farmers will be interested in participating.

Okudaira – Modernization of the system to make it more flexible is a precondition to effective user participation.

Groenfeldt – Both modernization and participation need to be done as a single, simultaneous process.

Tomohito Nomi – Without local participation, the system doesn’t work.

Doraiswamy – The need for rehabilitation is evidence of lack of farmers’ management participation in the first place. They need also to be involved in modernization plans and construction. Need greater priority on training and capacity building. [For details, see his organization’s website, www.Jalaspandana.org].

Masahiko Hiraiwa – “In the case of participatory rehabilitation projects of irrigation systems in the Mahaweli River Basin in Sri Lanka, a community awareness program was taken as the first step towards formulating a community development plan including rehabilitation plan.” He agrees that organizing and rehabilitation must go hand-in-hand.

Kazumi Yamaoka – Rather than the term “participation,” he suggests that we use “another term such as ‘empowerment’ or ‘water governance’ which implies empowering farmers to manage irrigation autonomously and to take the full responsibility or at least to
act together with agencies as an equal partner.” If this is the goal, then it becomes easier to decide whether rehabilitation or organizing should come first. Sometimes rehabilitation needs to precede, and sometimes organizing, in order to empower farmers to have full management autonomy.

Tatsumi Tomosho – “In my opinion, the first thing needed is, "farmers’ assurance or trust of benefit from irrigation development.”

2. Technical transfer for efficient and sustainable water use

Shigemitsu Tsukamoto – “Capacity building of irrigation engineers through appropriate technical transfer is the important issue in Cambodia.”

Uch HIng – “I hope that INWEPF will provide a platform for technology information exchange system for irrigation and water resources development.” He added that there is a need for technical manuals in English.

Hay Bunthoeun – Irrigation technology transfer is an important issue for INWEPF.

Heng Teng-Tong - Technology transfer through training opportunities abroad, is animportant for developing countries.

//Groenfeldt – IPTRID has a mandate for technology transfer which could complement the role of INWEPF (see the website, www.fao.org/iptrid/)

Thierry Facon – There are many useful training manuals and related working papers available for download on the FAO website: http://www.fao.org/ag/agl/public.stm#iwmtm

3. Efficient and Sustainable Cropping Systems

Groenfeldt - How can rice-based cropping systems become more productive and still be sustainable? Three examples of rice production strategies that may have potential for balancing productivity and sustainability are the following:

- Ecological approaches such as "duck-rice" and other ways of incorporating livestock and aquaculture into paddy production. Can these approaches give greater total yields when all the products are counted (meat, fish, rice, etc)?
  System of Rice Intensification (SRI), also called "alternate wet-dry" (AWD).

- Many claims have been made for the higher productivity of the SRI approach, and counter-claims have also been made that it doesn't work. There is a very interesting website maintained by Cornell University: http://ciifad.cornell.edu/sri/. On the other hand, the research community (IRRI) has been very cautious about SRI.

- Crop Diversification. There has been a major effort by IWMI and other research institutes to promote non-rice crops for dry season cultivation. The logic was both economic returns (higher value pulses and vegetables rather than paddy) and
water efficiency. But there is often a reluctance among farmers to take on the extra expense and risks of growing non-paddy crops.

Tsuruda Shinya – In Bangladesh, it is important to diversify agriculture and to add value to farm products, while keeping food grain productivity high. It is also indispensable to increase employment opportunities for the rural population by enhancing the non-farming sectors

Hay Bunthoeun – In Cambodia, enhancing rice productivity is more important than diversification. There is an interest in SRI as a way of doing meeting production goals.

Prum Kanthel – Another reason that Cambodian farmers like SRI is that they can continue to use their traditional varieties.

Bruce Lankford - The concept of irrigation efficiency needs include two different categories of water loss (efficiency loss): recovered and non recovered losses. But in practice, these two types of losses are connected, and both types of losses influence our ability to schedule irrigation on time, which affects agricultural productivity.

Thierry Facon - The critical step for improving existing schemes is really the assessment, which requires separate analysis at the local and basin levels, if we aim at improving actual efficiencies as opposed to stated efficiencies. We need to look at both types of efficiency and make a judgment in each case, as to where the greatest scope for efficiencies can be found.

4. Importance of Watershed Management

Dominador Pascua – In the Philippines, degraded watersheds are a major problem to irrigation system integrity. They need a massive reforestation program to protect irrigation systems, and to protect the landscape.

Shinobu Sakai – Development of a large number of small-scale irrigation systems, including small community reservoir systems in upland areas, can have very beneficial effects in keeping precipitation in place, and augmenting ground water. Consequently, a strategy of small-scale irrigation systems in the uplands can contribute to the efficiency and sustainability of downstream irrigation systems in lowland areas.

Hiroshi Okudaira – Because of such interactions, both irrigation and watershed management should be discussed together.

Groenfeldt – The same logic of inter-connection between irrigation and watershed management, also suggests the benefit of organizing WUAs at the watershed level, either as separate watershed organizations, or as dual function organizations for both irrigation and watershed management.
Hay Bunthoeun – In Cambodia, reforestation is a priority because of eroding watersheds due to previous illegal logging.

Suresh Kumar – In India, watershed treatments have shown clear benefits to farmers.

5. Irrigations Systems and Usage of Groundwater

Ravinder Malik – In Punjab, India, there is severe over-drawing of groundwater for paddy, and now only deep wells can be used to irrigate. The over-use is linked to the government policy of free electricity for operating irrigation wells.

Thierry Facon – Groundwater depletion can be caused either through over-pricing water (resulting in individual incentives to spread the water thinly and giving less recharge to the aquifer) or through under-pricing water (resulting in too much pumping as in the Punjab case).

Kazumi Yamaoka – “We need a legislative scheme under which people can properly control and manage common pool resources such as groundwater. I also suggest that not only groundwater but also surface water for paddy field irrigation under the humid climate should be recognized as a kind of common pool resource when we take into account significance of multifunctionality of the irrigated water…”

“I believe that a subsidy scheme on initial investment for developing groundwater as common pool resources collectively run by farmers, is good for promoting water governance, empowering farmers to manage water and also accumulating social capital among farmers.”

6. Participatory Irrigation Management

Kenji Washino – In Cambodia, there are many Farmer Water User Committees (FWUC) but few of them are really active.

Sok Korn – The JICA publication [cited above] gives a more positive example of active WUAs.

Arai Hirouiki – In Punjab, Pakistan the provincial government is launching a large-scale, program on PIM with good results.

Teav Vutha – Here is an example where INWEPF could help share PIM experience from Pakistan to Cambodia.

Kazunobu Shimura – in Pakistan, there is a need for local capacity building: “What is equally important is to establish close linkages with institutions concerning agriculture and water users in villages…. All stakeholders should learn much more from each other so that more efficient and sustainable water use becomes possible and also to make water use institutions functional.”
Salman Sarwar – INPIM is active in helping with the PIM program in Pakistan (see www.inpim.org).

Nobutaka Nonata – JICA is supporting a program in Egypt which is doing something similar in establishing larger-scale WUAs with greater management functions.

Yoshifumi Nakamura – In Thailand, cooperation between the WUA and the local community is important for dealing with water shortages and working out win-win arrangements.

7. Capacity-Building for Water and Livelihoods

Doraiswami – Large-scale irrigation projects in India have neglected livelihood concerns of farmers. Capacity building is a priority need, and Jalaspandana is doing this in the state of Andhra Pradesh. Capacity-building is focusing on better ways of farming (particularly through SRI), planting new crops, and introducing new types of organizations (PIM). Outcomes include higher income and better functioning WUAs (see website, www.jalspandana.org).

Thierry Facon – capacity building on the organizational aspects of management has been lacking, not only in terms of PIM but also other institutional dimensions.

Groenfeldt – Irrigation managers need to learn people skills, because this is the major focus of their actual work, but they are seldom given any training in people-management. This is still a blind spot in capacity-building programs.

8. Other Issues

Bulk Water Supply: Masahiko Hiraiwa – In Sri Lanka, within the Mahaweli H system, one block (3000 ha) is allocated a water budget which the concerned Farmer Federation (at the block level) and WUAs (at the sub-block level) have to work out how best to use it. This approach is working well.

Technologies: Upali Imbulana – The most appropriate technologies are important and might be very simple. They can include an approach that is very traditional (for example, dry rubble walls) or very modern (computer-controlled automatic gates).

Efficiency and sustainability: Masahiko Hiraiwa – In a Sri Lanka study, a system with tighter water constraints performed better (as measured by higher yields) than a nearby system with more water, because farmers were more careful with that water.
Meeting Room #2

What Do 'Efficiency' and 'Sustainability' Mean When Other Objectives Are Also Considered?

Baseline Statement

When objectives other than short-term economic returns are considered, the definitions of 'efficiency' and 'sustainability' in paddy production become much more difficult to determine. We need to optimize many variables at the same time! For example, taking the categories of Meeting Room #1 (above), what specific technologies, infrastructure, cropping patterns, or management arrangements can enhance ecosystem services, or rural employment, or cultural heritage, or other functions? When all the multiplier effects and long-term impacts of a particular technology or cropping pattern are taken into account, what can we say about overall system efficiency and sustainability? Some specific issues to be discussed in this Meeting Room could include the following:

- Management arrangements to sustain paddy agriculture. Participatory strategies (PIM), improvements to existing line-agencies, links to local government, and private sector management are all options for improving paddy system productivity (efficiency and sustainability). To what extent do these management options have real economic effects, and to what extent do management interventions give benefits to other functions (e.g., rural livelihoods)? And even where farmers' management participation offers greater efficiencies, what are the contributing factors to their effective participation (e.g., training, capacity-building, supportive policies) and how can we assess the sustainability of these contributing factors?

- Ecological agriculture and implications for physical infrastructure and technology choices. What are some "win-win" solutions combining ecological approaches with higher productivity? For example, if ecological control of insect pests relies on synchronized land preparation and flooding, what scale and type of water conveyance and control structures will support this? What types of mechanized equipment (for tilling, planting, harvesting, etc) are most compatible with ecological farming?

- At the policy level, how can policies aimed at conservation of agricultural land and protection of water quality also contribute to economic returns to farmers? What win-win arrangements can link urban consumers of ecosystem services with ecological farmers upstream? For example, environmental policies to reduce pesticide loads could reward local farmers who practice organic agriculture.

- What are the implications for paddy agriculture of economic policies aimed at food security and poverty alleviation? Do small-scale or large-scale operations give the best economic returns to vulnerable populations? When long-term sustainability of soil and water resources are also considered, what can we say about ecological agriculture vs. industrial, high-input modes of paddy cultivation?
Summary of Discussion

1. Sustainability and Governance

Upali Imbulana – A study in Sri Lanka revealed that the budget allocated by the government is about 20-30% of the actual requirement to maintain existing facilities. The study recommended to implement community participatory rehabilitation to create a sense of ownership, and entrust Farmers Organizations with the task of maintaining the secondary systems.

Kazumi Yamaoka –
(1) promoting better governance is much more effective improvement than promoting market economy policies in water management because the value (shadow price) of water in humid climates is normally extremely low, while it soars during abnormal dry spells;
(2) as technical support necessary for projects, rather than engineering technology designed to correct temporal or spatial maldistribution of water resources on a macro scale (such as whole basins), engineering technology on a micro scale (such as peripheral beneficiary areas) has also come to fulfill an important role. Another factor of increasing importance is the sociological technology designed to accumulate social capital, i.e. networks of mutual trust and reciprocity among farmers, and to improve the efficiency and sustainability of collective activities for water distribution.
(3) Under PIM, conventional national irrigation projects, which had achieved certain results in meeting national macro-policy targets, have evolved into projects targeting at policy on capacity building and social development, with the spotlight on individual farmers and regions. To that end, ensuring the farmer’s individual participation, benefits and responsibilities, enhancing his capacity in autonomy, and intensifying and expanding good governance, are now essential for the success of these projects.

Masakazu Yamada - For realization of good governance, people's participation is required in the stage of policy decision. Effective participation improves governance and good governance secures sustainability.

2. Does Multifunctionality Apply to Poor Countries or Only Rich Ones?

Groenfeldt - Poor countries, along with rich countries, need to clearly identify not only the ecological benefits of paddy but also the cultural and psychological benefits of traditional modes of paddy-based production. When we take these "soft" benefits as serious parts of paddy's benefits to society, then we can focus our attention on ways of increasing the physical productivity of these paddy systems (to feed more people) without sacrificing the intangible benefits (cultural identity).

Hiroshi Okudaira - When I tried to explain to some developing-country colleagues that wide green paddy fields formed a beautiful landscape and made people relaxed, a Thai colleague just replied, “Huge paddy fields are a symbol of poverty.” This story tells me that the concept of multifunctionality could be enjoyed by those who are rich enough to
feed themselves. I hope many participants from developing countries disagree on this understanding.

Kazumi Yamaoka – Certain multiple benefits are very important for poor farmers in developing countries, but the particular benefits they value are likely to be different from the most valued benefits in the eyes of our more wealthy colleagues. The mix of benefits which are most relevant to a given farmer will change according to his economic circumstances.

Groenfeldt - The multiple benefits of paddy production cannot be imposed from outside; they must be felt from within. The community concerned, whether at the level of an irrigation system, or a region, or a country, are the ones who must define for themselves what benefits they experience from paddy agriculture.

3. The Realization of PIM through Legal Arrangements

Shino Takashi - The legal framework for PIM is not arranged in most countries (for example, water charges are not systematically collected). This is one reason why PIM is not functioning well in many countries. PIM leads to ‘efficiency’ and ‘sustainability’ automatically due to ownership and/or users’ management by themselves.

Uch Hing – Before collecting a water fee, the government needs to ensure that water is reaching the farmers.

Tatsumi Tomosho – If farmers cannot pay the irrigation fee, then we need to look at the productivity of their agriculture. If they are unable to pay, the problem may lie in the realm of the agricultural economy. If they simply do not want to pay, then the legal arrangements become important.

Naoya Fujimoto – Legal arrangements can also serve to protect farmers, e.g., where gatekeepers are charging too much.

Kunihiko Naito – legal arrangements are necessary for genuine PIM. If farmers are not willing to pay, there is need for capacity building so they understand the benefits and are able to organize collectively.

4. Sustainability of Paddy Yield

Masahiro Yagi – A distinction can be made between (a) flat land with regularly shaped paddy fields, where large-scale machinery can be used, and (b) small irregular paddy fields where economical farming is not possible but it has important environmental benefits to downstream urban consumers.

Groenfeldt – When environmental externalities are considered, the efficiency of large-scale paddy production is lower than market returns would indicate.

Lee Deobgae – An important environmental service of paddy fields is as a buffer against torrential monsoon rains and mitigating flood damage.
5. Irrigated Agriculture and Economic Policies

Upali Imbulana - Irrigation provides safe drinking water for many farm families; in areas without irrigation or badly served at the tail ends, there is higher incidence of both chronic poverty and transient poverty (Uda Walawe scheme)

Thierry Facon- contributes paper on multiple roles of agricultural water management systems

Hiroshi Okudaira – The traditional definition of efficiency is more crop per drop; water is supposed to be consumed by the plant, and not perform any other functions. INWEPF’s message is more complex: (a) Agriculture has many invisible values, and (b) Water is used for various purposes both before and after irrigates the plants in the field. The INWEPF message, in brief, is more VALUE per drop.
Meeting Room #3

Maintenance, Rehabilitation, and Multiple Use of Irrigation Infrastructure

Baseline Statement

Maintenance and rehabilitation of irrigation infrastructure are necessary (and expensive) investments to sustain irrigated agriculture. These investments offer an opportunity to introduce changes that can enhance the multiple functions and benefits of irrigated agriculture. The process of rehabilitation (planning, design, and implementation) is a natural time to re-consider the larger objectives of the irrigation system, and re-orient the system towards efficiency and sustainability. Some issues to be addressed in this Meeting Room include the following:

- Creative approaches to rehabilitation planning. How can the urgency of rehabilitation serve as a vehicle for creative debate about the long-term objectives of the irrigation system, and the best means of achieving those objectives? What are some examples of rehabilitation planning that have resulted in new thinking and real changes in the orientation of the irrigation system? How have farmers and other stakeholders (including tax payers) been included in the process of re-calibrating the objectives of the irrigation system?

- Redesigning irrigation infrastructure. How can a conventional, large-scale irrigation system be redesigned to meet the objectives of efficiency and sustainability. When rehabilitation is accompanied by management transfer to water user associations, the secondary canals may be sub-divided to match the management capacity of the new associations. Water measurement devices are often needed to allow each association to monitor its water use. If water charges are to be made on a volumetric basis, the measurements need to be both accurate and transparent. Design changes will also be required when there is a shift if cropping patterns, e.g., from paddy-only to wet season paddy and dry season legumes. What have we learned about design adjustments that can give greater flexibility and efficiencies?

- Preventative maintenance and rehabilitation. How can the expense of rehabilitation be minimized through "smart" maintenance aimed at avoiding critical problems which only rehabilitation can solve. What monitoring technologies (e.g. data instrumentation) and management arrangements (for both government agencies and water user associations) have proven to be helpful in identifying problems at an early stage?
Summary of Discussion

1. Modernization of Farmland Irrigation Facilities in Taiwan

Ming-hua-Tsai – In Taiwan, there are new policies promoting ecological agriculture including organic and biomass production. Irrigation Associations have handled rehabilitation of some 2,500 kms of channels in the past 5 years. The improvement work items include reduction of ditch seepage loss, gate repairs, green planting beautification and ecological engineering of canals. Additionally, 25,000ha have been served by pipe irrigation. Future steps will include digitalization of irrigation systems and GIS technology application to elevate the flexibility of irrigation infrastructure. On the institutional side, a new department of irrigation and engineering was established; a Farmland Irrigation Enterprise Act is under consideration but has been folded into an amended Water Act, which will also include regulations of Irrigation Associations as organizations.

Okudaira – Both structural (hardware) and managerial/institutional (software) improvements are required in the modernization process.

Thierry Facon – This type of large-scale activity by irrigation associations contrasts with small-scale PIM efforts in other countries

2. Women’s Voice is Important in Rehabilitation

Pich Maly – Most farmers are women and their ideas are needed as input to rehabilitation and modernization projects.

Groenfeldt - Multiple Voices are needed to identify the priorities in redesigning an irrigation system, including women, environment groups, poverty focused NGOs, local government officials, religious leaders, etc. A wide diversity of views is needed in order to capture all the multiple values.

Okudaira – In Cambodia 82% of all female workers are in the agriculture sector; for men the figure is 71%. Technology in agriculture serves to disenfranchise women who have less access to the channels through which these technology inputs are delivered. Also, women rarely sit on boards of WUAs, and are too little involved in establishing policies.

Motomu Uchimura – Any technology has a gender bias and as rice becomes a cash crop in many areas, production is taken over by men. But in very poor economies, where rice is grown more for subsistence it is more women who are involved.

Facon – The SEAGA program of FAO addresses many of these gender issues. Of particular importance for our discussion are (1) allocation and operation requirements to meet needs of women, especially in rural areas where system supply is the main or sole
source of domestic water supply; and (2) management requirements and the capacity of women in terms labour requirements for maintenance, financial payments etc.).

Susumu Sugatani – In Bangladesh, the economic role of women is important for the whole community, and not only for their families. Every Water Management Cooperative Association (WMCA) must have more than 1/4 of its steering committee members as women (according to the law). This is an effective system to hear women's voice and opinion and to bring them into the activities of the WMCA.

Tomosho – PIM needs the benefit of women’s communication networks, because those networks are not reached through the normal male-dominated channels.

3. Designing for Sustainability

Groenfeldt – Rehabilitation provides an opportunity for modernizing the system and also making it more sustainable.

Facon – See website (www.watercontrol.org) for suggestions of modernizing system design through rapid appraisal procedure and strategic planning and management. Building greater flexibility is essential, especially to adapt to new conditions that we can’t predict. He suggests that we should remove the word, “rehabilitation” from our vocabulary and replace it with “modernization”. It is inconceivable that the objectives of old irrigation systems have not changed, and projects to repair broken systems offer an important opportunity to redesign the systems accordingly.

Kazuhisa Koda – One design principle that can provide cost savings is standardization. Another principle is simplicity: Designs should be simple and not require special skills.

4. Designing for Multiple Roles

Facon - How could irrigation system design shift to correspond to the new objectives of multifunctionality? For example, for the objective of biodiversity, how do we design a system for operation to enhance management of aquatic resources? Can cross-regulators combining a weir portion and an undershot (gate) function be recommended to ensure connectivity in the canals? Can we plan for biodiversity corridors with the irrigation canals, open water bodies/ponds, regulating reservoirs, and drains? Should we over-size canals and allow vegetation growth for habitat? Can we have constructed wetlands to purify drainage water before releasing it into the rivers/downstream water bodies? Groundwater recharge: should we have system designed to allow recharge from canals and ponds with clean water rather than from fields with polluted water?

Groenfeldt – Redesign of canal layout, and introducing simpler water controls IMT is often done as part of Irrigation Management Transfer to farmer management. This is an example of redesigning for a social function (participation).
Meeting Room #4

Competition among Water Users at the Basin Level: “Building a Win-Win relationship”

Baseline Statement

Agriculture may be the largest user of water, but it is not the only water user. In every INWEPF country there is increasing demand for water from non-agricultural sectors. The rising population of cities, the growing demand from industry, and the often degrading quality of the water that is available, all add up to new challenges for agriculture. Where will the water come from? How can farmers be assured that water will be available when they need it, and that it will be safe when they use it? Farmers, or their representatives, find themselves having to negotiate for water which used to be free and readily available. How can these negotiations arrive at win-win relationships for farmers and other water users? Some of the issues for discussion in this Meeting Room are the following:

• In Japan, the approach established 30 years ago relies on the modernization of existing irrigation infrastructure (and associated diversions and reservoirs) to capture water which is then used by cities and industry as well as by farmers. Is this a model that can be tried in other countries as well?

• Basin-level organizations are an emerging approach in many countries. By creating a single administrative structure for all water users within a hydrological unit, there may be a better chance of finding win-win solutions. What has been the experience of basin-level organizations within INWEPF countries?

• In the absence of a basin-level organization, how can the interests of individual water stakeholders (farmers, urban water consumers, environmental activists) be expressed and incorporated into water policies? Some options include (a) geographically-based units such as watershed committees or river boards, (b) multi-representative water councils at the local or provincial level, and (c) the normal political process of local representatives voicing the concerns of their local constituents as the national level.

• How can national water laws create a framework for constructive negotiations at the local level? Water laws are notoriously difficult to enforce, but nonetheless have an important role to play in the overall effort to rationalize water use. What legal arrangements have proven most successful in arriving at win-win water allocation policies?
Summary of Discussion

1. Policies and Criteria for Water Allocation among Competing Users

Ravinder Malik – In India, the National Water Policy gives broad parameters for priorities: first drinking water, then irrigation, then hydropower, ecology, agro-industries, and non-ag industries; but these can be changed in particular circumstances. A recent study shows the advantages of a flexible policy based on economic values of the water. He advocates “a more flexible policy of water allocation amongst various sectors, whereby water is allocated to various sectors on the basis of its economic value in each sector rather than on the basis of fixed allocation made on the basis of current State policy.”

Naoya Fujimoto – This would under-represent ecological values of water which aren’t reflected in economic values. It means that stakeholders need education about the multiple values. [And it also implies that inflexible policies of water allocation can actually serve to reward farmers for the multiple benefits of agriculture which are not rewarded by the market.]

Pulianisami - A study done in the Lower Bhavani Project (LBP) in Tamil Nadu, India has indicated that rice area will decrease over time, due to increasing inter-sectoral water demand. To meet the gap, water-saving practices should be introduced in the system.

Yoshisuke Nakano – Rice farmers need enough water running through the system to adequately irrigate, even though much / most of this water is not directly used by the plants. Paddy agriculture cannot be judged as wasteful of water as the system level; we need to look at overall basin level productivity.

2. Multifunctionality as a Starting Point for Water Negotiations

Groenfeldt – We need to know what the multiple benefits of paddy agriculture are, as a basis for negotiations. This is much like Mr. Malik is proposing as a “rational” basis using economics, but we need to use “eco-nomics” or “multinomics” to capture the hidden values of paddy agriculture.

Lee Deogbae – Paddy farming can reduce pollution loads in water. We need to (a) do the right kind of farming and (b) educate the public about ecological farming.

Naoya Fujimoto - In addition to economic analysis, we need to look at other ways of promoting the multiple services of paddy, e.g., through paddy-field tours (agro-tourism).

Yamaokoa – We need to distinguish two categories of multifunctional benefits – One is the external economy of social, cultural, and environmental benefits that are not captured by the market, and the other is the multiple use of paddy water and agricultural fields.
through aquaculture, duck raising, transport, bathing, fire fighting, etc. These benefits are relatively more important for the poorest segments of the population.

3. The Case of Japan

Kohei Aoki – In Japan, the Agricultural Water Reorganization Measure was established 30 years ago to address the increasing need for urban water, and decreasing area of agriculture. Both agricultural and other water users gain benefit by the measure. Farmers pay less cost for rehabilitation of irrigation facilities with involvement of the other water users than cost for rehabilitation by only farmers, and other residents pay less cost for domestic or industrial water than develop new water resources.

In Tone Chuo region, irrigation facilities became decrepit and paddy fields were reduced through urbanization. Rehabilitation of irrigation facilities and reorganization of agricultural water were needed. On the other hand, urbanization increased demand of domestic and industrial water so development of a new water resource was needed. In the project, 3.8ton/second of water flow was converted to domestic water for 650,000 population. The cost for the project was allocated 53% to farmers and 47% to domestic water users.

Naoya Fujimoto – This collaborative project of Tone Chuo is a successful example of water rights transfer from agriculture to domestic water supply.

Facon – In Asia, with rare exceptions, water users associations are fashioned after the official function of the irrigation systems and are concerned only with irrigation water management, with little recognition of other users and uses, and functions. One interesting issue for INWEPF to explore would be to look at new forms of PIM/IMT that recognize other functions, with implications for management, financing, etc.

Yamaoka – Water transfers from agriculture to urban supply can also be temporary during abnormal dry spells. The Aichi-Yousui waterworks system provides agriculture, industry and domestic water. During 30 years (1973–2002), there were 15 years when agriculture granted water to domestic water users during abnormal dry spells. Such scarce water (valuable and high shadow price) was transferred repeatedly and in gratis as long as 800 days in 30 years in total. This phenomenon seems to be economically irrational because there is no benefit but only costs for the agricultural sector. However, it can be explained using game theory. This formula can also apply to the case of repeated temporary water transfer during abnormal dry spells between farmers who cultivate rice in the adjoining paddy plots. These interactions become a source of accumulating social capital, i.e. mutual trust, norm and network, among farmers.

4. PIM and IWRM

Shino Takashi – PIM and IWRM are opposite concepts – PIM is demand-driven and IWRM is top-down in trying to get stakeholders interested. In Vietnam, “Water Resources Councils” have been established to coordinate transfer from agriculture water
to urban water (Hydropower, Industrial, Drinking and environmental water). Especially in Mekong River and Red river such organization is to be expected for promoting IWRM and Coordination among all stakeholders, in other words, to build a win-win relationship.

Groenfeldt – PIM can be seen as the opposite of IWRM because it is focusing on the interests of a single sector (irrigation). But at the same time, PIM -- as an interest group representing farmers -- is an essential building block for successful IWRM. In this sense, PIM and IWRM can be seen as "nested" levels of action. It becomes much easier to have discussions about overall water use and management when the irrigation community is well organized.