PARTICIPATION AND EMPOWERMENT

An Assessment of Water User Associations in Asia and Egypt

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FOR ASIA AND THE NEAR EAST

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This report is the product of the time, energy and ideas of many people, who deserve all credit for its virtues. For any errors of fact or interpretation that may have crept in, the team leader and principal author is entirely responsible.

ACRONYMS AND TERMS

AKRSP	Aga Khan Rural Support Program
CIS	communal irrigation system
d-canal	distributary canal
DCO	distributary canal organization
DPU	Departmen Pekerjaan Umum (Department of Public Works)
FMIS	farmer-managed irrigation system
FO	farmer organization
IA	irrigator association
IARC	international agency research centers
ID	irrigation department
IIMI	International Irrigation Management Institute
IIP	Irrigation Improvement Project
IMI	irrigation management transfer
IRD	integrated rural development
ISF	irrigation service fee
kelompok tani	farmer organization (Indonesia)
MARD	Mahaweli Agriculture and Rural Development (Project)
MASL	Mahaweli Authority of Sri Lanka
marwa	drainage ditch (Egypt)
mesqa	watercourse (Egypt)
NGO	nongovernmental organization
NIA	National Irrigation Administration
O&M	operation and maintenance
OFWM	On-Farm Water Management (Project)
P3A	Perkumpulan Petani Pemakai Air (WUA)
PBDAC	Principal Bank for Development and Agricultural Credit
subak	traditional WUA (Bali)

USAID	U.S. Agency for International Development
WUA	water user association
zanjeros	traditional WUA (North Luzon)

EXECUTIVE SUMMARY

This study of water user associations (WUAs) in six Asian countries[1] and Egypt tries to answer three questions:

- Have WUAs improved irrigation system performance?
- What contribution have they made or are they likely to make to facilitate system turnover and enhance political participation? Are policy changes required to make these objectives more attainable?
- Are there other participatory approaches donors might support if the WUA approach seems irreparably flawed?

Seven field teams were led by an American institutional analyst who headed the study. He was supported by economic, engineering, and social science experts from the seven countries. The teams reviewed literature, interviewed host country officials, NGOs, and farmers, and met for discussions with representatives of international donors working in the irrigation sector.[2]

The study looked at WUAs in as many contexts as possible: in small and large systems, in pump and gravity-fed systems, in systems with participatory management or wholly government management, etc. The conclusions reached were based on field research which of necessity was very brief and superficial.

Water user associations in Asia and Egypt have been developed from the participatory method pioneered in the Philippines in the early 1970s. This method is effective in accomplishing what it aims to do: to organize groups of farmers to contribute labor, money, and ideas to the planning, design, construction, rehabilitation, and expansion of irrigation systems. But soon after construction is complete, most of the WUAs disappear.

To find out why this happens, the study examined the different approaches to organizing and establishing WUAs that donors and host governments have tried over the years. The study considered 11 different methodologies or philosophies of rural organization, all of which have merits and drawbacks, and concluded that an opportunity-oriented approach based on multi-purpose organizations seemed to have the best chance of generating maximum participation, contribution to system performance, and sustainability.

The study chose 15 variables to compose what each of the seven countries in the study is doing (or not doing) to promote WUAs. These range from the very simple, such as the names governments give their irrigation organizations and the way they categorize irrigation systems, to the relatively

---

[1] Philippines, Indonesia, Pakistan, Nepal, Sri Lanka, and India.

[2] Principally the World Bank, the Asian Development Bank, the Ford Foundation, and some bilateral agencies.

complex, such as the relationship between WUAs and traditional rural organizations and leaders or the macro and agricultural polices affecting WUAs.

Three simple indicators measure the success of a WUA in achieving improved performance, participation, and sustainability:

- The area maintained under an irrigation system
- The assets of the WUA
- The range of activities of the WUA

Based on the analyses, the study identified three groups of factors that influence the success of WUA programs: resource control issues, social structure issues, and administrative issues.

The study concludes that although WUAs do contribute to improved irrigation systems, especially in the design and construction phases, they generally do not assume responsibility for the effective O&M of these systems nor do they have the enduring appeal of multipurpose rural organizations to which farmers are attracted.

System turnover by governments to farmers is a good idea, but it will not create strong, sustainable WUAs. These must be in place for turnover to succeed. Turnover is not a magic wand that can transform dormant or languishing WUAs into vigorous rural organizations.

The farmers of Asia and Egypt produce the food for the burgeoning populations of those regions, but they themselves are often among the poorest and most powerless. To make economic gains and achieve a measure of empowerment, they must be able to organize. Irrigation systems link farmers with each other and are a natural basis for such collective action. Donors like AID must continue to support such organizations as WUAs if their rural and agricultural development investments are to bear fruit. That these investments have not yet achieved perfect success is reason to work harder at strengthening the WUAs, not reason to abandon them.

Chapter 1

THE BACKGROUND TO THE STUDY

The Irrigation Conundrum

Asian agriculture uses irrigation to feed millions of people. If irrigation fails, people starve, economies crumble, and governments fall. Governments and donors spend huge sums on irrigation dams, canals, tunnels, and drains. But all this infrastructure never seems to last as long as it should. These are the two parts of the irrigation conundrum:

- If irrigation is so important to governments and farmers, why don't they take better care of the infrastructure?
- If they cannot take care of what they have, should the donor community continue to invest in the construction, rehabilitation, expansion, operation and maintenance of that infrastructure?

The international donor community has poured billions of dollars into improving irrigated agriculture in Asia. In Pakistan, for example, USAID has spent over $900 million on water-related projects, most of them in the irrigation sector. In one sense, these investments have borne fruit: irrigated hectarage in Asia has tripled since the 1950s and governments have been able to feed their growing populations. In another sense, these investments have failed: more and more of them have gone into the rehabilitation of canals, structures, and dams that governments and water users have not maintained.

Over the past 20 years, donors and host country governments have come to realize that it is as important to put their funds and technical expertise into building the institutional infrastructure, a strategy that has centered on forming and strengthening water user associations (WUAs), training the personnel of irrigation agencies, and promoting policy reforms to encourage the maintenance and sustainable use of existing irrigation systems.

Starting in the 1970s in the Philippines, theorists and practitioners began to combine the best irrigation engineering with the best sociological insight to create local organizations that could take over the operation and maintenance (O&M) of the lower reaches of irrigation systems.[3] The hope was that this would not only reduce public expenditures but ensure better O&M by making the users responsible for the facilities they enjoyed.

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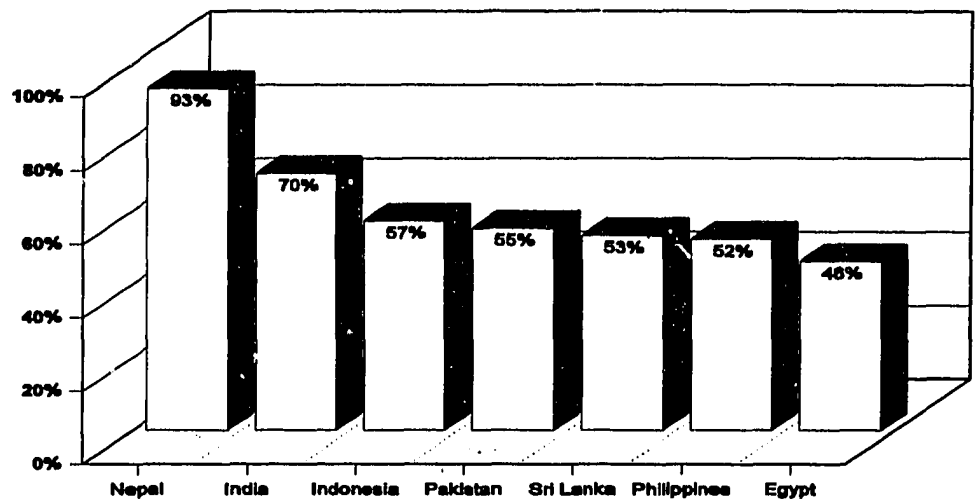
[3] Different countries have different names for the lower reaches of irrigation systems: farm channels, distributary channels, downstream infrastructure, *mesqas*, watercourses, etc. Each irrigation bureaucracy determines the point at which it will relinquish control of water allocation and O&M to the WUAs.

In most of the countries of Asia and in Egypt this strategy has yielded some success: farmers have organized effectively to plan, design, construct, or rehabilitate their canals, structures, and drains. But generally this has not led to better O&M or to sustainable rural organizations in the form of WUAs. The two questions in the irrigation conundrum remain unanswered.

Agriculture and Donors: To Invest or Not To Invest?

Most people in Asia and the Near East make their living directly or indirectly from agriculture. Direct employment in agriculture ranges widely, as Figure 1 demonstrates.

Figure 1



Percent of Population Who Make Their Living Directly from Agriculture

However, these numbers underestimate the importance of agriculture in these countries. In Sri Lanka, for example, over 80 percent of the population lives in rural areas and depends on agriculture for a livelihood, even though the census figures for agricultural employment do not reflect this. The same holds in the other countries mentioned.

Most farmers in Asia cultivate small landholdings. Except in Pakistan, large feudal estates are rare. Agriculture contributes between 20 percent and 30 percent of GNP in most of these countries, and this share is shrinking more rapidly than the agricultural population is declining. This means that large segments of the population in most Asian countries are getting a smaller share of the national income pie.

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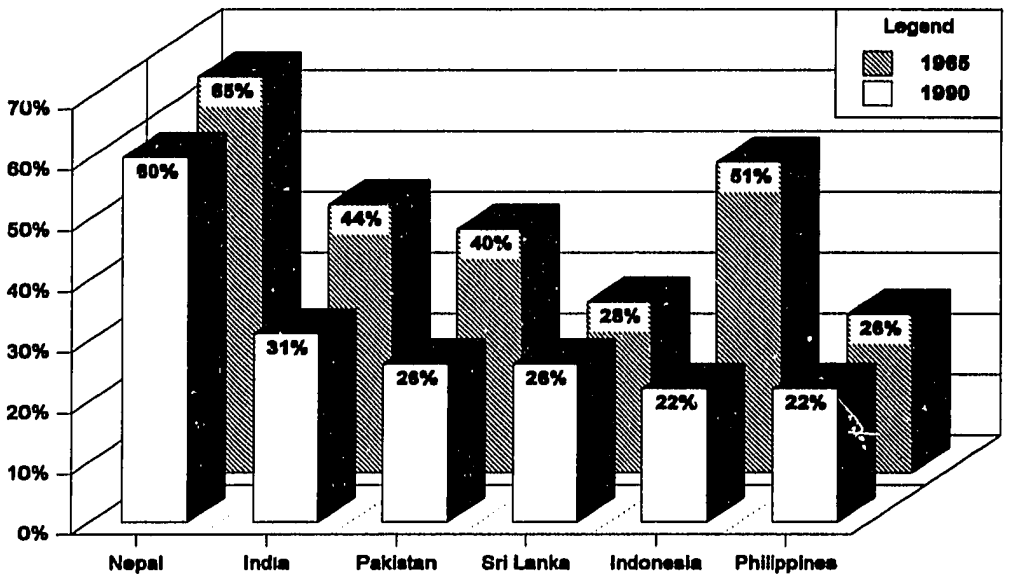
[4] World Bank, *Social Indicators of Development*, 1994, Johns Hopkins University Press, Baltimore, 1994.

Figure 2



Agricultural Share of GDP[5]

Agriculture's contribution to GNP is made by a large number of people whose wages lag behind those of the urban and industrial labor force in nearly every case. The correlation in Asia between low incomes and lack of control over decisions that affect peoples' lives is very high. In most Asian countries, farmers make up most of the population, earn low incomes, and have very little access to participatory processes.

If donors abandon support for these farmers, they lose the chance to work to improve the lot of the world's poorest people and to empower the continent's disenfranchised. In Asia, agriculture means irrigation. The potential for the expansion of dry-land agriculture is low, while irrigated hectarage and cropping intensity are far from reaching their limits. Irrigation is still the key to feeding growing populations, to increasing farm incomes, and to coping with accelerating urbanization.

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[5] *Development and the Environment: World Bank Development Report 1992*, Washington, 1993, p. 222f.

Water and Water Users: Public Goods and Private Uses

Water is so important to life that its universal role is often confused with its role in irrigation. Water users include those who drink, bathe in, manufacture with, swim in, bottle, or do anything else with water. But water users in the irrigation sector are those who use it only for farming, and WUAs are the organizations that represent them. This may seem obvious, but most irrigation projects, including those that promote WUAs, tend to see water as an end in itself and the purpose of irrigation infrastructure as conveyance: getting water from Point A to Point B in the most efficient, effective way.

But to farmers, water is a means to an end, and that end is income. They need water as they need land, seed, labor, capital, traction, storage, and any other input. They cannot farm without water, but they cannot maximize their returns from the investment of their labor and capital without a wide range of other inputs as well. Irrigation agencies miss the point when they organize farmers into WUAs primarily for canal construction or for O&M. Farmers will organize readily to get government assistance to repair or expand their irrigation systems, but only if improved O&M promises more income. If the WUA program means more work for the same return, they are unlikely to go along.

This point leads to another: water is unlike other inputs. It is a public good, and in Islamic countries such as Pakistan and Egypt, it is considered a gift of God and thus free to all. No one has the right to charge for the use of water. But in most irrigation systems[6] water comes from somewhere else. It travels through a network of canals, gates, anicuts, and weirs to get to a farmer's fields. On its way, others may use it for hydropower, recreation, drinking, bathing, manufacture, or agriculture. Water is nearly always shared, a public good.

The nature of water as a public good has two consequences. First, farmers must work with other farmers to distribute it, and this requires organization. Second, it is far harder to get control of water than of other agricultural inputs. A farmer can own his land, buy his seed, build his own storage shed. But he owns and controls his water only during the short period it is on his fields. In most circumstances, he has no control over the decisions that affect the use and allocation of water before it gets to his farm channel, *mesqa*, or watercourse. WUA programs have done very little to reduce farmers' dependence on irrigation bureaucracies.

Farmers and groups such as WUAs need to organize to carry out optimal O&M. But WUA programs that emphasize water conveyance, not the use of water to increase income nor the farmers' control over this critical input, have little chance of achieving lasting success.

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[6] The exceptions are fields irrigated by individual pumps, which tap into groundwater under a farmer's fields.

The WUA Applied Study

This study examined WUA programs in the Philippines, Indonesia, Pakistan, Nepal, Sri Lanka, India, and Egypt to find out what approaches the governments of these countries and donors had used to organize water users, and under what circumstances these programs seemed to work most effectively. Did investments to create or strengthen WUAs improve O&M of the irrigation infrastructure and increase agricultural production?

After concentrating on the construction of the irrigation infrastructure from the post-WWII era up through the early 1980s, host country governments and donors have come to understand that the people who use irrigation are the key to successful irrigation development investments. In most cases,[7] O&M of an irrigation system is a collective enterprise, and all those who use it must cooperate to keep it running.

Throughout Asia, there are very old irrigation systems that farmers have built and managed themselves, banding together in formal or informal organizations to do what was needed to operate and maintain, and even expand, these systems. Donors initially ignored these traditional organizations, and in the Philippines deliberately put them aside. But when donors finally decided to try to work with them, their efforts were often counterproductive. In Indonesia, attempts to transform the *subaks* of Bali into organizations the donors could understand only led to their decline. Donors and host governments tended to emphasize the conveyance and engineering aspects of irrigation and failed to see that the traditional organizations were far more than WUAs. They represented the interests of members across a wide range of issues and worked for their economic and political well-being, not just to get water more efficiently to their fields.

The engineering model, based on infrastructure construction, and the sociological model, based on single-purpose WUAs to improve water management, were combined as the foundation of donor and host government investments in irrigation improvement for about 40 years. But O&M failures continue and premature rehabilitation is the rule, not the exception. The emphasis on infrastructure alone has not worked.

Starting with the Philippines in the 1970s, governments and donors began investing millions of dollars in promoting organizations of users to take care of irrigation systems. USAID has led the way in supporting these programs, which in most cases, however, have failed to generate long-term, sustainable results. But they have achieved some other objectives.

The study set out to answer three questions:

- Have WUAs improved irrigation system performance?
- What contribution have they made or are likely to make to facilitate system turnover and enhance political participation? Are policy changes required to make these objectives more attainable?

[7] In Pakistan and some areas of India, some irrigation systems or portions of large systems belong to individuals. These cases are rare and becoming rarer.

- Are there other participatory approaches donors might support if the WUA approach seems irreparably flawed?

The Applied Study Methodology

The study was designed by Peter Reiss, ISPAN's Technical Director, and began with a review of the extensive literature on WUAs in Asia and Egypt. An experienced consultant in each of the countries chosen for the study prepared a bibliography of the most important sources on WUAs in his/her homeland or country of residence.

Philippines:	Leo Gonzales
Indonesia:	Helmi and Gillian Brown
Pakistan:	Tariq Husain
Nepal:	Upendra Gautam
Sri Lanka:	Piyasena Ganewatte
Egypt:	Salah El Din Zaki
India:	K.K. Singh

The seven countries were chosen for the following reasons:

Philippines: The WUA movement began here in the 1970s, supported by the Ford Foundation and USAID. Other Asian countries still look to the Philippines' National Irrigation Administration (NIA) as the source of institutional organization. USAID has invested heavily in the water sector here.

Indonesia: Indonesia picked up the WUA idea very quickly from the Philippines and has applied it widely as official government policy. USAID has invested nearly $235 million in water projects since 1971.

Pakistan: Pakistan has one of the best-known and best-documented WUA programs: the series of On-Farm Water Management projects. This is generally considered a prime example of the lack of sustainability of the WUA approach. USAID has invested heavily in water projects since 1963.

Nepal: Nepal has provided the paradigm for Farmer Managed Irrigation Systems (FMIS) and is the only country where farmers have built, managed, and sustained large irrigation systems. Nepal also has the worst record in Asia for O&M of state-managed systems. USAID has invested millions in the water sector since 1957.

Sri Lanka: USAID's most recent funding of major new irrigation infrastructure was in Sri Lanka. The country is almost entirely dependent on irrigated agriculture for its food supply, and several USAID projects have attempted innovative approaches to organizing farmers. USAID has invested very heavily in the water sector since 1977.

India: India has no national WUA program, but many individual states have permitted donors or NGOs to begin organizing farmers. In addition, private farmer organizations in several areas have begun collective water management activities.

Egypt: Egypt has the oldest irrigation system in the world but the newest WUA program, supported by USAID for the last two years. It seems to offer some hope for sustainable success because of new irrigation technology and a new organizational approach.

Heading the study was Max Goldensohn, an institutional analyst who served as team leader in each of the seven countries and participated in all the country investigations except India. Each country team had at least one representative of the country visited and one representative from another country in the study. This provided both a unifying presence of a team leader and a constantly changing comparative perspective. The teams tried to include representatives of the disciplines relevant to the study as well as of the academic and implementation communities. The members of the teams, in addition to Max Goldensohn, were:

Philippines	Leo Gonzales, Agricultural Economist (Philippines) Helmi, Social Scientist (Indonesia) Honorato Angeles, Irrigation Engineer (Philippines)
Indonesia	Leo Gonzales, Agricultural Economist (Philippines) Helmi, Social Scientist (Indonesia) Gillian Brown, Agricultural Engineer, (UK, resident in Indonesia) Sigit Arif, Irrigation Engineer (Indonesia)
Pakistan	Tariq Husain, Agricultural Economist (Pakistan) A.R. Saleemi, Agronomist (Pakistan) Kapila Goonesekera, Irrigation Engineer (Sri Lanka)
Nepal	Kapila Goonesekera, Irrigation Engineer (Sri Lanka) Upendra Gautam, Social Scientist (Nepal) K.K. Singh, Organizational Development Specialist (India)
Sri Lanka	Kapila Goonesekera, Irrigation Engineer (Sri Lanka) K.K. Singh, Organizational Development Specialist (India) Tariq Husain, Agricultural Economist (Pakistan)

India	K.K. Singh, Organizational Development Specialist (India) Peter Reiss, Social Scientist (USA)
Egypt	Salah El Din Zaki, Public Administration Specialist

In each country, the team met with the staffs of USAID and other donors and with a wide range of government and NGO workers in the irrigation sector. The team also visited several field sites, in consultation with USAID staff, to talk with individual farmers and representatives of WUAs.

Before leaving a country, each team submitted a trip report and an annotated bibliography to the USAID Mission. The trip report recorded the team's itinerary and whom they had met, and also offered some preliminary ideas about WUAs in the country.

To organize the information about WUAs in each country and to make comparisons easier, the team followed a single matrix of descriptive elements. This paper discusses the contents of the matrix, which appears as an annex.

Irrigation Management: The Range of Possibilities

Water user associations are usually defined as organizations of farmers to manage irrigation systems or parts of irrigation systems fed by either surface or groundwater sources. The term WUA is rarely applied to users of domestic or industrial water, or of water for animal husbandry,[8] although there is no good reason for this exclusion. The definition makes several assumptions about these groups:

- Water is the unifying element.
- WUAs are institutions and thus should last indefinitely, i.e., should be sustainable.
- The primary purpose of a WUA is the management of an irrigation system.

These assumptions are responsible for many of the problems encountered by governments and donors in implementing institutional development in irrigation programs. They reflect the perspective of engineers and administrators who take it for granted that the interests of the state, which pays for the infrastructure, are paramount, and that those of individual farmers are secondary.

People have discovered an endless variety of management styles to operate and maintain irrigation systems. The most successful and sustainable lasted for centuries in Egypt, Mesopotamia, Sri Lanka, and the Indus Valley, and supported the oriental despotisms that Karl Wittfogel describes

[8] In Tunisia, a very successful USAID-funded program organized rural villages into associations to manage potable water systems.

as hydraulic societies.[9] Oriental despots required large surpluses of food to maintain their armies and their bureaucracies and obtained these from irrigated agriculture. Disciplined agricultural production depended on the constant construction, repair, rehabilitation, and O&M of irrigation systems.

Farmers in hydraulic societies obeyed the instructions of an irrigation bureaucracy, backed by the army, that regulated cropping patterns and calendars, as well as O&M. Engineers and managers of irrigation bureaucracies often refer nostalgically to the days when water users obeyed what they were told...or else!

At the other end of the spectrum, farmers in Bali, Northern Luzon, and Nepal, among other places, have built, maintained, and managed their own irrigation systems without outside control for hundreds of years, jointly making the critical decisions that affect their lives and their livelihood. Paradoxically, very few of these farmers say they wish the government would leave them completely alone. They almost always welcome government contributions for improving or expanding their systems, provided they retain control over decisions affecting system operation.

Between these two extremes—the totally nonparticipatory and the totally participatory—there are numerous variations. Most observers have noted that farmer control seems to work better, as long as governments are not ruthless enough to impose a despotic system on their citizens.[10] Since the early 1970s, governments and donors in Asia have worked to find the ideal mix of water user participation and government intervention to achieve sustainable increases in production from irrigated agriculture.

Can governments help water users organize themselves and how? How should irrigation systems be operated and maintained and by whom?

Changing Paradigms, Babies and Bath Water

As most Asian countries became independent after WWII, their governments realized that the decaying irrigation infrastructures they had inherited from colonial regimes or their despotic ancestors were inadequate for their rapidly growing populations. With the enthusiastic support of the international donor community, led by USAID and the World Bank, Asia launched a program of infrastructure construction and rehabilitation that tripled irrigated hectarage on the continent between 1950 and 1980.

This construction, complemented by the success of the "Green Revolution" in spreading the cultivation of new rice varieties, led governments and donors alike to believe that they could solve the problem of food production through the measured application of basic and applied science.

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[9] Wittfogel, Karl August, *Oriental Despotism: A Comparative Study of Total Power*, Vintage Books, NY, 1981 (1957).

[10] Examples of despots who did keep successful irrigation systems going for centuries are the Sri Lankan kingdom of Anuradhapura, the Mesopotamians, and the Han Chinese.

One of the first countries to benefit from these programs of construction and agricultural research was the Philippines, which was also the first to realize that the large new systems broke down all too quickly for lack of maintenance. Increasing demands on shrinking government revenues meant diminishing resources for the upkeep of these systems.

In 1964, the Philippines created the National Irrigation Administration (NIA) to deal with this problem. At the insistence of the visionary Ben Bagadion, the NIA in the 1970s began developing the participatory approach, working with farmers before the construction or rehabilitation of an irrigation system to get their input and support for planning, design, and construction. Once a system was ready, farmers had to agree to operate and maintain it themselves.

The immediate success of the participatory approach led to a major revision of government and donor attitudes to irrigation development throughout Asia. It became the keystone of irrigation policy from the 1970s through the early 1990s. Governments and donors in Indonesia, Sri Lanka, Pakistan, and Nepal adopted WUAs as the solution to the problems of O&M in irrigation.

But once again, the engineers and sociologists who managed the WUA process and the participatory method in the NIA in the Philippines, the Department of Public Works in Indonesia, the Department of Irrigation in Nepal, and the Directorate of On-Farm Water Management in Pakistan found that the irrigation systems built with so much effort were not being maintained to approved standards. Even where farmers were striving to keep the system going, the WUAs that the irrigation agencies had worked so zealously[11] to create had disappeared entirely.[12]

Donors and government finance departments have begun to worry that the whole irrigation enterprise may not be economically and technically sustainable. If the best infrastructure and the best organizational efforts have failed in this endeavor, should investment in irrigated agriculture continue? In an era of scarce resources and intense sectoral and geographical competition for government and donor funding, can irrigation compete?

We know how to build good infrastructure. If irrigation systems fall apart, is it because irrigated agriculture is not a viable activity? Is it because farmers cannot be organized or motivated to take care of the canals and structures that support their livelihood from the soil? The answers to these questions must be unequivocal: Asia and the world need irrigation to survive. Farmers can make a good living from irrigated agriculture. Asian nations benefit from agricultural exports and taxes on agricultural products. Farmers have to take care of their own water conveyance systems.

We cannot afford to throw out the baby (farmer participation) with the bath water (the mistakes in implementing the idea). We need some new thinking about the role of WUAs in irrigated

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[11] The first group of advocates of the WUA approach presented their case for farmer organization to support irrigation infrastructure with an almost missionary zeal. They have generated a group of true believers throughout Asia who have worked very hard to convert irrigation bureaucracies to the participatory method. They have, in large measure, succeeded.

[12] For example, an ISPAN report, *Privatization and Sustainability of Small-Scale Irrigation in Indonesia: A Reassessment of the Sederhana and HPSIS Systems*, September 1991, found that the WUAs created after years of USAID and GOI investment had disappeared, but that the O&M of the systems was at an acceptable level.

agriculture that should begin with some searching questions. What are WUAs? Who are their members? What do these people really want?

The Death of a Paradigm: Participation in What?

A mistake in terminology has colored the institutional development of irrigation systems to date: WUAs are groups of farmers who use water, not just groups of water users. The engineers who build the irrigation infrastructure have a straightforward purpose in the planning, design, and construction of dams, anicuts, canals, off-take and control structures, and drains. It is to get water from Point A to Point B as quickly, efficiently, and economically as possible. Point A may be a dam or a diversion structure or a well; Point B is usually the outflow point from a distributary canal or watercourse, the entry to the downstream or tertiary part of an irrigation system, or even a farm gate. If the water gets from here to there with minimal loss (system efficiency) and at the right times and in the right quantities (system effectiveness), the engineers have done their job.

The sociologists and anthropologists who joined the irrigation bureaucracies to help create and strengthen WUAs concentrated on how to organize. They paid far less attention to what to organize for. They generated effective internal management and administrative structures to help establish organizations as good as the irrigation infrastructure itself. But they failed to look carefully enough at why water users would want to organize and what purpose WUAs would serve after the construction was over. They aimed for simplicity and efficiency in their organizations and gave little thought to the complications that politics and economics could introduce.

Farmers cannot be expected to limit their objectives to those of the engineers and sociologists, but unfortunately, until recently, this assumption has governed most efforts to organize WUAs in Asia. In all the countries visited during the ISPAN applied study except India, which has no national agency for WUAs, the government agencies responsible for the organization and strengthening of WUAs are those that build and maintain the physical infrastructure:

Pakistan:	On-Farm Water Management Directorate
Nepal:	Department of Irrigation
Sri Lanka:	Irrigation Department and Mahaweli Authority
Philippines:	National Irrigation Administration
Indonesia:	Ministry of Public Works
Egypt:	Department of Irrigation

These agencies generally are staffed by engineers who have made their reputations and justified their continued employment by building, operating, and maintaining irrigation systems. Although these agencies use social scientists, rural organizers, and NGOs to set up and supervise WUAs, the role of WUAs is defined in engineering terms: manage the water, perform O&M, pay a share of O&M and/or construction costs. This is what each country expects of the WUAs:

Pakistan:	watercourse renovation and resource mobilization for rehabilitation and O&M
Nepal:	O&M, system management, and resource mobilization for rehabilitation and O&M
Sri Lanka:	Multipurpose organizations starting with O&M and water management[13]
Philippines:	O&M, irrigation service fee collection, system management
Indonesia:	O&M, irrigation service fee collection
Egypt:	O&M of canals and pumps
India:	no formal definition

The members of WUAs, however, earn their living from their farms, not from their irrigation systems, which admittedly provide a critical input but one that is no more important than land, labor, capital, seeds, and other inputs. Without these agriculture cannot thrive, even if the irrigation system is working perfectly. WUAs principally are organizations of water-using farmers, whose final concern is the living they earn from agriculture.

The participatory approach to WUAs stops at the entry to the farm. The WUAs thus become irrelevant to farmers after construction or rehabilitation is over. Farmers want water. But they want water as a means to an end, not as an end in itself. The WUAs are conceived with water management as their sole objective, whereas farmers want more than to manage the water and to perform O&M. They know that efficient and effective water delivery is a *sine qua non* for agriculture. They are not opposed to what the engineers have in mind. On the contrary, their almost universally enthusiastic response to efforts to organize WUAs for system construction, rehabilitation, or expansion shows that they share the engineers' goals. However, they want to go beyond these goals because they see a holistic system, not just an irrigation system, at work.

International applied research shares the same bias as donors and host governments. The International Irrigation Management Institute (IIMI), the only international agency research center (IARC) that deals with water management as a separate subject, is an example of the limits of the "water as an end in itself" school of thought. IIMI has always avoided on-farm analysis, stopping where the engineers stop: at the point where the water is delivered to the farmer. How the farmer uses the water and what the returns are on investment in O&M or rehabilitation are outside IIMI's range of interest.[14] IIMI could easily extend its reach and its research to coordinate with inputs from other IARCs: rice, wheat, corn, millet, livestock, arid zone crops, etc. Farmers and the practitioners who work with IIMI could then apply its research results with confidence and enthusiasm.

The study found that farmers in all the countries visited are willing to participate in the development and O&M of their irrigation systems as long as the organizations proposed serve their

[13] This is the definition used by the Mahaweli Authority of Sri Lanka. The MASL has moved more quickly to the concept of opportunity orientation than agencies in the other countries have.

[14] There are exceptions to this generalization but by and large it is not unfair.

ends. When the organizations become irrelevant, they wither and die. Organizations must provide farmers with what they want, not simply serve the need of government to devolve the responsibility for paying for O&M.

Farmers the world over tend to want security, whose components are power and money. Power means the ability to exercise the greatest possible control over the decisions that affect their lives. They know they cannot entirely dictate terms to the world around them, but they want a voice in their own affairs.

Money represents purchasing power. The day of the subsistence farmer has passed. All farmers, from the remote mountain valleys of Nepal to the dry zone of Sri Lanka, from the deserts of Baluchistan to the swamps of Sumatra, grow crops to obtain the money they need to give their families the best they can.

If governments and donors want farmers to participate in operating and maintaining their irrigation systems, they must offer a convincing reason. Merely instructing them to do so will not suffice. Farmers must be satisfied that the technical, institutional, economic, financial, cultural, and environmental aspects of participation are to their advantage. Most farmers to date have voted with their feet, leaving their WUAs after construction or rehabilitation has ended.

Chapter 2

APPROACHES TO PARTICIPATORY DEVELOPMENT

The change from ignoring farmers in irrigation development to enlisting their participation has occurred throughout Asia and the Near East, and host countries and donors have tried several methods of creating and strengthening WUAs. Some of those that have undergone field testing are described below in a highly condensed form that does not do justice to the subtlety and variety of the programs described. The bibliography contains references to most of these programs.

Participatory Method Irrigators Associations

Description: The NIA program in the Philippines works with irrigators before construction or rehabilitation begins. They are invited to study the area and are then helped to form an association according to NIA guidelines. This association participates in the design, planning, and construction of the new or rehabilitated irrigation system. In large systems, associations are usually formed at the distributary (d-canal or tertiary) level. The associations contribute labor for construction and money or materials to defray part of the capital costs. They are responsible for O&M, including water management, after the works are completed. These associations are the model for WUA programs in many other Asian countries, where NIA trainers have helped with farmer leader and government agent training.

Outcome: These IAs or WUAs tend to disappear after construction has ended, except in small systems such as the Communal Irrigation Systems (CIS) in the Philippines, where they tend to assume the form of traditional farmer organizations that existed before NIA construction began.

Irrigation Service Fee Organizations

Description: An irrigation service fee (ISF) is what farmers or groups of farmers pay to the government to cover the costs of O&M and/or capital improvements to the system.[15] Some countries, like Sri Lanka, have ISF laws on the books but collect nothing from farmers. Others, like the Philippines, try to collect the full cost of O&M and partial costs of capital investments. In the Philippines, the IAs agree to collect and hand over to the government a specified ISF in return for the government's contribution to the improvement, expansion, or O&M of their irrigation system.

[15] In most countries, ISF is collected at the local level and transmitted to a central government agency that allocates funds to irrigation districts for O&M and administrative expenses.

With Asian Development Bank and World Bank support, Indonesia has launched a series of projects to improve ISF collections and, simultaneously, the service farmers get from the state organizations to which they pay the ISF. These ISF projects are mostly on large systems. WUAs are entitled to keep for their own purposes a small proportion of the ISF they collect. The DPU (Department of Public Works) is supposed to pay special attention to the ISF project areas to ensure that farmers get the services for which they are paying.

At present levels in Indonesia, 100 percent ISF collection would cover 50 percent of the O&M costs and none of the capital costs of the systems in the project areas. Collection rates vary from area to area, and in some cases reach 100 percent.

Outcome: The ISF WUAs in Indonesia are likely to be permanent and sustainable because the government has organized them for tax collection purposes and will most likely encourage their continuation for that reason. On the contrary, data suggest that farmers pay because they have to pay, not because they feel they are getting better O&M service from the DPU. The ISF principle is sound, but success depends on providing the farmers with the return they are seeking for their investment: higher incomes, more reliable water delivery, and better O&M.

Just-Enough Organizations

Description: This phrase, borrowed from a social scientist who has worked extensively with WUAs in Indonesia and Thailand, refers to the informal, periodic organizations that appear in irrigated areas once construction has ended and the single-purpose WUA has disappeared. Farmers recognize that O&M of their system and the equitable and efficient distribution and management of water are necessary. If they feel the government will not step in and do it for them, they organize themselves to carry out specific tasks on an as-needed basis, that is, with just enough organization to keep the system going.

This is usually part of a wider village-based or system-based organization that attends to the social, economic, and political needs of the farmers.

Outcome: The just-enough concept implies that governments and donors can leave farmers to take care of the irrigation infrastructure adequately. With the exception of long-standing groups such as the *subaks*, the *zanjeros*, and the Nepalese farmer-managed irrigation systems (FMIS), this has not proven true. If farmers are left alone, most irrigation systems break down over time. Irrigated areas shrink, as do production and

> In Pakistan, many officials working on the OFWM projects appeared puzzled when asked about the sustainability of the WUAs they helped form to rehabilitate or expand village irrigation systems. They had assumed that the WUAs would disappear after the construction phase and that the villagers would go back to their traditional, informal organizations, which kept their canals and structures minimally functional. In Sind, for example, these are usually groups of tenants organized and supervised by landowners. In NWFP and Punjab, they are informal organizations of the small-holding farmers themselves.

incomes. However, in many small, traditional systems, the just-enough approach works quite well, as long as populations remain stable and no expansion of the system is required (see box). Unfortunately, with growing populations and increasing urban demand for food, most countries cannot afford to leave minimally productive irrigated systems to the care of farmers alone.

Sectoral Organizations

Description: In the United States and in Europe, farmers' organizations are often set up to include people with a single interest: water-rights holders in Colorado, citrus growers (e.g., Sunkist), milk producers (e.g., Land o' Lakes), parent-teacher associations, folk-dancing groups, rural electricity users (e.g., National Rural Electric Cooperative Association), and the like. These groups are often both successful and durable. In modern communities, no one expects one organization to meet all the needs for collective action.

Governments and donors have often advocated setting up WUAs as sectoral organizations to deal with water, as cooperatives deal with milk or oranges. There is no need, they say, for WUAs to deal with agriculture. It is simpler for them to stick to canals and drains. But sectoral organizations in Asia have most often come to grief in this attempt to transplant this model of cooperation to rural societies through WUA-type programs.

In Pakistan, cooperatives served as rural banks until widespread corruption brought them into nationwide disrepute. In Sri Lanka, cooperative input supply centers were successful until politicians from outside the rural areas took over their management and destroyed their local base. But in India and Sri Lanka, milk supply cooperatives have met with some success in areas near urban centers where there are processing facilities to purchase milk.

Outcome: In most cases cooperatives in rural Asia have short lives. Established most frequently by governments as a channel for subsidized credit in cash or in inputs, they survive until all the members have become defaulters. In the Philippines, the average life of a cooperative is about three to four years.

In most rural areas, a village model is more culturally, and thus institutionally, sustainable than a sectoral model. Most irrigators live in cohesive village communities where people deal collectively with a wide range of issues. The connections among these are organic, and any attempt to separate one from another is likely to prove culturally destructive. Cooperatives or other sectoral organizations work best where agriculture is highly commercialized and farmers can coalesce profitably to sell their crops to processors or exporters. In Egypt, for example, commercial potato growers have had their own organization for many years. But it is not geographically based and has no relationship to water management.

Hydrological Units

Description: Typical hydrological units are turn-outs or d-canals or small systems operated off stream diversions or small reservoirs. Small mountain systems in Nepal or some CIS in the Philippines are examples of hydrological units that make up a whole network. In the huge Mahaweli and Indus systems of Sri Lanka and Pakistan, respectively, the Mahaweli Authority and the On-Farm Water Management Project organize WUAs on the basis of hydrology. Engineering agencies prefer this approach, as they can more easily deal with all water users in a single linked system or discrete section of a system.

Unfortunately, hydrological boundaries do not always coincide with the administrative boundaries that are relevant for the farmers who make up the membership of the WUAs. An administrative unit may encompass several hydrological units or include parts of several irrigation systems or system sections. Farmers depend on the local administration for solutions to many of their problems and as a source of favors, access to power, and information. In the Mahaweli, for example, administrative units cover between 100 and 500 farmers and may include parts of up to seven d-canals. Many d-canals run through two or more units.

In other cases, cohesive traditional village units may include farmers who work on several irrigation systems or may unite all those who work on two or more systems. Villagers may find themselves torn between a WUA in which they have a plot of land and one which is based in the village in which they live. In Indonesia, where hydrological boundaries determine the membership of official WUAs, many such situations prevail. Farmers often are more attached to their village than to the single-function WUA.

In Egypt, on the other hand, farmers along one watercourse may belong to several villages. But their WUAs have become important enough to them that they prefer to work along hydrological rather than village/administrative lines.

Outcome: If hydrological, administrative, and residential boundaries coincide, as they sometimes do in the Mahaweli and often do in FMIS in Nepal, farmers are unlikely to face any conflict. However, if they are pulled by several organizational arrangements competing for their loyalty, they may end up fleeing one or all of the associations that could serve their ends satisfactorily. Farmers should be free to choose the kind of organization they prefer. Imposing a basis for membership from the outside is unlikely to provide a solution with which they are content.

Parallel Rural Organizations: Sectoral Egoism

Description: In many of the countries visited, government agencies see programs to organize farmers as a justification for maintaining or increasing levels of personnel, material, and funding. Having farmers to organize gives them power and resources. They protect their turf jealously, displaying what can be called sectoral egoism. As a result, line agency representatives in the field do not work together well, and farmers have to deal with a sometimes bewildering array of organizational requirements to get the "treats" that each agency or NGO offers in return for cooperation.

In Indonesia, for example, the DPU organizes farmers into P3A or WUAs for the O&M and rehabilitation of their canals. If the farmers cooperate, they get assistance and subsidies for the improvement of their irrigation system. The Department of Agriculture organizes farmers into *kolompok tani* or farmers organizations. If the farmers cooperate, they get special prices on seeds and fertilizer. The Department of Cooperatives rewards farmers who join a cooperative with access to special credit facilities. Other agencies have their own programs for farmers, who also belong to villages. The Ministry of Home Affairs supervises local village government, which requires farmers to mobilize labor, material, and financial resources as well.

In Nepal, the situation is similar. The Department of Irrigation organizes water user associations, which receive subsidies for the capital costs and part of the labor costs of the construction, extension, or rehabilitation of their irrigation systems. The Department of Agriculture organizes sectoral, commodity-based farmers' associations, which are given technical assistance and, especially, marketing support, as well as inputs. The Department of Cooperatives organizes cooperatives, which get subsidized loans from the National Agricultural Development Bank.

Outcome: In many cases, as the teams observed in both Indonesia and Nepal, farmers form all the necessary organizations; do the record-keeping and paperwork to satisfy government or donor monitoring; and then elect the same people as officers in all the organizations, holding their meetings simultaneously.

Line agencies working separately cause a significant waste of time. Farmers would like to deal with a single authority for all their needs, rather than guess where to go for each problem and risk offending some official they have inadvertently ignored. Regional development authorities, like the Mahaweli Authority of Sri Lanka, or regionally centered broad-based development programs, like the Aga Khan Rural Support Program (AKRSP) in northern Pakistan, tend to move quickly to multipurpose organizations that can respond to farmers' needs, while sectoral agencies generate single-purpose farmer organizations that tend to dissolve once their initial objectives are attained.

Single-Purpose Organizations

Description: The NIA model from the Philippines calls for IAs (WUAs) concerned only with water—the construction or rehabilitation of water delivery infrastructure, O&M of completed systems, and water management, including allocation and dispute resolution. The linkage between water and profit from agriculture is vague, although NIA staff pay lip service to the importance of increasing agricultural production. Whether or not these production gains lead to increased income is moot.

Two arguments have led irrigation agencies throughout Asia to adopt the principle of single-purpose, water management farmers' organizations in the irrigation systems they control:

- Water is the critical factor in irrigated agriculture and thus farmers' organizations should take care of water before any other factors; and

- Farmer groups should not have to manage several activities at once, straining their weak management skills and inviting failure.

Farmers do want control of their water, which has considerable significance in their lives. But they also want control of their land, their labor, their choice of crops, their access to credit, their market negotiations, and their purchase and use of inputs.

The control of water is not easy because of its nature as a public good. In consequence, organizations based on it are, in a way, emasculated from the start because they center on a resource beyond their authority. The existence or absence of WUAs makes little difference to this fact. This impotence diminishes the importance of single-purpose WUAs in the eyes of their members.

Farmers are used to managing multiple activities. A Sri Lankan small-holder in a non-Mahaweli system has to manage his water and manage his land. He has to find tenants or negotiate with a landlord. He has to obtain and manage credit and purchase inputs for his fields. He has to choose and support a political party and a temple. He has to participate in and help organize voluntary labor contributions for roads and bridges and the repair of his irrigation infrastructure. In fact, he has to manage far more numerous and more disparate activities than most urban dwellers in the Western world.

Farmers in small CIS in the Philippines belong to single-purpose WUAs but use them to form cooperatives to get loans at advantageous rates or interest. They use their WUAs to purchase bulk supplies of inputs at a discount and they name their leaders to act as purchasing agents for the National Food Agency. They transform the single-purpose organization into a multipurpose one from the start. Farmer organization specialists in the USAID-funded MARD project in Sri Lanka observed the same phenomenon. When given the chance, farmers immediately took advantage of the organization for purposes not related to water but directly related to income generation. These multipurpose organizations were more dynamic than the NIA-model WUAs formed in adjacent ID systems, where sectoral egoism among line agencies inhibited the development of multipurpose organizations that would compete with established commercial and marketing infrastructure.

Outcome: Limiting WUAs to water management has made them more useful to government agencies than to their members. Single-purpose organizations fit neatly into organization charts, suit line agencies that oversee specific tasks in rural areas, and facilitate organizing and training. But when asked what they need most, few farmers talk about improved water management. The single-purpose WUA is ill-adapted to their economic, political, and social needs.

Integrated Models: The Aga Khan Rural Support Program (AKRSP)

Description: The AKRSP uses a three-pronged approach to generating sustainable village organizations in northern Pakistan. The infrastructural and institutional components of the approach follow the economic component. The AKRSP, which operates in the northern areas of Chitral and Gilgit, works with existing village associations to identify what people believe are obstacles to

economic and social development. If they consider irrigation infrastructure a major problem area, the AKRSP will provide a grant to cover part of the cost of building or repairs.

Villages can choose whatever project they want—a road or bridge, a dam or anicut, a clinic or school. The organization they form to carry it out receives training and support for other activities its members may consider important. The AKRSP recognizes that villagers are concerned primarily with increasing their income and that rural organizations give them negotiating power in dealing with their local and provincial governments and in commercial bargaining.

The AKRSP has two advantages in its favor:

- It started after the Karakorum Highway had opened up Pakistan's northern areas to commerce and tourism.
- It drew on the Aga Khan's considerable religious influence with Ismaili villagers to mobilize participation in the village organizations it was promoting.

The AKRSP differs from most WUA programs in one significant respect. It does not assume that after a certain point the associations should be left to operate entirely on their own. The idea of leaving them to fend for themselves stems as much from a fear they will grow dependent, as from donor interest in funding programs that have a fixed start and end. It also reflects increasing difficulties in paying for rural services such as institutional organization or agricultural extension. AKRSP intends to provide permanent oversight and ongoing training and support for village organizations, just as most governments provide agricultural extension or veterinary services for farmers and herders.

Outcome: The AKRSP approach is a variation on integrated rural development (IRD), which gives economic development first priority. To date, results in the northern areas of Pakistan have been very encouraging and lasting, but attempts to apply the program's principles to the rest of the country have not advanced. The AKRSP is a highly successful attempt to adapt the principles of IRD and rural organization to a specific socioeconomic milieu. It will not bear replication elsewhere, but does suggest that a careful matching of organizational, economic, and infrastructural requirements with the socioeconomic characteristics of a program area is most likely to pay off.

WUAs for Farmers or for Governments

Description: The countries visited by the teams broke down neatly into two groups defined by whom the WUAs are intended for. The Philippines, Indonesia, and Pakistan have laws and policies stating that the primary purpose of the WUA/IA is to share the cost of O&M and pay all or part of the cost of construction or rehabilitation as well as of the management of completed systems. WUAs are formed primarily and explicitly to help the government.

Nepal and Sri Lanka, to different degrees, state that the WUAs or farmer organizations (FOs) are intended to increase the prosperity of farmers. Sri Lanka's Agrarian Services Act specifically

mandates multipurpose, income-oriented rural organizations for irrigated and non-irrigated areas. In Nepal, the national irrigation policy of 1992 calls for water management organizations but talks about them in terms of promoting farmers' agricultural interests. There is little mention of income as a primary factor but lots of talk of increased yields and increased productive capacity.

In many cases, the readiness to devolve control of irrigation systems to local governments or to farmers is plainly a matter of finance. Central governments, finding they cannot pay for the O&M of state-managed irrigation systems, transfer responsibility to provincial or local governments, which, in turn, find that they cannot pay for these services either. The solution that then comes to mind is to have the farmers pay, since they are the beneficiaries.

In some situations this may work (see box). In most cases, however, farmers either cannot or will not pay full O&M costs. In instances in Pakistan (SCARP/MARDAN) and in the Philippines (Bicol area), donors and the governments installed diesel pumps whose O&M costs farmers could not afford to pay out of their earnings from traditional wheat and rice crops. Without an income-improvement strategy, this technology was not sustainable.

Passing on to local governments or local communities the responsibility for meeting O&M costs does not encourage sustainable rural organizations.

> Farmers in the Friar Lands irrigation system in the Cavite region in Southern Luzon in the Philippines formed a WUA to obtain help to rehabilitate their centuries-old National Irrigation System (NIS). The WUA became dormant after the rehabilitation phase ended. However, an informal organization decided to ensure that O&M of the system was carried out by hiring the NIA to do the work. Rather than organize and do the work themselves, the Friar Lands farmers have NIA collect enough ISF to pay for O&M and essential structural repairs and reap a significant profit for itself.

Outcome: Farmers are obviously less interested in WUAs that help the government rather than help them in their quest for more money or greater control over the decisions that affect their lives. The WUA programs in Sri Lanka and Egypt, for example, dedicated to promoting farmer welfare, are far more successful than those in the countries whose dominant concern is passing on O&M costs.

> In Egypt, farmers have always paid for the O&M of their irrigation infrastructure at the *mesqa* and *marwa* level. Thus the new WUA program, which accompanied the change from rotational to continuous flow irrigation along with significant reductions in the O&M costs on *mesqas* and *marwas*, unambiguously helped farmers. The GOE's interest in saving water to get other parts of the country under irrigation played little or no part in the extension campaign to promote WUAs. In Egypt, to date, WUAs are unambiguously for the farmer.

Turnover: The New Magic Bullet

Description: Several Asian countries, encouraged by donors, have launched management turnover or management transfer programs. Indonesia, Nepal, and Sri Lanka have led the way. These programs relieve the government of

technical, financial, and management responsibility for the tertiary, and sometimes higher, levels of irrigation systems, turning over this obligation to the WUAs. The irrigation agency gives the WUAs management training, conducts awareness campaigns about the benefits to farmers of system turnover, and, most important, walks farmers through the systems to identify defects that will be repaired before the turnover takes place.

The turnover usually is accompanied by a written agreement between the government and the farmers laying out each party's future responsibilities. The farmers generally are liable for the O&M of that part of the system they have taken over and for some contribution to the cost of water delivered. The government agrees to provide stipulated quantities of water, to carry out O&M on the primary and secondary canals and structures, and to provide advice to the WUA as needed.

Outcome: The governments that have launched turnover programs hope they will prevent the dissolution of WUAs at the end of construction or rehabilitation and thus alleviate the problem of inadequate O&M. This hope, however, may prove vain. Turnover programs are unilaterally designed by the government, which decides what it will turn over and when and how much control the farmers will get. In Nepal, for example, all water belongs to the government. Farmers can use it, but it is not theirs. In the Philippines, farmers own their water as long as it is used for agriculture, but they cannot sell their water rights, according to NIA officials.

The success of irrigation management transfer (IMT) and turnover programs will depend on the strength of the WUAs to which the systems are handed over. Governments seem to think they have no alternatives to the WUAs and dismiss traditional rural organizations as inappropriate partners for turnover programs. Nepal's FMIS are the exception to this rule.

Many WUAs are willing to accept turnover in return for a rehabilitated, improved irrigation system. Beyond turnover, they get very little for relieving the government of the burden of paying for tertiary O&M. The theory behind the turnover program is that if farmers believe the irrigation system is theirs, they will take care of it. If it belongs to the government, they will neglect it.

There are three problems with this approach:

- The potential success of turnover programs is compromised by governments that retain essential resource control for themselves.

> The extent to which IMT or turnover has become a magic bullet with which to slay all the dragons of farmer-managed O&M shows in Egypt's young but very promising WUA program. Egyptian farmers have always managed their systems from the *mesqa* down on their own. There is no point to a turnover program because farmers already own and manage their infrastructure. Nonetheless, the WUA program writes and talks about moving to turnover as quickly as possible. Without GOE policies supporting farmer management of larger canals, turnover is not relevant in Egypt.

- Most farmers have always believed the irrigation system is theirs and that the government has an obligation to help with O&M. This conviction is reinforced in many countries where farmers have grown accustomed to politicians competing for their votes with the promise of infrastructure projects.

- Turnover programs cover the tertiary segments of irrigation systems but not the main and branch canals from which water is received. Thus, farmers still have no control of water until it arrives in their part of the system. The Mahaweli Authority of Sri Lanka has recognized this problem and is attempting to deal with it by organizing consultative farmer groups at main and branch canal levels.

> In Sri Lanka, the Gal Oya irrigation system has gone through at least three cycles of rehabilitation, neglect, shrinkage, and rehabilitation since the 1950s. USAID funded the latest rehabilitation in the 1980s. In each case, WUAs were formed to help with rehabilitation, then disappeared. Evaluations indicate that farmers were willing to do some O&M but not enough to keep the system in shape. They were confident that the government would step in when needed.

Turnover is basically a very good idea. If farmers can get real control of irrigation resources and make decisions about their use, they will probably take far better care of those resources than if they belong to the government. But strong farmer organizations or WUAs must precede turnover programs, which will not of themselves create such groups. Farmers have to want to take over the systems, not just be willing to have them handed over. A Mahaweli farmer in Dammina block, the leader of a d-canal organization (DCO), was emphatic about this. "We have to take the canals over," he said. "They are ours. If we control them, we can use them as we see fit. In that case, we will take care of them".

> The Mahaweli Authority of Sri Lanka has launched a program to establish multipurpose, income-oriented associations in the four large irrigation systems it administers. To overcome the problem of resource control, MASL has worked with farmers to generate nested WUAs or FOs at all levels of system administration—unit or d-canal, block or branch canal, and system or main canal. Farmers are represented on committees that make decisions affecting water deliveries, scheduling, and quantities, as well as O&M priorities.

Opportunity Orientation: A Dynamic Synthesis

Without water, irrigation systems will not work. But without income, farmers will not operate them. By combining the importance of water management with a recognition of the farmers' predominant interest in agriculture, several countries in Asia, led by Sri Lanka and Nepal, are moving toward a new vision of WUAs. This starts with what farmers want and proceeds to an accommodation with what government needs.

Sri Lanka and Nepal call this new approach an effort to develop farmer organizations. The study prefers to call it opportunity orientation, or Opportunity-Oriented Farmer Organizations (FOs). Governments, donors, and NGOs encourage farmers to organize for their own purposes. In irrigated agricultural

zones, it is hard to imagine that such organizations would not attend to O&M and water management.

In Sri Lanka's Mahaweli areas, farmer organizations intent on crop diversification and marketing to increase income find quickly that they need efficient and effective water delivery and drainage systems to generate the maximum returns. In Nepal, WUAs often find themselves merging with farmer organizations that raise and sell vegetable seeds. In northern Pakistan, AKRSP-supported village organizations opt frequently to invest their scarce collective resources in improving the irrigation infrastructure.

Farmers recognize the importance of irrigation but only as a means to increase income. Attempts to organize WUAs and later move them to income-oriented activities have not succeeded. The Command Water Management Project in Pakistan and the Irrigation Systems Management Project in Sri Lanka are examples of this. Farmers organize to provide the labor, funds, and materials the government wants during construction. Once the works are complete the organizations fade away, because no one has bothered to make the connection between water management and O&M and increases in income.

In fact, the connection usually is not very clear. Farming the same crops in the same fields with the same technology and the same markets but with better canals and cleaner structures makes very little difference in the income of the farmers. If the organizers had started by identifying opportunities for farmers to increase their incomes or their power, they very quickly would have convinced the FO of the need for reliable, timely water supply and thus for O&M.

Is the FO a suitable model? Initial evidence (AKRSP, MARD/Sri Lanka, FMIS/Nepal, CIS/Philippines, etc.) suggests that it is, because it most closely resembles the traditional systems that have flourished in most of these countries for centuries. FOs are not just-enough organizations. They require interventions for training and for helping members to see where opportunities lie. But the programs are in their infancy and it is too soon to tell if they will work everywhere.

Conclusions

All the approaches listed in this chapter have their strengths and their weaknesses and have contributed to the development of ideas about rural organization in irrigated agricultural areas. The main theme that runs through them is that farmers must be free to choose what kind of organization they want. The participatory method of NIA has shown that irrigation projects are most successful when farmers are consulted about design, planning, and implementation. Engineers throughout Asia and the Near East have learned this lesson well.

Governments continue to create national (or provincial, as in Pakistan) models for WUAs and to impose them throughout the country. It is like a shoe store that stocks only one size and shows surprise that very few customers ever come in to buy! This one-size-fits-all model has made WUAs unattractive, whereas a flexible, opportunity approach would leave farmers free to choose the kind of organization they want.

Chapter 3

WUAS IN ASIA AND THE NEAR EAST: A COMPARATIVE PERSPECTIVE

The Comparative Matrix: Seven Countries by Fifteen Dimensions

To ensure that comparable information was collected about the WUAs, the teams prepared a matrix that evolved as the study proceeded. This chapter explains why each item in the matrix was included and summarizes the country-by-country comparison. The complete comparison in both text and matrix form appears in the annex. Regional variations, based on ecosystems, agricultural systems and crops, ethnic groups, and project interventions, make generalizations risky. Each team tried to unify its observations on the country as carefully as possible, recognizing, however, that assigning a national character to the WUA programs of a country would distort the true picture in any given region.

The comparisons below present the lessons learned from the study.

The Official Typology of Irrigation Systems

Rationale: The ISPAN study started with the assumption that all irrigation systems are not alike. But it found that the countries, in organizing WUAs, made no distinctions other than those based on their official classifications.

Observations: The countries in the study paid too little attention to differences in the types of irrigation systems that prevail. Whether the systems were divided by size (the most usual approach), by technological complexity (Indonesia), by management system (Nepal), or not at all (Egypt), a single methodology was used to create and strengthen WUAs. There was a small exception in Indonesia, where certain systems started with a commitment to pay ISF and others did not. But the organizing techniques, training materials, and bureaucratic requirements for registration were based on a single national model.

Inventory of Irrigation Systems

Rationale: Much of the literature on WUAs emphasizes that the size and complexity of irrigation systems determine the potential impact of WUAs on O&M. Small discrete systems are easier to work with. System size and complexity did influence the WUA program with the best chance of success in each area.

Observations: In most of the countries, hectarage under large irrigation schemes predominates. Pakistan and Egypt, for example, each depend basically on one huge irrigation system—that of the Indus and of the Nile, respectively. Only in the Philippines and Nepal do small systems predominate (57 percent in the Philippines, 76 percent in Nepal), while in India large and small systems cover approximately equal areas. This predominance of large irrigation systems underlines the importance of a flexible WUA or FO methodology to deal with segments of systems and with hierarchies of farmer organizations. The current WUA approach works best with small, isolated, discrete irrigation systems.

Government Institutions Overseeing WUAs

Rationale: Farmers depend on government agencies for a wide range of services, including those critical to the creation, strengthening, and expansion of WUAs. All WUA programs are funded by donors or the government. The agency named by the government to oversee WUA activities has a marked influence on the nature and content of the program.

The study found no examples of farmer-funded or indigenous WUAs with which the government worked, except for the FMIS in Nepal. In Indonesia and the Philippines, NGOs showed a preference for these indigenous organizations. But governments insist that they meet certain national administrative or organizational norms before they can participate in government-sponsored programs.

Observations: The WUA programs in nearly all the countries studied are run by irrigation agencies. The exceptions, such as Pakistan, where the OFWM programs are under the provincial departments of agriculture, have entrusted the function of creating and strengthening WUAs to a branch of the department that has nothing to do with agricultural production, processing, or marketing. The provincial D/OFWM is responsible for the rehabilitation of irrigation systems. Sri Lanka, whose Mahaweli Authority, a regional development body, manages the farmer organization program, is the only country in which a multifunction agency manages a program to promote farmer organizations in irrigated areas. That Sri Lanka has progressed more quickly toward the FO model than the countries in which engineering agencies run the WUA program is not surprising.

Official Name for WUAs

Rationale: What's in a name? The names governments give their rural organizations reflect their attitudes towards them.

Observations: With the exception of Sri Lanka, all the countries in the study give their organizations names that identify them as water-centered. Sri Lanka calls them farmer organizations (FOs). India, which has no national WUA/FO program, has no name for the organizations, which have various labels from project to project and state to state. The names for

WUAs clearly indicate how the governments regard them: as single-purpose, water-centered organizations.

Formal Role of WUAs and Legal Status of WUAs

Rationale: WUAs in all the countries have a legal status that defines the role of WUAs but not always what they actually do. The formal recognition of WUAs is a prerequisite to their eligibility to work with public and private sector agencies.

Observations: In the Philippines, Indonesia, and Nepal, WUAs are defined as single-purpose entities for water management and O&M. Pakistan's provincial laws allow for multipurpose organizations, but the D/OFWM programs have not applied this principle in their field work. Egypt does not have laws or policies recognizing WUAs, which constrains their ability to represent their members in public fora, both commercial and administrative. Sri Lanka is the only country to legislate multipurpose, income-oriented farmer organizations and to apply this principle in some (not all) circumstances. India has no WUA laws as part of its Irrigation Acts, but it does have laws under the CAD program that could enable WUAs. However, CAD got stuck in the mode of a construction program. One state, Andhra Pradesh, passed legislation authorizing the formation of pipe-outlet committees, but little has come of this isolated initiative.

Levels of WUA Organization

Rationale: Resource control is a critical element in motivating farmers to build their WUAs into permanent, sustainable entities. Almost all WUA programs establish informal groups at the turnout level, where small groups (10 - 100 farmers) take water from a distributary. These turnout groups elect the officers of the WUA, which is the legal organization with which governments deal for programs of turnover or rehabilitation. In small systems such as the CIS of the Philippines or the minor tank systems of Sri Lanka, this organization has control of the source of water for irrigation. No higher levels of organization are required for water control.

In large systems, the WUA does not have control of the water that the irrigation system delivers. The main canals and headworks remain in the hands of an engineering agency such as NIA in the Philippines or DPU in Indonesia. Water arrives at the part of the system entrusted to the WUA at the time and in the quantity decided by the engineering agency. This lack of control vitiates the importance of a water-management based organization, whose members have no voice in deciding how to use all their resources to the best advantage.

Federated, or nested, organizations correct this somewhat by giving farmers a voice in the management of water from its source without handing them complete control. But setting up these organizations as effective bodies for farmer participation has been difficult.

Observations: Pakistan, Nepal, and Sri Lanka now encourage WUAs to federate within systems and to generate subsystem or system-level organizations to deal with the government about the

O&M of the main system and headworks infrastructure. However, the only examples with enough time-in-service to show results are the large FMIS in Nepal. Sri Lanka has begun a promising experiment with FO participation in subsystem and system water management decision making. Only Indonesia specifically discourages the federation of WUAs, except in ISF systems. In Egypt and India, where WUAs are not formally recognized, the question does not really arise, except in donor-funded projects. In India, NGOs and irrigation departments (IDs) in several states have experimented with two-tier WUAs on a limited scale.

Relationship with Traditional Rural Organizations and Leaders

Rationale: Government and donor attitudes toward traditional organizations are important in the implementation of WUA programs. Governments may regard these organizations as feudal and unrepresentative, as obstacles to project planning and management, and as unwelcome competitors for the cooperation and support of villagers and farmers. At best, they can be modernized to conform to standard national models. Only in Nepal and Bali have they been accepted as worthwhile partners.

Observations: Irrigation farmers in all the countries have developed their own organizations to deal with O&M and to handle other economic and social problems. These traditional organizations take many forms. Some are very formal, others completely informal. Some are grounded in religion, others in economics. Some have been around for hundreds of years, others have sprung up recently (see box).

> In the 1960s, farmers in the Moneragala area of Sri Lanka discovered ancient tanks that had fallen into disrepair. They organized themselves to repair the tanks and the water distribution systems that served small command areas below the tanks. They established strict but varying rules for collective labor and contributions to O&M and other activities. Dozens of these systems grew and prospered until a well-meaning government agent tried to impose a uniform set of rules in return for help with system improvement. Within five years all the systems had disappeared back into the jungle.

The Philippines, Pakistan, Sri Lanka, and Indonesia generally have ignored and even actively opposed them in their WUA programs. In Nepal, some projects have tried to turn them into modern WUAs, others have set up parallel organizations to compete with them.

In India, some states have made them ineffective by cutting off or reducing their water supplies, which have gone to support new development projects. A few states have tried to rehabilitate them. Examples are the tank systems in Tamil Nadu and Karnataka and the microirrigation systems in Himachal Pradesh. There is no clear policy for India as a whole.

The Nature of Organizing Efforts: Concept and Reality

Rationale: WUA programs are meant to involve farmers in planning, designing, and building their own irrigation systems and then managing them. Governments and donors all subscribe to this idea.

> Near Hyderabad, in Sind Province, most irrigation systems rehabilitated by the D/OFWM are owned by one individual or one family. Mohammed Ismael, one such landowner, told us clearly that he instructed his tenants to contribute the labor the D/OFWM required as counterpart contribution for the lining of his canals. He also said that he did everything the D/OFWM told him to do in order to get his "treat": an improved irrigation system.

Observations: All the countries visited use a standard national model for WUA formation that permits no deviation, thus preventing farmers from creating organizations that meet their own needs. This is particularly true in the Philippines and Indonesia, where the approach adapted to small systems is applied to segments of large systems as well, and in Pakistan, where farmers often organize only to satisfy the criteria set by the government before canal lining can begin. Nepal and Sri Lanka allow far more flexibility, reflected in policies and laws that permit the WUAs or FOs to set themselves up the way they want to. Egypt's program is quite rigid, but it is also brand new and works in a very limited area on a pilot basis. In all the countries visited, except India,[16] the farmers' participation in planning, design, and construction is quite genuine.

National Standard Organizations or Local Option

Rationale: The agricultural and socioeconomic conditions and the government support structures affecting WUAs vary from country to country and within each country. WUA programs should be adapted to these varying conditions.

Observations: Government agencies in every country applied a standard model for all WUAs to follow and offered the same justification for this rigidity: irrigation systems are irrigation systems. The specifics of O&M organization are most easily assembled in a standard package that civil servants at the field level can apply. The model in general use is that developed in the Philippines in the early 1970s. This one-size-fits-all approach (see box) cannot begin to meet the varying needs of irrigation farmers in any one country, much less across international boundaries.

[16] Only a few states in India invite farmer participation, and even this is done with some reluctance.

History, topography, size, ethnography, economics, politics, and any number of other factors speak in favor of locally adapted models for WUAs or FOs. Farmers in successful WUAs throughout the study area have modified the national model on their own, all too often without the knowledge or with the opposition of government agencies (see box). Nepal prescribes a standard model but explicitly allows local modifications. Sri Lanka allows a great deal of liberty but insists on certain norms for official registration of FOs.

> In Indonesia, a very dedicated and energetic NGO, LP3ES, administers WUA programs for USAID and the GOI, as well as for other donors, in a wide range of settings. The ISPAN team visited its USAID-funded SSIMP in South Sulawesi. The LP3ES supervisor stated emphatically that the GOI DPU model for WUAs is used in the SSIMP area and that the training of field agents takes no account of the experience of LP3ES agents and programs elsewhere. All the same, farmer-leaders indicated they would merge their WUAs with their *kolompok tanis* and cooperatives to meet the need for services not directly related to the O&M of irrigation systems.

Sources of Funding, Cost Recovery Policy, and Investment Levels

Rationale: Cost recovery measures the importance of the irrigation sector to the governments, as well as the share of both O&M and capital costs they expect farmers to pay.

Observations: In all the countries in the study, irrigation construction and rehabilitation are funded by government with donor assistance. The World Bank and the Asian Development Bank are the main donors, except in Egypt, where USAID has made the major investments. EEC investments are modest, and Japanese aid often goes to very large projects such as the Mahaweli System B Right Bank in Sri Lanka and the Left Bank Outfall Drain in Pakistan.

Cost recovery policies vary widely. In Egypt, Sri Lanka, and India there is virtually no capital cost recovery. Sri Lanka has O&M cost recovery laws but they are not enforced. Egypt may pass cost-sharing laws soon and farmers do pay for their own O&M. In Nepal and the Philippines, the government expects farmers to cover all O&M costs and to repay part of the capital costs of construction or rehabilitation. In Pakistan, farmers have to pay a share of rehabilitation costs and meet their own O&M expenses. In India and Indonesia, farmers pay something for O&M but nothing for construction or rehabilitation. Some states in India are beginning to ask for a nominal contribution towards rehabilitation costs to give farmers a sense of ownership and thus of responsibility for the systems.

In all the countries in the study, government investment in O&M is inadequate. A standard annual allocation for "average" fields, usually made on a per hectare basis, generally falls far short of what is needed and makes no provision for structural, emergency, or major repairs. This partly reflects growing shortfalls in available funds and partly a shifting of priorities in allocations.

These governments count on donor funds and farmer investments to supplement their own budgetary support for irrigated agriculture. Farmers are expected to provide free labor and

management and to mobilize the capital for their own systems. Without strong and effective WUAs, this strategy has little chance for success.

Cropping Issues

Rationale: The effectiveness of rural organizations in improving rural income and the empowerment of rural people depends on prevailing agricultural conditions. Farmers, for whom water is only one component of agricultural production, will be committed to WUAs if these organizations can make the agricultural enterprise more profitable and strengthen the negotiating position of farmers in marketing their crops.

Observation: The returns from the cultivation of staple crops (rice in the Philippines, Indonesia, and Sri Lanka; wheat in Pakistan and Egypt; mixed crops in India and Nepal) have declined markedly in the last decade. The only exception among the countries studied is Egypt, where a free market policy combined with a decline in nonagricultural income has led to a relative improvement in agricultural income.

WUAs or FOs are successful where farmers have found markets for new crops or can collectively market traditional crops for greater returns. In Sri Lanka's Mahaweli areas, FOs do better where farmers grow high-value crops. In the Philippines, farmers near Manila are ready to organize if they can profit from joint ventures. However, in small systems, especially in remote parts of the Philippines and Nepal, farmers are able to manage their own irrigation systems effectively if they have full control of the water, land, and other inputs they need.

> The MARD Project in Sri Lanka, funded by USAID since 1988, has used crop diversification to improve farm incomes in Mahaweli System B. Data collected in this isolated area show that returns from rice have remained steady since the project began (US$311-400/ha), while annual inflation has run between 8 percent and 14 percent according to official statistics. Real rates are assumed to be higher.

All six Asian countries reflect the same reality: farmers raising traditional crops are getting poorer, no matter how well they farm. If WUAs cannot change this, they will not be regarded as instruments for the advancement of rural aspirations and will die, as has happened already, when they have outrun their immediate usefulness, namely, the construction or rehabilitation of irrigation projects.

Government Policies That Affect WUAs and the Agricultural Economy

Rationale: Government policies play a critical role in promoting or retarding the development of the agricultural sector, but go beyond the direct effects on prices, production, or profit margins. These policies can greatly influence the performance and sustainability of WUAs as associations trying to maximize the returns for farmers.

Macroeconomic Policies

- *Food policy*: Is food self-sufficiency a high priority?[17]
- *Investment in infrastructure*: Is the country investing more in irrigation infrastructure?
- *Decentralization*: Is the central government transferring real power, including financial authority, to local governments and farmer groups?
- *Exchange rate*: Is the government manipulating the exchange rate to control consumer preferences?
- *Trade policy*: Does the government impose hidden taxes on agricultural exports or on domestic sales by its trade policy?

Agriculture Sector Policies

- *Output prices*: Does the government support or control prices of farm produce?
- *Input prices*: Does the government subsidize or overtax agricultural inputs, including credit?
- *Water resource allocations*: Is irrigation high on the list of sectoral allocations?
- *Membership in WUAs*: Can only landowners join?
- *Cropping choices*: Can farmers plant what they want and when?
- *Land markets*: Is land a commodity that can be traded or are sales controlled?
- *Incentive channels*: How does the government get "treats" to the farmers and WUAs? Is there a preferred channel?

Observations: All the countries in the study have adopted free market policy reforms in the past few years. Subsidies of agricultural inputs are very rare as are floor or ceiling prices. Most countries still put a high priority, explicit or implicit, on food self-sufficiency and thus steer farmers toward production of staple crops, regardless of profitability. In most cases, trade regulations favor industrial over agricultural commodity exchanges, but most countries are also trying to promote the export of agricultural products. There are few incentives for investment in agro-processing or other value-added activities. Agricultural credit is usually subsidized and dominated by state-controlled banks.

Few of the countries have explicit water resource allocation policies, except for Nepal, which favors irrigation over everything except domestic use. In Sri Lanka, hydropower comes first during

[17] Policies to promote food self-sufficiency often include incentives or requirements to plant crops that serve the national interest but not farmers' interests. Inappropriate subsidies or taxes can keep urban food prices low at the expense of farm incomes. Most small-holding farmers in Asia and Egypt do not make much profit from rice, wheat, or other staple crops.

droughts, while in Egypt, plentiful water obviates the need for sectoral priorities. The annual budgets for agriculture and irrigation are declining in most countries and are paralleled by fading donor interest.

In general, farmers gain more from the removal of restrictions on agricultural production than they lose from the elimination of subsidies. Many well-meaning policies, such as subsidies on interest rates for agricultural loans, and the allocation of permanent rights to long-term tenants, may have unintended negative consequences. However, the liberalization of macro and agricultural sector policies offers opportunities that farmers can exploit by organizing themselves into groups large enough to exercise leverage in commercial and administrative negotiations. WUAs or FOs prosper in free markets.

The Nature and Source of Support Services

Rationale: Farmers need support services for numerous reasons. They borrow money. They buy fertilizer, seeds, and pesticides. They try to keep abreast of new crops, new varieties, new techniques, and new markets. They collect information on the investment of surplus capital and on adding value to their harvest. Farmers get support services for these needs from government agencies and parastatals, NGOs, private firms, associations, or their fellow farmers. The wider the choice they have, the better the deal they can hope to get. Farmers and WUAs prosper in a buyer's market for services.

Observations: In a classic seller's market, the government alone provides support services, which the farmers have to accept or do without. Farmers pay in obedience, respect, hospitality, gifts, even bribes. But when farmers organize, they can transform the market for services into a buyer's market. As described in Chapter II, a group in the Philippines (Cavite) was able to set the schedules and nature of O&M services purchased from the NIA. Other examples show how the same power can work for agricultural inputs and even extension services.

> In Mahaweli System B, the USAID-funded MARD Project started the island's first arrangement between a gherkin grower and exporter and small-farmer outgrowers. When another grower tried to lure the farmers by offering a better deal, the first grower countered with good extension work, timely supply of inputs, and fair pricing. The outgrowers worked together, under MEA and MARD auspices, to negotiate their fidelity to the first grower.

WUAs and FOs can demonstrate their usefulness and thus ensure their sustainability when there is a need to negotiate with several private suppliers to obtain the best deal for farmers.

The countries in the study are moving toward privatizing essential support services for the agricultural economy, although certain services like sectoral water allocations, main system O&M, and transport and communications networks remain in the hands of the government. This tendency toward privatization should promote the healthy development of WUAs and FOs.

Indicators of Successful WUA Programs

Rationale: Governments and donors always want to know how well their programs are doing. The indicators of progress they choose are a good measure of how they view the goals of these programs.

Observations: Nearly all the countries visited felt their programs had achieved a good deal of success when measured by the monitoring and evaluation systems they had devised. However, with the exception of the Philippines, none of the countries had established impact indicators to determine the usefulness or sustainability of the WUA or FO programs. Some (Indonesia, Philippines, Sri Lanka, Egypt) measured success by conformity to rules and regulations (meetings held and books kept). Others (Pakistan, Egypt) judged by inputs and outputs (meters of canal lined, ISF paid, program funds expended, person-days of farmer labor provided, etc.). Nepal and India had no indicators at all, although individual projects monitored both bureaucratic conformity and physical and financial parameters.

Even in the Philippines, which had devised impact criteria, irrigation systems could attain high scores without having any WUAs at all.

Three indicators of WUA sustainability and performance could be applied to the irrigation systems of all the countries visited. They are simple, would require data easy to collect, and would measure what they set out to measure.

- *Is the command area*[18] *growing, stable, or shrinking?* The first sign of ineffective O&M and thus of ineffective WUAs is a shrinking irrigated area. When canals and structures fail, tail-end irrigators lose their access to water, midcanal irrigators become tail-enders, and gradually the system goes out of use. Good O&M, based on good organization and the active participation of farmers, should keep the irrigated area stable or even enable it to grow, when combined with good water management and crop diversification. This indicator is measured in hectares and expressed as a percentage of the effective command area after construction or rehabilitation or at the time the FO is founded. The target is 100 percent. Environmental degradation beyond the control of the farmer organization would not compromise this measure.

- *Do the WUAs have assets and are these assets growing?* Assets can include bank accounts, equipment, buildings, stocks of inputs, or anything else that the organization has purchased or collected in trust for its members. Growing assets indicate not only that members are participating but that the organization is serving their best interests.

- *What activities are the WUAs engaged in?* If a WUA is involved in a wide range of activities—economic, social, community—the chances are good that it is providing services that its members want.

[18] The command area of an irrigation system includes all arable land below the point at which water enters the system.

Chapter 4

FACTORS THAT INFLUENCE THE SUCCESS OF WUA PROGRAMS

The comparisons in the previous chapter yielded a list of factors that influence the sustainability of WUAs and their contribution to the improved performance of irrigation systems. Successful turnover programs will depend on strong WUAs. If the WUAs work well, the turnover programs can be pursued with confidence.

The factors that influence the establishment of sustainable, effective rural organizations in irrigated areas of Asia can be grouped under three heads:

- *Resource Control*: Organizations with real control of resources do better than those without.
- *Social Structure*: WUAs that fit into community networks and social structures and satisfy collective needs are more likely to endure.
- *Administration*: The nature of water as a public good obliges farmers to work with local and central governments, which generally are the main providers of essential services such as transport and communications, credit, and technical assistance. The character of the relationship makes a big difference in the long-term prospects of WUAs.

Resource Control Issues

Big Systems and Small Systems

WUAs work better in small systems, although there are notable exceptions, particularly in Nepal.[19] In small irrigation systems like Irigasi Desa in Indonesia, CIS in the Philippines, FMIS in Nepal, and Minor Tanks in Sri Lanka, a WUA can control the water from its source—a small tank, a tube well, or a stream diversion. This gives the WUA a meaningful role in making decisions of critical importance in farmers' lives: when to issue water, how much to issue, when to carry out O&M. Resource control gives the WUA a sense of power and thus a chance to be effective. People really do work harder to manage and maintain resources they own.

In Sri Lanka, the MEA, recognizing this, includes FO representatives in decisions on the O&M of main canals and headworks. Farmers who have a voice in decisions about the entire system are

[19] The 200-year-old Shaptis Mauja FMIS has expanded from 36 to 72 villages. Its irrigated area exceeds 15,000 ha. This is a good example of a "nested" system, where small associations work together in a larger, system-wide organization.

more likely to take a greater interest in the control of their section of it. The size of the irrigation system seems far less important than resource control.

Lesson: Give WUAs the maximum possible control over their water resources in both big and small systems.

Gravity-flow Irrigation and Pump Irrigation

Some people believe that pump irrigation systems foster WUA development; others strongly disagree. The issue is resource control, combined with technological and economic sustainability of the pump systems themselves.

In theory, pump systems give the owners complete control over the water resource and, thus, the opportunity for WUAs to thrive. But can the villagers afford to operate the pump, and are parts easily available at a reasonable price?

In Nepal, many of the donor-funded projects have installed pumps that are too big and too expensive to operate. Some of the systems have been in operation for over 10 years, but the farmers have refused to accept complete responsibility for them. On the other hand, where farmers themselves have purchased pumps or where donors have supplied appropriate equipment, the WUAs operating these pumps are functioning well and keeping them in repair. Examples of successful WUA-managed pump irrigation schemes can be found in the Philippines, in India,[20] in Indonesia, and in Egypt.[21]

The comparison between pump irrigation and gravity-flow irrigation is not particularly useful in predicting the success or failure of WUAs. Rather, it is the fit between the equipment made available to the WUAs and their economic and technological resources that is important. The Mardan SCARP pumps in Pakistan and most of the AMIS pump systems in Nepal[22] do not achieve this fit. In other cases, donor procurement rules impose the purchase of unsuitable pumps for which parts are not available or with which repairmen are not familiar. This problem hindered the WUA program in Egypt in its initial phases and is characteristic more of bilateral than of multilateral projects.

Lesson: Pump systems can give farmers control over their water resources and thus promote sustainable organizations. But the pumps have to fit the agro-economic circumstances of the farmers.

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[20] India has many farmer-owned and operated pump irrigation schemes, especially in Maharashtra and Gujarat.

[21] In Egypt, the IIP systems are based on single-point lifting by pump from the gravity flow system of the Nile to fields that would otherwise be above command.

[22] Examples include the World Bank-financed Kapilvastu tubewell project and the Ramgunj tubewell system of the Bhairahina Lumbini groundwater project.

Simple or Complex Technology

WUAs in systems where simple irrigation technology permits farmers themselves to do O&M without having to call on outside assistance generally perform better. Exceptions to this are systems where organized, market-oriented farmers have access to professional services for hire, either from the government or from the private sector.

In Indonesia and the Philippines, simple systems that farmers had maintained successfully fell apart after the government and donors upgraded technology. Permanent concrete structures were substituted for the wooden or earthen structures that were rebuilt annually. Farmers had trouble finding the skills and the funds for the upkeep of the new systems, and the WUAs formed to manage them soon proved unequal to their responsibility.

Lesson: The farmers' ability to manage the technology that delivers and distributes water influences their commitment to making a WUA work. Simple technology seems preferable, but if complex technology is introduced, governments and donors should ensure that farmers' returns from agriculture can generate sufficient surplus to pay for O&M.

Water-rich and Water-poor Systems

Water-rich systems are those in which abundant supplies impose no constraints on agricultural decision making. In Mahaweli System B, for example, farmers can take as much water as they want when they want, permitting them to grow crops for market demand rather than according to the seasons. In Egypt, the IIP has instituted continuous flow irrigation in improved *mesqas*, giving farmers the same freedom.

In theory, farmers in water-rich systems should have less need for WUAs since conflicts about the allocation of resources are rare. In water-poor systems, by contrast, farmers who must share a scarce resource should want strong, sustainable WUAs to keep conflicts under control and to ensure equity.

The evidence does not support either of these generalizations. Farmers in the water-rich *mesqas* in Egypt need strong WUAs to operate and maintain the pumps that bring them water. Farmers in System B of the Mahaweli, far from normal marketing channels, need the bargaining power that strong WUAs can provide to deal with their input suppliers, the purchasers of their produce, and banks and government agencies. In both cases, strong WUAs are developing in water-rich areas.

In many water-poor areas of Pakistan, where shortages keep cropping intensities well below 100 percent a year, WUAs have not been successful. In Nepal, on most AMIS, there is a direct correlation between water shortages and the failure of WUAs. As agency-built and managed systems break down and water becomes scarcer, farmers cease cooperating and compete as they can for the available supplies.

Lesson: Farmers in both water-rich and water-poor systems need WUAs or FOs for reasons other than the delivery of water. Single-purpose, water-only organizations disappear from both if they do not meet various other needs their members might have.

Membership Criteria: Landowners or Tillers

In the Philippines, anyone who tills the soil in the command area of an irrigation system can belong to the WUA. Absentee landlords are excluded. In Indonesia and Sri Lanka, only landowners can belong. Tenants cannot join. In theory, landowners have a long-term commitment to their farms and thus to the irrigation infrastructure. Limiting WUA membership to them should promote commitment to WUAs and thus sustainability.

But in situations where tenants make up a large proportion of the tillers of the soil and are secure in their tenancies, excluding them from membership can have significant negative consequences for the WUA. Nonmembers may be indifferent to O&M activities, may not respect water allocation or cropping pattern decisions, or may damage the infrastructure because they have been excluded. But including all landowners as members may, in turn, bring to the WUA absentee landowners who do not have the same interests as those who till the soil.

Lesson: The deciding factor should be land tenure. Where tenure is secure, as in Central Luzon in the Philippines, WUAs should include all tillers. If land tenure is insecure and there are many tenants, then WUAs are unlikely to become a permanent part of the agricultural landscape.[23]

Social Structure Issues

Old Systems and New Systems

Old systems are those that predate government intervention. New systems are those built to extend existing irrigated hectarage. Old systems have been in place long enough for farmers to know each other and their agro-economic environment. New systems have either resettled farmers from areas of rain-fed agriculture or very rudimentary seasonal irrigation structures such as stick dams, or brought in settlers from other parts of the country.

Many irrigation agencies prefer to work with new systems because they can avoid dealing with traditional leadership and can form WUAs to their own specifications. These WUAs do not bring any baggage from the past and are thus more pliable in doing what they are asked to do: operate and maintain their systems, pay fees, produce more food, etc.

Other agencies, donors, and NGOs prefer to work with old systems, where farmers know each other and have usually established informal organizations to take care of their needs. But their objectives may not parallel those of the irrigation agencies that rehabilitate or extend the systems in use.

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[23] In Pakistan, a well-meaning law established tenants' rights to land after three years of occupancy. This law did not put land in the hands of former tenants. It only succeeded in creating a new class of migrant tenants in place of the stable tenant farming communities that had previously existed in many parts of the country.

Programs like the AKRSP in Pakistan work with existing village structures and build on them to improve standards of living. In the Philippines, the NIA generally has tried to bypass the traditional leadership in old systems. In the Philippines CIS, most of which existed in some form before government intervention, WUAs formed to help with rehabilitation or extension of existing systems have transformed themselves into multipurpose farmer organizations to take care of O&M along with input supply, marketing, negotiations with NIA, etc.

Lesson: In general, WUAs seem to have better records in older systems when irrigation agencies work closely with traditional community leaders. Most of these are small systems where WUA members have real control over their resources.

But dangers lurk when donors and irrigation agencies try to transform traditional WUAs. In Bali and in Nepal, donors have documented cases where projects have reduced the effectiveness of traditional organizations (*subaks* in Bali, FMIS in Nepal) by trying to make them over into something new.

Who Owns What and Where?

No one any longer questions farmers' rights to their own labor and capital. Government requirements to grow minimum areas of specified crops have almost gone.[24] But the ownership of the three other critical production inputs in irrigated agriculture—water, land and irrigation infrastructure—remains unclear in many cases.

In the Mahaweli areas of Sri Lanka, for example, farmers generally are given one-year land use permits. They have no fear of being thrown off their land if they farm it, but they cannot sell, rent, or subdivide it. Land is of no use as collateral for bank loans because they do not own it. In Nepal, the state owns all the water in the country and anyone who uses it needs a permit. Riparian users get a blanket exception to the permit requirement, but the state retains the right to redirect water at any time. Farmers may feel secure in their access to water, but they know it does not belong to them. In Indonesia and the Philippines, the infrastructure in large irrigation systems belongs to the state. Farmers cannot redirect canals or drains without permission from the appropriate agency.

Farmers in the study usually answered that they could sell their water rights if they wanted to[25] but argued about whether they could sell their irrigation infrastructure. In nearly all cases, government officials denied that farmers could sell either water rights or infrastructure.

Lesson: The idea of tradable water rights has not developed in the countries studied. Farmers use water as a gift from God or the state. The use of land or of irrigation infrastructure as collateral for loans is also very rare. The fuzziness of property rights over land, water, and irrigation

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[24] In Indonesia and in Pakistan, the government may encourage the cultivation of specific crops by establishing water distribution priorities in times of drought. For example, farmers who grow cotton may get water before farmers who grow vegetables. But even this sort of indirect control over cropping patterns is disappearing. An exception is Morocco, where ORMVAs (*Organisations Regionales de Mise en Valeur Agricole*) still exercise a good deal of control over cropping patterns.

[25] Nepal was the exception. The farmers there know that water belongs to the state.

infrastructure compromises the status of the WUAs that use the resources. The clearer the lines drawn between what belongs to the farmers and what belongs to the government, the easier will prove the task of creating and strengthening meaningful and sustainable WUAs.

Nesting: How High Can WUAs Reach?

WUAs in small systems with informal traditional organization and good control of their own resources have the best chance of succeeding. But much of the irrigated land in Asia is under large systems. Egypt and Pakistan each depend on one large system for most of their agricultural production and employment. Can governments and donors approximate in large systems the conditions in which WUAs in small systems appear to thrive and endure: good control of resources and effective informal communication and organization? They can if they resort to "nesting": establishing a pyramid of organizations from the bottom. Farmers' representatives at the lowest level of the system choose some of their number to represent them at the next level and so on up, until a single group manages the entire system.

In Sri Lanka, farmers who share a turnout (10-20 hectares) choose representatives to a distributary canal (d-canal) organization (DCO). The DCO representatives from all the d-canals form a branch canal organization. Representatives of all the branch canal organizations form a system-wide organization. At each level, the organization participates in all decisions about the O&M of the irrigation system and about government and donor investments in the system area—agricultural research and extension, marketing, storage and processing, priorities for social institutions, etc.

Lesson: Where government agencies commit themselves to sharing control of the irrigation infrastructure, WUAs at each level of the organizational pyramid can prove very effective. Some FMIS in Nepal and some Mahaweli systems in Sri Lanka were the only ones where the teams saw this technique applied to give WUAs or FOs real control over their resources and the decisions affecting their use. There is no better alternative to the problem of organizing farmers in large irrigation systems. But government commitment to sharing power is not easy to obtain.

Isolated and Nonisolated Systems

Governments and donors apply the same WUA approach to irrigation systems near important markets and centers of administration as to systems in isolated areas of the country, which have fewer economic advantages and benefit less from government intervention.

In general, farmers in remote irrigated areas have better success in forming sustainable WUAs because their systems are small and they have often had to set up indigenous forms of organization to deal with the many problems they face. Government assistance is less easily available and the dependency syndrome is less likely to occur. With fewer economic advantages, farmers must organize themselves to negotiate the best deals with suppliers of inputs and buyers of outputs.

Lesson: Farmers in irrigation systems near markets and administrative centers need organizations just as those in isolated areas do. But the goals and structures of organizations in the two cases will differ greatly. WUA or FO programs should be modified to take these differences into account.

Ceremonial and Utilitarian Roles

The most widely used model for WUAs, that of the NIA in the Philippines, calls for strictly utilitarian rural organizations. Yet most of the traditional organizations—FMIS in Nepal, some of which are over 200 years old; *subaks* in Bali, many of which are even older; *zanjeras* in the Philippines; small tank systems in Sri Lanka; and tank and diversion schemes in India—all have important ceremonial and religious functions as well.

In Indonesia, the informal organizations that soon replace the formal WUAs created by the DPU take on the ceremonial commemoration of the first water release or the harvest. In Sri Lanka, the WUAs that organize the first plowing ceremonies or milk boiling ceremonies are the ones that survive.

Lesson: Rural organizations attuned to the cultural patterns and the wider needs of communities are more likely to endure than those that perform a purely utilitarian function in the lives of their members.

Welfare Orientation and Business Orientation

In promoting WUAs, most governments and donors stress the improved welfare that members will enjoy from better water delivery, fewer disputes over allocations and rotations, better services from the government, and treats such as system rehabilitation. This ties in with the orientation of traditional rural organizations in many areas, geared to the general betterment of the community. But emphasizing welfare is not enough when farmers, even in the most isolated areas, must buy and sell to live.

Most farmers in Asia are small cultivators who, without organization, have no bargaining power in purchasing or selling and in dealing with the government. In many countries (Nepal, Sri Lanka, Indonesia, Philippines, Egypt) they are now banding together for purposes related to their business activities. The most usual are input supply and joint marketing.[26]

Lesson: The rural organizations most likely to survive and prosper are those concerned with business as well as community welfare. In Asia and Egypt, the government and private service providers generally are able to dictate terms to the farmers. But if farmers can organize, they have the strength to negotiate what they will accept and what they will reject. In the Philippines, the farmers of the Friar Lands decide when they want the NIA for O&M on their system and which structural improvements they will pay for. In Sri Lanka and Nepal, farmer groups negotiate bulk discounts and even representational agreements with agro-chemical suppliers. They tell the suppliers what products they want and when they will need them.

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[26] Joint marketing can take many forms, from bargaining with purchasers to shared storage facilities, shared processing or transport, and joint responsibility for contract growing.

Administrative Issues

WUA Management by Line Agencies or by Integrated Authorities

Except in the Mahaweli Authority of Sri Lanka, the WUAs are administered by government line agencies. Even in Nepal and the Philippines, where decentralization has made real progress in other domains, irrigation and WUAs remain under the central government. This concentration of administrative authority underlines the single-function nature of the WUAs, which are regarded as creatures of the irrigation agencies.

This sectoral egoism greatly inconveniences the members and officers of the WUAs, who have to run from one office to another to get answers to their questions. Offices that do not supervise them may refuse to deal with them. As representatives of numerous agencies may visit the villages or irrigated areas to ask for resources for various programs, farmers frequently find they are bearing the costs of conflicting or overlapping activities.

An integrated development authority or regional development authority (RDA) can minimize these problems. If local administrative units (such as village development councils in Nepal or block and unit offices in the Mahaweli of Sri Lanka) are given real power, farmers will know where to go to get services or information. A single channel of support for WUAs will greatly diminish contradictions and confusion. Conversely, rural organizations such as WUAs can be a ready means of communication between farmers and the administration.

But regional authorities diminish the power, the budgets, and the turf of line agencies, which can make strong arguments based on technical and historical grounds for retaining direct control of WUAs. In most countries, they have won these arguments and have kept local governments out. Even in Sri Lanka, the line agencies are working hard to break up the Mahaweli Authority and to bring the Mahaweli irrigation systems back into the orbit of normal government operations. In India, line agencies took over the CAD program, making it quite ineffective.

Lesson: Coordinated government support for WUAs or FOs can improve their prospects for survival. WUAs perform better and last longer when not under the aegis of a specific technical line ministry.

Foundations: Hydrology or Administration, Geography or Commodity

Membership in nearly all WUAs is determined by the hydrological boundaries of the irrigation systems. The farmers who draw water from one canal all belong to the same WUA, which may mean that a WUA may have farmers from several villages or that a village may have members of several WUAs. Members of a WUA may report to different local administrative or technical authorities.

In many cases, hydrological and administrative boundaries coincide. A watercourse or d-canal may fall entirely within a local government unit or it may define a village. But often this is not the case. In places like Indonesia, where villages play a predominant role in rural life, WUAs tend to disappear and be replaced by village-based informal groups. In Egypt, it seems to make little

difference. The links among farmers of a *mesqa* are strong enough that it does not matter that members belong to different villages.

Lesson: Governments and donors should not impose their own ideas of how WUAs are organized. In Indonesia and in parts of Sri Lanka, farmers prefer to have WUAs coincide with local administrative divisions. In Egypt and Pakistan, they prefer organizations along hydrological boundaries. There is no right way to organize WUAs. The members should decide for themselves. Yet again, one size does not fit all.

Officer Selection: By Whom and from Which End?

In every WUA visited, farmers had chosen their own officers. Some had held elections with nominations, secret ballots, and outside observers; others had selected their officers less formally. In no case had the government designated the officers, though instances were reported of attempts to influence the choice of WUA representatives—some of which had succeeded.

In all cases but one, the choice of officials began at the bottom, at the turnout or *marwa* level. These representatives make up the organization at the d-canal or watercourse/*mesqa* level, and if there is an organization at the branch or main canal level, they decide who will represent them there.

In one case in India, the government and USAID have tried a top-down approach, calling together all the notables from a branch or main canal and asking them to designate the leaders of the organizations in the lower reaches of the irrigation system. This saves time but compromises the participatory nature of the WUA. The experiment is not old enough to provide evidence of success.

Lesson: Letting farmers select their officials and starting from the bottom probably is the best guarantee of a successful WUA. Most WUAs already do this but very few have become sustainable, although most contribute effectively to irrigation system rehabilitation or expansion. Thus, the importance of elections has not yet been proved.

To Catalyze or Not To Catalyze?

Most donors and governments have used catalysts to jump start WUAs or to strengthen existing rural organizations. Catalysts may be irrigation agency employees who are vitally interested in rural organizations or who have lost their jobs to budget cuts or to changes in technology. They may be recent college graduates with high ideals and little experience in the rural areas, or they may be local people with minimal formal education but lots of local experience. In India, line agencies have used their personnel or recruited trained specialists, and more rarely, have used village leaders and youth organizations as catalysts.

Catalysts explain to farmers why and how they should organize, on the theory that they need someone to prod them to take initiative. This observation is based on the O&M failure in many new and rehabilitated irrigation systems.

Catalysts generally have been effective in promoting WUAs, which facilitates the planning, designing, construction, and rehabilitation or extension of irrigation systems. They are often enthusiastic, even messianic about their mission. Governments like them because they create employment opportunities, generally funded by donors. They help postpone layoffs within the civil service. As they make both the governments and the donors happy, they are almost universally present in donor-funded WUA programs.

But if catalysts have contributed significantly to the success in organizing WUAs, they are responsible, unfortunately, for a major failure: the lack of sustainable WUAs. The young men and women who spend so freely of their time and energy to help set up WUAs must leave as soon as irrigation construction or rehabilitation has ended. Line agency extension personnel who replace them usually are neither trained to support nor interested in the sustainability of the WUAs.

With few exceptions, catalysts are seen as a transient presence, although several programs are working to make them a permanent part of the agricultural economy. The AKRSP in Pakistan intends to retain extension/catalyst staff in the northern areas indefinitely. The MARD program in Sri Lanka, with USAID funding, is working to make the catalysts valuable enough to the farmers' economic activities that the WUAs will eventually hire these change agents themselves. In areas such as Bicol in the Philippines, where agencies have switched to the use of voluntary local catalysts, the WUAs may find them useful enough to support them permanently.

Lesson: Once WUAs become functional, the presence of catalysts can create excessive dependency, as in Tamil Nadu, for example. But without catalysts, most WUA programs would not get off the ground. Catalysts should become permanent parts of the agricultural economy in irrigated areas. To accomplish the transformation from catalyst to resource, they will have to find a role that brings economic or political benefits to WUA members.

Single-purpose and Multipurpose Organizations

Much of the discussion has examined the relative merits of single-purpose and multipurpose WUAs. Multipurpose WUAs seem to have a far greater chance of contributing to the long-term performance of irrigation systems than single-purpose, water-only organizations. Most of the legislation in the countries studied specifies that WUAs are only for irrigation. Some laws, like those of Pakistan, Nepal, and Sri Lanka, are more flexible in permitting other roles for WUAs. But even in these more progressive countries, implementing agencies tend to limit WUAs to a water management and system O&M role.

Lesson: Any law or policy that prevents farmers from shaping their WUAs in the way they want will compromise the performance and survival of these organizations. WUAs should be helped to understand the opportunities they have. If they see that improved O&M is one way of taking advantage of those opportunities, they may decide to establish a single-purpose, water management organization. But the choice should be theirs.

Formal and Informal Organizations

If formal WUAs fall apart after the construction of irrigation projects, and if informal organizations emerge to provide "just enough" O&M to keep the systems going,[27] why bother to create sustainable formal organizations for irrigation management? The answer lies in the nature of the agricultural economies of the countries in the study.

With the exception of Sind and Baluchistan provinces in Pakistan, these countries depend heavily on the agricultural output of small-holders, whose incomes are low and whose power as individuals can get them very little. A single farmer with a hectare of land cannot bargain with a fertilizer salesman to get a decent price any more than he can pressure the local public works agency to fix a bridge on the road that gets his produce to market. Farmers need to organize to gain negotiating strength.

But why should these organizations be formal? Formal organizations have some standing in negotiating with government agencies for resource allocations. They can enter into contracts for input supplies or output sales. Government agencies are likely to ignore informal groups of farmers, just as input suppliers are likely to dismiss farmer representatives who ask for credit or bulk discounts. No bank will make a loan to an informal organization, far less to an individual farmer. But formal organizations, recognized by law and legally obliged to honor contracts, can obtain loans in many places.

In irrigated areas, the O&M of canals, structures, and drains may seem the most sensible starting point for farmer organizations. However, as important as water and the conveyance of water will always remain, there are other critical inputs needed to make agriculture profitable. The emphasis on income and power for farmers—on taking advantage of the opportunities available to them—should override the emphasis on O&M of canals, structures, and drains.

If FOs can help increase income, farmers will readily understand that they or someone they pay must carry out O&M to get the water to their fields when and in the quantity they want.

This lesson is brought home very effectively in Egypt. The USAID-funded Irrigation Improvement Project (IIP) organizes WUAs along *mesqas*, which receive the benefit of the new technology of single-point lifting and continuous flow irrigation. This innovation immediately reduces the costs of irrigation significantly and increases production noticeably. Farmers organize, not around the O&M of their canals, which they have done traditionally with "just-enough" organizations, but around the purchase and maintenance of the large diesel pump that lifts water into their *mesqa*. The IIP is a new program, but the farmer organizations it has helped create are enthusiastic and innovative. Many are already discussing moving into input supply, joint marketing, and even investments in storage facilities.

In Sri Lanka, the WUAs with the most promising future are those that have started income-generating activities along with the reorganization of their FOs. These activities are in the areas

[27] The idea of "just enough" O&M comes from Dr. Bryan Bruns. The ISPAN study of the USAID-funded Sederhana projects in Indonesia supports the proposal to leave O&M to informal organizations.

of high-value crop production, paddy storage, input supply and general merchandise shops, contract farming, and buy-back contracts with purchasers of their crops.

In both these cases, informal organizations would not suffice. The IIP WUAs need loans for their pumps. The Sri Lankan FOs must sign contracts and ensure that their ability to meet their obligations is respected. Informal groups could do neither of these things. Although the GOE has not yet enacted legislation to give IIP WUAs legal status, they have been able to obtain loans from the state-operated PBDAC. But as the project ends and the PBDAC's role diminishes with the entry of private banks into the rural world, informal WUAs will no longer be able to obtain loans. Sri Lankan law, on the other hand, gives farmers' organizations full legal recognition once they have registered.

Lesson: Governments need to enact enabling legislation and implementing regulations that give WUAs or FOs legal recognition as formal, multifunctional organizations. Without this legal recognition, WUAs will disappear when the projects that support them end.

Chapter 5

CONCLUSIONS

Improved System Performance

The study used a simple definition for system performance: getting water from one point to another with minimum loss and with maximum responsiveness to farmers' needs. WUAs everywhere have made a significant contribution to the planning, design, and construction or rehabilitation of improved irrigation systems by contributing their ideas, their money, and their labor.

But in many circumstances, the WUAs have disappeared after the construction or rehabilitation is complete. In large systems, O&M failures are common. In smaller systems, farmers may retreat to "just-enough" organizations, or the WUAs may yield their O&M role to traditional informal organizations, whose primary concerns are more than water management. The main reason for this general failure is that farmers see no point to keeping their WUAs alive.

WUAs formed to support system design, planning, and construction or rehabilitation do this very well. There is no reason to discontinue them. But governments and donors must realize that these single-purpose, water-based organizations will have an enduring appeal only if they are permitted to evolve into sustainable, multifunctional rural organizations.

System Turnover and Enhanced Political Participation

System turnover is the latest panacea for irrigation systems the state can no longer afford to operate and maintain. Even in Egypt, where the government has never undertaken the O&M of *mesqas*, the IIP talks of a *mesqa* turnover program. The turnover solution is based on the idea that a WUA given all or a portion of an irrigation system will somehow realize its obligation to operate and maintain it. That idea is unlikely to work without first developing effective, sustainable WUAs.

The word turnover itself shows where the problem lies. The government decides to turn over a system to the farmers, who are expected to passively accept the change. If there were talk of takeover programs, there would be cause for more optimism about the potential benefits of IMT. In a takeover, a farmer organization would initiate the process and ask the government to hand over the system along with the responsibility to operate and maintain it. But even the IMT program counts on the transfer itself to revitalize the WUAs or the FOs.

The field teams met a few farmers in Sri Lanka and India who talked about the takeover of systems, but there were no examples to show this has actually happened.

Since turnover takes place at the behest of the government, it does not really enhance farmer participation in the democratic process. Joining in every phase of new and improved irrigation

systems has indeed given WUAs a sense of ownership of some small systems and has ensured that government, donor, and farmer investments accurately meet farmers' objectives. But because WUAs are restricted to water management, they do not have the wider scope farmers would give them if they had the choice. Irrigation departments may deal with WUAs but few other agencies pay attention to them.

WUAs will generate greater participation in the political and economic processes critical to the well-being of their members only when they can move beyond their water management role to become formal FOs.

Old Lessons and New Approaches

It would be unfair to say that the resources invested in creating and strengthening WUAs and FOs have been wasted and that the programs have failed. The WUAs have done what they were designed to do and have contributed mightily to the expansion and improvement of irrigation infrastructure to increase national food production, reduce imports, and slow the rural exodus. But once construction or rehabilitation is over, the WUAs generally disappear.

Farmers—and rural people in general—have to organize to avoid exploitation by merchants, middlemen, and government agents. The question is whether the WUA concept can answer this need.

The success of the NIA participatory approach to establishing WUAs has been most notable when

- farmers have organized for something they really want; and
- they have achieved control over the resources they use and the decisions that affect their lives.

Farmers, almost without exception, really want their irrigation systems rehabilitated or expanded and will organize for this. But they look to an organization to do more for them and to range over a wider perspective.

The designers of programs that attempt to meet this need and thus encourage the participation of farmers should consider the following recommendations:

- Rural organizations should be permitted to negotiate with all government agencies, not just those concerned with irrigation, and with service providers and purchasers of goods in the private sector.
- Farmers and their organizations should be given control over the resources they need and the decisions affecting their use. This usually means delegating authority to local jurisdictions to permit farmer participation in decisions such as the opening and closing of main canals.

- Farmers should be helped in identifying opportunities for improving the returns on their investments in agriculture or agro-industry and in negotiating effectively with public and private sector service providers.
- Farmers should be constantly reminded of the relationship between proper O&M of the irrigation system and increased agricultural incomes.
- System turnover, federating farmer organizations, or payments of ISF do not make better WUAs or FOs, which will come if the organizations meet farmers' needs for more money and more power.
- Information about successful rural organizational programs should be shared and should include the contributions from engineering, agriculture, the social sciences, and economics, at a minimum.

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ANNEX

COMPARATIVE WUA MATRIX

COMPARATIVE WUA MATRIX

Critical Issue	Philippines	Indonesia	Pakistan	Nepal	Sri Lanka	India
Official Typology of Systems	National Communal Pump	Technical Semi-Technical Simple or Over 500 Ha PIK IRIGASI DESA	Indus Basin Civil Canals FMIS	FMIS Agency Managed Jointly Managed (Public Agency + WUA) Turnover (Privatization Private (Collective and Individual)	Major Minor/village Rainfed	Major projects: 10,000 ha and above. Medium projects: 10,000-2000 ha. Minor projects: up to 2,000 ha.
Inventory of Irrigation Systems (Ha/Type)	NIS: 621,000 CIS: 695,000 Pump: 152,000	Big: 2,800,000 PIK: 900,000 DESA: 1,100,000	Indus - 14,000,000 Civil & FMIS 2,000,000	FMIS: 824,000 Agency Managed: 267,000 Jointly Managed: NA Turnover: NA Private: NA Surface: 923,000 Groundwater: 168,000	Major: 335,000 Minor/village: 163,000 Rainfed: 217,000	Major: 102 Medium: 811, 33.0 Mha Minor: millions, 34.8 Mha Inventory of minor schemes: dugwells 9.8 million; private tubewells 5.5m; state tubewells 0.7m; lift irrigation pumps 13.1; tanks 0.5m (may be 0.2m in use).
Government Institutions Overseeing WUAs	NIA DA Others	MHA/DPU/DOA Others	Directorates of OFWM Department of Agriculture	DOI Project-specific Development Boards	IMD (Major) ID (Major) MEA (Major) DAS (Minor/village)	Irrigation Department, the concerned line agency, does not as yet recognize WUAs. Outlet level WUAs were formed under the command area development program under special CAD Acts but these are all defunct.
Official Name for WUAs	Irrigators Association (IA)	P3A = Water Users Association	WUA	WUA	Farmer Organization	No official standing. Those in existence are called Pani (water) Panchayats, water cooperatives, FOs, Chak (outlet) committees, etc.

Formal Role of WUAs	Single Purpose: O&M ISF Collection System Management	Single Purpose: O&M: Tertiary/Big O&M Small Scale ISF Collection	In practice single purpose (WC renovation). Legally multipurpose.	O&M Resource mobilization System management and local flexibility	Multipurpose O&M Agricultural inputs Marketing Credit	None in law. Those governed by MDUs usually do O&M, WM and fee collection. Agricultural inputs also tackled by many.
Status of WUAs	Registered with SEC (Securities & Exchange Commission). Full legal personality.	Registered with local office of Department of Justice from 1992. Not yet implemented. Will provide full legal personality. Now registered with local MHA hierarchy. Limited legal status.	Registered with DOFWM under provincial WUA ordinances of 1981/1982. (NAs, FATA) (AJK) No legal status.	Registered with Office of District Administration under Association Registration Act 2034. According to new laws to be registered with District Water Resources Committee under Water Resources Act 2049.	Registration under Agrarian Services (Amendment) Act No. 4 of 1991. Registration Authority: Commissioner of Agricultural Services and MD, Mahaweli Economic Agency.	No formal status under Irrigation Acts. CAD legislation recognized them, pt. 3 above. Traditional systems find recognition in principal Irrigation Acts. Rehabilitation assisted in some states.
of Organization of As (nesting)	NIS: Authorized but rare CIS: No Pump: No	Desa & PIK: No. ISF Systems: yes, but tertiary only (P3AG). Secondary level under consideration.	Allowed to federate at district level (except in Punjab).	Depending on the size and extent of the system from singular to multitier.	a. Distributary Canal Organization (DCO). b. Area/subproject farmer organization. c. Project FO in Mahaweli DCO only.	Usually two levels: farm and management.
rtionship to ditional Organizations Leaders	CIS: Begin with traditional, if they exist, but GOP pushes move to standard model. NIS: No recognition. Pump: No recognition.	GOI tries to push new form of organization, but strong traditional organizations can impose their wills.	Traditional elites are generally WUA leaders. No deliberate "grafting" on traditional institutions.	Begin with indigenous and traditional, if they exist, and evolve into modern organization with government assistance program.	No impact of traditional organizations on DCOS in major schemes. Pushes more to model. Traditional organizations and leaders influence FOs in minor/village schemes.	No formal relationship. Some states support rehabilitation.
re of Organizing rts: Concept and ty	Concept: participatory Reality: CIS: participatory NIS: top-down	Concept: participatory Reality: top-down	All cultivators can be members (but tenants excluded in Sindh). In law and practice, controlled by small executive committee working with DOFWM, top-down approach.	Concept: participatory Reality: top-down	Concept: participatory. Reality: DCOs in major schemes participatory.	Government does not organize WUAs. Mostly NGOs involved. GOI supports research on WUAs.
ndard Organization or al Option	National standard (one size fits all).	National standard, but law specifically allows local variation.	National with minor variations. Provincial legislation. Local bylaws allowed.	National standard but policy and laws allow local options.	National standard (one size fits all).	No standard. It is accepted that tiers are related to system size. Grassroot-level effort needed.

Sources of Funding, Cost Recovery, and Level of Investment	Full O&M and capital cost recovery in CIS and pump systems. Funding: farmer fees and amortization; donor projects; local foundations; GOP (NIA, DA, BSWM). O&M level: 10% of capital costs/year.	Partial O&M cost recovery in ISF systems. No capital cost recovery anywhere. Funding: donor projects; DPU; remittances; farmer fees. O&M level: 30,000 Rh/ha per year.	labor 20-30% of cost of civil works recovered in installments over 5-7 years for W/C. No recovery above W/C O&M benchmark: no collective liability but individuals pay partial cost recovery for W/C LOI: declining since 1970s. O&M: 2.6% of the costs and 1,000/W.	Partial capital cost recovery in participatory projects; Low O&M cost recovery in Agency-managed projects; partial O&M cost recovery in jointly-managed projects; full O&M responsibility of WUA in FMIS; O&M budget ranged from Rs 30 million in 1986 to Rs 51.6 million in 1989. Groundwater: 700-800 ha Tera: 300 or 400 ha Wells: 500/ha	O&M cost recovery failed. DCOS prompted to take over D. canals for O&M. No cost recovery.	States O&M budgets considered increasingly inadequate. Irrigation rates vary from state to state but considered too low to meet regular O&M requirements. $5 per ha allocation for O&M must be doubled, state IDs assert. Irrigation revenues in some states just covers the cost of collection. Investment in irrigation shows slight decline at 1980 prices. Government allocation $5,130 million in 7th Plan (1985-90) which excludes private investment. This trend continues in 8th plan.
s and Returns to in	Major crop: rice. Secondary: corn, legumes vegetables. Intensity : 80-210%. Returns: rice 40-80% corn: 30-110% vegetables: 100-340%. Terms of trade: declining for farmers.	Major crop: rice. Secondary: legumes, vegetables. Intensity: 200-300%. Returns: rice: legumes: vegetables: Terms of trade: declining for farmers +/- 8% per year in 1992 and 1993.	Major systems: ARS cotton-wheat, rice-wheat, sugarcane, and mixed cropping. Intensity: Terms of trade:	Paddy, wheat, maize, legumes, vegetables; 153-191 percent EIRR: New large projects - 9% DOI Groundwater projects - 8-46% Other DOI projects - 4-16% ADB/N (STW) - 46% Terms of trade declining for farmers.	Major crop: rice. Secondary: other food crops, pulses, legumes, and vegetables. Intensity: 100-300%. Rice: 130-150%. Corn: 100-110%. Legumes: 120%. Vegetables: 200-300%.	Many agroclimatic zones, diverse crops: rice, wheat, oil seeds, corn, potatoes, sugarcane, vegetables, etc. Intensities: 100-300%. RDI: rice and wheat 100-150%. Oilseeds: 150-200%. Sugarcane: 200-300%. Vegetables: more. Considerable variations. Investment in agriculture stagnant over last 10 years. Terms of trade unfavorable to farmers.
legree of lemocratization, Relative 'ower/ Independence	IAs quite democratic. CIS: some power. NIS: very little power.	Very low democratization, but some P3As operate effectively in local arena.	Very low democratization. Controlled by local elites with DOFWM supervision.	Democratic/nonpartisan and ability to impose strong organizational and social sanctions.	FOs quite democratic at all levels.	Does not apply. Where WUAs exist, they enjoy powers as per MOU.

ment Policies That WUAs, Macro and al	Macro policies: Food: Rice self-sufficiency. Investment in infrastructure: declining - demand-driven. Devolution: effective, except NIA - status unclear. Exchange rate: over-valued by +/-25%. Trade: bias vs. agriculture. Sectoral policies: Output prices: support prices ineffective. Input prices: market prices to farmers (coops receive subsidized credit via ADB). Water resource use: needs-based. Agriculture competes with sectors. Cropping choice: free. Land: free market. Incentive channel: coops.	Macro policies: Food: rice self-sufficiency. Investment in infrastructure: high - supply driven. Devolution: effective. Exchange rate: market level. Trade: less restrictive, moving to free trade. Sectoral policies: Output prices: support prices generally effective. Input prices: credit at market rates; fertilizer seeds, etc. subsidized. Water resource use: agriculture is no longer first priority. Cropping choice: free, but local authorities still dictate. 1992 law allows free choice. Land: free market. Incentive channel: many.	Macro policies: Food: no policy, self-reliance wheat self-sufficiency. Investment in infrastructure: down, supply driven. Devolution: irrigation and agriculture to provinces. Local government to provinces but lack power. Market exchange rate: Trade: basis of commercial policy is U.S. org. ??? ???? Sectoral policies: Output prices: free market wheat, cotton, rice, sugarcane. Support prices below free market. GOP buys 20% of wheat. Keeps prices low. Input prices: potash only. Credit. Water resource use: 93 percent agriculture. Needs-based. Cropping choice: free. Land: free market Incentive channel: many,	Macro policies: self-sufficiency in food. Investment in infrastructure declining and partially demand driven. Devolution effective in FMIS. Exchange value at the market rate. Trade moving toward privatization (debates on). Sectoral policies: support prices generally ineffective. Input of credit, fertilizer, seeds subsidized. Water resources use given second priority for irrigated agriculture. ? Cropping choices depending upon farmers' socioeconomic status, needs and agro-climatic conditions. No incentive channel institutionalized Many ?.	Macro policies: Food: rice self-sufficiency. Investment in infrastructure: high support. Devolution: effective government promotes private commercial agriculture and export production. Exchange rate: market level. Open market policy. Sectoral policies: subsidies and guaranteed prices of most crops withdrawn recently. Improved credit and marketing. Water resource use: agriculture high priority. Cropping choice: limited in major schemes. Land: no free market in major schemes.	Current emphasis on better WM and completion of existing irrigation projects. National Water Policy (1987) stresses farmer participation in irrigation and better use of WR. Commitment to privatization and commercialization of agriculture and high value crops for export. No restrictions on movement of food crops between states. Support prices for crops to hedge against price crash at harvest. Self-sufficiency in food and subsidies for farm inputs.

Source and Nature of Support Services	GOP and private sources important. TA from GOP.	GOI provides and channels most support. Sectoral egoism critical. Private sector services in input supply and output purchasing.	Extensive government. Other governments except pesticides, fertilizers, agricltural marketing.	GON dominates channels of most support which is mostly erratic, unpredictable. Private sector services in output purchases. Agrochemical credit.	COSL provides and channel most support. Incentives to the private sector. Open market policy.	Government and private sector fully involved in providing services: credit, fertilizers, seeds pesticides. While credit is through government channels, the latter three reach farmers through extensive private distribution networks.
[illegible]formance [illegible]icators	Cropping intensity. Collection efficiency. System viability.	Highly detailed set of Indicators from PTGA used in most programs. These measure specifics of routine activities.	Detailed input and output indicators. Physical and financial.	Increase in irrigation hectarage p_____ and financial	Cropping intensity. Crop diversification. Percent agricultural sector of gross domestic product. Volume of export crops. Volume index of agricultural products and self-sufficiency rate.	Not applicable.