Global Development of Farmer Water User Associations (WUA): Lessons from South-East Asia[1]

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Rural paysages in Vietnam

Trends in Irrigation Management

Irrigation management is moving towards joint management and partnership between governments and farmers and their water groups. Involving farmers in irrigation management – giving them voice in making decisions regarding water distribution and

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system O&M - is referred to as Participatory Irrigation Management, or PIM. The process by which government transfers irrigation management responsibilities from its line agencies or companies to farmer groups is referred to as Irrigation Management Transfer, or IMT. Management responsibilities cover the operations and maintenance (O&M) of irrigation infrastructure. In some countries, they also include the determination of irrigation service fees and collection.

Many countries are moving towards PIM and IMT, by organizing farmers into water user groups and transferring certain levels of responsibility to them. The name given to these farmer water groups differs from country to country, depending largely on the country's institutional set up and culture. For example, in many countries (such as Turkey, Mexico, China, India, and most Eastern European countries), the term 'water user associations', or WUAs, is adopted. In Pakistan, the term 'farmer organizations', or FO, is used. In the Philippines, the term 'irrigators associations', or IA, is common. In Iran, 'farmer cooperatives' is the nomenclature that is used. To simplify, the term WUA is used in this paper to refer to all of the above farmer water groups.

Water suppliers, which can be government or semi-government water companies, wholesale irrigation water to farmers or their groups. Usually, governments manage technically and financially complex structures, such as main systems up to secondary canals and structures, and wholesales water to farmer WUA, who manage lower level systems, such as tertiary level canals and below and minor structures. There are also places where an entire irrigation system that used to be managed by the government is now operated completely by farmer groups, though these are less common.

The focus of discussion below is on irrigation infrastructure that is built, financed and operated by government, and not those that are built, funded and maintained traditionally by farmers themselves (or traditional farmer management).

Developed countries, such as the US, France, Germany, Japan, Australia, etc., have implemented IMT since the 1960s and 1970s, while developing countries have done so more recently. Many are developing WUAs to implement IMT, and this is spreading. To name a few, Mexico, Peru, and Colombia in South America; India and Pakistan in South Asia; Turkey and Iran in the Middle East; Uzbekistan and Kyrgyzstan in Central Asia; Albania and Romania in Eastern Europe; Philippines, China, Indonesia, and Vietnam in East Asia; and Mali, Niger, Tanzania, and Egypt in Africa. These countries are at varying stages of WUA development, and others are planning to introduce similar concepts and institutions. Some view PIM, WUA and IMT as a revolution in irrigation management.

Different countries have developed their own WUA and IMT 'models', based on their specific cultural, political, institutional, economic and climatic conditions. No two country models are exactly alike. While some are making significant progress, others are facing challenges related to the sustainability of WUA and IMT, and in several countries there has been political or institutional resistance. Many lessons can be learnt and shared among the countries. In order to distill lessons, this paper briefly explores four basic questions and presents some cases from South and East Asia. The four questions are: why were WUAs developed? what did WUA help achieve? who mobilized and supported WUA? how to develop sustainable WUA?

What Are the Driving Forces for WUA?

In the 1970s and 80s, the world witnessed a large expansion of capital investment in irrigation, as part of the 'green revolution'. These capital investments were mostly in large-scale irrigation funded and managed by governments. Towards late 1980s, the fiscal burden of the public sector in managing and operating irrigation systems emerged as an issue for many governments, and some infrastructure started to deteriorate due to the lack of funds for adequate maintenance and efficient operations. There was then a shift from investment in new construction and irrigation area expansion to that in rehabilitation and area improvement. Irrigation service fees (ISF) were subsequently introduced in many places, aiming to improve O&M cost recovery. Some countries, such as the Philippines and Malaysia, initiated efforts to promote farmer participation in irrigation management jointly with governments.

For an irrigation system to be sustainable, there should be full cost recovery of O&M spending related to the infrastructure – i.e. water users should pay irrigation service fees (ISF) that can fully cover O&M costs. However, governments have failed to raise enough revenues from ISF (in some places, 'water fees') for O&M, and this in turn has led to the deterioration of infrastructure and inefficient use of water. As a result, the measured productivity of irrigation infrastructure often falls behind design targets, as seen in many irrigation systems worldwide. In fact, with appropriate levels of ISF, farmer water users have the incentives to see that their irrigations systems are functional and productive. Their managed systems often cost less than those managed by government agencies.

In the 1990s, institutional reforms took place in many parts of the world, reflected in policies and efforts to improve ISF collection for greater cost recovery, promote farmer participation to improve accountability in irrigation services, and reduce government fiscal burdens. This was done through the devolution of irrigation management responsibilities, especially for lower level irrigation systems, to farmer groups. It was under these conditions that the development of farmer water organizations such as WUA emerged as conduit to communication between the public sector and farmers, and to take over irrigation management. It was done either as a part of national institutional reforms or as pilots under government or donor funded irrigation programs.

The specific driving forces for irrigation sector reforms or for WUA development and IMT differ from country-to country, depending on political and economic conditions. For example,

§ In *Mexico*, it was the economic crisis of the late 1980s that prompted the transfer of irrigation management and infrastructure to water users through WUA, and saw a reduction in number of staff in the irrigation agency and a shift in the role of government agencies.

§ In *Turkey*, it was the need to decentralize management to local governments and to reform the state bureaucracy (DSI), which was struggling with the falling budget for O&M of irrigation infrastructure, and the need to expand irrigation to new areas in Eastern Turkey. Learning from the experience of Mexico, the government started the IMT reform and establishment of WUA, and moved some agency staff to new areas.

§ In the *Philippines*, it was the need for better ISF collection, which supported a large part of the O&M costs of the National Irrigation Administration, and the need for streamlining of the public sector following the country's fiscal crisis.

§ In Andhra Pradesh State in *India*, the push for reform of its largest public sector entity (the Irrigation Department) and the establishment of WUA were championed by a pro-reform state-level administration and facilitated by the availability of investments in irrigation rehabilitation that were partly-funded by the World Bank.

§ In *China*, tertiary and below canal levels used to be the responsibility of village and county authorities through communes. With the economic opening and reform since the 1980s, these levels of authorities largely collapsed and irrigation management at these lower levels were largely left unattended or allowed to deteriorate. This created an institutional 'vacuum', for which WUA came at the right time, along with other forms of irrigation arrangements at lower levels.

§ In *Albania*, it was the collapse of the communist system and its reform of large state farms into smallholdings cultivated by private farmers that created space for WUA to fill in irrigation management.

§ In other places, such as *Vietnam*, *Uzbekistan*, etc., the development of WUA was promoted by external donor-funded investment projects.

Understanding the driving forces in each country is critical to understanding the lessons and experience from that country, as they determine the local demand for such services and organizations and the eventual sustainability of WUA.

Mountainous village in North Vietnam

What Are Modalities of WUA ?

In most cases, WUA are taking over management responsibility (as opposed to property ownership) of tertiary and below canal levels of irrigation infrastructure. In these cases, government agencies manage main and up to secondary canals and structures, own the property, supervise and assist the WUA that manage tertiary and lower level canals and structures. WUA are typically responsible for the simple operation of gates, cleaning of canals, collecting water charges or ISF from their members, managing their

own accounts, and paying for the government agencies for their services. While some countries give freedom to WUA to charge extra fees for the WUA's own expenditures (China, Mexico, Albania), others require their WUA to submit all ISF charges to the government agencies, which in turn remit a portion to the WUA for farmer managed O&M costs (e.g., Philippines, Iran, Pakistan).

There are also places where WUA (or their federations) have been given the management responsibility for an entire irrigation system –O&M and fee collection, while government agencies simply have regulatory and technical assistance functions (the US, Japan, Albania, some irrigation districts in Mexico, a few cases in the Philippines, etc.). These cases are less common and, typically, such systems are small and less complex.

Transfer of ownership of irrigation infrastructure is less common, and it largely depends on the legal framework of a country. Countries such as Mexico, Albania, have set up special laws to allow the transfer of ownership of irrigation infrastructure to WUA or their federations. Others such as Iran, China, and the Philippines do not have the legal basis or are still working on the legal framework for such transfers.

Who Develops WUA and Under What Institutional Framework ?

The WUA and IMT concepts are relatively new (introduced mainly in the past decade) for many developing countries. Thus, in terms of "who" the main players or implementers are, different modalities have emerged, depending on the institutional set up of a country. To give a few examples, in the Philippines the national irrigation administration (or NIA) has the responsibility for organizing farmer irrigators into irrigators' associations. This has been defined by its charter since the early 1980s. In Mexico, the national water commission (CNA) was created in 1989 to carry out the IMT program. Similarly, in Pakistan, provincial level irrigation development authorities (for example PIDA in Punjab and SIDA in Sindh) were established in the late 1990s to initiate the organization of WUA in their respective provinces. In China, however, it has been the provincial authorities (local governments) and their irrigation district companies which have taken the major role in farmer mobilization and organization of WUA since 1995. In Iran, the format varies – in some provinces, it was the Operation & Maintenance Companies (OMC), associated with the local water authorities to pilot the WUA; in others, it was the local agriculture branches of the agricultural ministry. In Albania, Uzbekistan and Vietnam, the project management units (PMU) under donor funded investment programs introduced and implemented the WUA, working with the central government agriculture ministries.

Some countries formulated special laws, which identify the responsible entities (Mexico, Albania, Romania, India, Pakistan, etc). Others do not have specific laws and, instead, issued ministerial circulars and ordinances to facilitate WUA implementation.

How Have WUA Developed ?

This question deals with the process of developing WUA – composition of management structures of WUA, sustainability of WUA, legal status, etc. Each country has its own political, institutional and socio-economic settings. Generally speaking, one can summarize a few commonalities and basic principles.

The process to develop a WUA can take 6-12 months, assuming other conditions are ready. It involves:

§ Define legal basis for WUA – by either establishing specific laws or regulations or finding 'common ground' among existing laws to clearly define the scope within which a WUA functions –responsibilities, nature of the organization, membership, relationship with members and government agencies, administrative and financial arrangements, water rights, etc.

§ Disseminate information to farmers and their groups, carry out campaigns and promotional activities, and train candidate farmer leaders

§ Define physical boundaries of each WUA and water group, and collect base data (important for contract negotiations, registration and monitoring & evaluation).

§ Prepare WUA by-laws and elect farmer leaders

§ Pass by-laws and register WUA

§ Provide technical support, capacity building, and supervision

WUA should represent farmer water users in a command area democratically; have legal status to enter into contracts and the necessary authority to manage an irrigation system (partial or whole); operate and maintain irrigation infrastructure that is transferred to them or under their jurisdiction; and have administrative and financial autonomy. The management structure of a WUA is similar across many countries. It mainly consists of an executive board that is elected by farmers and an assembly of farmers or their representatives.

Two Examples from East & South Asia

In the following, examples are drawn from China and India. Both countries started development of WUA around the same time, in the mid-1990s. Both depend heavily on irrigated agriculture. Both initiated institutional reform in the irrigation sector as a part of their broad economic development policies in the past decade, and yet, they differ in many ways and offer valuable lessons to share with other countries.

It should be noted that there are varying models of WUA in the different states of India and in different provinces of China. In this paper, WUA in Hunan province of China and those in Andhra Pradesh state of India are examined, as they were both pioneers in their respective countries in the establishment of WUA. These models have now spread widely in other states/provinces of the two countries. Comparisons are made below using the questions above: why? what? who? and how?

China, Hunan. WUA has been a recent phenomenon over the past decade. The concept was introduced through the World Bank funded "Yangtze Water Development Project" (1994-2000) that covered Hunan and Hubei provinces. A first WUA was set up in 1995 in China. Since then, over 20,000 WUA have been established across the country. To draw lessons, one should understand why WUA was introduced and the driving forces back then.

Water resources – a critical factor in economic development. Water resources in China total 2,800 billion m^3, the 4^{th} largest stock in the world. However, per capita water resources are only 1/4 of the world average, so China is among the countries with the most serious water shortages. Water is thus an important factor for development in China.

This in turn has impact on the management of irrigation, and on how water saving benefits brought by WUA are valued.

Water management at different levels of the government. The Ministry of Water Resources (MWR) is the central body making policies and regulations for irrigation management. The actual management of irrigation systems is done locally at provincial level. The bureaus of water resources at the provincial, municipal and prefecture (省，市，区) levels are each responsible for irrigation schemes within their respective jurisdictions. For example, a large-scale irrigation system that benefits two or more prefectures is managed by provincial water resources bureau (PWRB)[3]. Otherwise, it is managed by a prefecture office.

Irrigation management prior to 1995 – Farmers typically viewed irrigation as the government's business. For medium –large irrigation districts (ID), provincial or prefecture bureaus were commonly responsible for the O&M of main to branch/secondary canals and structures. Tertiary and below levels and small systems were managed by irrigation stations that belonged to the county, township and village administrations -县，乡，村 (Fig.1). There was little participation from farmers, who had no voice in management decisions.

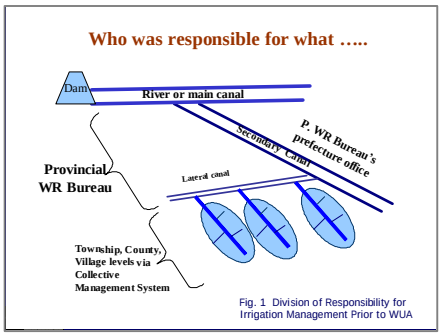


Fig. 1 Division of Responsibility for Irrigation Management Prior to WUA

Since the country's economic restructuring in the early 1980s, the old collective systems by communes collapsed and were replaced by household responsibility-contract systems that allowed for individual small farms. Subsequently, irrigation management at village and township levels became ineffective and complex, given the small land holdings and large number of farmers whose production no more depended on central commune planning but on markets. The attention of lower level administrative authorities also shifted to other economic opportunities. Over-staffing, lack of staff incentives, and chronic shortages of government funds led to inadequate O&M of irrigation infrastructure. Unreliable delivery and inefficient use of irrigation water were common. Farmers were unhappy.

Water fees were collected through several layers - from farmers to farmer groups, village, county, and township irrigation stations, and finally to irrigation districts. Other types of fees were often 'added' to water fee collection. Farmers were reluctant to pay. Both central and local governments were eager to search for new approaches to irrigation management. The introduction of WUA was timely, as it filled an institutional vacuum.

New modality - self-managed I&D district (SIDD). The modality has two key components (Fig.2): ID =WSC+WUA, where WSC represents the water supply company, which could be a government agency or a semi-government company to supply water to urban and rural users, with users represented on the company board. The WUA represents farmer users. There is a contractual relationship between WUA and WSC, based on water and service provision and fee collection. This modality eliminated multi-layer fee collection and made the supplier accountable (Fig. 3). While WUA has since

[3] There are over 400 large irrigation districts (ID), defined as greater than 20,000 ha each.

spread across Hunan and China, WSC are still being developed as they require state agency/enterprise reforms, and this has taken time.

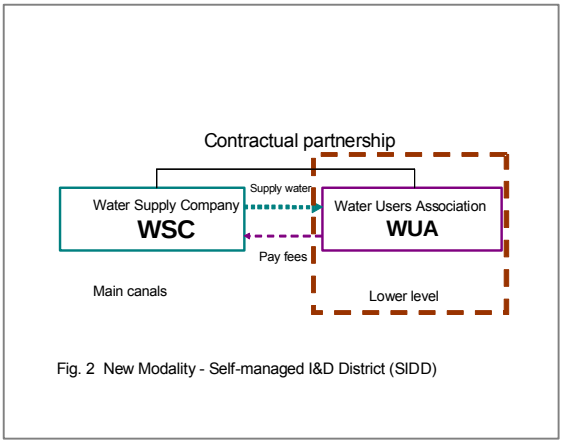


Fig. 2 New Modality - Self-managed I&D District (SIDD)

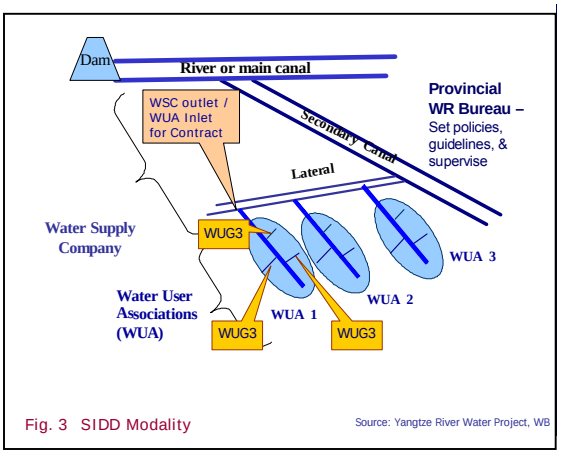


Fig. 3 SIDD Modality

Source: Yangtze River Water Project, WB

The story of *JingTang (JT) WUA* illustrates how WUA were initiated and evolved, and their impacts. *JT WUA* is located in the Tieshan Irrigation District in Hunan. Established in 1998, it covers 370 ha, consists of 4 villages and a population of 3,632, or 972 farm households. The area grows rice, beans, cotton, and oil seeds. It draws water from the main Tieshan reservoir, 2 small local reservoirs, and 3 pumping stations. It has 3 lateral canals (7.5km.), 13 sub-laterals (8km.), and 108 field canals (26km.). Before 1998, there was no farmer participation in irrigation management, which was considered as government duties. Irrigation fees were collected through multiple layers of administration. Over 30 percent of the collected water fee was for non-water activities, and 55 percent went to pay the salaries of 9 irrigation staff, who were put in place by township authorities. The staff were not accountable to farmers, and had little incentive to improve services. They asked for funds from the local government whenever they needed money for maintenance and repair or for other matters. The shortage of funds and mis-management left infrastructure to deteriorate. Farmers complained often and refused to pay, as there was no guarantee of water delivery to the fields. There were many fights (some resulted in death) among farmers over water and between farmers and local authorities. Irrigation management was viewed as a burden by local administrations, which decided to try the new participatory irrigation management concepts introduced under the World Bank-funded Yangtze Water Resources Project.

JingTang became one of the early pilots. In order to ensure success, it was agreed that WUA development would need to follow five principles. WUA should:

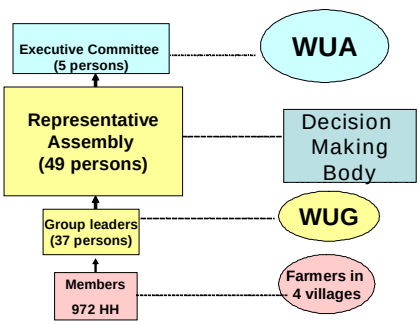


Fig. 4 JingTang WUA – Management Structure

1. be viewed by farmers as their own organization, with democratically elected committees and freedom in financial management, and relative operational independence from government on routine activities.
2. use the hydrological boundary as the WUA boundary.
3. measure water flows at intakes from the water supplier and pay water fees according to the volume of water supplied.

4. collect fees from members and pay directly to the water supplier.
5. have a reliable water supply and functional distribution system.

Mountainous fields in Yunnan (China)

The provincial government set up leading groups at each level of the administration (from province down to prefecture, county, and village), to guide the WUA program. Extensive training was provided to government officials, farmers, local training institutions in order to raise awareness among public. After the boundary of a WUA was agreed upon with farmers, 37 water groups were defined and group leaders were elected to form a 49-person WUA Representative Assembly (more than 1 representative for bigger groups). The Assembly drafted by-laws and elected the WUA executive committee through democratic election by secret ballot, which was a novelty at that time (Fig.4)[4]. All the ballots were achieved, open for inspection. In China, the size of land holdings is relatively homogenous, with differences in land allocations accounted for mainly by their different quality characteristics. Thus, one vote per household was used. The project provided for a WUA office, with space for farmers to gather, to view WUA by-laws and regulations, maps and system layouts, and to examine the financial records of the WUA if desired. These documents are required to be displayed on the wall of a WUA office. The application for the JT WUA was reviewed by the Civil Affairs Agency for their compliance with the five principles.

Irrigation management was transferred from the county-village irrigation stations to JT WUA. In addition, ownership of the 2 small reservoirs and 3 pumping stations (which were funded by the old communes and township governments in the past) were transferred to WUA. JingTang WUA has since been operating and maintaining the infrastructure, determining the level of and collecting water charges from members, and paying fees to the Tieshan Water Supply Company for each seasonal contract. It keeps a certain amount of the collected water fees to meet its own expenditure. The WUA and farmers voluntarily input labor and funds to improve the irrigation infrastructure and

[4] As a general rule, if a WUA covers less than 500 ha, the management committee would have 3-5 persons (chairman, deputy chairman, accountant/secretary and technical staff). If it covers over 500ha, a 5-7 person committee may be needed. Tenure is 3 years for committee members.

expand coverage to new irrigation areas using water saved since the introduction of IMT. From the large-sized slogans written on walls of the villages that provide guidance and exhortations on individual farmer behavior, it is clear that there has been a massive change of attitudes towards caring for the irrigation infrastructure and towards water savings. Local governments have continued to provide support to rural infrastructure, market access, and agriculture extension to farmers.

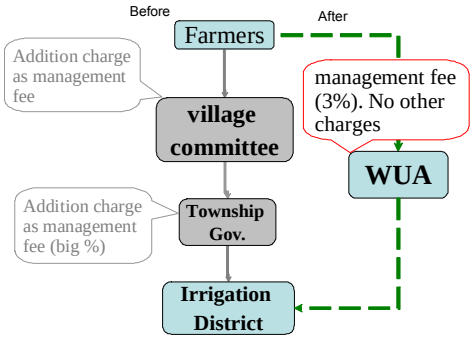


Fig. 5 Typical way of water fee collection before & after WUA

Four features about the JT WUA should be highlighted. *First*, its policy of "Three Transparencies" - water price, irrigated area and actual water volume. This was welcomed by farmers, who disliked the lack of information on irrigation management that had characterized the earlier situation. *Second*, reduced layers of water fee collection – from four to two (Fig.5). This reduced the financial burden on farmers, and made irrigation providers accountable. Water fees are allowed to vary from year to year, depending on savings from the previous year, and on the needs and expenditures of the WUA. A review of the fee structure is done and voted upon by the Representative Assembly. *Third*, varying water charges between upstream, mid-stream and downstream users, depending on water availability. *Fourth*, expanding to other 'business', in addition to irrigation, to supplement WUA income. For example, JT WUA used the 2 small reservoirs and numerous water ponds to develop fishery, duck and pig breeding. The income reduced water charges by $4/ha for all members.

Before	After
9 staff at Irrigation station (55% water fees to salary)	WUA management staff (5 persons)
Wasted water, no one cared. water use = 13,500 m^3 /ha	Saved water (17%/yr), everyone cares. water use = 11,200 m^3/ha
water fee = $40-46/ha	water fee = $22-42/ha
1 crop	2 crops. Increased farmer income
farmers paid more water fees for poor water services	Paid less for good services, saved labor by 2/3, got $530,000 more income

Fig. 6 Comparison of before and after WUA

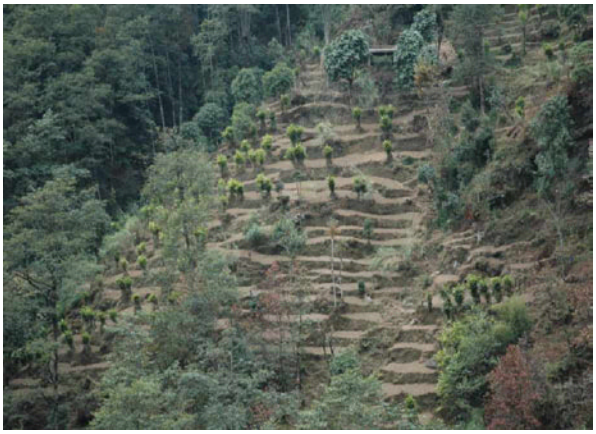
Comparing before and after JT WUA, the changes are striking (Fig.6). Water fee is down by 30-45%; water fee collection rate is down from 60% in the past to over 95%; water savings in irrigation by 17%; labor input during irrigation is reduced by 65%, and the saved labors allowed male farmers to seek work outside the villages and earned additional income of $0.5 million each year. Other benefits included improvement in irrigation service and canal maintenance, transparencies in financial management of water charges, farmer income, and reductions in irrigation time, farm costs, financial burden of local government and conflict among farmers.

China – After 10 years of WUA development. During 1995 – 2004, the concept of PIM and WUA has been widely accepted in China. Most large and medium-sized IDs have adopted the management modality of combining professional management with collective management by farmer groups. There are over 20,000 WUA reported to exist in

China now[5]. With an average of 700 -1000 hh per WUA, there could be 14 -20 million members. The lessons are compared to those from India in the following sections.

India, Andhra Pradesh. Andhra Pradesh (AP) is the fourth largest state in India. Referred to as 'rice bowl', irrigated agriculture is the cornerstone of AP and contributes to over 60 percent of the State's agricultural production. AP has an irrigated area of 4.8 Mha, consisting of 15 major irrigation projects (>10,00ha each), 75 medium irrigation projects (2,000-10,000 ha), and 12,264 tanks. The size of landholding averages 1.6 ha, with irrigated farms averaging a little less than one ha. Small farms employ around 80 percent of AP's farmers. The performance of the irrigation sector is critical to AP's economic growth.

Rice field in West Bengali (India)



Cardamom plants in India

Irrigation Sector Reform. The irrigation sector is managed by the ICADD (Irrigation and Command Area Development Department, short name Irrigation Department), which has the second largest state budget, next to the power sector. Up to the early 1990s, irrigation was chiefly the government's business without farmer participation in decision-making or operations. ICADD primarily focused on the construction of irrigation infrastructure and area expansion, with little attention to the O&M of existing systems. Over the years, irrigation has under-performed, reflected in a decline in net irrigated area, low irrigation efficiencies, low yields and farmer income, and low agriculture growth. The neglect of maintenance of irrigation infrastructure throughout the state was seen as the primary factor in this under-performance. Most funds for O&M were used to pay the salaries of ICADD. To address the sector issues, the state government, under the strong leadership of the Naidu administration, undertook drastic reforms in 1997. The goal was to make service providers accountable to users and emphasize PIM. Farmer empowerment was at the heart of the reform.

The government decided that the reform should be bold and comprehensive, rather than incremental. Three key actions laid the ground: (i) special law on AP Farmers' Management of Irrigation Systems Act (APFMIS), passed in 1997, which was the first of its kind in India to exclusively promote farmer participation in irrigation management. (ii) extensive public consultation to create awareness and to prepare the public for the big change to come, and build partnerships between the government and communities (known as Janmabhoomi). (iii) tripling water charges to Rs. 500/ha (or US$11/ha), aiming

[5] Although not all WUA have registered.

to fully cover O&M costs, and preparing the financial ground for extensive rehabilitation of irrigation systems and for WUA that were to take over a part of irrigation management.

Coupled with the development of PIM and farmer WUA, the State embarked upon massive irrigation rehabilitation investments covering 2.5 million ha out of 4.8 million ha. At the core of the investment program was the World Bank's AP Economic Restructuring Loan, with an irrigation component of US$300m for 2.5 million ha, and the 3rd AP Irrigation Sector Project of US$422 million, covering about 0.3 million ha. Both projects supported the PIM as well as infrastructure rehabilitation, which was a major incentive for farmers to work together with the government on irrigation management.

A unique feature of AP's IMT was the formation of over 10,000 WUA in a year, covering the entire State and with an irrigated area of 4.8 million ha. WUA were formed at tertiary and lower levels. Higher level transfer of secondary canals through District Committees (called federation of WUA in other countries) and of main canals through Project Committees (or super-federations) were envisaged under the new law, but have yet to be implemented.

ISF has been traditionally done by the Revenue Department, thus WUA were required to assist the Revenue Department in collecting water charges, instead of being put in charge of the collection. A part of the fees collected were supposed to be returned to WUA (the Philippines has the same arrangement) for their O&M expenditures, which would be fully covered if the remittances reached 90 percent of the fee collection efficiency. But, in reality, the remittance of funds to WUA was only 10% (2005-2006). Even worse, the ISF collection rate was low, averaging 30-40 percent in AP over the past four years. The combination of a low rate with low remittances is threatening the quality of irrigation services by WUA, and their sustainability.

Results after 10 years of WUA Implementation. After more than ten years since APFMIS began implementation, a recent review of AP's WUA implementation revealed several key issues underlying the successes and failures of the IMT program. The achievements included greater farmer participation in O&M; better water deliveries, especially in several drought years; more equitable water distribution; and improved relations with the irrigation department. Recent surveys indicated that 70 percent of the WUA are still functioning, after a slow period of 2-3 years during the re-election of WUA management committees in 2002. However, the challenges appear to be greater – while the APFMIS Act is comprehensive and satisfactory, its implementation has been an issue; changes in the state government in 2004 affected the pace of IMT implementation; WUA are not in charge of water fee collections, not to mention fee determination; low collection rate; and low remittance rate to WUA. As a result of these factors, the availability of funding resources for O&M remains unresolved after ten years of sector reform efforts – government continues to subsidize irrigation O&M as only 60 percent of the cost is recovered by fees collected, excluding staff costs. There was no staff reduction in the state irrigation agency.

Comparing Hunan (China) with Andhra Pradesh (India). Both countries piloted WUA around the same time, i.e. in the mid 1990s. The two provinces were pioneers in their respective countries. But the path that the two pioneers took differs significantly.

Andhra Pradesh (AP) adopted a 'big bang' approach and established over 10,000 WUA in a short time of over a year. Hunan, like the rest of China, took a 'gradual approach' and there are only about 20,000 WUA in total in China after ten years, many set up after 2000-02. AP started the irrigation sector reform with a clear 'road map', by putting in place specific irrigation laws to lay the legal basis for WUA operations before

establishing the WUA. Hunan, however, undertook the reform incrementally, with 'trial and error'. WUA are still rooted on existing civil laws, supplemented by new circulars and guidelines issued by the central government, and by the regulations issued by local governments. Even today, there is no special law on WUA. The first regulations at the national level on the functions of WUA and provisional measures on managing irrigation districts were issued in 2005, ten years after the first WUA was established.

Both countries implemented WUA at lower canal levels, and have not moved much to secondary and main canals. In AP, IMT was planned for main canals and even entire systems but has yet to be implemented. In China, the higher level systems are supposed to be taken over by irrigation supply companies, whose boards have representation from the WUA or their federations. This has not progressed as fast as envisaged, since it involves complex institutional reforms, although most provinces have 'separated' their irrigation management companies from government departments or bureaus. These companies are semi-government, and are supposed to be financially and administratively independent, although some still rely on subsidies. Moreover, the central government gives provinces a great deal of freedom to develop their own reforms and modalities. This has resulted in a number of forms of irrigation management in any given province– in addition to WUA and the old collective management at village levels, there is increasing private sector involvement through individual contracting for managing an irrigation system, or a combination of the above.

WUA membership is voluntary in Hunan, similar to Albania, the Philippines, Romania, etc. AP has automatic membership or mandatory participation, as in the case of Mexico. This helps represent poor farmers, who otherwise may be affected by the power of rich farmers already benefiting from their location and large land sizes in the scheme, and who may not need or want the voice of the small landholders. Both systems follow the 'one member one vote' system.

In terms of water charges, they are based on area in AP, while 80 percent of irrigation systems in China are moving to charges on water volume. But the most critical difference is that WUA in Hunan not only collect water fees and keep a portion for their own operations, but are also allowed to vary the fee level if agreed by the majority of their members. In AP, water charges are determined and collected by the state Revenue Department. WUA were supposed to get 90 percent of the fees remitted from the revenue department to cover WUA costs. In reality, the remittance has been meager, at 10 percent in 2006. This undermines the financial condition of WUA, making it difficult for them to operate and maintain the infrastructure adequately. In turn, poor services do not provide incentives to WUA members. The water fee collection rate is only 30-40 percent in AP[6], but over 95 percent in Hunan.

For both countries, WUAs are still in their infancy. How likely will they be sustainable? Although it is early to reach conclusions, some early signs can be observed. In Hunan, both the local government and the WUA are becoming more active in nurturing farmer participation. Gradually, but steadily, the number of WUA is increasing, and the plan of local governments, working with local irrigation supply companies, is to expand WUA to cover all irrigation districts in the next decade. Thus, it can be said with reasonable confidence that WUA in Hunan are likely to be sustained. In the state of Andhra Pradesh in India, however, the signs are not so promising. With the meager

[6] Or 25% if considering back-account.

financial back-ups, the WUAs lack the financial means (even if they had the will) and incentives to adequately take care of the infrastructure that has been transferred to them. A recent Implementation Completion Report (March 2007, World Bank) of the Andhra Pradesh Economic Restructuring Project rated the sustainability of institutional development of WUA as “unlikely”.

Flood comes into the Mekong Delta in South Vietnam

Conclusions

There has been rapid development of WUA in the last decade across all regions. Although it seems too early to conclude if the PIM, WUA and IMT are successful, as sustainability will have to be seen over a span of several decades, one can still say with confidence that farmer participation in irrigation management has brought many benefits.

The issue of WUA sustainability is moving to the top agenda of many countries, leaders, water managers, irrigation practitioners and professionals, as well as to the focus of discussion by the International Network on Participatory Irrigation Management (INPIM). Looking at progress in the past decade, one can distill the following conclusions: To develop WUA, there must be a real need and local demands, and there should be some perceived benefits for all stakeholders. To sustain WUA, some basic conditions appear absolutely necessary: (i) reliable water sources and functional irrigation infrastructure; these often require that infrastructure rehabilitation and irrigation improvement go hand-in-hand with WUA development. Even a strong WUA cannot couple with a dysfunctional system or infrastructure with no water supplies; (ii) WUA should have financial means to function, without reliance on government subsidies or donor funds; (iii) land holding and farm productivity should be relatively homogenous among WUA members, avoiding the situation of a few big land holders dominate decision or have disincentive to collaborate; (iv) the productivity and profitability of irrigated agriculture are attractive enough for farmers to collaborate in water management and to be able to pay adequate water

charges; and (v) proper legal framework should be in place, so are sustained political interest, government technical support and capacity building for WUA and farmers.

There is limited literature on the evaluation of WUA performance. Even less so on the evaluation of IMT. Under donor financed projects in which WUA was implemented, there is some documentation on the evaluation. A World Bank study reviewed 42 cases (without going into details in each case) across countries in IMT implementation, in order to obtain broad lessons and recommendations. In China, studies were carried out by local governments to review if the WUA have met the required principles and have made any impact, using comparisons between areas with and without WUA. A World Bank team carried out a three-phase evaluation of IMT performance during 2003-04 in the Philippines. It was one of the few cases where systematic evaluation on the impact of IMT was done. Given that millions of dollars have been spent on WUA and IMT worldwide, it is time to evaluate systematically the impact of IMT and WUA on irrigation management across the regions and on water resources management.

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