PARTICIPATORY IRRIGATION MANAGEMENT IN ANDHRA PRADESH: PROMISE, PRACTICE AND A WAY FORWARD

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INSTITUTE FOR SOCIAL AND ECONOMIC CHANGE
2000
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PARTICIPATORY IRRIGATION MANAGEMENT IN ANDHRA PRADESH: PROMISE, PRACTICE AND A WAY FORWARD

K.V. Raju

Abstract

The state of Andhra Pradesh has been leading in economic reforms in India, particularly within the irrigation sector. Major steps are focused on institutional reforms towards irrigation management turnover all over the state. In this connection, the state has formed 10292 water users associations and 174 distributory committees. As a major positive change, the state government has done away with contractors for all maintenance and repair works. All irrigation lands in the state get equal financial and physical attention for improvement. Both farmers and officials have realised benefits in the process. With some modifications in the present approach the state can become a model state both within and outside the country. This paper looks at the promises made, the actual practice, and future potential of the whole approach.

Introduction

The last five years have seen the state of Andhra Pradesh make rapid strides in its economic reforms. The irrigation sector has been positively influenced by institutional reforms largely focussing on: i) introduction of a suitable policy and legal framework; ii) formation of water users' associations across all types of irrigation systems in the state; iii) implementation of large scale training programmes for farmers and staff of the irrigation department; iv) bringing in significant financial reforms to influence quality performance of users' organisations. Today, the state is leading in its irrigation reforms in India. This paper, based on field visits, looks at what has made the Andhra Pradesh experiment work by examining:

a. The promise made through a) the Andhra Pradesh Farmer Managed Irrigation Systems Act, 1997 (APFMIS Act); b) document on ‘Vision 2000: Swarna Andhra Pradesh’; and c) Government Orders issued over time to encourage formation and functioning of water users associations (WULAs);

b. The practice;

c. The long-term strategy.

1. This paper is based on a short study, commissioned by the Indian Network for Participatory Irrigation Management. The study was prepared with cooperation of Raymond Peters, Commissioner, CAD and the Ex-Officio Secretary, Irrigation and Command Area Development Department, and Irrigation Department staff across Andhra Pradesh State and the farmers. The author is grateful to all of them for willingly sharing their experiences and actively participating in discussions, and thankful to Dr. Ruth Meinzen-Dick and Dr. Shashi Kolavalli for useful comments on the earlier version of this paper.

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Part I: The Promise

Background

Irrigated Agriculture in Andhra Pradesh: Andhra Pradesh with a population of about 75 million and a geographical area of 27.68 million ha, is the fifth largest state in the country. About 73 per cent of the population live in rural areas. The labour force constitutes about 45 per cent of the total population and about 65 per cent of it is engaged in agriculture. The state comprises three regions namely: a) Telangana (with 39 per cent of the state population and 42 per cent of the geographical area), b) Coastal Andhra (with 43 per cent population and 34 per cent area), and c) Rayalaseema (with 18 per cent population, and 24 per cent area). Of the state's geographical area, 47 per cent (12.9 million ha) is under cultivation and the net area sown is about 11.04 million ha. (4.88 million ha irrigated). The dominant pattern of land ownership in Andhra Pradesh is small private farms with an average of 1.56 ha per holding. Irrigated holdings have an average size of 0.88 ha. About 30 per cent of the state economy is contributed by agriculture.

The state's three major rivers, namely Godavari, Krishna and Pennar drain 70 per cent of the state's land area. The water potential of Andhra Pradesh is estimated to be 7.78 million ham (2746 TMC). The major rivers are seasonal with more than 90 per cent of the total flows occurring between June and December depending on the rainfall, which greatly varies from year to year. The ultimate irrigation potential from all sources is estimated to be 9.50 m ha. This includes 7.30 m ha from surface water and 2.20 m ha from groundwater. The performance of the irrigation sector in the state is poor, particularly in the case of major and medium irrigation projects. Inadequate budgetary allocations for the operation and maintenance of irrigation systems have led over the years to poor maintenance and unsatisfactory service. This has resulted in poor irrigation service, low yields, and low farm incomes, leading to farmer dissatisfaction and political pressures affecting the allocations for operations and maintenance (O&M) in the state irrigation budget. This vicious circle is observed in most of the Indian states (Gulati, Meinzen-Dick, and Raju, 1999).

The Irrigation and Command Area Development Department (I&CAD) provides water and services to: a) farmers for irrigation purposes, b) municipalities and villages for human and domestic uses, c) state electricity board for power generation, and d) industries. Water charges for irrigation levied on a per ha basis were increased by more than three times from 1997 (see Finance section in Part II). Current O&M budget allocations for the various irrigation schemes are made on the basis of a uniform flat rate of Rs100/ha, and about Rs47/ha for special repairs. This figure is about 50 per cent of the tenth Finance Commission recommendation and about 30 per cent of the actual needs of about Rs.500/ha

assessed for the purpose of the irrigation component of the AP Economic Restructuring Project (APERP). Therefore, in effect, the current O&M budgetary allocations neither covers the full O&M cost nor the full establishment cost estimated at about Rs200/ha. As a result, no funds are available for the actual O&M works requirements. The deficits in establishment financing are covered to a small extent under special repairs by budgetary allocations for planned works and O&M works.

**Policy Framework**

The state irrigation policy has clearly kept user involvement in irrigation management as the central theme; all concerted actions revolve around this. The need for reform became essential owing to the following:

1. **Irrigation sector's low performance despite the massive investment.** Traditionally, the sector (irrigation and drainage) has been the largest user of the plan funds; and even in the Eighth Plan (1992/93 to 1996/97), expenditure amounted to Rs25000 million, or 24 per cent of the plan expenditure.

2. **Infrastructure is in disrepair and irrigated area declining.** From 1991/92 to 1993/94, the gross irrigated area dropped from 4.3 million ha to 3.9 million ha. Currently (in 1998), out of 4.8 million ha of net irrigated area created, only 2.8 million ha is actually irrigated.

3. **Low agricultural productivity.** Growth in productivity has declined in recent years to less than 2 per cent per annum. A major factor has been weak performance of irrigated agriculture. Rice yields an average of only 2.6 t/ha.

4. **Cumulative impact of inadequate maintenance of infrastructure.** For instance, expenditure on O&M in 1995/96 was only Rs99/ha, as against the tenth Finance Commission (1997) recommendation of Rs300/ha for major and medium irrigation projects. Further, because of inflation of wage bills, over 75 per cent of O&M expenditure went to wages, leaving a negligible amount for actual maintenance works. Low maintenance has been compounded by a purely government approach to the sector despite the limited capacity for the government to intervene, especially at the lower levels of the systems, and by an extremely low cost recovery. With the three-fold increase in water charges made effective from the 1996/97 rabi season, revenues, for the first time in many years, exceeded O&M expenditure. As O&M expenditure has remained far too low, revenues remain inadequate to cover their entire needs. Further, to make up for the cumulative neglect, significant additional expenditure is required to rehabilitate the system.

5. **Rehabilitating and sustaining irrigation and enhancing agricultural productivity are of paramount importance.** About 40 per cent of the
state’s gross cropped area is irrigated. Irrigation’s contribution to state agricultural production is about 60 per cent.

**Policy Initiatives:** New initiatives in policy reform began with a diagnosis of the situation and subsequent issuance of a white paper on irrigation outlining the performance of the irrigation sector over the years. This was debated in the legislative assembly and these are the major actions taken:

- Three-fold increase in water charges from the 1996/97 rabi season;
- Passing of the APFMIS Act in 1997;
- Creation of WUAs across the state;
- Commencement of a massive campaign to make WUAs functional;
- Constitution of the water charges review committee in December 1997.

**Policy Objectives and Strategy:** It is from Mexico and Turkey that the idea of forming WUAs had been borrowed to a large extent. Both countries are international ‘success stories’ in irrigation reform. The major increase in water charges, traditionally a politically sensitive aspect, required extensive public consultation and agreement by all parties. These steps are nevertheless acknowledged as only a start of the difficult actions that must follow. These must be seen in the broader context of Andhra Pradesh’s long-term vision for the water resources sector within which irrigation, though important, is only a component. The core elements of the long-term vision are discussed next. They encompass two areas: reforms in ownership, financing and management of the state’s irrigation systems, and progressive development of comprehensive multi-sectoral water resources management.

a) **Democratic Decentralisation, Farmer Management, and Financial Autonomy** are considered vital to change the past ‘vicious circle’ of influences to a ‘virtuous circle’ where these constraints are tackled systematically to generate mutually reinforcing improvement with in-built incentives to achieve this. The objective is to build rapidly from the present WUAs at a minor level to federated WUAs at a distributory, and then project (scheme) level. The [ultimate] objective is to have self-financing and autonomous irrigation schemes managed by WUAs. A farmers’ apex committee at the state level will provide a forum for state-wide decision making. The government’s role will progressively reduce as provider of technical assistance to manage the headworks of larger systems.

This process will be accompanied by institutional and financial reforms and capacity-building to create the respective autonomous entities. The short-term objective is that WUAs and the irrigation and the I&CAD should become financially autonomous for O&M and revenue and expenditure. They would generate

4. A purely governmental approach, wherein poor system performance, has led to farmer dissatisfaction, low fee payment, low cost recovery, and under-funding of O&M is common (for more details see Ashok Gulati, Ruth Meinzen-Dick, and K. V. Raju, 1999, *From Top Down to Bottom Up: Institutional Reforms in Indian Canal Irrigation*. A collaborative study of IFPRI-NCEAR-IEG-ISEC).
their own revenue from water charges and finance O&M, thus giving them financial independence and being cost and quality effective which was critically lacking in the past. WUA members will also contribute to the interest earning reserve fund accounts, to progressively build up the financial capacity to reinvest or undertake improvements. New investment will continue to be financed by the government, but with users or prospective users contributing through appropriate cost-sharing arrangements.

For I&CAD, there will be radical change in its role as the above progression takes place. One of the major transformations commencing quickly is to switch staff orientation to a service provider role to WUAs. Rehabilitating existing systems and upgrading maintenance will be the responsibilities of the newly constituted Water Charges Review Committee (WCRC). The key need is to ensure the necessary direct financial link between revenue and expenditure and the availability of funds for this purpose. WUAs participation in decision-making, and reporting mechanisms to ensure accountability to users will also be cost effective and service oriented throughout the organisation.

b) Sustainable Water Resources Management. Following are the principles for future development and management of water resources: i) comprehensive water resources management; ii) environmental management; iii) water as an economic good; and iv) technology development. To achieve these objectives several steps have been suggested.

Strategy Implementation: The immediate priority was to provide a follow-up to the change process already initiated in 1997 by the FMIS Act, the three-fold increase in water charges, and the state-wide elections for WUAs. This was followed in November 1997 by state-wide elections for the second tier of WUA management structures. If they were to succeed and generate further reforms, these actions required urgent follow-up like: restore and improve the productivity of the existing irrigation systems; assure their sustainable management by transforming management to farmers through the new WUAs; and put the sector on a sound financial footing. Concerted actions in the following areas are being launched such as: a) creation of a farmer–government partnership, b) consolidation of irrigation management transfer to farmers, c) maintenance and rehabilitation, d) agricultural extension, e) cost recovery and financial sustainability, f) expenditure prioritisation, g) institutional reforms and capacity building.

5. The important steps are: a) establishment of a state multi-sectoral water resources board or committee to guide development of actions; b) development of multi-sectoral river plans and environmental management plans to provide guidance for management and future development; c) continued development of watershed management practices and integrated conjunctive use of surface and groundwater resources; d) promotion of technologies for greater water use efficiency, with emphasis on irrigation; e) progressive development of institutional and human resource capabilities in water resources management, and f) public awareness campaign on water resources management issues to foster an environment for change.
Legal Framework

The Andhra Pradesh Farmer Managed Irrigation Systems Act came into effect in Andhra Pradesh in April 1997. Under this Act, till July 1999, some 10292 WUAs were constituted and elections were held in June 1997. Further, 174 distributory committees for the major projects in the state had also been constituted and elections held in November 1997. The Act facilitates: a) formation of VLUAs on the basis of a hydraulic boundary; b) the inclusion of landowners and tenants; c) making a person eligible to become a member of more than one WUA boundary; d) the right to vote to only members (owners or tenants). The Act has made provisions for the election of president and members of the managing committee for a period of three years at three levels: i) WUA level, ii) distributory level, and iii) project level. Members have a right to recall the elected president and managing committee after one year, based on their performance. The act also stipulates that the elected members are progressive. Such clauses are rare to find in other irrigation acts of India. The FMIS Act has clearly underlined the objectives, functions and resources of WUA: to provide clarity, the Act also holds the government officials and WUAs responsible.

Long-term Vision

Andhra Pradesh is the first state in India to put forth a long-term vision through the document Vision 2020: Swarna Andhra Pradesh. Both the policy and the legal framework are in tune with the long-term vision evolved by the State. The vision document (GoAP, 1999) has set ambitious goals to achieve them through: a) building capabilities; b) focusing on high potential sectors of the economy; and c) transforming governance. As a part of building capabilities, the Vision document highlights involving people to manage services as a key area. It states that, an effective way to provide quality and responsive services is to decentralise them and ensure that the people have a role to manage them. Andhra Pradesh’s own experiment in water management demonstrates the power of people’s participation. Also, the state’s own legislation (like APFMIS Act, 1997) in relation to local bodies provides some basis for people’s participation.

To transform governance, the government will have to act, in several ways. A major change is being envisaged to involve people in governance. The state, according to the Vision document, is committed to the devolution of power through the implementation of the 73rd and 74th constitutional amendments. To ensure participatory governance and transparency and improve services, the state has instituted the Janmabhoomi initiative and is promoting self-help groups, such as the water users’ associations (WUAs) and school education committees. To operationalise this concept, the government has delegated technical and administrative powers to sanction works, simplify procedures and ensure

6. The Act says, "a person having more than two children shall be disqualified for election or for continuing as a Chairman or a President or a member of the Managing Committee" (p.13); in addition, "the person shall be disqualified, if he/she is interested in a subsisting contract made with, or any work being done, for the gram panchayat, mandal parishad, zilla parishad, or any state or central government or the WUA".
transparency in the estimates of works undertaken, including a social audit of works completed. To involve stakeholders in the management of water resources, the state will continue to encourage and support WUAs. Broadly, WUAs will manage (i.e. operate and maintain) water resources by raising funds for maintenance, supervising works, deciding on water allocation, and improving services.

Investment in the irrigation infrastructure has been a priority. Successive five-year plans have emphasised the need for greater investment in the irrigation sector. Plan outlays on irrigation have increased from Rs620 million in the Second Plan to Rs31,860 million in the Eighth Plan. This has expanded the net irrigated area from 150,000 ha to around 5.9 million ha and greatly increased the productivity of land, leading to a substantial impact on agricultural and industrial growth, incomes, and employment. However, to achieve the long-term vision, more needs to be done. This will require the following approaches:

- Realising the maximum irrigation potential
- Improving the efficiency of the existing irrigation network
- Managing water resources better through stakeholder participation.

The Vision document has envisaged involvement of users in the management of their common resources as the best way to ensure effective local management. Recognising this, the state has made a pioneering move to create WUAs under the APFMIS Act, 1997. Through these WUAs, the stakeholders get involved in the maintenance and management of irrigation systems.

In the absence of funds from the Andhra Pradesh Economic Restructuring Project (APERP), Participatory Irrigation Management (PIM) activities could have had little impact. Good blending of the APFMIS Act and timely assistance from APERP has made a distinct difference in the state. APERP is assisting WUAs through: a) minimum rehabilitation of the canal network, b) regular operation and maintenance, c) scheme improvement and farmers turnover (SIFT), d) agricultural intervention programme (AIP), e) institutional support for project monitoring unit, f) human resources development.

Experience the world over has shown that management of local resources for agricultural development is best left to users themselves. This not only reduces the burden on the government but also increases the users' sense of responsibility towards optimal management of resources. Andhra Pradesh has recognised this and has enacted a legislation to enable participatory management of resources. The formation of WUAs to achieve optimal utilisation of water resources from major and medium irrigation projects is a case in point. Overall, the PIM process followed in Andhra Pradesh has good linkages and right inputs, as shown in the following chart.

7. Another example of decentralisation is the increased community involvement in managing forest resources through the formation of Vana samrakshana Samitis. These mechanisms had been extended to a number of other areas such as the provision of credit (self-help groups) and extension services, watershed development (watershed samitis), and the management of agricultural markets (e.g. raitu bazaars).
PARTICIPATORY IRRIGATION MANAGEMENT PROCESS IN ANDHRA PRADESH

- Took inputs from ID staff and NGOS
- Issued suitable government orders
- Appointed competitive authority from ID staff
- Timely support from the World Bank
- Competent Authority assisted in technical estimates preparation

→ Generated Political will
↓
→ Introduced APFMIS Act
↓
→ Conducted WUA/DC elections by the state government agencies..
↓
→ Provided financial support to WUAs/DC
↓
→ All M&R works done through WUAs/DCs/PCs
↓
→ Works identification and execution by WUA/DC/PC

Part II: The Practice

In this part we will look at the actual practices of WUAs in the three regions of Telangana, Coastal Andhra, and Rayalseema. In each region, we visited major, medium, and minor irrigation systems. In the field, we looked at how the WUA functions, its advantages to members and the irrigation department. Also the financial support received and viability of WUAs in the present form have been explored. Many WUAs indicated how the current experiment is playing a pivotal role in the command area development. Some WUAs also expressed their demands and views on the whole exercise initiated by the state government. The number of WUAs visited (given below) varies across the region and the type of irrigation system.


<table>
<thead>
<tr>
<th>Region</th>
<th>Typewise No.of WUAs visited</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Major</td>
</tr>
<tr>
<td>Telangana</td>
<td>4</td>
</tr>
<tr>
<td>Coastal Andhra</td>
<td>7</td>
</tr>
<tr>
<td>Rayalaseema</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>14</td>
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**WUA formation and Structure**

In Andhra Pradesh, formation of farmer's organisations all over the state was considered as essential to promote a total change in irrigation management. Farmer's organisations include WUAs, the distributory committees (DC's), and the project committees (PC's). WUAs, and DCs were formed through elections. The structure of users' organisation is given from the top. Each WUA has been formed, based on the hydraulic boundary, for 500–8000 acres, and with four to six Territorial Committee (TC) members in each. Each TC will have an area in the range of 500-1300 acres. The elected presidents of WUAs will become members of the Distributory Committee (DC) at the distributory level. In some projects, the formulation of a Project Committee (PC) is being contemplated. Accordingly, the tiers of the organization have been formed, except for the project level committees. Elections were held for each of these tiers of the organisation, as per the government order and all processes were formally handled by the government agencies. Till 31 May 1999, the total number of WUAs formed was 10292; it includes, 1699 major, 413 medium, and 8180 minor projects. Elections were conducted for 9797 WUAs (in minor projects, only for 7749 WUAs). In the case of 495 WUAs, elections were not held for various reasons. The assistant engineer at the WUA level and the deputy executive engineer at the DC level have been designated as the competent authority (CA) who can record the works carried out, prepare bills and recommend payments.

Since the formation of WUAs, more emphasis has been laid on meeting the president, conducting training courses, short workshops, and keeping him/her as a contact person of the WUA. This has helped the President understand the internal process. Unfortunately, neither the TCs nor ordinary members have any access to this information and to the CA. The recall clause in the Act is a big booster for members; so far, seven presidents have been recalled due to misappropriation of funds. Wide publicity of this information in the farmers' newsletters has sent warning signals to others.

Earlier, WUAs never realised the enormity of funds flowing. With increase in size of funds and powers, WUAs have become more influential. Quality of the structures have improved and farmers are directly involved in repairs and maintenance. For water allocation, farmers go to the WUA president and not to
irrigation department staff. In some places, there are efficient WUAs mainly owing to good senior officials and their efforts (e.g. in SRSP project, Karimnagar; Sri Kakulam, and West Godavari). Poor WUAs are mainly because of political interference (e.g. in Cuddapa, Chittoor, and Mehboobnagar). WUAs are categorised (informally by officials) based on the complaints and progress heard from the presidents of WUAs. However, WUAs and DCs face opposition, from senior and junior staff of the irrigation department, since they are losing money and power.

**Court Case of lascars**: A lascar is primarily a system level canal operator and water regulator. E.g., in Srikakulam district, there are 574 WUAs, and 180 lascars. The services of lascars, originally employed by the state government, have now been transferred to WUAs. They are under the functional control of WUAs and receive salaries from the government. Some 3500 lascars in the state have opposed this government order and a legal battle is still on. There was also opposition from the engineers association regarding the transfer of roles and responsibilities to WUAs. The government gave them three choices: a) a voluntary retirement scheme; b) work according to government instructions; c) punishment by government of erring staff. For now, the staff has agreed to work according to government instructions.

In the process of reforms, the government staff, particularly those who are at the level of service delivery and have direct link with the users (like lascars, assistant engineers, deputy executive engineers) feel threatened. Primarily because they lose their undisputed powers, the prestige attached to their positions, no more endless requests from the users for their services, and there by a major loss in their additional earnings. Indeed, absence or reduction in these additional earnings affects the upper hierarchy too owing to lack of demand for such positions, and no grease money involved in transfers and appointments. These positions, termed as 'wet' positions, have now become 'dry'. They have to be more accountable and transparent in their dealings.

**Trendsetters**: Srikakulam district claims to be a front-runner in the WUA movement in the state. WUAs in this district maintain schedules, conduct meetings on time, the irrigation department disburses funds regularly to WUAs, and responds to government orders regularly. Newsletters are published in Telugu (local language) regularly. The Superintend Engineer (S.E) and his staff take keen interest in all the activities and works. The middle and lower level officials claim their workload has increased. Krishna District is a trendsetter in the delta region leading both in area coverage and expenditure incurred by WUAs and DCs.

**WUA Meetings**

The APFMIS act clearly delineates roles and responsibilities at each tier of the organisation as described in the above section. User organisations take pride in saying, “This is the first time, in the state’s history, that a chief minister is directly writing to organisations at the village level. So, we feel, we can communicate directly.
with the chief minister and that is a big achievement for us.” Being a new set-up, the government is taking the initiative to conduct general body meetings. During the last and current years, general body meetings have been initiated through CAs. Twenty to 50 per cent of the members attend these meetings; in a few cases, the attendance level has exceeded 60 per cent. Otherwise, the WUA/DC president and TC members call small group meetings (6-20 farmers) on their own, as and when required; more specifically, to endorse works identification and execution, to discuss funds received and expenditure incurred. Informal meetings are held to discuss if voluntary work is required to clean canals, and water regulation across the reaches. For calling a meeting, drum beating is common across the state. For small group meetings, the WUA/DC president informs through oral communication. Unfortunately, WUAs and DCs have not focused on a) water acquisition, b) equity in distribution, and c) efficiency in water use. Neither CAs stress these issues nor WUAs discuss them seriously in their meetings.

**WUAs v/s Village Panchayat:** There is a growing dissent in some village panchayats on the WUA’s control on resources, which until now was controlled by the village panchayat. Village panchayats feel that there are too many organisations. Water management could have been handled by the village panchayat since farmers belong to the same village. But in many places, with a separate organisation like WUA, farmers feel that they have done better work and have greater freedom to do what is actually required. Water fee can be used for WUA works and functions. In some WUAs (including tank-WUAs) which are close to urban areas and headed by an absentee-landlord, there is non-co-operation from member-farmers. In the case of urban-proximity tank-WUAs, members have secondary interest in tank management.

**Identity crisis:** WUAs like to have a formal identity. They feel a formal identity helps in communication with political parties and with officials. It would help even in filing a legal case, or lodging a complaint with the police for dispute resolution. Many WUAs have printed letterheads with the names of the president and TC members. As a part of documentary evidence, most of the WUAs and DCs have made it compulsory to take photograph of sites, before and after work execution.

**Sharecroppers:** In the present system, WUAs give little importance to share-croppers. The Act too, attributed less scope to them. But in practice, we found, share-croppers constitute a considerable proportion of the actual cultivators across the state. This is true, across the regions, and all types of irrigation systems.

**Physical Works**

In Andhra Pradesh, as elsewhere in India, the emphasis till 1970s was on creating infrastructure. But the engineers were not oriented in project management. From the 70s onwards the state faced a financial crunch leading to lack of management and maintenance. System delivery was weak, and system efficiency was down to 40 per cent in all major projects. Owing to these problems,
the management in all major projects was in trouble. This necessitated introducing the Act. Thus, during may 1998, many works were taken up. During the first ten days, some 22,800 works were started. During 1999-2000 some 16,000 works are planned for completion, most being repairs to canals and structures and adding some new structures, below distributory level.

In recent months, a new trend has started; i.e., contract being given by local officials (who are CAs) to WUA presidents. Some presidents have taken the work on behalf of WUA and then sub-contracted it to their territorial committee (TC) members, who are basically sub-committee members. In the register of administrative approvals, only TC names figure (e.g., medium irrigation project - UMD, WUA-1-4. Most of these presidents are contractors by profession, and the WUA work came as an opportunity to get involved and gain confidence at the local level to execute these works. Around 30-40 per cent of the WUAs presidents in the state has been involved in this kind of processes.

The last two years have seen the following practice. The WUA president, one/two TC members, and some farmers, through a walk-through survey, identify the required works. These works are then discussed in an executive committee meeting, which generally all TC members attend. It is then passed on to the Competent Authority (CA) of the irrigation department for inspection and preparation of technical estimates. He in turn, with assistance of the work inspector and the lascar, prepares technical and financial estimates. An agreement is signed between the CA and the WUA president. Funds are released on the basis of Rs50/acre during the first year and Rs100/acre during the second year. For tank-WUAs during the second year it is Rs90/acre (Rs10/acre is given to the village panchayat). Forty per cent is paid in advance and the remaining on completion of the works. But in a majority of the cases, even after completion of the works, the balance amount was not paid. Whatever funds are released go directly to the WUA account. The ID staff has no role in handling the funds. WUAs directly execute these works, except in some cases, where the president and TC members share the work and funds. But there is more transparency in handling funds and executing works. Proximity to the process of technical and financial estimates, funds disbursements, works execution by local farmers, have all brought more transparency in WUA dealings. Contractors are completely out of the picture; savings on this alone is about 30 per cent.

The government has given clear instructions that there will be no new structures, or alteration of original designs. So, major emphasis is on restoring the original designs. There was need for physical rehabilitation work in the command areas. Repairs and strengthening of structures, addition of missing structures, desilting canals, installation of water regulation structures wherever damaged or not installed earlier, strengthening canal bunds, and construction of drop-structures are some of the major works that WUAs have carried out. In the Godavari and Krishna delta areas, in addition to these works, emphasis was on drainage works. In the tank systems, in addition to the above works, the major focus was on repairing
and strengthening of surplus weir and apron, raising and strengthening tank bunds to original designs, and improving sluice structures.

In the process of users identifying and execution of works, lot of attention has been laid on users needs like cattle pathways, washing steps for women in canal systems, removal of encroachments, clearing shrubs and silt for smooth flow of water till the tail-reach. In most places, farmers have contributed their labour for additional working days, as part of their earlier practice of shramadan. The AP-PIM programme must have stressed sufficiently on improving and strengthening the shramadan practices in local areas. Owing to these induced works, WUA members of Elabotharam village in SRSP project in the Telangana region feel they have come together; and can take more collective action now. In the Narmala village of Upper Manor dam, desiltation of canals was done after 14 years. In Thotapalli tank-WUA, farmers contributed carts and tractors for desilting at a lower rate of Rs100/trip, which is Rs30 less than the market rate. The Bajjipuram tank in Coastal Andhra had three surplus weirs at different levels; now there is just one and this helps in having more storage. The work got the approval from the district collector.

Problems of Works Execution: One of the problems in work execution is the rate approved by the government for various works from the current year (1999-2000). The rate for Proclainer machine is Rs16.24 per cubic meter and from this 15 per cent is deducted as farmer’s contribution. This becomes Rs13.50/cubic meter, for which no machine owner is willing to work. Also farmers are not willing to pay this 15 per cent. With 40 per cent of grants (disbursed as the first installment), work was carried out to the extent possible. Hence, many WUAs and DCs are not taking up any work.

Transportation of materials in irrigated areas is difficult. Vehicles with cement, sand and stones cannot move on narrow and small roads. WUA has to use labour to transport materials from the nearest main or canal road; but there are no provisions for such expenses. Experienced contractors do a good planning of both materials and the manpower, but the new work-masters like the WUA and DC presidents do not plan well and get trapped in difficulties. Meanwhile, the CAs are unable to attend to all works and hence, work gets affected in some places.

Water Management

Across the state, unauthorised outlets have retained their status quo. However, WUAs have ensured that water traverses to tail-reaches by canal cleaning, or and by rotation of minors, as in most problematic areas. Across the state, WUAs have neeradi for water distribution; earlier the neeradi was accountable to an informal group/association of farmers: now, he is answerable to the WUA, as a formal set-up. Some WUAs have hired neeradis on their own for the irrigation period and pay them salaries.

Water regulation in the Tungabhadra High Level Canal, Stage 1 (in Ananthpur district) has undergone changes owing to the WUAs active role. The
canals water supplies are during 15 July to 15 December. The WUAs were demanding better water regulation across the reaches. Then the irrigation department staff devised an alternative system. Accordingly from 1998, distributories are closed for one day a week (i.e. on Monday). Sluices below the distributory are operated on a rotation basis. Now with the consent of the WUAs, distributories are closed once a week, and thus the approximately 6 TMC water saved is supplied for the second crop in the rabi season to some 130,000 acres. For the first time in the project history, during the rabi season, some 130,000 acres have been irrigated without any additional supplies. This is mainly from the water saved by rotation during the kharif season. Local officials feel, gradually they should be able to increase the area under rabi season to 180,000 acres.

Constraints:

- Several WUAs and DCs are demanding for grants since in some places political leaders had made false promises about liberal grants for office building construction.
- Power supply in rural areas is limited to a total of 5–9 hours/day, supplied in 3–4 slots. This affects commercial crop cultivation and increases the dependency on canal water.  
- In many places, the water supply has not reached the designed discharge levels at regulation points, even after some structural repairs and desilting by WUAs.
- WUA and DC presidents are not very clear about their future activities and the potential of these organisations to carry out allied activities.
- Government grants have remained the sole source of funding for most of the WUAs with little (or no) efforts having been made to mobilise own resources.
- Most of the WUAs have not made serious attempts to mobilise contributions from the farmers to meet the prescribed 15 per cent of the estimated costs of works. Hence, physical works have been carried out from the government allotted funds (i.e. 85 per cent).

Rayalaseema Region: Acquire and Regulate. Water regulation is the key in the Rayalaseema region. This region is largely a dry land area, being a part of the Deccan Plateau liberally packed with rocky hillocks and having an undulated terrain. While surface irrigation sources are limited, groundwater has to be extracted from the deep bottoms. The aquifers are interlocked in hard

8. In spite of cheaper power rates, many farmers have not paid up the bills. Because, the Congress party has promised in their electoral manifesto (of Parliamentary elections, held in October 1999) that they will reduce the current rates, and abolish all arrears. These arrears range from Rs. 4,000 to Rs. 35,000 per farmer, with a burden of about Rs. 300 crores per year on the state exchequer.
rocks or are saturated with salinity. Either way, groundwater usage is costly and difficult to tap and its recharge levels are low. Surface irrigation sources are either linked to inter-state water resources sharing or in the case of medium projects are limited to the single crop season. Yet, farmers, over a period of time, have increasingly got used to opt for paddy if easy canal water is available. If it is own-cost extraction of groundwater clubbed with limited surface water, then preference is for horticultural crops. Increasingly, this region is shifting towards mango orchards, citrus fruits and other long gestation and long-term yielding tree products. Farmers prefer this option, because of better insulation from vagaries of rainfall and labour availability and yet, get promised returns over the years.

Thereby, dependability on surface water is less in command areas. More farmers have opted for low water-consumption crops. But, within the authorised command areas, demand for canal irrigation is high owing to paddy cultivation. Most of the tanks in Rayalaseema region, are 100–450 years old. Owing to good physical features, most of them are free from major maintenance problems; bunds are leak-proof, even after 200 years. But, they are constrained by siltation in the tank-bed, and reduction in the in-flows.

Coastal Andhra Region: Delta and Drainage. This region consists of two delta areas — Krishna and Godavari; these irrigation systems are centuries old (with some additions and modifications in recent decades) and well tuned to paddy cultivation. The region has been named as the 'rice-bowl' of India. Over the years, urban-pull and rural-push factors have led to more large landholders shifting their base to urban areas; to add, the next generation showed little interest in farming activity. This trend has pushed many farmlands (more than 75 per cent) to the hands of share-croppers. Production-sharing varies from 25 to 50 per cent, depending on soil quality, and water availability. Since, the owners can do little with soil quality, they have taken keen interest to improve water acquisition and distribution. The WUAs then came as a boon to execute essential works and check the system operation and maintenance. Farmers (mainly landowners) have taken enormous interest in WUAs and their activities, mainly to boost up production levels.

Another major problem infested with the delta region is drainage. Being a delta region and close to the sea (ranging from 20–60 km) the gradient is low — one feet per five km. This has affected easy gravity flow, and during the rainy season, a sheet of water covers the whole area with a depth ranging from one to three feet. Inadequate drainage facilities is a major problem even for irrigated lands. Funds for WUAs, DCs, and PCs came as big boon to this region. During the last two years, all over the delta region, heavy machines were used to desilt main canals, branch canals, and distributories. Essential structures were constructed in some places and repaired in many places. This massive work is visible to landowners and share-croppers. All this has facilitated a smooth flow of water, advancement of transplantation (by two-three weeks) before the arrival of the monsoons, and yield
levels are up by 20–40 per cent. The main advantage, as many farmers mentioned is, “after several years, for the first time delta region did not get submerged in the monsoon period; otherwise, by August, one could see all lands are covered by a sheet of water”. We did not find (during our visit in end August 1999) any submerged paddy fields and most of the transplantation, including in the tail-reaches, was completed before the arrival of monsoon.

**Telangana Region: Sustain Current Development.**

Traditionally, the Telangana region has little experience in canal irrigation; many surface irrigation projects are close to completion stage (some of them have been on-going over the last 20–30 years). The Sri Ram Sagar Project, which has created large irrigation belt, has induced social and economic development in this region; the project is yet to attain its full potential. Hence, the present irrigated area (one-third of the designed command area) has surplus water. But the carrying capacity of the distribution system has been declining over time owing to lack of maintenance and repairs. Under these circumstances, funds through WUAs, DCs became handy to carry out works of their choice. This has boosted the local farmer’s confidence in WUAs.

**Finance**

The financial implications of this whole exercise are presently still not focused. The current emphasis is on empowerment of farmers. The government is saving about 20 per cent on works (which earlier went as rent-seeking at various levels) more as cost effectiveness. Same money is spent, but presumably more work gets done. The main idea is not to save money (by avoiding contractors), but to increase the area under irrigation. At the WUA level, contributions were set at only 15 per cent, (unlike the 30 per cent under Janmabhoomi, schemes). Unfortunately, only few WUAs are contributing their 15 per cent share. Neither the CA nor the project level irrigation department office has records to indicate the number of WUAs contributing their share.

To begin with, the irrigation department was expecting part of the work (as prioritised from walk-through survey) from the current maintenance grant of Rs40/acre which was supposed to be given to the WUAs. Based on the criteria of Rs40/acre for maintenance and repairs, the SRSP project was getting Rs63 million per year (out of the state Rs1500 million); nearly 85 per cent of it was spent on staff costs. It was planned to give this amount to the WUAs in the mid-1997, soon after the WUA elections. Meanwhile, (after three months of the WUA formation) observing the formation of WUAs and the state’s long-term plans, the World Bank expressed interest to support some activities; The Bank was ready to fund, initially, minimum rehabilitation and then operation and maintenance (O&M). The detailed costs worked out to Rs1300/acre in major and medium projects (minor projects were excluded at that time, but for no reason) for minimum rehabilitation. O&M costs worked out to Rs500-600/acre. From this bank grant, the department is
currently providing Rs50/acre during the first year and Rs100/acre during the second year to each WUA. Grants are being given from 1998 to all WUAs in the state for a total of five years. These grants are for the non-SRSP projects under the APRoP project of the World Bank. Under the AP-III project of the World Bank, the SRSP project will be modernised with an allocation of Rs13,000/acre. Till the AP-III starts, the SRSP project gets Rs 500/acre for five years (@Rs100/acre) meant for only O&M.

**Proposed irrigation revenue sharing pattern across the schemes**

<table>
<thead>
<tr>
<th>Level</th>
<th>Major</th>
<th>Medium</th>
<th>Minor</th>
</tr>
</thead>
<tbody>
<tr>
<td>WUA</td>
<td>50%</td>
<td>60%</td>
<td>90%</td>
</tr>
<tr>
<td>DC</td>
<td>20%</td>
<td>30%</td>
<td>-</td>
</tr>
<tr>
<td>PC</td>
<td>20%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Local government</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
</tr>
</tbody>
</table>

In the whole process, the state budget is not touched. After the APRoP project period, WUAs are expected to collect fees, which will be given to all tiers of the organisation and the local government as shown above. The sharing pattern is a tentative plan. During the first year (1998–99) each WUA and DC got Rs50/acre, and during the second year (1999–2000) Rs100/acre as maintenance grant. In these Rs100/acre, minor level WUA has 60 per cent, DC 20 per cent, and PC 20 per cent share; since PC is yet to form, irrigation department (ID) is taking 20 per cent till PC is formed. In this process, Rs1070 million were spent during 1998–99; out of which some Rs1030 million was spent during the 45 days. Every bill of ID has to be passed by the accounts officer, before going to WUA. This is a hindrance owing to the delays and rent-seeking attitude at that level. The annual demand raised (based on water fees) is Rs1400 million, while actual collection is only 50–60 per cent. However, water fee collection has increased to 65 per cent during 1998–99, from 54 per cent during 1997–98.

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9. The World Bank funding for WUAs through Andhra Pradesh Economic Restructuring Program (APERP) came much after the whole process started. Under APERP major items of expenditure (during 1998-99) is a total of Rs 1114 crores, including: a) Minimum rehabilitation, Rs. 336 crores; b) SIFT, Rs. 120 crores; c) Operation and maintenance, Rs. 600 crores; d) Management Information System, Rs. 29 crores; and e) Human Resources Development, Rs. 29 crores.
## Revised Water Charges from 1997

<table>
<thead>
<tr>
<th>Nature of crop</th>
<th>Type of source wise water rates/acre in Rs.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Category I</td>
</tr>
<tr>
<td></td>
<td>Pre-revised</td>
</tr>
<tr>
<td>First or single wet crop</td>
<td>60</td>
</tr>
<tr>
<td>2nd &amp; 3rd wet crop</td>
<td>60</td>
</tr>
<tr>
<td>First crop irrigated</td>
<td>40</td>
</tr>
<tr>
<td>2nd &amp; 3rd crop irrigated dry</td>
<td>40</td>
</tr>
<tr>
<td>Two-season crops per year</td>
<td>120</td>
</tr>
<tr>
<td>Aquaculture per year</td>
<td>0</td>
</tr>
</tbody>
</table>

Note: Pre-revised with effect from July 1986, and Revised from July 1996. 

The financial component has played a pivotal role in expediting the whole WUA exercise in Andhra Pradesh. To begin with (during the APFMIS act formulation), the financial map was not clear; the introduction of the APERP project (as part of the world bank funding for economic reforms in the state) during the later part of 1997, had changed the scenario. The focus shifted to funds allocation for physical rehabilitation. Till 1997, the main problem was lower level of grants for O&M at Rs 40/acre, of which Rs25 was spent on staff costs. With the remaining money, few essential works were carried out. Now, WULAs get Rs50 during the first year and Rs100/acre during the second year and it is free from staff costs. In the process, farmers are realising benefits from the WULAs function in the present pattern. Some farmers as well as field officials have agreed that, "the government investment is less than one bag of paddy per acre (i.e. about Rs 400/bag of 75 kgs, as per the minimum support price); while the return is 5-10 bags/acre (additional yield per acre). That is the real benefit of formation and funding of WULAs". In some places, funds were also promised for WUA and DC office buildings. Every year WULAs in the major canal irrigation projects receive Rs200/acre (100 for WUA and 100 for DC). During 1999-2000, Krishna delta got around Rs123.6 million; NSLC got Rs60 million; medium projects got Rs3 million; and minor projects got Rs10.4 million. Under APERP, the Krishna delta got Rs40.2 million (during 1999-2000), including project Committee works on main canals and drainage works. PIM coordinator of Vijayawada district said, as a coordinator, he would continue WULAs and with 50 per cent of the present level of funding.

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10. For e.g., at a division level (in delta area), Rs. 2 crores (@ Rs. 40/acre), nearly Rs. 1.30 crore goes to salaries. At the sub-division level (at Duggirala in Krishna delta) the Rs. 40/acre grant was Rs. 60 lakhs, out of which work-charge staff salaries are Rs. 35 lakhs, leaving a balance of Rs. 25 lakhs for works. Now, this sub-division gets Rs. 2.60 crores for minimum rehabilitation through WULAs. Clearly a four times increase in funds allocation and all these without any salary component.
One of the key factors attracting the WUAs to function, is the size of funds ranging from Rs700,000 per WUA in Coastal Andhra to a mere Rs12,000 for tank-WUA in Rayalaseema region. The former focuses only on operation and maintenance, and repairs of the distribution system in its command; while, the tank-WUA has to take care of both the source (including tank structures) and distribution system. There is an imbalance in the fund allocation pattern, as most of the tank-WUAs in all regions have complained. Indeed, field officials of the minor irrigation department endorsed this view, and suggested modification in the present allocation pattern to encourage tanks rehabilitation.

Currently, water fee collection and area assessment is done by patwari and in few places WUA president and TCs are involved; together they endorse the figures. Water fee level is Rs 200/acre; about 70 per cent of farmers have paid, the remaining 30 per cent consists mostly large landholders who delay or don’t pay quickly. If fee collection is the responsibility of the WUA, it will be easier, since they can cut off the supplies to the field. Otherwise, there is no record as to who has paid or defaulted. WUAs can raise this issue in the general body meeting and owing to social status, people will pay up; this can not be done by the revenue patwari. On the other hand, WUAs are not focusing on resource mobilisation nor the irrigation department has stressed this point. In some places, farmers are willing to invest on lift irrigation. Priority may be given to such villages, where villagers are willing to contribute a major portion of the investment. That would influence more villages to mobilise own resources.

**Fishing rights:** All tank-WUAs think that fishing rights should be given to them. Currently, fishing rights given to the local fisherman cooperative societies on a 3–5 years lease at much lower rates are unfair. e.g. Srikakulam’s Bajjipuram tank, the fishing rights were sold for only Rs2000, while it could have fetched Rs50,000. Many of the fishermen cooperative societies are belong to outside the WUA boundary and even outside of the village boundary. Local WUA feel very strongly about this, because these contracts could have boosted their resource mobilisation.

**Records**

The FMIS Act. 1997 has suggested maintaining 12 registers at the WUA level; each register focusing on a different aspect, ranging from the work register to the WUA property register. The field staff of the irrigation department report that most WUAs/DCs being in their early stages, maintain just three or four registers pertaining to the minutes of meetings, payment of bills, physical works, and cash dealings. There are a few WUAs, promoted as models, which have all 12 registers. e.g. Elabotharam-WUA in SRSP and Yenubilli tank-WUA in coastal Andhra. Interestingly, many field staff are not aware of the 12 registers. In few cases, the department staff have got registers printed in the local language. Many WUAs (and field staff) are not clear whether they can spend the grant allocated for administrative.
expenses for this purpose. Clearly there is a communication gap. Even CA is not
clear, in many places, about the nature of registers to be maintained. The training
programmes have not incorporated book-keeping by the executive committee as a
main activity, as informed by WUA presidents. Currently all WUAs, except a few,
maintain only a cash book, administration approval, minute’s book, and bank
passbook. Field staff of the department write these registers/records. In a few
cases, locally hired persons write them. Only a few ‘model’ WUAs have task-
specific printed (as prescribed by the Act) registers. In spite of providing Rs10,000
for administrative purposes to all WUAs (many WUAs have not even entered this
in their cash book till August, 1999), neither have they nor local A.E/Dy.Es
printed task-specific registers. There seems to be lack of interest or inadequate
monitoring.

**Area irrigated records:** Until recently, the revenue department
with the help of the agriculture department used to assess the irrigated area at the
end of each season. Owing to an understanding between the farmer and field staff,
reported irrigated area figures and in turn, water fee levels, are less than actual.
‘Discounted’ figures vary from 20-40 per cent less than the actual. By involving
WUAs in the assessment process, irrigated area figures have gone up by 20-40
per cent owing to correction in the documentation process, rather than anything to
do with actual area increase. Information flow from the revenue department to
farmers is still inadequate: in several schemes, farmers do not have command area
maps and information on water fee defaulters. Clearly there is a communication
gap. Even now, either the concerned WUA or ID staff has records to indicate
actual levels of water fee collected in their jurisdiction. The revenue staff feels it is
not obligatory on their part to share this information with WUAs or ID staff: the
village agricultural officer also expressed similar feelings.

**Information Diffusion**

The major advantage of having WUA is quick information flow from
farmers to senior officials and vice versa. Should there be inadequate water supply
and if the local field staff do not respond, farmers quickly complain to the higher
level officials. WUAs have also gained their rights. They also telephonically complain
to state level senior officials, if project level officials do not respond. Before the
formation of WUAs, the process of information flow from bottom to top, used to
take a week to ten days and some times even more.

Reporting WUAs activities in local newspapers and state-level newspapers
has contributed significantly to information dissemination. In other states, local
newspapers are area-based, and restrict their coverage to the local area (mostly
town/city level or district level). In Andhra Pradesh, particularly in recent years,
the state level newspapers in Telugu language, have started having editions at the
district level. Indeed, these newspaper reports have also become inputs for the
Chief Minister’s teleconference every Thursday morning.
Training

The state has launched a massive training programme on WUAs; the programme aims at covering the entire state, by having local training camps for a fixed period (ranging from 2-3 days per batch). Outside agencies have collaborated to prepare the training material in Telugu language. The reading material is widely disseminated to participants. Today, every WUA president and TC member has attended the training programme. WALAMTARI has become a live partner in the whole training process and dissemination of publications. The institute has shifted their focus from earlier engineering-oriented programmes to WUA training programmes. To bring in a practical perspective to classrooms, WALAMTARI has trained middle and junior level officials of the agriculture, revenue and irrigation department, as trainers under the Training of the Trainers. This team in turn conducts classes in the training centres at mandal level.

Crop Pattern

By and large, the irrigated area has expanded owing to improved water supplies and cleaning of canal network. This has largely benefitted the tailend areas. All this has increased the production and productivity levels due to better water distribution practices by the WUA. In most areas, shift is towards rice cultivation both in the kharif and rabi season. For example, in Bannurada village-WUA area, in the kharif season, rice is grown in 3011 acres; total rabi crop area is also 3000 acres. There are no open or bore wells owing to lose and sandy soil, and mainly close to sea coast. In Duggirala-WUA area, the net profit from kharif rice is Rs8-10,000/acre, according to farmers. In rabi, the entire 6727 acres are cultivated; area under rice cultivation has increased from 600 acres before WUA, to 2500 acres after carrying out all physical works. Field official’s record shows all 6727 acres of the command area as wet (paddy) area, plus 1000 acres non-paddy area.

In Emani-WUA in Krishna delta, during kharif all 5700 acres are cultivated for rice. The command area has some 100 filter points; the groundwater from these wells are used for preparation of seed beds; thus some 200 acres use borewells water. In the rabi season, rice cultivation in 3700 acres and blackgram in 2000 acres was possible only after the WUAs works. 11

Monitoring

From mid-1998, every district has a PIM coordinator. These coordinators are expected to coordinate all PIM/WUA/DC training programmes, activities, meetings with district collectors. Currently, they are not dynamic owing to inadequate

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11. We also looked at cost of paddy production in Dharmavaram Tank-WUA. In this command, generally only one crop is cultivated, paddy in kharif and no crop during rabi. One acre of paddy produces some 25-30 bags (each bag of 70 kgs); gross value Rs. 15,000; labour costs Rs. 7000 ($000+2000); chemicals and pesticides Rs. 2500; net profit Rs. 6000, according to local farmers.
training and supportive staff. Some 25 PIM coordinators were positioned at district level mainly owing to problems in career promotion. The PIM coordinator is responsible for computerisation of WUA details; assigning nine digit code numbers for each WUA (as of now only for major and medium projects); supervising training, planning and its implementation; communicating to all WUAs; and sending letters and publishing in local news papers.

All ID people have to report to the district coordinator on a regular basis. Because of the weekly (every Thursday) teleconference meetings the district collector along with ID senior staff have to discuss ID, WUA activities with the chief minister. At these teleconferences the chief minister, gets all newspaper reports (from all district editions of some newspapers) for discussion. This has made all collectors, in turn all staff of ID on tenterhooks, to regularly keep track of newspaper reports, and answer them. This has boosted up WUAs/DCs morale.

Misappropriation

In some WUAs, the president and or the executive committee has mismanaged the funds. Though, the FMIS act provides sufficient insulation, the irrigation department has not taken sufficient preventive measures. The Upper Manor Project is a medium irrigation project with ayacut of 13,000 acres. It has seven WUAs, and no DCs or PCs as per the Act. First year these WUAs got Rs50/acre and Rs100/acre during the second year. So far, three misappropriation cases have been booked against the presidents for utilising the funds for non-specific purposes.

Tanks

The state has 12,294 tanks under the irrigation and CAD department covering 1.25 million ha in 27,379 villages. The overall performance of most minor irrigation tanks is more sensitive to droughts and cyclones due to small size. Their deficient maintenance under the irrigation and CAD department has resulted in losses and decline of irrigated areas. Till May 1999, tank-WUAs (8180) constituted 81 per cent of the total WUAs in the state. In Rayalaseema region, some 23 tank-WUAs have not used tank water for irrigation, yet they are listed; farmers use their own well water, which is recharged from tank storage. For example, in Chandurti mandal (some 20 kms from Siricilla), few tanks have closed (6-7 years back) their canals to recharge wells during two crop seasons. These WUAs just maintain tanks and not distribution network.

Percolation tanks and WUAs: In the Chittoor division area, some 80 per cent of the 60 tanks have been converted into percolation tanks over the last 10–15 years, due to fast depletion of groundwater table and siltation of the tank bed. Gradually farmers have shifted to groundwater usage from earlier practice of tank irrigation. During last 8–10 years, tank sluices have been completely closed to influence continuous recharge of groundwater. Farmers argued that direct tank
water usage, would empty the storage in one to three months; whereas groundwater usage would help irrigate up to 10 months. This is also because, most of these tank command areas are under sugarcane crop.

Now the question is, why do these non-tank water users, require WUA? Field officials of the irrigation department claim that WUAs are local based organisations and can respond to local needs and emergencies. Otherwise, farmers have to travel some 40–50 km to Chittor for any tank related works. The major problem with most of these more than a century old Zamindari tanks, is siltation of the tank bed and thereby, a loss of more than half of their storage capacity. The ID staff strongly feels that desiltation is very costly and it is better to opt for construction of new tanks.

The percolation tanks are located in the northwestern part of the Chittor revenue division, and spread over 2–3 Mandals. But towards the extreme south, east and northeastern part of the district, tanks are still sluice and canal operated surface irrigation systems. Many of these percolation tanks command area farmers are debating, whether to pay or not the water fee owing to complete dependency on groundwater.

**District Level Tank-WUAs Forum:** In Karimnagar, the District Level WUAs President’s Forum was started on 20 April, 1998, to provide a link between WUAs and the government in order to solve problems of funds and grants. Until now, this forum has had 7 meetings. The forum demands are:

- Give Rs250/acre instead of Rs100/acre (no basis for this figure);
- Neeradic should be under WUAs, rather than under the mandal revenue officer. 80 per cent of WUAs have Neeradic and their salary should be given by the government;
- 50 per cent of the funds accrued through fishermen coop societies should be transferred to WUAs.
- Revenue collected from toddy tappers (mainly palm trees) through leasing out trees on canals, tank catchments at Rs11/tree, should be given to WUAs.
- WUAs should get revenue records, map of ayacut, and voters list.
- The Act should enable WUA to punish, or decontrol encroached lands in tank command and catchment areas.
- Presidents are expected to do lot of work, including record keeping, cash maintenance. WUAs need one accountant per mandal basis.
- CAs responsibility is biased; some CAs have 45 tanks each under them; even if he visits one tank/day, he can not inspect all tanks in a month (this problem is not there in major projects)
• The district pay and accounts officer gives account payee cheque payable at Karimnagar town only for which banks take 20 days for realisation. Alternative arrangements (like demand draft) at local level should be made.

Ananthapur District Tank-WUAs Association: The tank-WUAs association formed in July 1999 meets once in three months. Its focus is mainly: a) to fight for auction rights of fish and trees on foreshore and tank bunds area; b) since many WUAs presidents are illiterates, and not fully aware of the WUAs rights and responsibilities, the district tank–WUA association would like to help them; c) through this association, the fight for funds from various district offices. However, so far, the association has not discussed problems of siltation and possibilities of increase in storage capacity. Most tanks help recharge groundwater in the downstream, in some cases up to 10–15 km.

WUA needs

In spite of wide awareness about the WUAs role and responsibilities, not everywhere, they are being involved in the decision-making and implementation process. Under the World Bank supported AP-III project in Sri Ram Sagar Project, allocation for physical works is Rs8090 million out of the total outlay of Rs9510 million. In these physical works, either in planning or at the execution stage WUAs are not involved. But, farmers are hoping that these forthcoming works would be executed through them.

Records: None of the WUAs have their command area map with survey numbers. They are essential for water distribution planning, and fee collection. WUAs need simple formats to report season-wise, source-wise irrigation and area and to check against the revenue records; that would help future fee collection.

Support from Officials

A large number of field staff and senior staff of the irrigation department have started realising how WUAs and DCs are positively facilitating their functions. The competent authority will: a) sanction estimates of DC works and approvals up to Rs One lakh and enter into an agreement for works execution; b) attend problems and works, given to DC. In most cases, CAs feel that in spite of more work, they are enjoying it; especially, since the current process has facilitated more interaction with farmers. Problems are aggregated at the DC level and becomes easy to handle. Distributory committee necessitates farmer’s participation in operation and maintenance of canal network.12

12. E.g., according to one of the CA in SRSP project, after DC and WUA formation irrigated area increased to 3600 acres from 2000. The CA said, additional 800 acres are 30 per cent from revising revenue records, and 70 per cent from owing to better structures and improved maintenance. The SRSP can gain additional 20 per cent irrigated area, if staff can reconcile groundwater irrigated area (now groundwater area is not recorded, properly).
There are some good Samaritans in the irrigation department; the chief engineer and administrator of the SRSP project, are among the key architects of the WUA movement in Andhra Pradesh. The Administrator of Vamsadhara Project at Srikakulam, who is also PIM coordinator in-charge feels strongly that users involvement is necessary in water management essentially to turnover the system. For that he emphasises that top level officials like EE and SE and CE should have direct contact with farmers of various reaches; the top officials should frequently visit the sites and should have open dialogue with the users and personally observe the sites. The SE is brings out the district level newsletter. This newsletter is quite regular and is released during the first week of every month, reporting the progress made, funds disbursed, and one or two farmers are interviewed on WUAs. Every month a thousand copies are printed and distributed to all WUAs. The SE himself edits the newsletter (till now, four issues) and gets a monthly supportive grant of Rs5000 from the irrigation department.

Some field officials shared their disappointment owing to WUAs. They have cut into their additional earnings, which may further decline. A deputy executive engineer expressed that owing to too many WUAs everywhere, a new breed of contractors - WUA presidents have emerged and they charge about 10 per cent commission. They would like to have all monetary details with them. Many territorial committees are against it. Many presidents do not even discuss these monetary aspects during the general body meetings. Perhaps for the same reason, during our discussions with many WUAs, ordinary farmers showed blank faces whenever we discussed financial matters. On the other hand, engineers are hesitant, since they are losing their additional earnings and have to answer to the public. Earlier they were answerable to only the government.

The executive engineer, and the deputy executive engineer of Vijayawada, on Krishna Delta said, WUAs are not taking on the water regulation task. This year, rainfall was delayed by 20 days. WUAs did not help water flow till the tail-reach. They are interested only in works and grants. EE claims that water regulation should be done by engineers; WUAs did not come forward to make any structures: they needed to decrease pipe size from nine to six inches that would help better flows. They are however not keen on shutters also. Farmers like draining more water. Even during the walk-through survey, WUAs, and DCs are dictating engineers. Engineers are not sure about whether WUAs have prioritised their works. Remodelling of all works (pipes) at the minor level are not taking place. EE feels, preference should have been to structures, since water regulation, shutters and pipe structures are important. But WUAs focus on ramps, strengthening bunds, and pipe culverts.

In Ananthpur, the SE of the minor irrigation department, and the SE of the major irrigation department said that before formation of WUAs in major projects, farmers used to have dharanas. During emergencies, tractor loads of farmers would barge in to local department office to demand water and some
essential physical repairs. Now, all that has stopped. Farmers now address the WUA president with their problems. Even officials direct farmers to route their complaints through WUA presidents. In effect, for any command area problems, only one/two persons meet or call upon the officials. Major achievements (according to these SEs) are: a) water reaches tail-end, which is a big achievement; b) WUAs look after all O&M; c) ID is relieved from regular O&M problems. In Rayalaseema region, water regulation was terrible, before WUAs formation; now there is a forum (WUA) to whom ID officials can speak about the emerging issues; in turn these WUA presidents, brief their members and arrive at consensus.

Benefits

Benefits are crystal clear. Large sums have been spent through users associations. Users have identified works and executed them. WUAs have carried out their long pending essential physical works. Physical benefits are accrued in a short time, and they are distinctly visible. Across the state, WUAs are doubly happy for the same reason. Every site gets the same treatment. Wide awareness on WUAs created by the government and the media has surely raised the users' aspirations, and thereby pressurised the WUA president and TC members on one hand, while on the other hand, pressurised the ID staff to execute the works. It is hard to dispute visible benefits. However, some researchers in the state have a different opinion. The solid benefit across the state is water flowing to the tail reaches; some of them were deprived for years, and now receive water for the first time. Physical structures have definitely facilitated better water flow, both across the reaches, and for the length of time. This has enhanced crop yield levels by almost 20–30 per cent across the state. Every WUA that we had visited has vouched on both yield increase and water flow to tail-reach.

The WUA movement in Andhra Pradesh has gained its momentum. With all these visible physical benefits, the spirits of the farmers are high to feel that the system belongs to them. If users take active part in system maintenance, it brings them better flows and improved yields. Developing the sense of ownership is getting established in many places. WUA members unhesitatingly and with pride say "now water is ours; we have a right on that". In the whole process farmers made no (or in some cases, little) monetary contribution; they were involved in decision-making, work execution; hence, the quality of work is better and farmers feel the structures belong to them. A septugenerian (a freedom fighter, and president of WUA-47, in Manthani village) said "earlier government officials were saying and holding important roles; now that is lost. Users have got a major say in all irrigation related aspects; this is a good trend in the state".

The present focus is construction-oriented – system rehabilitation, repairs, and adding essential structures. Many canals are 10–20 years old and never maintained. Stress is on cleaning shrubs, desiltation, and strengthening bunds. Key players (presidents, TCs) and WUA meetings also emphasised on these aspects.
All these activities have resulted in improved and regular water flows, particularly to the tail-reach. Now based on water availability, WUAs decide area for the rabi season and rotation of outlets. In some tanks, WUAs have stopped canal flows to help recharge groundwater. In turn, they use water lifting devices to use water economically for cash crops. In recent years, particularly water scarce areas like Rayalaseema region, most of the tank command area based farmers are shifting to commercial crops.

Even the irrigation department officials are convinced about the benefits. According to one of the executive engineer of the Vamsadhara Project in Coastal Andhra, the following benefits have accrued from WUAs:

- Carrying capacity of canals, both main, distributory and minor canals have increased by 20–30 per cent
- Irrigated area increased mainly in tail reaches by 10–15 per cent
- Number of complaints drastically reduced
- The EE and SE have quick access to information. Earlier information was available only from the AE and Dy EE. Presently, it is from all WUAs
- Users prioritise works and carry them out with technical approval from the CA
- Now users have role in works identification, prioritisation, and execution
- Collective action among users is increasing
- In future, WUAs have to collect fees and do all O&M works; but this will emerge gradually
- WUAs are more beneficial in minor irrigation tanks and medium projects, since source and control can be seen and separated. In major projects (mainly O&M) can be carried out by WUA
- In the Vamsadhara project, the problem was water carrying capacity and not water availability. WUA solved them since most of it are river diversion schemes and run of the river channels. Canals run continuously from July end to December.

In some places the star gains are removal of encroachments, particularly in tank-bed areas. Godavari and Krishna delta areas have gained a leading edge in cashing in the WUA movement, and its associated financial allocations. Because of the sheer size of the command area (together, one million acres), and large size WUAs (average is 9,000 acres) work components and benefits are large. Their prime focus on improving drainage facilities and desilting earthen canal distribution network has paid rich dividends. Even officials concur with user pride. Some major benefits in Krishna delta are: Reduced canal breaches; building of much awaited bathing and washing stone-steps; construction of cattle ramps; desiltation of minors
and distributaries; equity in distribution from tail to head reach. In some distributaries, owing to desiltation, and canal protection walls, water flows till the tail reach easily. Hence, now water distribution starts from tail to head, unlike earlier from head to tail, owing to less water and difficult flow. Paddy crop yield level has increased by 10 bags in the tail reaches (from 15 to 25 bags/acre) and in the head reaches by 5 bags (20–25 to 30 bags/acre). Transplantation has been advanced by 10–15 days throughout the command area; earlier by September, floods could have affected lands if transplantation was not completed. The good drainage system has helped in improving the yield. Now, water flows regularly and drains easily. Hence, improved yield levels and farmers are happy too. This has helped to grow a second crop.\textsuperscript{13} In the Nagarjuna Sagar right bank canal system owing to a weak data base, the project level data could not be collected for seasonwise benefits accrued due to WUA activities. In all these (Krishna, Godavari, and Nagarjuna Sagar) projects, constraint is more of canal regulation and their carrying capacity, rather than water supply levels.

**Present motive is to do away with contractors, involve farmers and spend the whole money on works.** Few PIM coordinators in the recently created posts and appointed at the district level, are in full support of WUA activity. Though some of them have never worked on WUAs and are close to retirement, they are able to see returns from this exercise.

**Staff size reduced.** At a circle level (i.e., superintending engineer level), since the formation of WUAs, all maintenance and repair works are carried out by WUAs. This has some impact on the ID staff size and their workload. For e.g., the SE (major irrigation) in Ananthapur has confirmed that his circle is supposed to have 149 assistant engineers. In reality 60 posts are vacant. The system is still running without any hitch; the SE said “this is mainly owing to WUAs involvement and is really beneficial to the department”. Even at the middle level, for the deputy engineers, vacant positions are 6 (sanctioned are 35) and at executive engineers level, vacant posts are 50 per cent (sanctioned 8).

In Chittoor division, some 65 tanks have been converted into percolation tanks by users, over the last 10–30 years. These percolation tank–WUAs have focused on improving the in-flow channels and strengthening surplus weirs and aprons. Also they have strengthened tank bunds and cleared shrubs and weeds. To improve storage levels, and in turn improve their groundwater recharge levels in the command area, most of these tank commands grow sugarcane, as a traditional crop.

\textsuperscript{13} Duggirala, and Emani WUAs farmers in Krishna delta area have honoured WUA presidents and ID staff for their tremendous efforts in water supply and cleaning canals. They had conducted public functions. They honoured these guests by presenting shawl on their shoulders. now some farmers jokingly say, if they do not perform well, the same farmers will take back the shawl.
The commissioner of irrigation and command area development, Raymond Peters, clearly identifies two major benefits due to WUAs and DCs: a) simplified payment procedures; b) introduction of simple monitoring procedures. Further, he listed out some major achievements:

- Empowerment of farmers; they are more articulate now.
- Emergence of young leadership in rural areas
- Teleconferences for effective monitoring (every Thursday, of the first 3 weeks of the month, with all district collectors and department officials
- WUAs have achieved their critical mass.
- Awareness on both WUAs, and the Act is good.
- Farmer and his organization have a role to maintain the system
- Hardly any complaints on system damages in any project area
- Faction leaders demand collective action in poor areas.

He also identified some major strengths of this experiment: a) Effective, innovative, and quick action for monitoring, and follow up. Since the state has evolved this process, many irritants have been removed; b) Regular field inspection; c) To a large extent rent-seeking levels have been removed. In recent months (early 1999), WUAs have been assigned a nine digit code for better monitoring and follow up at the district level and irrigation department level. The state keeps a tab on these inputs; hence, at all levels, it becomes easy to access data and report progress made and problems if any. Formats are being developed for this.

In Andhra Pradesh, strong political will has made a major difference to the whole WUA exercise, followed by continuous bureaucratic support at the top level. This has led to empowerment of farmers, greater awareness among farmers who have even been able to question the local officials and field staff.

**Social benefits:** Collective action has gained momentum; local leadership is emerging; users own and protect system, defaulters get punishment, social equity has increased; rights and responsibilities are getting clearer during the process. Conflict resolution is easy and quick.

**Economic Benefits:**

- Additional 5.21 lakh acres came under irrigation. In the SRSP project, the reported area has increased from 95,000 acres to 237,000 acres in the first year (1997-98) and to 345,000 acres in the second year (1998-99).
- In spite of heavy rains in Coastal Andhra, there was minimum loss owing to drainage works carried out by WUAs. Besides, rice transplantation was advanced by fifteen days.
- Paddy yield level has increased from 2.5 tons/acre to 3.5 ton/acre. Farmers reported that they obtained 45-60 bags/acre (70 kgs/bag) of paddy. Before WUA formation, it was 30-35 bags/acre.
- Total additional production worth was estimated at Rs6.140 million
Economic benefits are enormous at the state level; expenditure is more productive-oriented. Wasteful expenses reduced; resource mobilization at the local level has increased. Rent seeking has reduced. O&M grants can be reduced and are fully spent on works.

System benefits: The system performance levels improved by carrying out necessary repairs in entire state in two years. Otherwise in a normal course, it might have taken 10 years. Complaints on water supply and system breakdowns are quickly resolved. Procedural delays are reduced. Department officials quickly access problem areas and are able to resolve with WUAs/DCs.

Step towards Sustainability: The whole exercise has been seen as a major achievement in making users accountable and responsible for their action, in system protection, its operation, and maintenance. This has paid rich dividends to the state. It has also helped to improve and sustain the system performance. The irrigation department officials strongly feel about reduced political interference in canal regulation, water supplies, and repairs. Now officials address all complaints directly to WUA presidents.

Benefits for Users

- Contractor system: The contractor, the ‘bad’ middle-man for farmers, has been completely abolished; this has straight away increased funds availability to actual works by 40 per cent.
- Salaries for the work-charge staff (up to 40 per cent of O&M allocations) is bye-passed; now the entire money goes directly to WUAs.
- All this has increased the availability of O&M funds for actual works by four times. 14
- Essential works are identified by local farmers
- For identified works, technical estimates are prepared by the competent authority (here, assistant engineer, and deputy executive engineer) and are executed by the WUA; this has considerably enhanced quality of works and duration of work execution; farmers are quite satisfied with works quality.
- Farmers now feel, “it is our work and we should protect it”.
- WUAs, DCs, (and PCs in formation stage) are driven by government funds (on per acre basis) and other grants (like incentives for unanimous election, and for administrative expenses)
- most of the WUAs feel ‘work if you get money—otherwise, don’t worry’.

14. Earlier, O&M grant was Rs. 40/acre; in that Rs. 15 goes for work-charge staff, and another Rs. 10-15 goes to the contractors’ kitty.
• However, the organization may continue in some form mainly focusing on dispute resolution in some cases, and water distribution in some other places. Otherwise, also some of these villages were doing similar jobs even before WUAs formation.

Benefits for Officials

• The present course of events would lead to major shift towards decentralizing the perceived power structure of local officials - both lower and middle; officials feel, at this speed, even senior officials may lose their "powers".

• However, there is a growing understanding across the state, and across all levels of officials that the WUA movement has helped in a big way in system operation and maintenance; and to a large extent helped to influence farmers involvement in irrigation management. Officials at all levels, and in all places (more in major irrigation systems) feel, their major burden is reduced in operation and maintenance of the system.

• Officials feel that local engineers should have bank cheque signing powers along with the WUA president and TC members. Unfortunately, none of the WUAs are in tune with this view: WUAs feel, this is another tool for arm-twisting and they pleaded "this should not be encouraged; if any WUA presidents and TC members have mis-utilised the funds., the ID staff can always take stringent action on them".

• WUAs and DCs annual expenses should be audited regularly.

Some suggestions by officials

• Minor irrigation officials argue that present grants (Rs$0 or 100/acre) is grossly inadequate for tank systems; in the absence of any DC and PCs for tank systems, WUAs have to take care of both main system (reservoir, sluices, regulation points) and distribution systems. Since present grants are proportionate to area size, tank systems get much lower (in many cases, in the range of Rs12,000–25,000), while major irrigation systems WUAs get in the range of Rs300,000–900,000 or even more. Tank systems need different level of grant; they need completely one time allocation of large amounts to completely rehabilitate the tank systems to their original standards, and then WUAs can get the present level of grants.

• Some senior irrigation officials feel, during the next five years, WUAs should completely a) operate and maintain the system; b) regulate water supplies, and c) collect water fees.

• In the APFMIS Act, according to the S.E. minor irrigation, Ananthapur, some changes are required: a) recalling of WUA president should be
made more effective; b) CA should have control over the funds disbursed (because, WUA president and TC members area misusing funds, he feels); c) the Act should provide a clause to take-back funds from WUA, if they do not execute agreed works.

Major strengths

- **Focus on key areas**: Emphasis was laid on getting rid of middleman - contractors system in O&M; users are responsible for identifying and executing essential works for repair and maintenance. In O&M, irrigation department’s role is reduced and users role increased.

- **Building capabilities**: training at all levels; focus is more on middle and lower level field staff; departmental staff were trained as trainers; for the users training was conducted in all centers; Wide dissemination of specifically prepared training material in local language (Telugu) has been reached to all WUA presidents. Similarly, for the first time in the country, an Act (here, FMIS Act) has been printed in the local language, and has been distributed to all WUA presidents.

- **Good governance**: Strong political will at the top level (the Chief minister and irrigation minister level) has made a positive difference. Right kind of bureaucrats have been identified to head the department/ divisions.

- **Effective Monitoring**: Tele-conferences at top-level with all district collectors and senior officials of the department. Regular monitoring through specially designed formats by filling and filing to higher level offices and quick consolidation at the top level to help necessary decision-making process.

- **Institutionalisation**: The whole process has been evolved through the present set-up. In most states, WUA movement came through a non-governmental or semi-governmental agency (SOPPECOM in Maharashtra, and in small scale through WALMI’s in some states). In Andhra Pradesh, the irrigation department has taken the present initiative: thereby, it has become part of the regular work of the department. It is one of the state-wide department’s initiative and main activity. Competent Authority for WUAs and DCs are regular staff of the department and currently they are responsible to prepare technical estimates and to authorize work completion.

- **Large Scale Operation**: This has four key features like a) Do it in one-shot, b) Massive scale, c) Learning by doing, d) Modify through government orders and continuous monitoring. Anything big is visible and will have wider implications at all levels. Big operation also demand larger human power effort, and related operational and organisational effort; largescale operations are mounted to achieve bigger output in
one-shot. If operations are spread out both in space and time, there is scope to learn by doing. If the framework is flexible to achieve the given targets, then one sees variations across regions and levels. Indeed, flexibility over time provides opportunities to modify the process. Senior officials understand that the whole process is moving towards getting it right—learning by doing. To support the process, government orders/circulars/guidelines are issued regularly.

Some Weakness

a) Organisations are not evolved, b) Members participation and member-control is minimal, c) Activities are organization-president centered.. d) Current trend is 'get-money' and 'execute-work' oriented, e) Training needs assessment was inadequate, f) Lack of incentives and disincentives, both at official and WUAs levels, g) Criteria for performance assessment is not in place for WUAs, DCs, and PCs, and for officials at various levels, h) Absence of demonstration sites/organisations of complete irrigation management turnover, i) Lack of orientation or and professionalism in field to adequately implement PIM approach, j) WUAs are largely dependent on government grants, k) WUAs have inadequate orientation and lack of interest in resource mobilization, water acquisition, and water distribution, l) Absence of a road map for the next five to ten years.

Part III: The Future

This part of the paper focuses on some of the critical issues (like capacity building, organizational structure including federation of WUAs, and financing) and future of PIM in Andhra Pradesh. The issues deliberated are based on our observations, discussions with the officials of the irrigation department, WUA members, and experiences of other states in India. At the outset, there is no road map as such to drive the WUA movement in the state during the next five or ten years. But, the irrigation department has kept irrigation management transfer as its main goal. Towards that direction, formation of WUAs, DCs, and PCs are perceived as most important. “We do not have any blueprint; we wanted to build as it grows” says Raymond Peters, Commissioner of I&CAD, who is the key driving force in the irrigation department for the WUA movement.

Both top level and field staff are making efforts to learn while they do things. The chief engineer of the SRSP project would like the following as future plan to give a boost to the WUA movement in the state by: a) linking water fee with revenue; b) ultimately, making WUAs responsible for collecting water fees; c) future releases of government funds to be proportionate to fee collection of WUAs; and d) development of financial management systems for farmer groups at WUA and DC level.

Andhra Pradesh has made a beginning in large-scale PIM. The chief features are the following:
For the first time, in the state and also in the country, a suitable legislation has been enacted. The administrators and senior engineers with plenty of field experience crafted it. Users across the state and field staff hail the legislation.

The state has mounted awareness and training camps in different parts and for different levels.

Continuous and effective monitoring mechanism both at lower and top levels.

Strong political will laced with administrative acceptance.

Hardly anybody (WUA presidents, DC presidents, TC members) has read the whole act and debated the contents. Even trainers have not read through the act.

A Way Forward

**Water Management:** Many WUA command areas, even after WUA formation, have not irrigated their full designed area. Current irrigation levels, during 1999, are around 60–70 per cent. The department staff says that the carrying capacity of canals is low owing to poor maintenance of the distribution network over the last 15 years. While the system is designed for dry crops, most of it now caters to wet cultivation. This has led to the consumption of more water in less area. Surprisingly, none of the WUAs or DCs has discussed this issue in their meetings or expressed their worries during discussions. Neither DCs nor WUAs presidents are trained to solve this problem. There is dire need to revise the project objectives, and find out how this can be achieved through WUAs. One needs to seriously look into the field realities before making promises to WUAs. There is need to take a realistic view of the main system management and actual water availability. Project wise small-area demonstration models helps in this direction, to learn, modify and to replicate.

**Monitoring:** We feel, that the performance evaluation formats (quarterly, and annually) should have been devised when WUAs were formed. These formats should be on season-crop basis, covering problems, area covered, production and yield levels in their jurisdiction, activities undertaken, resources mobilisation, and item-wise expenditure incurred. It requires focused planning and frequent appraisals and upgradation to keep up with the growth of WUAs and their functions and allied activities.

**Revenue Records:** WUAs should have access to revenue records related to water fee collection made every season. Both WUAs and DCs should get details of land acquired on either sides of the canal and distributories. These lands should be under WUAs and DCs. They should be able to grow plants and auction them or lease them periodically to mobilise resources. Thus, canal bunds would be protected and organisations will have a regular source of income. This would also help reduce the silt accumulation in the canals. We did not see the
command area map with any WUA of the coastal region; it appeared that they are yet to receive one such map.

In each WUA, one or two TCs should also be trained in bookkeeping; their skills need to be upgraded over time, as WUA/DC/PC activities expand. Training should focus on function-specific aspects. If one/two TC members are not willing to pick up the responsibility, locally hired educated unemployed persons can be trained. WUA/DC/PC should agree to pay their salaries and costs.

Copies of all official records should be given to WUAs. These records should include storage levels, reservoir size, tank bed area, canal boundary, catchment area, authorised command area with survey numbers, structures, and other irrigation and revenue details. This would help remove the encroachments, improve the storage level, and carrying capacity in canals of all types of irrigation systems. Currently, around 15–30 per cent more area is irrigated in all projects. In some cases, the additional area irrigated is 40 per cent more than the designed area. But this is not shown in the revenue and irrigation records. In practice, WUAs would be able to convert all non-command area into authorised command area through these records. WUAs would be able to get more funds on per acre basis and collect more water fees. This would help strengthen the resource mobilisation capacity of WUAs and reduce disputes relating to authorised and unauthorised areas.13

**Revamp Training Programmes.** Organisers have to conduct need assessment on contents, timings, and locations of the training programmes. The staff need to be reoriented to effective training and use of effective teaching methods. They need to forge an alliance among NIRD-IRDA-HRD agencies. The training programmes should upgrade skills of WUAs, DCs, and PCs and its various functionaries on task-specific activities. Training programmes (as of now common to all) need to be modified to task-specific training courses. So that, at least one or two persons from each WUA and DC will be trained. Training programmes should be type-specific (major, medium, and minor) and function-specific. As the organisations grow, their needs also change; these training programmes and their contents should keep abreast with the happenings in the field. Revamping training programmes would include the following:

- Training programmes should be modified to user need-based; they should be scheduled according to users' free time (during 1999–2000, training programmes were organized during transplantation time).

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13. E.g., in Vamsadhara project through canal lift irrigation using private diesel pumpsets, some 40,000 acres are getting irrigated; this practice is on for several years; yet, official records do not indicate this; while somebody does collect 'some' water fees from those unauthorised irrigators. This process of rectification and thus revising records, needs to be done before asking WUAs to collect water fees on their own: this is a common demand across all WUAs in the state.
• Training programmes should be organised for task-masters on task-specific issues. Future training programmes should cover ordinary members, preferably to be conducted at the mandal level. Over time, a minimum of one-third members (ordinary members), representing each territorial constituency, should be covered.

• For task-specific (like book-keeping, financial handling, organisational matters) a separate TC can be deputed.

• Training materials should include actual case studies of various WUAs across the state.

• For all training programmes (3–4 days) one day should be kept aside for field visits; indeed training programmes should be conducted in rural areas rather than in urban areas.

• In training programmes, successful and poorly performing WUAs should be invited to share their experiences.

• Both senior and junior officials should be invited to share their successes and shortcomings. Only interested (fortunately, there are many of them in the field) staff and those who are willing to work should be posted as CAs, preferably having a minimum of five years field experience.

One of the key elements for training is having a good and dynamic training institute in the state. Currently WALAMTARI has been identified as the training institute. This was established with USAID assistance in 1987. Originally designed to be an autonomous organisation, it has remained under the wings of the department; virtually, an extended wing of the department. It needs to be restructured, preferably on the lines of recommendations made for WALMI-Gujarat: to design and offer more demand-driven training programmes; to recruit more productive persons on time-bound and incentive based scale; to bring in output orientation to the institute. Currently, in spite of a strong WUA movement in the state, WALAMTARI has a few faculty members with good social science, organisation behaviour, and management skills. The Institute needs to respond to the changing needs of the state and its activities. It has to play: a pivotal role in capacity building for the WUA movement; essentially, track down its road map for the next five to ten years in order to be a productive partner in the WUA movement; be a truly autonomous organisation, free from the irrigation department’s control. Upgrade its staff skills since the training materials currently used for WUAs presidents and CAs training programmes are designed by outside agencies.


17. The Institute need to utilize all those staff trained under USAID assistance, both within and outside the country (currently most of the trained staff had been posted elsewhere in the state).
Strengthen User Participation: WUAs, DCs, and PCs should become member-controlled organisations. There should be incentives for better participation. If government funding stops, many WUA may become defunct. Users may not give money, but some may do *shramadan*. Over the last two years, 15 percent (users share in the total cost) is not collected in any form in most WUAs. If the project is rehabilitated and then turned over to PC, WUAs are willing to manage it. PC, DC, and WUA presidents need training on undertaking allied (farmers preferred) activities in the long-term.

To improve farmers' participation in WUAs:

- Enroll them with members after paying annual fee
- Give identity cards, with photo and survey number
- Provide a passbook for recording water supply and payment of water fee

Enhance ID Staff Productivity: To bring in more effectiveness to the WUA movement, promotions of ID staff should be linked to their performance in PIM activities at different levels. Higher the levels of turnover better the promotion chances. For example, to become a chief engineer, a S.E should have successfully turned over the irrigation system in all respects and should clearly establish the savings to the department and advantages provided to farmers. Performance evaluation should be from the bottom level; for such an exercise, SE may have to put in a minimum of 5–8 years of work on turnover related activities. Similarly, junior level officials have to establish the empirical evidence of turnover at distributory, branch, and main canal or project level in medium irrigation projects and group of tanks.

- Forge institutional alliance: As of now, the WUA movement has been mainly confined to the irrigation department. To utilise the available expertise both within the state and outside, this movement needs to forge an alliance with non-governmental organisations and research institutes (for more details, see the larger version of this paper). To draw a road map, with clear milestones and financial implications, and potential outputs and inputs, it may be worthwhile to collaborate with the International Water Management Institute based in Colombo. All these would enable better: Performance measurement; Appraisals and mid-course corrections; Evaluation; and Learning from mistakes.

**PIM Coordinator at district level:** In future, the PIM coordinator at the district level should be retained and filled by preferably an S.E. Ideally he should be between 45 and 50 years. They can be transferred to other districts to replicate the good practices carried out in their early stint. For more productive results, it should be made compulsory for all S.E's to work as PIM coordinator for a minimum of 5 years (may be in one or two districts) before moving to C.E position. This would help a CE to monitor all activities and PIM too. Currently all deputy executive engineers and assistant engineers are working as competent authorities at their level. PIM experience becomes handy when they become SE and CE to facilitate functions of Project Committee.
The district level PIM coordinator should keep a tab on each WUA on the following: date of estimation submitted; funds actually released; date of work execution; items of expenditure; ensure that WUAs maintain registers as per the Act.

**Focus on Organizational Principles:** WUAs should be directed from the present orientation towards physical works and meetings to water management and productive functioning of the organization in terms of resources mobilization, long term plans, member education, member participation, water and related activities, value added functions, strengthening rule making process and rule enforcement mechanisms. The current method does not focus on the organisational design of WUA. The experience with creating user organisations, especially in gravity flow systems, is still formative and yet to yield firm design principles which will ensure that the user organisations will be capable of self-governance and self-management. The WUA movement will be in jeopardy unless it begins with valid assumptions about the design principles that need to be followed to catalyse participatory user organisations. Designing energetic member organisations involves understanding their working through focusing on the interactions between their three constituent sub-systems: members, the governance structure (board or management committee), and the operating system which provides the services. User organisations succeed when their design ensures high levels of:

- **Goal Cohesiveness:** Members are somehow able to ensure that, in all decision-making, the governance structure is cohesive around the goal of promoting members' immediate, direct, and common interests
- **Governance Effectiveness:** the governance structure (management committee) is able to 'govern' the operating system such that the goals of members get served
- **Member-need Responsiveness:** the operating system is able to devise new and innovative ways to strengthen the loyalty and allegiance of members to the user organisation

Extensive research in member organisations in various fields suggests that robust self-governing user organisations achieve high levels of goal-cohesiveness, governance effectiveness, and member-need responsiveness by satisfying four design principles:

- **a) Member-Centrality of the Goal:** Members give their allegiance and loyalty to a user organization only to the extent it serves their interests. If the purpose is non-central or not-immediate for members, the organization generally proves still-born unless externally propped up. If its purpose is non-central to members, people will participate but will withhold their support as soon as selective inducements in the form of subsidies, wage labour, and other give-aways are withdrawn.
b) Goal-cohesive Governance: Most boards/management committees of induced user organisations tend to be powerless, divisive, and pursue an agenda that has vague or no relationship with members' stake in the organization. Often boards/management committees do not represent genuine member interests or are dominated by outside agencies. It also happens that, after being elected/nominated, members have no or ineffective mechanisms to hold non-performing boards accountable to them. Training and education for effective board development can help promote member-centred governance, but the design features that are really critical include: [a] election of all or most members of the governance structure by members; [b] stake-based voting rights and representation; [c] members' rights of recalling non-performing boards/members; and [d] board/management committee (and not the catalyst organisation) as the custodian of the decision making authority of the general body.

c) Get the Right Operating System: The operating system is the vehicle through which the user organisation serves members. It has to be so designed that it can generate high rewards for collective action. Operating systems which successfully add value, often invent new methods of organising resource-system or getting tasks performed or service delivered compared to existing methods. The operating system for a successful user organisation creates unique member allegiance propositions that provide members strong and continuing reasons for offering their loyalty and allegiance to the organisation and to comply with the behavioral norms it establishes.

d) Secure and Retain Member Faith and Allegiance: The user organisation fails when members desert it. On the contrary, a user organization becomes increasingly stronger as it amasses the allegiance and loyalty of a growing membership. Even when well designed, a user organisation has to be launched carefully since adverse member expectations formed from early experiences take a long time to undo. The operating system thus has to create positive member expectations at the start and meet them so that a member develop faith in its capacity to deliver. Virtuous cycles of this type strengthen member allegiance and faith in the user organisation, which is the sure formula for its success and centrality.

Develop Model Projects: The AP-FMIS act is a trendsetter for the country and also for south Asian countries. The Act remains same for the whole state; while the government orders have to make provisions for regional variations. For users, and also field staff, seeing is believing. As of now, the state has no pilot site/project to show as the model and from which to learn lessons. The state has to have demonstration sites/projects, wherein the total irrigation management transfer has taken place. Good documentation and lessons learnt will be a good guide during the training programmes and for replication in the state. In the absence of that, both water users and field staff are riding on wish-horses. For demonstrative effect, in each of the three regions (Telangana, Coastal Andhra, and Rayalaseema) one full major project (or a hydraulic boundary of 50,000 acres or above), one
medium project, and two minor irrigation projects (or two tanks) should be taken to bring all WUAs, DCs and form one PC. Farmers should be involved in selecting the pilot sites for full turnover.

First, bring these sites on to a dynamic function in tune with the act and establish a true organic link across all tiers in their functions, responsibilities, and roles. Each tier, wherever applicable, should be accountable both upward and downward. Gradually, in a phase-wise manner, as the tiers get strengthened, the irrigation department should be withdrawn from all projects (under this experiment); each tier or concerned organisation level should have office space in the regular ID office and use it for regular liaison purposes; as the ID staff reduces, the WUA/DC/PC should, if they feel, increase their staff; if the user organisations are made to pay staff salaries, they will be in a better position to judge the need-based staff. As today the lascar is accountable and works under WUAs, similarly AEs and DyEEs should work under DCs. Gradually, this should move up to EE and SE level.

The state has to design and attempt three different approaches, one each for minor, medium, and major projects. While the existing Act serves a good purpose at the macro-level, in practice, for effective implementation, problems are mainly technical and social. Feasible approaches have to be evolved, designed region and type-wise. To test the feasibility of these approaches a period of two crop seasons should be considered. Geographically, the experiment should cover three districts in three regions; in each region it should cover a minor, medium and major projects. During the second year, the approach may be modified and extended to two more districts; and during the third year onwards replicated all over the state.

**Maintain the Tempo:** To keep up the tempo and experiment with irrigation management transfer in a more meaningful manner, the state needs to adopt three projects – one each in Telengana, Coastal Andhra, and Rayalaseema. A gradual process of turnover should take place. Interested and task-oriented SEs should be posted with full responsibility to perform and show results within three years. These SEs should have overall responsibility to plan, execute, turnover, and thereby to prove clear-cut benefits to farmers and the state in terms of water efficiency, actual area irrigated (after reconciliation with revenue records), savings in O&M grants to the state, savings in staff at various levels, and water fee collection across reaches. Savings to government and benefits to farmers should be clearly measurable at each division level. This kind of demonstration effect is essential to convince both technical staff and farmers; indeed, these demonstration projects, should become training locations for WUAs, DCs, and PCs, and all CAs.

**Transform Technocracy:** In the state, the focus is on transforming technocracy. Owing to the Chief Minister’s teleconferences and district collectors’ frequent meetings, countless formats have to be sent to the I&CAD secretary regularly. On turning over projects to WUAs, the whole ID staff is involved in the exercise. Even if 50 per cent of the staff is not interested, day in and out, owing to
interactions with WUAs and their activities, they get familiar with WUAs. However, individual and attitudinal changes do matter a lot. In Srikakulam district, like in other districts, the collector gives two awards to the best CAs in the district, and similar awards to staff of other departments.

As part of the transforming technocracy, the present set-up of the organisation has to be restructured on the following lines. The proposed federal structure will have WUA at the bottom and the irrigation department at the top. The federal structure will:

- Be self-supporting with initial corpus fund from the government;
- Hire professionals at all levels, and will have own staff rules and incentive schemes for high performers;
- Have rights to raise funds and loans at all levels. The federal structure will have four tier structure - WUAs at the bottom, DCs at the second tier, and PCs at the third tier (project level), and the state level federation at the top level.
- Each level will be self-supporting with autonomous powers, with clear rights and responsibilities, yet vertically and horizontally well integrated (e.g., for water acquisition, water distribution, system maintenance, and fee collection). We feel, the federal structure as shown in Figure 1 may be useful.

**Utilise local knowledge**: The government should encourage all PCs to explore the replication of the Mullankoor Multi-purpose Cooperative Society’s activities. In Srikakulam district, many WUAs are keen to undertake allied activities like distribution of fertilisers, seeds, pesticides, and tractors. All DC and PC presidents need proper orientation to chalk out long-term plans to design road maps to travel for the next 5–10 years.

**Tackling Tanks**

Management of tanks necessitates an altogether different approach. Tank users’ associations have control both on source of water and its entire distribution system. Compared to major and medium irrigation systems, tank systems are pretty old. A large number of rainfed tanks in Vishakapatnam district are of the pre-independence vintage. Most of them have a designed command area of 150 acres and more. In 1953 the irrigation department took over these tanks, which hardly had any repair and maintenance work undertaken. Some of them have silt close to their surplus weir level. Most of the silt comes from nearby hillocks owing to flash floods, high slope, and deforestation in the upper stream and lack of catchment area treatment. What is required is to desilt for sustainable irrigation and increase irrigated area. But present O&M grants at Rs100/acre are inadequate for any desilting work. Government, according to field officials, has to provide special grants, since this problem is not prevalent in major and medium projects.
Another problem affecting most of the tanks in Vishakapatnam and Vijayanagaram districts is growth of weeds (Ipomea and others). Almost all tanks face this problem, which is worsening every year. According to field officials and farmers, weed growth in the tankbeds has reduced water storage by one-third. Farmers suggest that when tank-beds are dry in summer, weeds should be completely removed and the tank bed ploughed couple of times, and some herbicides applied. Funds under O&M are not sufficient for these activities. Total cost for these activities should be shared by the WUA to a minimum of 30 per cent. Priority should be given to whichever WUA is keen to share more than 30 per cent costs. Suitable and cost-effective mechanisms have to be evolved to remove weeds permanently.

Tank management is a different ball game. Tank-WUAs need different financial disbursements. Firstly, they require physical rehabilitation. Prior to that, tank-WUAs should be made vibrant and responsive. This needs a special task force
both at the state and regional level. A time-bound plan should be evolved in consultation with the existing tank-WUAs and in some cases (wherever available) district level tank-WUA associations.

**Fishing rights:** Most tanks have potential to cultivate fish and sell them for Rs10,000 to 200,000 per year. But, as of now they are helpless to make use of this opportunity, owing to existing rules. Current rules permit fishing by only fishing cooperatives at local level, who pay some nominal amount to the fisheries department. In turn, the fisheries department pays some nominal amount to WUA. According to the Bajjipuram tank-WUA, it can get Rs50,000 per year as fishing rights, while presently it gets only Rs2000 per year from the fisheries department. To improve the resource mobilisation capacity of WUAs, rules need to be revised. The fishing community also does not get any benefits. Currently, middlemen are making money.

**Some Issues**

- How to retain the present cropping pattern and cope with the increasing shift towards water loving crops, which is quite far from the designed cropping pattern? Or Should WUAs take the present cropping pattern as given, and with the help of agricultural and extension departments, plan effectively for the future course of action?
- How to involve WUAs, DCs and PCs in water regulation?
- How to achieve equity in water distribution?
- One of the major issues is the role of share-croppers; they are concerned with day-to-day affairs of the canal system, water regulation, system maintenance. They however, lack voting power and do not have rights to raise points in GBMs, while the actual landowners hardly take interest in canal system affairs. The FMIS act should enable the share-croppers to actively participate in WUA affairs, and have voting powers in WUA elections and rights to raise issues in GBMs. In the absence of the sharecropper's active role, the WUA role may not be effective.
- Most WUAs are not clear about how to spend funds. In the first year spending was restricted to works and during the second year to only maintenance and repairs. In reality, their priority was other things for which the funding conditions were not flexible. For the next two years, WUAs and DCs should be permitted to plan and execute (with technical assistance from ID staff) entirely on activities, which they prefer. No activity-wise conditions should be attached to funds and funds should be released in two time-bound installments.
- To have more effective integration of WUAs at all levels they need to be federated into a four tier structure: primary (at present level); secondary (distributory or DC level); Project (PC level); and apex (state level body)
level. This would enhance the coordination of various aspects (organisational, financial and manpower). This would also facilitate focusing on essential activities like water acquisition, water regulation and distribution, and moving towards equity within the WUA level and across the reaches in a project. The apex body has to take the full responsibility of all these functions; it should plan and execute its activities on its own; generate funds; should be able to borrow funds and get grants on its own. The organisation should lay emphasis on member-controlled WUAs, DCs and PCs. The apex body and the four-tier organisation should function as vibrant and truly member-controlled organisations.  

- Before the WUA formation, local informal committees or groups (both in tanks and canal systems) used to collect both men (one/acre or household) and money (Rs 10-50/acre or household) for essential works like cleaning canals before the crop season began, desilting, and some essential repairs. After the formation of WUAs, all farmers think that since the government is giving money, let the WUA president and TC members do all the works. Farmers, in general, contribute neither labour nor money. The new initiative of the government has weakened the local initiatives and participation. The new initiatives are defined to be participatory; but the approach is different. The new approach was imposed from outside, and has little member-contribution and control, while the traditional approach was locally evolved and member-controlled.

The new approach should have taken local approaches into consideration; it should necessitate that local farmers contribute first and twice of that amount may be given as a matching grant from the government. Local contributions should have been made compulsory on an acre basis. Rs 30-50/acre/year is ideal, as many WUAs have mentioned. Thereby, members would develop stakes in the organisation and its functions. Some WUAs have suggested that the accumulated money may be deposited in a commercial bank and the interest accrued may be spent on activities.

- There is inequity in water distribution in percolation tank command areas. The powerful farmers have better access to groundwater extraction and usage, while resource-poor farmers have to opt for dry crops. There are no restrictions on the crop pattern in the command area. While some

18. In India, such member-controlled organisations and their success stories have proved that, it is possible to effectively function that way, e.g. three-tier milk societies in many states which has created white revolution in the country; apple growers cooperatives in Himachal Pradesh and Western Uttar Pradesh, which has strengthened growers and at the same time, delivered apples round the year all over the country. Locally, Andhra Pradesh can look at Mulkanoor Multi-purpose Cooperative Society for its effective member-controlled and good servicing society.
grow dry crops, others can cultivate water-loving crops since they use their own well water.

- A clear message has to be disseminated at all levels of the ID hierarchy that their future growth, both horizontal and vertical, is related to progress made in WUAs and their functions.
- It is essential, to design a separate training course to ID field staff and WUA office bearers on how to make WUAs self-dependent, and how a WUA/DC/PC should work as a true organisation.
- Future fund allocation to WUAs, DCs and PCs should be based on performance, water fee collection, GBMs held, number of members attended and other related aspects. Definitely not on just acre-basis.
- An institutional study is required at the end of the third year, to consider further institutional adjustments, including options chosen in other countries and sectors.
- To improve water use efficiency and accountability, the state has to form basin-wise autonomous boards. These boards will have full responsibility to plan, implement, monitor and assess the progress of water resources development. The boards, will design locally suitable strategies for irrigation management transfer, cost recovery, and raising revenues from the open market (like the Krishna Valley Development Corporation Bonds).

**Replicability**

The Andhra Pradesh programme on WUAs is a standing example of how an impossible task can be made possible. Prime requirements are:

- strong political will
- right people in right places, particularly dynamic and interested bureaucrats at the top level and senior officials of the irrigation department
- crafting the FMIS Act, locally by the state officials and evolve it internally
- further modifications should be quick and government orders should be issued at the earliest
- massive awareness campaign for officials and farmers
- mount task-specific training programmes both for officials and farmers
- enforcement of effective monitoring system from top to bottom levels
- based on feedback and complaints, corrective steps should be taken quickly
- Financial assistance through WUAs for physical rehabilitation and essential repairs. (Please see Part-I for presentation of the PIM model in Andhra Pradesh).
Fig. 2 Responsibilities of WUAs and government in the process of irrigation management transfer for adoption in demonstration sites in Andhra Pradesh and replication in other states.

Impressed by the performance, some states have made a modest beginning to replicate the experiment. Madhya Pradesh has already formulated a legislation mostly in tune with the AP-FMIS Act. Tamil Nadu seems to have started an internal exercise to move towards in this direction. Officials of the Andhra Pradesh Irrigation Department strongly feel that the states interested to replicate the experiment should have taken the Andhra Pradesh state personnel during the initial years of WUA formulation. This state could share its rich experience with other states.

Both demonstration sites in Andhra Pradesh and other states have to make well designed and constant efforts to move towards total irrigation management transfer. To begin with, as shown in Figure 2, responsibilities of the government have to be minimal in the lower level of canal distribution network and gradually increase towards main canal and project level. The above chart indicates kind of responsibilities of WUAs and the government across different levels of the irrigation system.

What is also essential is that both the Planning Commission and the Command Area Development wings of the Government of India, should make such Acts and internal changes as pre-condition for any assistance, including financial disbursements from the central government. This would help build pressure to expedite the process. In spite of having a separate component on farmers organisation
and turnover in the Water Resources Consolidation Project, three states (Haryana, Orissa, and Tamil Nadu) have made little progress in that direction. These three states had started their exercise, much before Andhra Pradesh stepped in. On the other hand, the Indian Network for Participatory Irrigation Management (INPIM), should play a more active role at two levels: central level and another state level. It should help restructure all state training institutes (like WLMIs) to respond to the emerging needs of the state irrigation sector. The INPIM can facilitate at state level, formulation of policy and legal framework formulation, guidelines for monitoring and evaluation of WUAs and irrigation management transfer activities, and for training farmers and officials at various levels.

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Price: Rs.30-00

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