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How Participatory is Participatory Irrigation Management (PIM)? A Study of Water User Associations (WUAs) in Andhra Pradesh

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ABSTRACT

It is argued that the reason for the ills of irrigation management is the alienation of farmers from the process of planning and implementation. Often 'lack of political will' is identified as the main reason for the tardy progress in irrigation reforms at the state level. Andhra Pradesh has demonstrated the political will by initiating widespread irrigation reforms through legislation. This paper, based on the situation after six years of WUAs in existence, makes an attempt to provide a comprehensive view on the status and functioning of the Water Users' Associations in the State. It is argued that while substantial amounts of money were spent on the reform process, the money was used mainly for improving the ailing irrigation systems rather than strengthening the formal institutional structures. Though some benefits in terms of increased area under irrigation in canal systems and improved quality of irrigation is evident, the sustainability of these benefits is rather uncertain in the absence of efficient institutional structures.

Despite the fact that WUAs are promoted as non-political institutions, 'elite capture' and political involvement dominate their functioning. And the present trend appears to be towards further politicization of these institutions. More importantly, even after six years of their existence devolution of powers to WUAs has not taken place, as most of the important functions like assessment, collection of water charges, sanctioning of works, etc., are still in the hands of the irrigation department. In the absence of devolution of powers the WUAs are aiming for political gains rather than improving the systems. It is argued that political will is a necessary but not a sufficient condition for making the WUAs autonomous and self-sufficient. Restructuring and reforming of the State irrigation departments and the bureaucracy is critical for effective and sustainable irrigation institutions.

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I Background

Judicious management of water resources is among the critical policy issues across the continents. The need for action in this direction is growing, as countries and communities across the globe are increasingly experiencing water stress. The growing water stress represents culmination of gross neglect and mis-management of water resources over the years. For, the problem is not due to absolute shortage of water, but due to the absence of proper mechanisms for conservation, distribution and efficient use. Realising the importance, irrigation development policy has undergone changes across the globe during the last ten years. As Meinzen-Dick, et. al (1997) point out that the earlier approaches to irrigation development were based on the assumption that a combination of "correct" technology, "efficient" markets, and "capable" agencies (government departments) would yield best possible results. These approaches were found ineffective in the absence of decentralization and devolution of powers to the users. It is now widely recognized that appropriate institutional arrangements involving farmers and other stakeholders is critical for sustainable water resource management.

A growing body of literature documents the role of farmers' organizations in irrigation management and agricultural development. It is the social system that ultimately determines how productively the water flowing through the irrigation system will be managed. These social systems may be traditional forms of farmer organization or more contemporary forms such as the Water Users' Associations (WUAs). Vermillion (1996) observed that farmer management of public irrigation systems would enhance their performance

and bring about wide-ranging socio-economic changes that would enable farmers to substantially improve farm income besides improving cost-effectiveness of operation and maintenance. Though global experience with irrigation management transfer is far from uniform, especially in low-income societies, it has shown some success in countries like Philippines, Mexico, Chile, Australia, etc (Saleth and Dinar, 2004).

The central and State governments of independent India inherited the idea that most water rights belong to the State (Stone, 1984). But this trend has been changed in recent years where, many State governments have adopted the principle of participatory irrigation management through government orders. The Command Area Development (CAD) programme, operational since 1973, became the major effort towards improving water use efficiency and productivity of irrigated agriculture. During the second half of 1990s, number of States in India had transferred the irrigation management responsibilities to WUAs or private/NGO contractors. In most of the cases, full transfer of powers has taken place as far as responsibilities are concerned (O&M, water distribution, fee collection, etc), while only partial transfer has taken place in the case of assessment, assured water supply, etc.

In Andhra Pradesh, Irrigation and Command Area Development (CAD) Act that was enacted in the year 1984 imposed the creation of command area development authorities and ‘Pipe Committees’. These ‘Pipe Committees’ proved to be quite ineffective as the delivery of water at the outlet was quite unrealistic leaving no scope to the pipe committees to effect any improvement in the distribution of water. Pipe Committees had no role in the maintenance and their responsibilities were not defined and hence were non-functional (Joshi, 1997). The State through another act in the year 1997 called "The Andhra Pradesh Farmers’ Management of Irrigation" created a three-tier WUA system at hydraulic level, Distributory Committee and Project Committee. More than 10,000 WUAs have been formed with a clearly specified responsibilities and powers. A provision was also made to provide financial assistance for those WUAs that enhance water fee collections in their commands (Brewer, et al. 1999).

Most of the studies available on the experience of WUAs are early assessments, as the process of implementation was just falling in line. These studies provide mixed assessment of the WUAs and the impact

appears to differ between canal WUAs and tank WUAs[1]. The WUAs are expected to be financially self sufficient, socially stronger and politically united to manage the systems efficiently in the medium to long term (above 5 years). Against this backdrop, this paper, based on the situation after six years of WUAs in existence, makes an attempt to provide a comprehensive view on the status and functioning of the Water Users' Associations in the State of Andhra Pradesh.

II Setting

The A. P. Farmers' Management of Irrigation Systems Act was enacted in 1997. Following this the elections were conducted in June 1997 to WUAs for all major, medium and minor schemes. In November 1997, elections to the distributory committees were also completed. It was proposed (1997) that project level committees would also be constituted soon in order to effect total transfer of management to the farmers' organisations. The main objectives of the WUAs act include: i) realising the maximum irrigation potential, ii) ensuring equitable and reliable supplies, iii) improving the efficiency of the existing irrigation network, and iv) managing water resources better through stakeholder participation and withdraw the department from O & M. Under this act, upto March 2000, 10,292 WUAs have been registered (Table 1). Of these, elections for 9,800 WUAs were conducted and these WUAs were formalised by March 2000. Elections were not conducted in 492 WUAs for various reasons such as stay orders from court or the government. Interestingly, elections were unanimous in majority of the cases (Jairath, 2001). Elections for the second term were conducted during 2003, though not in all the WUAs. Second term elections were conducted in all but nine districts and in about 4,564 out of the total 10,790 WUAs. Elections were postponed in nine districts[2]. The main reason given was that there was no water in the canals, especially in the Nagarjuna Sagar command area. About 80 percent of these WUAs are in minor systems. The evolution of water user associations is mainly facilitated by the A. P. Economic restructuring project (irrigation component) funded (Rs.4,994 crores) mainly by World

[1] To capture both the views see Pangare (2002), Jairath, (2001), Parthasarathy and Joshi (2001), Raju (2001), Reddy (1998) and Peter and Pingle (1999).

[2] These districts include Anantapur, Cuddapah, Guntur, Khammam, Krishna, Kurnool, Nalgonda, Nellore and Prakasam. Besides, elections for 22 WUAs in West Godavari and 11 WUAs in Chittoor are with held.

Bank, NABARD and through the Accelerated Irrigation Benefit Programme (AIBP) of Government of India.

Table 1: District / Sector Wise WUAs (as on 23/03/2000)

Name of the District	Total No. of WUAs Notified			Total Notified (2+3+4)	Elections conducted			Total (6+7 +8)	Elec-tions to be Held	Total No. of WUAs (9+10)
	Major	Medi-um	Minor		Major	Medi-um	Minor			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Adilabad*	35	27	221	283	35	27	212	274	9	283
Anantapur	46	7	305	358	46	7	302	355	3	358
Chittoor	0	51	644	695	0	48	616	664	31	695
Cuddapah	74	8	276	358	74	8	259	341	70	358
E. Godavari#	106	12	225	343	106	12	215	333	10	343
Guntur	245	8	81	334	239	8	76	323	11	334
Karimnagar	249	10	586	845	249	10	571	83	15	845
Khammam	51	5	181	237	50	5	180	235	2	237
Krishna	189	12	288	489	166	12	256	434	55	489
Kurnool	116	12	153	281	114	12	145	271	10	281
M.Nagar	21	31	478	530	21	29	473	523	7	530
Medak	0	12	585	597	0	12	551	563	34	597
Nalgonda	91	45	541	677	91	44	541	678	1	677
Nellor	110	58	695	863	100	57	612	769	94	863
Nizamabad^	78	13	267	358	78	13	228	319	39	358
Prakasam	124	5	317	446	113	4	291	408	38	446
Rangareddy	0	3	165	168	0	2	165	167	1	168
Srikakulam	37	28	459	524	37	28	442	507	17	524
Visakha**	28	18	375	421	28	18	349	415	6	421
Vizianagaram	0	22	439	461	0	21	422	443	18	461
Warangal	29	18	683	730	28	18	623	669	61	730
W. Godavari	71	6	217	294	70	6	205	281	13	294
Total	**1700**	**411**	**8181**	**10292**	**1645**	**401**	**7754**	**9800**	**492**	**10292**

Notes: *Includes 9 WUAs under Vattivagu & Chelamalavagu.
**Includes Tandava (Part Only)
#Includes 12 WUAs under Tandava
^Includes 7 WUAs under Koulsanala, conduct of elections signifies completion of the formalities of WUAs.
Source: Department of irrigation, Govt. of Andhra Pradesh.

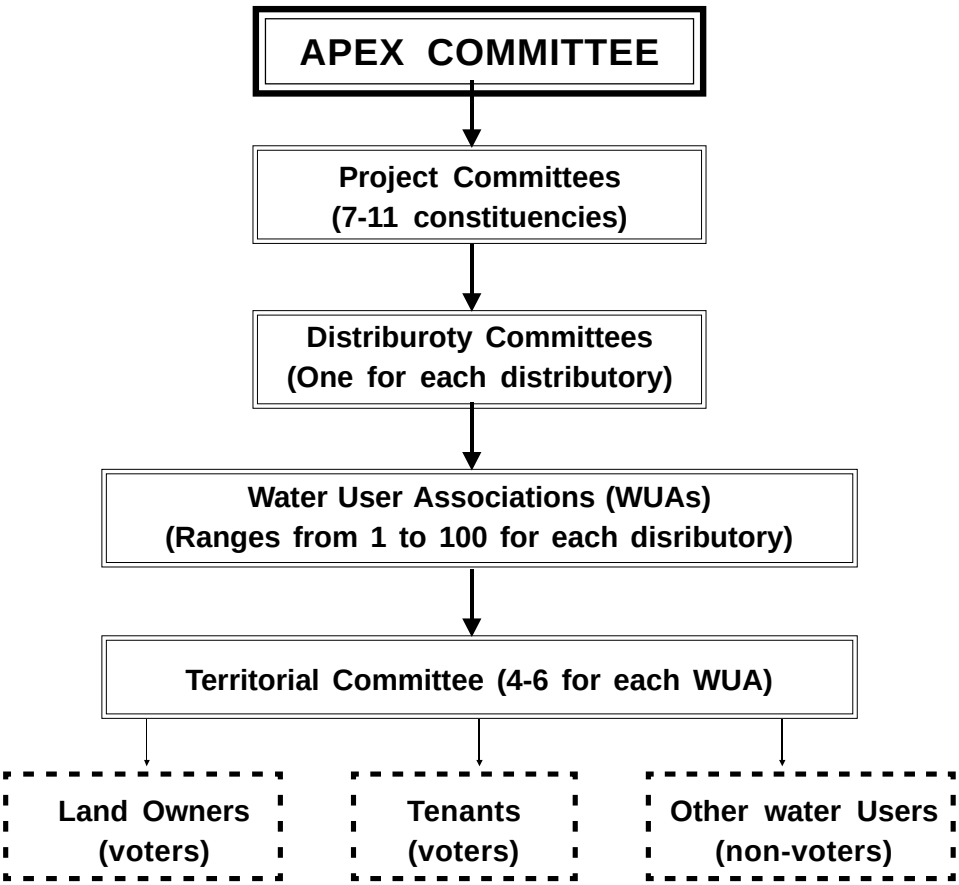
Institutional Structure [3]

As per the act all the surface irrigation schemes, major, medium and minor, are covered under the programme. Only the schemes under the *Panchayati Raj* institutions and all minor water bodies in the scheduled areas of Andhra Pradesh are not covered. Command area of the project has been delineated

[3] For more details see Pangare (2002); Jairath (2001) and Raju (2000).

on hydraulic basis that was administratively and functionally viable. Each farmers' organisation was expected to have even number of territorial constituencies or committees (TC) within the WUA. Area covered by each constituency depends on the nature of the project and size of the command area. It ranges between 150 and 250 hectares in the case of major and medium projects and between less than 50 and 200 hectares in the case of minor irrigation projects. Each TC will have an area between 250 and 600 hectares. The area under the WUA ranges from 250 to 3500 hectares. The area will be much less in the case of minor systems. Depending on the type of irrigation scheme, one to three tier systems of associations / committees will be in place. Each Assistant Engineer will be in-charge for a maximum area of 4445 ha and four to five times of this area would be under a Deputy Engineer. The basic structure of the PIM is presented in Figure 1.

Figure 1: Structure of the Participatory Irrigation Management in Andhra Pradesh



Water User Associations are the primary structures of irrigation water users. Number of WUAs under each scheme depends on the size of the irrigation scheme, which ranges from one to a few hundreds of WUAs across the schemes. The main role of WUAs is to regulate and distribute water within its command area. The total command area will be divided into 4-10 Water User (WU) constituencies. Each WU constituency will elect a member of the WUAs managing committee and directly elect the president of the WUA. All the landholders, title holders as well as tenants, within localised / authorised area are members of the WUAs with voting rights. All other water users will be co-opted members without voting rights. A group of WUAs under a distributory or a small group of distributaries comprises a distributory committee (DC), which will look after the distributory related issues. All the WUA Presidents are members of the DC and they elect the managing committee and the president of the DC. All the DC Presidents will be members of the project committees (PC). PCs are in-charge of the entire project command area, which is often divided in to 7-11 constituencies. The members of the PC will elect the president and 7-11 managing committee members from each constituency. Above all, an apex committee headed by the minister for major and medium projects shall be constituted to formulate broad policy guidelines and to resolve the disputes.

The election procedure of the WUAs has been changed in the year 2003. According to the new procedure: There are twelve territorial WU constituencies in each of the Water User Association of Major and medium irrigation systems and six in the case of minor irrigation systems. Every WUA shall consist of the following members:

- All the water users who are land holders in water users area,
- All other water users co-opted in a water user area
- Members specified above shall constitute the general body for a Water Users' Association
- A person eligible to become a member of more than one territorial constituency of a water user associations under above shall be entitled to be a member of only one territorial constituency and he/she shall exercise his/her option of membership
- Members specified above shall alone have the right to vote

There shall be a Managing Committee for each Water User Association, comprising members of the Territorial constituencies elected directly by the water users from their respective Territorial constituencies. The managing committee for water users association shall be a continuous body, with one third of its members retiring every two years. The term of the office of the members of the Territorial Constituencies is expected to be six years from the date of first meeting of the Managing Committee (Provided that at the first election, all the territorial constituency members shall be elected at one time, out of which, one third of the members thereof shall retire as soon as may be on the completion of two years, another one third members are expected to retire after completion of four years, and the remaining one third shall retire after completion of six years in office and their terms of retirement shall be decided by drawl of lots.)

An ordinary election is to be held for the purpose of constituting water users associations in major, medium and minor irrigation systems. The election of Territorial constituency members, President and the vice-president of the water users association may be either through raising of hands or through voting slips. The Election officer shall ascertain the opinion of the voters present in respect of their choice of electing the president whether by rising of hands or through voting slips. The election officer shall follow one of the above two methods as agreed upon by the majority of the voters present. The president and the vice-president of the managing committee of water users association shall, if not recalled or removed or disqualified by the provisions of the Act, be in office for a period of two years from the date of election or his tenure as member of territorial constituency, which ever is earlier.

Functions of these bodies include preparation of operational plans at the beginning of each season, maintain an inventory of irrigation systems such as tanks, ponds, wells, etc., within the command area, maintenance of records, plan and execute the distributory and drainage systems maintenance, water budgeting, resource mobilisation, conflict resolution, etc. One interesting feature of the WUAs is the right to recall the president if his functioning is not satisfactory. The general body can remove him with one-third majority. However, the institutional structure misses out on some important aspects that are necessary for the success and sustainability of the institutions. There is an in-built bias against minor irrigation, as the

minister for major and medium irrigation is heading the apex committee though there is separate ministry for minor irrigation. The apex committee provides the broad policy frame and hence it is but natural to favour major irrigation. This may reflect in the performance of the WUAs in the two sectors. All the rights in WUAs are given to land owning and tenant cultivators to the neglect of land less and other water users such as land less women, fishermen, etc. This denies equitable access to a common pool resource. As a result, the huge public investments in this sector benefit only a section of the community, though in majority. Equal distribution of water rights is seen as vital for sustaining water institutions (Deshpande and Reddy, 1990).

Financial Aspects

The whole process is funded through external funding. Under the Andhra Pradesh Economic Restructuring Programme each WUA and DC got Rs. 50 per acre during the first year (1998-99) and Rs. 100 per acre in the second year (1999-00). Of this, WUAs at the minor level get 60 percent, DC gets 20 percent and PC gets 20 percent share. Though the allocations look small on per acre basis, at the aggregate level, this could be any where between Rs. 50,000 to 8,00,000 per WUA in the canal commands. Where as in the case of tank WUAs, the amount would be below Rs. 5000 per WUA in majority of the cases. During the year 1998-99 Rs. 1070 million were spent of which Rs. 1030 million were spent just in 45 days. This has led to rent-seeking attitude at the department level as every bill has to be passed by the accounts officer before going to the WUA. Besides, every year WUAs in the major canal commands receive Rs. 200 per acre (Rs.100 per acre for WUA and Rs. 100 per acre for the DC). Under this, during 1999-2000 Krishna delta got Rs. 123.6 million; Nagarjuna Sagar left canal Rs. 60 million; medium projects got Rs. 3 million; and minor projects got Rs. 10.4 million (Raju, 2000). Moreover, in the canal WUAs entire money is spent on repairing the distributory network while in the case of tank WUAs tanks as well as the distributaries requiring more investment for restoration. Present funding when compared to the actual requirement for tank restoration is grossly inadequate (see later section). This clearly reflects the bias in favour of canal WUAs.

As indicated earlier the PIM programme is entirely funded by external sources. Though user contribution of 15 percent is imbibed in the PIM act there is

no evidence of any contribution from farmers so far. In fact, there are no efforts to collect this contribution. However, it is expected that WUAs would become self-sufficient over time through hike in water rates coupled with better recovery. As a first step water rates were raised by 3 times during 1996-97 (Table 2). After the revision, it was reported, water fee collection has increased by 9 percent from 54 percent to 65 percent during 1997-98 (Raju, 2000). But, this is not reflected in any way in the budget figures during or after the year 1997-98 (Reddy, 2003). Such idiosyncrasies could be due to the absence of devolution of powers to the WUA level. As per the act, WUAs are expected to become self sufficient in managing their affairs. They are expected to assess the command area and collect the water cess. Since the entire fee is retained at WUA, DC, PC and local body level there is no incentive for under reporting of area. The proposed revenue sharing pattern is presented in Table 3. The first step in this direction was initiated during the year (2001-2002) though the approach is cautious. Initially, the plan was to plough back 50 percent of the revenue collected to WUAs (25 percent) and DCs (25 percent). But, irrigation department is still carrying out the collection of water charges. The impact of this new system is yet to reflect in the data. However, it is a long way before the devolution of financial power takes place. Till then the PIM in Andhra Pradesh would have to sustain, which is the main focus of this study.

Table 2: Revised Water Rates for Different Crop Categories

Crop Category	Type of source wise water rates per acre in Rs.			
	Category I		Category II	
	Old	New	Old	New
1. First / Single wet crop	60	200	40	100
2. 2nd and 3rd wet crop	60	150	40	100
3. 1st crop irrigated dry	40	100	20	60
4. 2nd and 3rd irrigated dry crop	40	100	20	60
5. Two-season crops per year	120	350	80	350
6. Aquaculture per year	00	500	00	500

Note: old rates with effect from July 1986 and the new rates from July 1996.
Source: APERP Project Implementation Plan, 1998.

Table 3: Proposed Revenue Sharing Pattern among the PIM Structures (Percent of total)

Level	Major	Medium	Minor
Water User Association (WUA)	50	60	90
Distributory Committee (DC)	20	30	---
Project Committee (PC)	20	---	---
Local Government	10	10	10

III Framework and Approach

Collective action framework is the most appropriate to study and understand the Common Pool Resources (CPRs) situations. Several authors have documented the case studies of CPRs and other rural institutions. Different approaches are used to explain various institutional arrangements existing in rural areas. These approaches include: property rights approach, game theoretic approach, transaction costs and limited information approach of new institutional economics. Property rights approach focuses on different institutional arrangements- ranging from private property rights to common property rights. The property rights school argues that private property rights, rather than community property rights, would result in an efficient allocation of resources and their management, while there is enough empirical evidence to support the contrary. The game theoretic approach emphasizes understanding the individual's behaviors and the strategies followed in various CPR situations. The new institutional economics, unlike neo-classical economics, treats institutions as central to development process and explain their growth and efficiency in terms of transaction costs. However, none of these approaches on own seem to explain the diverse CPR situations characterized by the complex attributes of collective action in developing economies like India. The main bottleneck of these approaches is their emphasis on individual rationality while CPR management is based on collective action. Recent attempts to provide a theoretical framework for collective action have tried to draw support from various disciplines and put it under the framework of Institutional Analysis and Development (IAD) (Ostrom, Gardner and Walker, 1994; Bromley, 1992; Ostrom, 1990). This approach is comprehensive and, in fact, fairly successful in explaining the success stories of collective action situation and has led to a shift in focus away from the so-called "tragedy of the commons". However, given the

limited number of successful cases compared to failures makes it a specific rather than a general framework. More importantly, though it explains the institutional sustainability part very well, its applicability is limited as far as institutional innovation and changes are concerned. The latter are equally important, if not more, for understanding institutional success and failure in CPR management.

Number of studies tried to explain the causes of poor performance of WUA through identifying the factors that characterise successful WUAs (for a detailed review of studies see Meizen-Dick, 1997). These studies identify, among other factors, social capital, group size, homogeneity, leadership, operational rules, etc., as important factors in explaining the success stories. The existing theories of collective action are based on these success stories. Moreover, they have not helped much in formulating policies for effective participatory irrigation management (PIM). It is observed: "Currently dominant institutional-economic models fail to grasp the cultural specifics of irrigation as social practice and are a poor guide to the meanings and motivations of local institutional development" (Mosse, 2003, p.287). While the evolution of PIM may depend on policy support and external funding, it sustainability critically hinges on the effective support from the political networks and irrigation bureaucracy. "PIM cannot become a reality nor it become self sustaining without restructuring of the State irrigation departments. However, the irrigation bureaucracy is unlikely to initiate such change. The record of last 20 years standing against it" (Singh, 2000, p.698). Historically WUAs are political institutions (Mosse, 2003). Local leaders compete for control over these institutions, as these new institutions tend to become financially stronger. The situations do not vary much between resources (irrigation or watershed development) or locations (Tamilnadu or Andhra Pradesh) (Mosse, 2003; Reddy, 2003). As Bardhan (2004) puts it "In most poor countries, there are massive costs of collective action in building new economic institutions and political coalitions, and in breaking the deadlock of incumbent interests threatened by new technologies" (p.481). Therefore, evolving, sustaining and replicating WUAs or PIM is not easy given the socio-cultural and political dynamics in countries like India. The present study analyse the issues at hand in the collective action framework.

This study is carried out at theoretical as well as empirical levels. As a first step, a thorough review of literature on participatory development and

collective action in the context of natural resource management in general and irrigation in particular was carried out. This review is used as a background for drawing testable insights and hypotheses as a second step. Finally, the empirical analyses are used to verify the hypotheses and develop a more generalized and practicable framework for irrigation management.

At the empirical level, our approach is to study the problem extensively as well as intensively. At the extensive level a sample of 222 WUAs were selected from 22 districts (10 WUAs in each district) in the State (see presented appendix table 1). A detailed schedule was canvassed among these 222 WUAs in order to examine their structure and functioning. At the intensive level a sample of 6 WUAs representing the three agro-climate regions of the State viz, Coastal Andhra, Rayalaseema and Telangana regions were selected (Table 1.4). The selection was purposive to cover the canal and tank systems, though the selection of districts was based on the concentration of WUAs in each category (canal and tank). From each WUA a sample of fifty farmers, representing head-middle-tail ends of the distributory systems and different socio-economic sections of the community was drawn using the probability proportionate sampling method for an in-depth survey. In all 300 farmers will be studied intensively using the survey method with the help of a detailed household level schedule. Prior to the sample survey Participatory Rural Appraisal (PRA) exercises were conducted in the sample villages in order to draw qualitative inferences about the village community. PRA was also helpful in designing the questionnaire. Besides, focus group interviews were held with the office bearers of the WUAs and irrigation department officials.

IV Structure, Organisation and Functioning of WUAs

The composition of WUA members reflects not only the socio-economic milieu of the community but also the political economy dimensions of the institutional innovation and development. In the sample WUAs the executive members are spread evenly across socio-economic groups in terms of their representation in the committee in relation to their actual population. In fact, the lower social and economic groups have better representation in the WUA executive. But, in the case of the highest position (the President), they are grossly under represented. The large farmers and upper castes usually hold the position of the President (Table 4). Their representation at the

highest office clearly indicates the 'elite capture' syndrome. This reflects the general picture pertaining to the recently evolved parallel institutions in the state (Reddy and Jenkins, 2004). The 'elite capture' of parallel institutions is attributed mainly to: a) elite are not able to get into Panchayat Raj bodies due to reservation policy and, b) parallel institutions are financially stronger than the PRIs.

Table 4: Socio-economic Composition of Executive Members in Canal and Tank WUAs

Caste	Canal			Tank		
	President	Mem-bers	% to population	President	Mem-bers	% to population
Social Composition (%)						
SC/ST	01	11	10	04	14	12
BC	11	32	30	43	54	52
OC	88	57	60	53	32	36
Economic Composition (%)						
0.10-2.50	03	12	11	19	31	29
2.51-5.00	09	30	27	25	27	27
5.10-10.0	49	42	43	30	26	26
10.1&above	39	16	19	26	16	18
All	100 (1.2)	100 (0.1)	100	100 (1.4)	100 (2.5)	100

Note: Figures in brackets are proportion of females in the respective category.

Management of Funds

Average area per WUA varies across systems and locations. WUAs in the head reaches are bigger in terms of command area and area irrigated when compared to middle and tail end WUAs. Canal WUAs are larger than tank WUAs by a factor of more than ten i.e., 4900 in the head reaches to 268 acres in the Tank WUAs. In most of the cases, area under WUA, command area of WUA and area irrigated under WUA is co-terminus. The size of WUA affects the fund allocations, as the fund allocations are on per acre basis. While canal WUAs get anywhere between Rs. 2 to 3 lakhs per year, the tank WUAs get between Rs. 50, 000 and 70,000 (Table 5). Tank WUAs are getting more money per acre when compared to canal WUAs due to the limited coverage of tank systems. While tank WUAs got about

Rs. 200 per acre per year as against Rs.100/- in canal WUAs. Though tank WUAs received substantially higher allocations (2-4 times in 6 years) when compared to canal WUAs, the amounts are much lower than the requirement for tank restoration. The estimates for repairs range between Rs. 3000 - Rs. 7000 per acre depending on the tank size without desilting (Reddy, 2002). The low allocations are mainly due to the reason that funds are allocated for canal repairs rather than restoration of tanks. This approach suits well in the canal systems, as the major problem is canal maintenance. Where as in the case of tank systems the length of the distributory canals or feeder channels is not much. Moreover, the requirement of tank systems is the repair of tanks in terms of repairing the breached bunds, de-silting, etc. In the absence of funds for such activities tank WUAs may not be effective.

Table 5: Source Wise Funds (in Rs.) to WUAs under Canal and Tank by Location and Type (1997 to 2002)

Sources of Funds	Canal						Tank			
	Head		Middle		Tail-end		Irrigation Tank		Percolation Tank	
	Per WUA	Per acre (Irr. Area)	Per WUA	Per acre (Irr. Area)	Per WUA	Per acre (Irr. Area)	Per WUA	Per acre (Irr. Area)	Per WUA	Per acre (Irr. Area)
Government	975921	199 (48)	1669620	485 (76)	916500	272 (46)	385276	1437 (90)	288201	1140 (90)
Water-cess	283065	208 (50)	425435	124 (19)	601879	179 (30)	9851	37 (02)	3999	16 (01)
Contribution	23441	5 (02)	33904	10) (02	69598	21 (04)	22051	82 (05)	20553	81 (06)
Others	2804	0.60	61203	18 (03)	397521	118 (20)	12749	48 (03)	6432	25 (03)
Total	1285231	412.6 (100)	2190162	637 (100)	1985498	590 (100)	429927	1604 (100)	319185	1262 (100)
Avg./year	214205	69	365027	106	330916	98	71655	267	53197	210

Note: Figures in brackets are respective percentages to total.

Major source of funding is from the government followed by water charges allocated to WUAs. The share of water cess is about 50 percent in the case of canal head reaches while it is 30 percent in tail ends and only 19 percent in the middle reaches. In the case of tank WUAs government contributes about 90 percent and the share of water charges is less than 2 percent.

However, the difference between government contribution and water charges is not clear as the sharing of water cess between the WUA and other institutions was initiated only recently. Hence, these two categories could be treated together as external funding. On the other hand, people's contribution is less than 4 percent in the case of canal WUAs and less than 6 percent in the case of tank WUAs. This clearly indicates that the mandatory 15 percent contribution in the works is not adhered to in the entire sample of WUAs.

As mentioned earlier majority of the works pertain to repair of canals followed by formation and rising the height of the bunds and removal of silt and maintenance of structures (Table 6). In the case of canals, works mostly pertain to canal cleaning and repairs (removal of silt and maintenance of structures) followed by construction of culverts / check dams. In the case of tanks, the distribution of works is more even across the type of works. In terms of fund allocations, raising the height of tank bunds account for 42 percent of the expenditure followed by tank repairs and deepening.

Table 6: Works Carried-out and Expenditure Incurred in Canal and Tank WUAs During the period 1997-2002

Type of Work	% of Works Carried out		
	Canal	Tank	Total
1. Repair of Canal/Tank pipelines	15 (1.5)	85 (13)	100 [95]
2. Digging/Repair of Canals/Tanks	39 (13)	61 (15)	100 [238]
3. Construction of Culvert/Check dams	34 (05)	66 (09)	100 [80]
4. Formation /raising the height of bunds	13 (03)	87 (42)	100 [182]
5. Cutting trees, plants/weeding	20 (01)	80 (05)	100 [45]
6. Deepening of Canals/Tanks	24 (08)	76 (13)	100 [96]
7. Formation of Ayacut/Tank bed road	67 (0.50)	33 (Neg.)	100 [3]
8. Removal of silt and maintenance of Structures	88 (68)	12 (02)	100 [155]

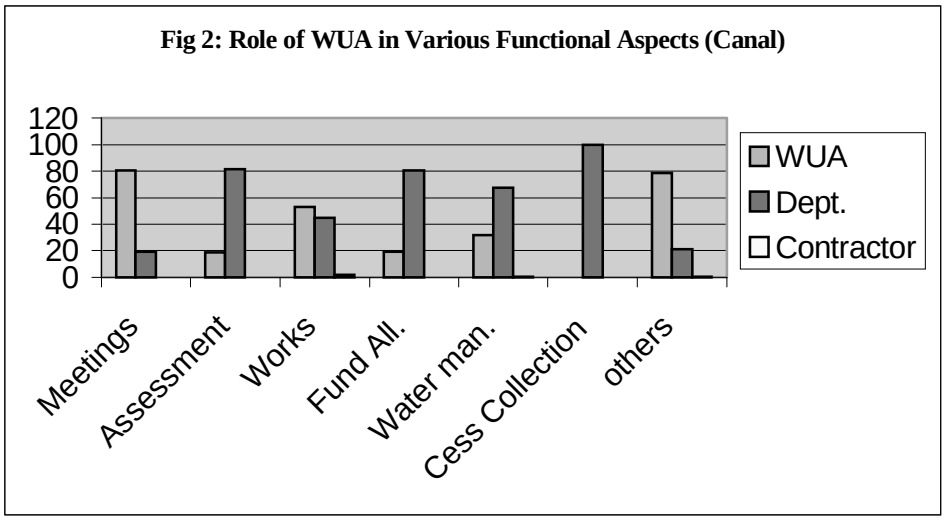
Note: Figures in '( )' are respective shares in expenditure. Figures in '[ ]' are the total number of works carried out.

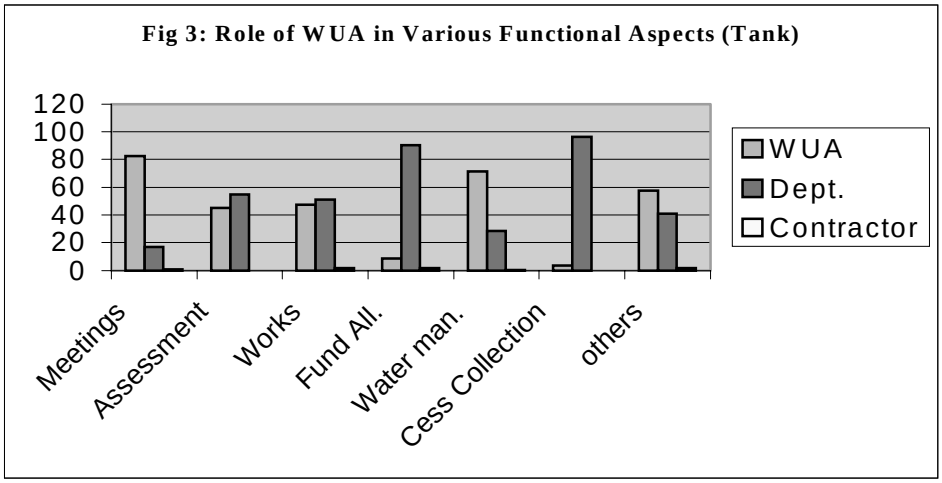
Meetings and other functions

As per the guidelines two general body (GB) meetings should be held in a year i.e., one each before starting of the kharif and the rabi seasons,

whereas, the executive committee meets as and when necessary. During the past six years (1997-2002) experience indicates that GB meetings were not held twice a year and this could be due to lack of irrigation water in some of the systems during the last two years. The frequency of EC meetings was more in tail end WUAs followed by head and middle WUAs. This indicates that middle reach WUAs face less number of problems when compared to head and tail reaches. EC meetings are more frequent in the case of tank WUAs. The Presidents of WUAs reported that participation (above 80 percent in the case of canal and above 90 percent in the case of tank WUAs) and co-operation (above 95 percent in canal and tank WUAs) of members in the EC meetings is quite high. Even after six years of existence, the only activity carried out predominantly by the WUAs is conducting the meetings (Figs 2 and 3). The only important activity in which the WUAs have a say in majority of the cases is regarding the works.

The dominance of the department is clearly seen in the most important aspects like assessment, fund allocation, cess collection and water management, though the involvement of WUAs is better in the case of tank WUAs (Fig. 3). Despite the promises the devolution of powers has not taken place even in the case of land assessment, let alone fund allocation and collection. This is one of the main bottlenecks for the sustenance of the WUAs. On the other hand, the role of contractors appears to be marginal even in the case of works. In the absence of devolution of powers there is no clarity even on the part of WUA Presidents regarding the purpose and role of WUAs. Only 40 percent of the Presidents are aware of the WUAs role in the canal systems while 59 percent of them are aware in the case of tank systems. Nevertheless, 90 percent of the Presidents in the case of canals and 70 percent in the case of tanks endorse effectiveness of WUAs. Devolution of more powers to the WUAs is expected to improve the performance in 67 percent of the canal WUAs. On the other hand, repairs to the main systems (tanks) would improve the performance in 60 percent of tank WUAs. As per the relationships between the constitutional (Panchayati Raj) and parallel (WUA) institutions they are cordial in more than 90 percent of the cases. That is there are no conflicts, though they are not working in tandem-a case of passive or indifferent attitude of the PRIs (Reddy and Jankins, 2004).





V Effectiveness of WUAs: Household Level Assessment

The aim of WUAs is to improve the water management system in terms of equitable and just distribution of water, financial sustainability of the system, promote self-management of the systems, etc. The macro picture indicated that in their present state, the WUAs are far from achieving these objectives. What emerged from the macro picture reflected the institutional strengths and weakness of WUAs, but could not provide insights on the processes and perceptions of the farmers pertaining to the effectiveness of the WUAs.

Here an attempt is made to highlight these aspects. Though assessing the economic impact of the WUAs is the ultimate test for its effectiveness, economic impacts could not be assessed clearly due to water scarcity in the systems.

Functioning and effectiveness of WUAs mostly depend on the process of their evolution. Both pre and post implementation processes play an important role in this regard. Our results indicate that very few farmers are involved in the pre-planning phase of the WUAs, though a majority of them expressed that the formation of WUAs is appropriate to solve the problems of irrigation. The involvement of local community was much less in the middle and tail reaches of canal system and almost zero in the case of tank systems. In the absence of local community participation, the main lacuna observed in the pre-planning process was: limited devolution of powers to the WUAs and selection of good leaders. It is observed that caste, gender and activity did not play an important role in the formation of WUAs. The proportion of women members in the WUAs is also very marginal, as there is no provision for reservation for them.

The awareness regarding the WUAs is quite high among the communities (Table 7). Greater awareness in the tank communities could be due to the smaller coverage, often pertaining to one village. Within the canal systems the awareness is higher in the head reaches compared to middle and tail reaches. Active participation in the activities is limited to a quarter of the members. Though elections are inherent in the design of the WUAs, elections were hardly conducted in the case of canal systems. For, no voting took place in any of the sample WUAs (Table 5). Presidents were unanimously elected (nominated) in more than 80 percent of the cases in canal systems as against 50 percent in the case of tank systems. Unanimous choice was more prevalent in the head and middle reaches than in tail reaches. This could be due to the nexus between the village elite (social or political or economic) and the department officials. Interestingly, political interference is observed in substantial number of cases, though these institutions are expected to be apolitical entities. Interferences are reported to be high in the canal systems when compared to tank systems. Democratic process is measured in terms of conducting, attending and decision-making process (collective / majority) in the meetings. GB meetings and EC meetings were not conducted on a regular basis.

Table 7: Formation of the WUAs

Formation of Water User Associations	Canal			Tank		
	Head	Middle	Tail	Head	Middle	Tail
1. Are you Aware of WUA						
Yes	49 (98)	26 (68)	48 (77)	44 (98)	51 (96)	50 (96)
No	1 (2)	12 (32)	14 (23)	1 (2)	2 (4)	2 (4)
2. Your role in WUA Activities						
Active	13 (26)	10 (26)	11 (18)	9 (20)	4 (8)	8 (15)
Passive	23 (46)	28 (74)	39 (63)	30 (67)	14 (26)	37 (71)
3. Who elected the members to the WUA						
Farmers	35 (70)	31 (82)	35 (56)	33 (73)	40 (75)	28 (54)
Presidents	8 (16)	4 (11)	10 (16)	10 (22)	5 (9)	11 (21)
Village Leaders	7 (14)	3 (8)	4 (6)	2 (4)	5 (9)	5 (10)
4. What is the Process of Election						
Voting	0	0	0	12 (27)	10 (19)	28 (54)
Nominated	2 (4)	3 (8)	0	2 (4)	1 (2)	0
Unanimous	48 (96)	35 (92)	49 (79)	31 (69)	42 (79)	24 (46)
5. Is there any political interference in the process						
Yes	24 (48)	8 (20)	23 (37)	8 (18)	18 (34)	7 (13)
No	26 (52)	31 (80)	39 (63)	37 (82)	35 (66)	45 (87)

Note: Figures in parentheses are respective percentages to the sample households. If the percentages do not add up to 100, the remaining should be taken as non-response.

Perceptions of the farmers

When enquired about the functioning of the WUA, the opinion of the sample farmers is divided. In the case of canal systems middle and tail farmers seem to be more satisfied than their counter parts in the head reaches (Table 8). In comparison, tank WUAs seem to be faring better in satisfying their members. In the case of tanks head and tail reach farmers are more satisfied than those in the middle reaches. Political interference appears to be the dominant reason for the member dis-satisfaction, especially in the canal systems. On the contrary more members are happy about the performance of the previous Presidents in both the cases and across the

locations. This indicates that the unanimous selection process of the Presidents is not very faulty. The limited dissatisfaction with the previous Presidents was mainly attributed to their incompetence. The difference of opinion between the WUA and the performance of the president could be more due to the institutional aspects, like devolution of powers. In the absence of relevant powers the functioning of WUA cannot be satisfactory, and the president would perform better given the limited powers.

As revealed in the previous section, here also sample farmers have indicated that WUA powers are limited to conducting meetings and development of irrigation channels (Table 8). There are disputes among WUA members of canal systems regarding works carried out and distribution of water. Greater number of disputes is reported in the middle reaches when compared to head and tail reaches and irrigation department plays an important role in solving the disputes. This indicates that the involvement and influence of the department has not declined. Interestingly, majority of the farmers do not have any suggestion for improving the performance of the WUAs, though some of them expressed the need for cooperation among the farmers. This clearly reflects the poor awareness and commitment of the farmers, indicating weak institutional structure in terms of social capital.

Lack of commitment and ownership also comes out clearly from the farmers' involvement in the maintenance of the systems. Farmer's involvement is limited to participation in elections, attending general body meetings (conducted only once) and to some extent water distribution. Their involvement in the important works like rehabilitation and resettlement and joint assessment survey is found to be marginal (Table 9). In the case of canal systems, less than 20 percent of the farmers contributed to the maintenance works, either in cash or kind. Interestingly, more people contributed in the head reaches when compared to middle and tail reaches though the differences are marginal. The reasons for lack of contribution in the case of tank systems are mainly due to the reason that nobody asked them. This indicates low emphasis on collecting contributions in the tank systems. In the case of canal systems three main reasons are indicated i.e., a) no demand, b) lack of money and c) nobody was contributing. Regarding the maintenance works, majority of them are not satisfied, especially in the case of canal systems. However, maintenance works appear to be satisfactory in majority of the cases in tail

Table 8: Functioning and Powers of the WUAs

Process of Water Users Associations	Canal			Tank		
	Head	Middle	Tail	Head	Middle	Tail
1. Are you satisfied with the functioning of the WUA						
Yes	21(42)	24 (63)	29(47)	35 (78)	17 (32)	39 (75)
No	22 (44)	6 (16)	21 (34)	6 (13)	15 (28)	6 (12)
2. If no, Why						
Presently not functioning Political	4 (8)	1 (3)	4 (6)	0	2	0
Interference	17 (34)	4 (11)	15 (24)	5 (11)	11 (21)	5 (10)
3. Are you happy with Ex. WUA President						
Yes	21 (42)	23 (61)	31 (50)	33 (73)	14 (26)	32 (62)
No	5 (10)	15 (39)	8 (13)	3 (7)	3 (6)	13 (25)
4. If No Why						
Incapable Person	5 (10)	15 (39)	8 (13)	2 (4)	3 (6)	5 (10)
Selfish	0	0	0	1 (2)	0	2 (4)
5. What are the powers of WUA						
Conducting meetings, training, programme and make suggestions	18 (36)	7 (18)	12 (19)	4 (9)	6 (11)	2 (4)
They can develop irrigation channels like tank, canal etc.	11 (22)	27 (71)	10 (16)	31 (69)	17 (32)	42 (81)
Getting funds from the government	5 (10)	5 (13)	1 (2)	4 (9)	8 (15)	3 (6)
6. Were there any disputes/conflicts among the WUA members						
Yes	13 (26)	19 (50)	15 (24)	0	1 (2)	0
No	13 (26)	18 (47)	24 (39)	37 (82)	18 (34)	44 (85)
7. If Yes, how did they resolve						
Involvement of department	9 (18)	11 (29)	2 (3)	0	4 (8)	3 (6)
President and other elders	4 (8)	2 (5)	1 (2)	0	0	3 (6)
8. Any suggestions for effective implementation						
Equal distribution of water	1 (2)	1 (3)	12 (19)	2 (4)	5 (9)	9 (17)
Deepening of the Tank and raising the height of tank	0	0	0	8 (18)	11 (21)	10 (19)
Needed cooperation and Coordination by the farmers	14 (28)	10 (26)	20 (32)	8 (18)	9 (17)	5 (10)
No Suggestions	30 (60)	23 (61)	28 (45)	22 (49)	21(40)	27 (52)

Note: Figures in parentheses are respective percentages to the sample households. If the percentages do not add up to 100, the remaining should be taken as non-response.

Table 9: Farmers involvement in Maintenance of WUAs

Maintenance of WUA	Canal			Tank		
	Head	Middle	Tail	Head	Middle	Tail
1. Contribution to the maintenance of the irrigation System						
Yes	10 (20)	7 (18)	10 (16)	14 (31)	19 (36)	18 (35)
No	38 (76)	26 (68)	49 (79)	34 (76)	34 (64)	31(60)
2. If No, Why						
No body asked (no demand)	7 (14)	5 (13)	9 (15)	23 (51)	20 (38)	24 (46)
Not contributed due to lack of money	8 (16)	5 (13)	15 (24)	1 (2)	1 (2)	3 (6)
Not contributed because others have not contributed	9 (18)	5 (13)	12 (19)	1 (2)	2 (4)	1 (2)
3. If yes, what were the forms of Contribution						
Cash	2 (4)	4 (11)	7 (11)	6 (13)	10 (19)	5 (10)
Labour	6 (12)	1 (3)	3 (5)	3 (7)	6 (11)	10 (19)
Both	2 (4)	1 (3)	2 (3)	1 (2)	1 (2)	0
4. Is the contribution for maintenance is based on per unit of cropped area						
Yes	10 (20)	9 (24)	9 (15)	15 (33)	29 (55)	24 (46)
No	38 (76)	18 (47)	51 (82)	20 (44)	16 (30)	15 (29)
5. Were you satisfied with the maintenance of the system						
Yes	16 (32)	10 (26)	31 (50)	24 (53)	28 (53)	32 (62)
No	34 (68)	18 (47)	21 (34)	21 (47)	24 (45)	19 (37)
6. If no, give reasons						
No progress in work	13 (26)	9 (24)	10 (16)	9 (20)	12 (23)	9 (17)
Lack of improvement of the system	5 (10)	5 (13)	4 (6)	3 (7)	1 (2)	3 (6)
President has become contractor	10 (20)	2 (5)	5 (8)	2 (4)	4 (8)	1 (2)
7. Have you got sufficient water from the Canal/Tank						
Yes	32 (64)	27 (71)	31 (50)	14 (31)	19 (36)	15 (29)
No	18 (36)	8 (21)	29 (47)	31 (69)	34 (64)	37 (71)
8. Participation in Election	33 (66)	16 (42)	36 (58)	1 (2)	1 (2)	1 (2)
9. Participation in R&R works	0	2 (5)	2 (3)	2 (4)	1 (2)	1 (2)
10. Water Distribution	25 (50)	25 (66)	28 (45)	1 (2)	0	0
11. Farmer participating in GB	50(100)	32 (84)	62 (100)	9 (20)	13 (25)	15 (29)
12. Farmer participating in Joint Survey	1 (2)	2 (5)	1 (2)	1 (2)	0	0

Note: Figures in parentheses are respective percentages to the sample households.

reaches. This is true in the cases of canal and tank systems. Despite the low satisfaction levels majority of the farmers indicated that they are getting sufficient water in canal systems. However, majority of the farmers in the tank WUAs are not getting sufficient water. Differences between the locations indicate that water availability in the tail ends is not satisfactory.

Low availability of water in the tail reaches is also reflected in the quality of works carried out. Over all less than a quarter of the works are observed to be of good quality in the case of canal systems, while it is more than 60 percent in the case of tank WUAs. The quality of works declines as one move from head to tail reaches. However, the better quality works in the tank WUAs is not translated into improved irrigation facility. This could be due to the absence of tank renovation and the absence of sufficient water storage facility. In the case of canal tail reaches substantial number of farmers (37 percent) have reported improved irrigation facility. But, the impact on equity in the distribution of water and awareness is marginal. Political interference appears to be the major demerit of the WUAs, especially in the canal systems. One important indicator of human capital development is capacity building at the local level. Here capacity is measured in terms of training and exposure visits. Only a quarter of the sample farmers have reported the capacity building activities that too in the canal systems. Capacity building is less emphasized in the WUAs under tanks. In both canal and tank systems capacity building is concentrated in the head reaches. The major activity in capacity building is better water management practices.

Impact of WUAs

The advent of WUAs is expected to have a direct bearing on the water availability and crop production. In the event of positive impact on these indicators, there is possibility of secondary impacts like employment, income, etc. Similarly, some environmental impacts are also expected in the nature of water logging and salinity. But, attributing all these impacts to WUAs is difficult. More over, the problem here is that most of the systems suffered water scarcity during past two years making the impact assessment difficult. Keeping this in view, here an attempt is made to examine some of the important impacts from the farmers' perspective. That is sample farmers were specifically asked whether there is any change in the indicators due to WUAs.

Water Availability and Crop production

Better water delivery / distribution is assumed to be an important indicator of the efficient functioning of any WUA. Water delivery performance can be estimated on the basis of area irrigated, number of waterings and crop productivity (here paddy, the main irrigated crop). Between 1997-98 and 2001-02 there has been an increase in the average area irrigated of the sample households in the canal systems. But, tank WUAs have recorded a sharp decline. Though, tank irrigation is experiencing a secular decline in the recent decades, the advent of WUAs could not check this decline. Added to this is the drought situation. If the 2002-03 figures were to be taken, even the canal systems would have shown a decline. Between 1997-98 and 2001-02 the increase in area irrigated is more in the case of middle and tail reaches indicating that these areas were suffering more water shortages prior to the advent of WUAs (Table 10)

Table 10: Changes in Area Irrigated (acres/household) during the period 1997-98 to 2001-2002 by Location

Year	Canal			Tank			All		
	Head	Middle	Tail	Head	Middle	Tail	Head	Middle	Tail
1997-98	3.81	4.01	2.61	2.71	2.15	1.43	3.30	2.86	2.10
1998-99	3.73	4.06	3.54	1.86	1.56	1.12	2.86	2.52	2.49
1999-00	3.89	4.16	2.79	1.80	1.50	1.05	2.92	2.52	2.04
2000-01	3.93	4.11	2.78	1.77	1.53	0.99	2.93	2.52	2.00
2001-02	3.88	4.21	2.69	1.92	1.55	1.05	2.98	2.57	1.98
2002-03	1.31	2.31	0.57	0.67	0.43	0.52	1.01	1.16	0.55
% Change (over 2001-02)	1.8	4.8	3.0	-41.1	-38.7	-36.2	-10.7	-11.3	-6.1

Source: Survey data

The adequacy of water reaching the farmers at the end of the canal / tank i.e., the number of days that sufficient water reached to the tail reaches of the canal / tank is measured in terms of number of actual waterings in comparison with water requirement. The analysis from the sample WUAs indicates that there are differences in the number of irrigations required and actual number of waterings for paddy, a water intensive crop. The

difference between different reaches under tank WUAs is more when compared to canal WUAs. The continuous failure of monsoon may be one of the reasons for the considerable decline in the available number of waterings during the period 1997-98 and 2001-02 especially under tanks (Table 11). The differences between requirement and actual use of water have narrowed down, especially in tail reaches only after the year 2000-01. This re-emphasises the improved availability of irrigation water in tail reaches due to the advent of WUAs.

Table 11: Water Requirement and Availability for Paddy during the period 1997-98 to 2002-2003.

Water Distribution	Canal			Tank		
	Head	Middle	Tail	Head	Middle	Tail
1997-98						
No. of Waterings Required	105	105	103	120	120	120
No. of actual Waterings	104	103	99	107	107	101
1998-99						
No. of Waterings Required	108	105	105	120	115	115
No. of actual Waterings	105	103	98	105	100	100
1999-2000						
No. of Waterings Required	107	107	100	120	110	115
No. of actual Waterings	105	105	94	108	105	98
2000-2001						
No. of Waterings Required	107	105	105	115	110	110
No. of actual Waterings	105	105	104	108	105	100
2001-2002						
No. of Waterings Required	105	105	105	120	110	110
No. of actual Waterings	105	105	102	107	103	100

While the impact on area irrigated is more in the middle and tail reaches, qualitative impact appears to be more in the middle and head reaches. Qualitative impact is observed in terms of improved productivity of paddy. Canal systems in all the locations have experienced increased productivity of paddy, while tank WUAs have experienced negative growth. With in the canal systems the rate of change is higher in the middle reaches followed by head and tail reaches. Middle reaches appear to have benefited most

in quantitative and qualitative terms. However, this may not be directly attributable to the WUAs, as the productivity changes could be due to various reasons. For instance, paddy yields have gone up by 25 percent in Krishna delta during the drought period due to better water management practices.

In line with the policy of transfer of management responsibilities to WUAs and making WUAs financially more sustainable, it was recognised that the water users have to pay the actual O & M costs for the irrigation service. The results indicate that since 1997, farmers were paying only 3 percent of the total cost of cultivation (2 to 1.5 percent in total gross value of output) in different locations viz., head, middle and tail end reaches of the canal system; while 1 to 1.5 percent of the total cost of cultivation (1.5 percent in total gross value of output) in different locations of the tank areas. It is also observed that there is a shift from cereal crops to cotton, castor, other cash crops like papaya, banana and mango especially in different locations of the tank areas. However, the shift to higher value crops is driven by prices, and influence of other factors and not entirely due to the irrigation reforms. In general there is an increase in income from all sources and in all locations (Reddy, Reddy and Kumar, 2004).

Water Logging and Salinity

One of the major problems faced by the WUAs in the regions of East Godavari head reaches is the water logging and salinity. Most of the sample households are aware of this and opined that the WUAs can solve the problem of water logging and salinity by constructing field channels (6 to 20 percent), drainage channels (4 to 16 percent), and pipelines (2 to 10 percent). From the farmers' point of view, the major steps to tackle these problems are clearing the weeds / debris in the field (2 to 14 percent), digging the drainage channels (2 to 8 percent), and inter plantation through field / drainage channels for income generation to WUAs (2 to 14 percent). But many farmers are unhappy that the present WUAs are not showing much concern to this problem of water and sanitation (4 to 6 percent) and no proper action with respect to field channels and drainage problems were taken up by the WUAs (Reddy, Reddy and Kumar, 2004).

VI Irrigation Reforms in A P: A Missed Opportunity?

It is often argued that the reason for the ills of irrigation management is the alienation of farmers from the process of planning and implementation. While substantial amounts of money were spent on the reform process, the money was used mainly for improving the ailing irrigation systems rather than making an effort to transfer the irrigation management to farmers. The main lacunae in the reforms are at two levels: a) conceptual or formulation level, and b) implementation level. At the formulation level, tank and canal systems are treated as similar in fund allocations. While the degenerated tanks needed more allocation for rehabilitation, the allocations under WUAs were based on the command area. This has led to under funding and resulted in little improvement in the tank systems per se and availability of water. For, unless water storage of the tanks is improved there is no gain in improving the distribution systems. Our analyses clearly brought out that there is hardly any improvement in the tank systems. And farmers are asking for more funds towards works pertaining to tank deepening and strengthening the bunds. Another issue in this regard is that groundwater resources, the single largest source of irrigation, are completely left out of the purview of the WUAs. That is irrigation reforms are neither comprehensive nor followed an integrated water resource management approach.

At the implementation level, an important aspect revealed is the 'elite capture' of the WUAs. As in the case of most of the parallel institutions initiated in A P (Reddy and Jenkinns, 2004), forward castes and large farmers are occupying the position of president disproportionate to their actual population. This is mainly due to the reason that they are loosing their positions in the constitutional bodies of PRIs due to the positive dissemination policy. Moreover, parallel institutions are financially stronger when compared to PRIs. All the rights in WUAs are given to land owning and tenant cultivators to the neglect of land less and other water users such as land less women, fishermen, etc. This denies equitable access to a common pool resource. As a result, the huge public investments in this sector benefit only a section of the community, though in majority. Equal distribution of water rights is seen as vital for sustaining water institutions (Deshpande and Reddy, 1990).

The main idea of initiating WUAs in A P, is that these institutions would be apolitical and focus on delivery. Though elections were not conducted in

their true spirit in majority of the cases, political interference is observed in a substantial number of cases. Though regular conduction of elections may go against the basic philosophy of participatory development and management through political divide, the nomination process facilitates 'elite capture'. As a result, these institutions in their present form tend to dilute the social capital rather than strengthening it.

Reforms also focus on financial sustainability through price reforms. Though water rates were increased initially by 3 times, they are still short of O&M expenditure. Though user contribution of 15 percent is inherent / included in the PIM act there is no evidence of any contribution from farmers. In fact, there are no efforts to collect this contribution. The main reason is that little effort is made in the direction of strengthening the institutional structures. Awareness, involvement, commitment and contribution to the cause are lacking at the primary stakeholder level. This is mainly due to the fact that irrigation department is not willing to devolve powers.

Though some benefits in terms of increased area under irrigation in canal systems and improved quality of irrigation is evident, the sustainability of these benefits is rather uncertain in the absence of efficient institutional structures. While it appears that an opportunity to build stronger and sustainable irrigation institutions is floundered, the opportunity is not totally lost, as the WUAs are still in place. It is observed that formal institutions are rigid and rule bound[4]. Equity in the management and distribution of water is not addressed. No proper incentive (positive and negative) structures were designed and placed to support rule compliance.

Post Script

Since the completion of our fieldwork number of important changes pertaining to WUAs as well political dynamics at the State level have taken place. At the time of fieldwork the status of WUAs was that second term elections were postponed due to various reasons such as lack of auditing of accounts of the WUAs. The actual reason could be political, as we found in our study that auditing of accounts was carried out in majority of the cases. Nevertheless, special officers were posted in the place of Presidents to

[4] For a detailed discussion on formal vis a vis informal institutions see Reddy, 2002.

carry out the functions of the WUAs. Subsequently, elections were conducted in 13 districts during October 2003. In nine districts, elections were not conducted, as there was no water in the canals. The election process has been changed substantially. Now the term of the President is only for two years. Every two years elections will be conducted for one third of the posts. Election procedure is also made simple by raising hands or voting slips instead of formal secret ballot system. This is mainly to cut the costs.

The new government appears to be keen in continuing the irrigation reforms. A meeting of the WUA Presidents (33 newly elected) representing all the districts was organized during August 2004 to discuss the modalities for improving the functioning of WUAs. The meeting was attended by the Minister for major irrigation, indicating the commitment of the new government to take forward the reforms. One of the main demands of the WUA Presidents was to revert back to the election procedures of the original act 1997. Their main contention was that 2 years is too short a period to make any meaningful contribution. It is proposed that General Body (GB) should co-opt 2 women members to the EC in the case of major and medium irrigation and 1 women member in the case of minor irrigation. They also propose among other things to enhance the financial viability of the WUAs through plantation and horticultural crops on common riverbeds, canal banks, etc. Further, social forestry can be taken up on the encroached lands. They also demand that the WUA should conduct the auction of fisheries. This may go against the interests of the fishing community. Presidents of small tanks of 100-150 acres are demanding more funds for repairs. The co-operation and co-ordination between president, EC and irrigation engineers should be strengthened. The quantity and distribution of water shall be carried out by PCs, DCs and WUAs through general body depending on the availability of water. In the absence of PC/DC, WUA be held responsible for water distribution. Laskars should be placed under the direct control of the WUAs.

Interestingly, the federation of WUA Presidents put forth two peculiar demands. One is delinking of WUAs from the village PRIs. Two, WUAs should be represented in the legislative council (proposed to be revived in AP). These two demands reflect the interests of the Presidents in making the WUAs as local power centers. The rationale for the first demand is that

in canal regions WUAs are often larger than the village panchayts and hence PRI cannot control WUAs. Another reason could be that the elite dominance in WUAs should go unchallenged from the local PRIs. Their interests appear to be more in terms of acquiring political clout than to demand more powers to strengthen the institution itself. While the government has not addressed the demands and requests in the context of institutional strengthening, their political demands are brought in though in a different manner. A draft bill is being proposed (accepted by the cabinet) to amend the 1997 act. According to this amendment, one male and a woman member representing the gram panchayat will be appointed to the minor irrigation WUAs. District collectors will appoint MPs, MLAs and Mandal president concerned to the project committee of the medium irrigation WUAs. In the case of large irrigation project WUAs, the government will appoint the MP, the MLA, the ZP chairperson, the district collector and the mandal president concerned. These co-opted members may not have voting rights. With this, it appears that the politicization process of the WUAs is complete.

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