Participatory Irrigation Management in Andhra Pradesh

A Quick Review of 7 years of experience

Conducted by

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Foreword

Development Support Centre (DSC), an NGO working on Participatory Management of Natural Resources since 1994, has formed a National Support Group (NSG) on Participatory Irrigation Management (PIM). The need for such a group came during the deliberations of a national workshop conducted by DSC to share the findings of the six state study on Tail-enders and Other Deprived in the Canal Irrigation System in November 28-29, 2003. Taking forward this idea, DSC's Founder Chairman the late Shri Anil Shah initiated the NSG in which eminent academicians and practitioners working in the field of PIM came together to discuss the issues faced in promoting quality PIM across the country. As a first step, parameters and indicators were developed for defining a successful PIM. Based on these parameters and indicators, a need was felt to study and learn lessons from the performance of Water Users' Associations (WUA) in three states viz. Andhra Pradesh and Madhya Pradesh which had pioneered PIM and up-scaled it through a legislation and Gujarat which had initiated PIM through voluntary measure by issuing series of Government orders. Taking this idea forward, DSC approached the Planning Commission which was kind enough to support this initiative by providing financial assistance to carry out the study in A.P. and M.P. Eminent researchers such as Dr KV Raju from the Institute of Social and Economic Change (ISEC), Bangalore and Prof KV Raju from Institute of Rural Management (IRMA), Anand agreed to carry out study. The findings of the studies indicated the need for continuous capacity building of functionaries, technical interventions for increasing water use efficiency and policy interventions for providing greater autonomy to Water Users Associations at the minor, distributory and project level.

The findings were shared in the '*Regional Workshop on PIM'* held on January 20-21, 2006 at Ahmedabad. This workshop was financially supported by the agencies such as the Aga Khan Foundation, Planning Commission, IWMI-TATA, Water Management Forum and NABARD. About 125 participants, senior

Government functionaries, academicians and practitioners from Andhra Pradesh, Madhya Pradesh, Gujarat and Maharashtra participated in the workshop. It was inaugurated by Prof Kirit Parikh, Member, Planning Commission while Shri J Hari Narayan, Secretary Ministry of Water Resources, Prof A Vaidyanathan and Prof Y.K Alagh – eminent economists provided the concluding remarks.

Some of the key issues identified during the workshop were:

- Need to create an enabling environment that would support the WUAs at various levels.
- Need for a comprehensive strategy and package for building capacities of WUAs, staff of the Irrigation Dept. and NGOs.
- Need for introducing volumetric supply and pricing of canal water.

The participants felt that the National Support Group could take forward these issues at the State and National level.

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Participatory Irrigation Management in Andhra Pradesh

A Quick Review of 7 years of experience[1]

1. Introduction

The state Andhra Pradesh has made considerable effort in the past seven years in Participatory Irrigation Management (PIM). Several studies were carried out at different stages of PIM-AP. The present study acquires importance, as it began at the time when PIM is entering into next generation of reforms. As part of the current study, some of the WUAs covered by the lead researcher of this study, in its early phase, were revisited[2]. Attempts were made to compare and understand the direction in which PIM is moving.

This study gains importance, as there is change in political leadership, which led to new thinking on the PIM. Having completed minimum rehabilitation, it is time for WUAs to concentrate on water management. Others states in the country are looking closely at the experience of AP, which has made a large-scale intervention in PIM. The outcome of this experiment will determine the direction of PIM in the country. The study looked into outcome of PIM based on its current stage and tried to map future needs looking into experience so far and priorities emerging in the context of next generation reforms.

2. Methodology

Participatory irrigation management is reviewed mainly with the objective of understanding in-depth, the problem, its dimensions and the actual reasons for the problems involved in getting adequate water for irrigation. Meeting with many WUA members gave a different dimensions regarding PIM. The study began with a consultation with the principal secretary and other senior officials at the state level, followed by extensive discussions with field officials, who provided insights on issues that need to be focused by the study. The fieldwork was completed between January and March 2005. The books and records were also consulted and secondary data was collected from the officials during the visit. Coverage of projects and WUAs across the regions is presented in the Table 1.

Table 1: WUAs covered by the study across three regions in Andhra Pradesh

Region	Fields Visited in 2005	No. of WUAs' visited
Telangana Region	05/jan -- 13/jan	12
Coastal Andhra Pradesh	11/feb -- 22/feb	17
Rayalseema	09/march -- 22/march	15
Total		44*

* Includes group discussions with 13 WUAs of SRSP command

[1] This study was sponsored by Development Support Centre from AKF funds. The study was carried out by K.V.Raju (Project Leader), H.L. Shashidhar (Water Resource Engineer) both from the Ecological Economics Unit, of ISEC, Bangalore, and N.L.Narasimha Reddy (Anthropologist) and Narendra Babu (Water Resources Engineer) both are from PLFG, Hyderabad.

[2] The situation when the study was carried out is as follows. Second term for WUA began in January 2005, though election was held in October 2003. In nine districts elections for WUAs were not held. The elections for Distributory committees did not take place for second term. Since the beginning, elections were not held for Project Level Committees.

While selecting WUAs, care was taken to have representation WUAs of head reach, middle reach and tail end. And further covered head reach, middle reach and tail-end WUAs within a selected area. In a few places, the team had an opportunity to interact with the presidents of different WUAs at the same time. This has provided an opportunity to understand the viewpoints and experiences of highly motivated leaders and change makers. WUAs were selected randomly from the districts chosen covering various geographical zones. After identifying the WUA's, during the visit to the respective WUAs, discussions with officials of irrigation department, farmers and villagers of WUAs held. With the help of the officials, we identified the WUAs as what they considered as highly problematic or best-practiced WUA. During field visits, WUAs visited are from, 16 major irrigation system, 3 medium irrigation, 22 minor irrigation projects, 2 anicuts and 1 lift irrigation system. Also group discussions were carried out with 13 WUA members and farmers.

3. Evolution of PIM

The experience on Participatory Irrigation Management in Andhra Pradesh can be put into three phases. In the first phase, the state has taken up a pilot programme (in early nineties) on a small scale covering a Minor with a command area of about 1,236 acres (5L of D-64) under Sriramsagar Project. This was followed with a large-scale Pilot Programme, covering a command area of about 49,420 acres, under six different distributaries in Sriramsagar Project during 1995-97.

In the second phase, having gained the experience on the utility and practicability of the Water Users Association (WUA) in the management of irrigation system, the state has scaled up the initiative to the entire state. Two things have happened at this stage. First, an act was passed to provide policy and legal space for WUAs. Second, WUAs (after elections) were provided with capacities and resources required for PIM. At this point emphasis was given to minimum rehabilitation, as to improve system before WUAs could take over maintenance. Though this was right measure, it created a mind set that WUAs are there to take up works.

In the third stage, having completed minimum rehabilitation, WUAs are expected to focus on water management, and annual repairs and maintenance. At this point, there was a delay in elections and subsequently elections were held in October 2003. There was no effort to prepare or build perspective to deal with change management. As result, WUAs across the regions have expressed their dissatisfaction over the financial resource provided to them. There has been gap in terms of capacity building and facilitation by the department during this stage. With the new government taken over reigns in AP, they started exploring the role for PRIs, etc in PIM. Above was the setting when study was carried out.

The study has attempted to capture the perspective of different stakeholders on the evolutionary path, gains and emerging priorities. It has looked the way different local institutions have forged relations, however limited these may be. Further, it examined competency of WUA in playing its role as self-help institution to understand its needs to mange next generation PIM.

The Andhra Pradesh Farmers Management of Irrigation Systems (APFMIS) Act, enacted in 1997 (Government of Andhra Pradesh, 1997), provides the basis for the take-over of the management and maintenance of irrigation systems by Water Users Associations (WUAs). This Act aims at reforms of irrigation management at both system and agency levels, and devolves powers to the water users. It is expected that the implementation of this Act will address such problems as inadequate water availability at the lowest of the outlets, poor maintenance of the system at the field level, and inequitable distribution of water at the farmers' level. It is also felt that when farmers manage the system themselves, they will have full understanding and knowledge of the system, and hence will be more willing to pay water fee.

4. Water User Associations (WUAs)

(i) Elections: WUAs and Distributory committees were formed in 1997. There was time lapse between the WUA first term and next phase elections[3]. So, in 2002 WUAs have handed back accounts and other registers to competent authority. General feedback on this process suggests that a number of WUAs have not completed the process of auditing and handing over even now. As a result, in many cases the newly formed WUAs have to open account without looking into earlier financial transactions. This brings into focus the need for a system while transferring accounts to one to other.

Finally elections were held in 2003 for WUAs (except in nine districts), but not for Distributory Committees[4]. The delay due to delay in conducting elections and subsequently time lapse between second term elections and oath taking of WUA has affected the PIM process[5].

The following are the important concerns emerging from the field interactions. First, farmers have a limited role on decisions of water release at project level in the absence of project level committee. This is resulting in conflicts and misunderstanding on intention of allocation of water for other users (i.e., drinking water, etc). This is very much evident from the case of SRSP, where water has been released for drinking water to Warangnal. This was interpreted as political interference. Second, in the absence Distributory Committee framers have no role in repairs and maintenance of distributaries. In addition, conflicts between tail-end WUAs and head reach farmers have been persisting.

Tenant farmers and women participation is also very limited. There was no effort to enlist women farmers in the command area and facilitate them to take part in election, as 'voters'. At least 5% of farmers are women farmers. There is no data with the farmers generally. No information is available regarding women participation in voting or in election in WUA.

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[3] Elections were delayed for WUA; and after a gap of one year the elections for WUA was conducted. During this period competent authority, acted as a WUA and discharged all the responsibilities. Elections for Distributory Committee were still pending, while elections were not held for Project Committee since the Act came into force.

[4] As per the act, provisions are made for committees at project level and distributory level. In reality, elections were not held so far for project level committees. In the absence of elected committees, competent authority will discharge all the responsibilities.

[5] WUAs took oath in January 2004, though elections were held in October 2003.

(ii) Demarcation of administrative area: WUA is constituted based on hydraulic unit. Therefore, WUA area will generally spread over more than one village. Further, farmers in a single village will have membership in more than one WUA depending location of field. It is possible that a single farmer may own land in more than one WUA area. However, s/he is eligible to vote only for one WUA. Discussion with farmers suggests that they have encountered practical difficulties in dealing with such issues in the absence guidance from officials.

In 2003, the area for WUAs has been re-demarcated. As a result, the number of WUAs in Telangana region has marginally reduced when compared with number of WUAs 1997. On the other hand, the number of WUAs in Coastal Andhra has increased. In the words of officials – the area for WUAs has reduced to less than 5000 acres in 2001 from 8000 -10000 acres in 1997. Similarly, area for DC has reduced to 20000 acres from 90000 acres. In the words WUA president in coastal Andhra – the reorganization of WUA area was aimed at reducing the influence and control of WUA president over large financial resources.

Two concerns emerging from the above process are as follows:

a) There seem to be delay in plough back of water fee to WUA, as there was no preparation of revenue officials on the measures required from revenue department in the reorganization structure of WUA area.
b) For instance, in costal Andhra with reorganization earlier WUA resulted in 2 WUAs, one for head reach and other for tail-end. As a result there has been conflict between the two.
c) While the size is important for operational reasons, collective actions and other socio-political dimensions are also needs to be taken into consideration. Further, officials need to sensitize and minimize conflicts.

(iii) Reorganisation: Along with reorganization of WUA area, some changes were made in the institutional structure of WUA. Some of the important changes are as follows:

- The number of Territorial Committee members has increased to 12 in WUAs under major and medium irrigation projects and six in minor irrigation projects.
- Position of Vice-President was introduced in 2003, where in either president or vice president should be elected from tail-end TC; and will jointly manage the account.
- Indirect elections to WUA president instead of direct elections.
- One-third of TC members will retire once in two years, which is aimed at providing continuity to WUA. It also means that elections for president and vice-president will be also held once in two years.

In the view of some WUA presidents, two years is too short duration for achieving any meaningful purpose. It is their experience that during the last one year they could not do much due to water shortage and other reasons. The next one year will also pass just like that. Another point made by some of the WUA presidents is that indirect elections would help political lobbying and unhealthy situation.

Though there is an understanding among people that either president or Vice-president must be elected from tail-end, but in reality local choices and power equations have led to ignoring this in a few cases.

(iv) Functional gaps: There is a wide gap between what has been proposed in guidelines and how WUAs are functioning in reality.

- ❖ WUA is more a group of individuals representing irrigating farmers. It is expected to look after maintenance of structures, water regulation, distribution and equity concerns, including tail-enders needs. WUA meetings and general body meetings are held to fulfill certain formalities.
- ❖ In spite of the absence of clear planning and ways to prioritize the concerns, WUAs are involved in resource sharing. The process towards transparent decision making, planning and monitoring, and roles and responsibilities of different actors in WUA are not properly evolved in the absence of group building process.

- ❖ Informs on the monthly water discharge. Transaction cost: Whenever the WUA conducts meeting it sends agenda three days in advance to all the members, mostly through laskar. However, a number WUA Presidents expressed their concern on the cost involved in travel and organizing meetings. One WUA president forthright in asking a question - who should bear expenses related to meetings, books, etc. Recently there was a meeting in response to the department's information that water will be released to all tanks in order to support drinking water and water for animals. But then, the WUA after its 2nd term election, a year back, does not have any funds.

- ❖ Regularity of meetings is considered as an important aspect, indicating health of any Self-help group. WUA generally meets as directed by the competent authority. A WUA president in Telangana region stated that after second term election it has met only once, to endorse the government decision to fill rain-fed tanks[6].

- ❖ WUA is expected to maintain 13 books of records. A majority of them found it difficult to maintain. There is a need to reduce and bring it down to a minimum number of books of records.

Some key observations from the field include:

- The maximum number times any WUA has met in the previous year (2004-05) was five times.
- The resolutions passed will be submitted to DC / DE and then moves to EE.

[6] The total number of tanks in the SRSP area is around 600, while under LMD there are 172 tanks. Due to severe scarcity and low rainfall (80% less than normal rainfall) the supply to minor and sub-minor was stopped. The district administration has decided to replenish tanks with Project water where there is severe drinking water scarcity due to prevailing drought conditions.

- WUA is considered as a service provider than representative body of farmers. People expect WUA to fulfill their desires / aspirations. So, farmers believe that WUA has responsibility to do everything.
- WUA President and TC members are interested in financial resources. Any WUA with more plough-back money has higher motivation to take up physical works.
- All physical works are prioritized and carried out by WUA and competent authority as per the availability of resources. Because, in the present context, there are no mechanisms to seek farmers' role and to share information on financial resources.
- The time taken to receive plough back money is generally more than a year. This will not coincide with time of repair and maintenance, which should take place before khariff crop season. This has largely affected WUA functions.

❖ *General Body Meetings*[7]**:** At least one-third of farmers (quorum) under WUA must attend general body. Therefore, in several cases WUA have recorded two meetings of general body; first, where quorum was not there, second with out quorum. It was felt across WUAs that organizing general body meeting was most difficult part of WUA functions. Practically, it was found difficult to organize farmers of different villages in one village. They found it rather convenient to organize village-wise Grama Saba where TC will take lead and attended by WUA President.

Others key issues affecting the functioning of WUA are:

- WUAs have not been functioning as a representative unit of all farmers. The responsibilities, decision making and benefits if any are skewed towards the chair person/vice chair person. The role of TCs is marginal and limited to getting his share of work.
- The sub-committees are formed only in exceptional cases. This approach seems to be not helpful in institutionalizing specific functions and functional responsibilities.
- The tenant farmers have not been involved in any way in WUA, which may affect negatively in so far collective action is concerned. This is happening in spite of a provision in act for inclusive membership for tenants in WUA and sub-committee to deal with such issues. This is only indicates lack of understanding on such issues and ability to translate concerns into action.
- The participation of farmers in planning and chalking out the priorities is almost absent. Neither there is an attempt to provide the space (by the office bearers or departments) nor pro-active action by farmers.
- There is also no upward linkage in decision making process in the absence of Distributory committee and Project Committee resulting in decision making at these levels volatile.

[7] The Authority shall meet at least once in three months at such place and time as the President may decide.

- ❖ *Tank based WUAs*: These tanks are rain-fed and independent of major irrigation projects. Tanks based WUAs worked with minor irrigation department. The status of WUAs in single villages was found different depending on whether they come under minor or major irrigation projects. There are variations in resource position, WUA functions and capacity building aspects between WUAs of minor and major irrigation.

- ❖ *Conflict resolution*: Across WUAs it was felt that Gram Sarpanch and village elders will play a larger role in conflict resolution. While resolving disputes necessary information including land maps will be consulted. The conflicts will be discussed in WUA, only when there is water. In few cases, though issues were took up for discussion it did not result in mutually agreed upon resolutions. For example, a TC has reported encroachment of field channel by a socially weak farmer (as it passes through his land). The WUA did not discuss or pass a resolution. Instead, the TC was asked to find alternative field channel to his field.

Monitoring at WUA level: The system of monitoring is absent at WUA level. There is no mechanism to regularly observe the quality of WUA and provide necessary support. Hence the study elicited WUAs view on indicators for assessing the performance of WUAs. The response was varied. The common indicators emerged from farmers are:

- Water Management (Meeting needs of tail-enders)
- Working with farmers and taking part in conflict resolutions
- Functional status of sub-committee and TC members
- Participation in Joint Azmoish[8] and Revenue generated at WUA level; and Resources available and utilization
- WUA role in involving village leaders and farmers in planning;
- WUA relations with officials
- Responsibility in understanding issues and facilitation of action (e,g., closing crab holes in field channels)

❖ ***Farmers' role***: Farmers used to do certain things on their own. Whenever, there was need a group of farmers used to approach officials for finding way out. With WUA coming into picture, much of this was expected by WUA. Now there is no felt responsibility on farmers part to mobilize fellow farmers. Now farmers feel, the WUA president will take care of every thing. When discussed with the WUA president, he was of the view that farmers earlier used to take care of field channels, but now they expect WUA to do everything. Many farmers have even blocked field channels, which makes it difficult for farmers in upper reach. Some major views gathered from farmers are:

- In the past, farmers use to attend repair works or engage workers. But with the increase in tenant farmers (from crop to crop), farmer's participation has come down. For example, in Singavaram village out of 300 farmers, 200 are tenant farmers. Now a majority of landowners have leased out land in small parcels. Tenants prefer watering the field and not any other work as they

[8] Joint azmoish is assessing land by village secretary which is accompanied by WUA president, TC members and village panchayath members.

need to attend their wage work too. Similarly, in Pandalparru village in West Godavari, 80 households are engaged in tenant farming.

- Farmers will always look at the WUA president as responsible person. A WUA president says, farmers have no role in WUA. They have no awareness and it may take another five years for them to get prepared for a new role.
- The performance of WUA, particularly organizing farmers, will depend on leadership capability of executive committee members. President should play a larger role in organizing and assigning roles to farmers as per the needs in WUA area.
- Based on co-operative societies experience a WUA president said, if WUA has to be successful, farmers should be involved. Only 30-40 percent of farmers preferred collective action, while others are either suspicious or reluctant to take part in collective action.

WUA is designed to suit specific functions of PIM. But the institutional evolution and strengthening process is affected by following conditions.

a) Ineffective role play by a WUA president in mustering TC members support;
b) TC is member interested in physical works contract rather than water management;
c) The meeting of WUAs and General Body meetings cannot be effective, as there is no financial allocation for such activities;
d) Lack of action binding factor between the WUA members and options for working towards collective action;
e) Inadequate efforts to facilitate roles and responsibilities of members.

5. WUA and other institutions

(i) Irrigation Department: The department officials, being competent authority, have been providing necessary support for WUAs in implementation of the project activities. They continue to manage the project activities, while WUAs provide them a support in the implementing works. The officials continue to play a regulatory role and they need skills of facilitation.

Across the WUAs, it was felt that people have improved relations with Irrigation department after the formation of WUAs. In the past, each farmer used to represent his/her problem directly to officials. At present, WUA president takes responsibility and provides necessary support.

While some WUAs have said that the frequency of visits by officials has increased in recent years, others felt that they are leaving to WUA president. On the whole people's ability to demand from the department has considerably improved.

(ii) Agriculture Department: The support of Agriculture Department in providing knowledge, technology and extension is critical in the context of efficient use of water. Farmers have felt that the agriculture department is generally providing inputs like seeds and subsidized inputs; and not in providing strategic interventions for the over all improvement of agricultural system in irrigated area.

Farmers like the agricultural officials to participate in different meetings of WUAs; and also project level meetings to help farmers in crop planning. Farmers have felt lack of relationship between the irrigation and the agricultural departments. Through initiative of a few agriculture officers and own initiative of farmers, SRI method of rice cultivation was demonstrated in some places. But in the absence of combined effort of the both the departments, this experience has been limited to demonstration.

Farmers in several places suggested that WUA should facilitate farmers' field school[9] to build better relations between farmers and the agricultural department. Also suggested was the agricultural department should participate in all-important meetings of WUA and provide support in crop planning and other agricultural investments.

(iii) Gram Panchayat: Gram sarpanch is involved whenever there is a conflict as of now. There is lack of trust between GP and WUA members. This is seen as interference rather than collaboration. A few experiences in the state suggest that role of GP can maximize the resource base of WUA. In this context different perceptions are presented:

- Sarpanch should be given advisory role in WUA in view of higher position (authority on resources in the village). This will help information flow from one to other.
- People saw the role for GP in relation to providing linkages with different government programmes. Since plough back of tax is taking time, it can mediate with MRO. It can also play a role in case of disputes between two villages; or decisions related to water allocation.
- *A*t present there is no role for GP. People suggested that co-opted members should also be drawn from farmers. On other users, they have felt that command farmers should be major stakeholders: "Farmers have improved role in protecting and management tank, as it is like a pot in the house of farmers".
- GP continues to control grass and tress, though as per the act WUA is entitled to raise revenue from grass and tress. GP has right and continue to auction tress and grass in its jurisdiction. There is no response from GP to WUA resolution asking GP to handover these rights. GP has also not responding to notice issued by the irrigation department to give its share from trees (rule as existed before WUA formation). Only a few GPs have responded this notice.
- GP also auctions fish from the drinking water tanks, but WUA has no right on this.
- There is improvement in tank due to works undertaken in recent years. Earlier a big farmer of GP used to take care partly in water regulation. At present there is a specific institution to look into water management. The

[9] A group of 15-20 small and marginal farmers come together to meet and participate in interactive learning at regular intervals during crop season. They select one acre of land (of one of the group members) for a controlled application of organic farming and to learn to identify pests and predators. The weekly FFS sessions will make farmers well versed in seed treatment, soil fertility management, and pest and disease management. In short they will learn by doing the integrated crop management.

relations with officers have also improved. GP invites WUA for review and other meetings. There is a need for a role of GP in WUA. The co-opted members from GP should not interfere in the decision making process.

- The role of sarpanch is important in conflict resolution. Though village secretary[10] takes part in tax collection, there is no link between PRI and WUA. As per the WUA president and farmers participated in discussion, WUA need separate identity to perform its functions. In fact, after WUAs formed there is some one to take interest and concentrate on various aspects of water management.
- GP has role in tanks with less than 100 acres ayacut. In this case with given functions, GP may not be able to give so much time on this, in response to question on why GP role cant be followed as in case of tanks less than 100 acres. There was no awareness in so far as sub-committee and PR role in water management as subject.
- There is also relation with GP as it involves in water fee collection through village assistant.
- *MLA/other political leaders*: Their role is also important as they can provide additional resources from MLA/MP funds. They are also important in the context of conflict resolution, negotiating with officials and set priorities in the area.
- *Other users*: If tank is drying up, WUA has supported release of water. Women are not allowed to wash clothes in scarce period. GP though not playing any role in WUA, will need to take initiative to save water by reducing water wastage.
- Water for other use: The major and medium projects are meeting other than irrigation needs. The role of WUAs in this is very important. In the absence of project level committee, the decisions on other uses always interpreted as political. The intensity of the need and prioritization is not at all understood and decision making that affect is not seen in reality.

In a majority of WUAs there is a suspicion on the role of Gram Panchayat in WUAs. There is a need for building trust between two institutions besides there should be focus on taking up certain pilots to demonstrate how two institutions can improve the effectiveness of PIM. There are several examples wherein Gram Panchayat and Water Associations working together on issues such as seeking resources from food for work, resolving conflicts etc. These two institutions need to understand the respective role and forge relationships for the larger benefit of the community with respect of water management.

The first phase of the PIM in the state has a major focus on the maintenance and repair. Hence, funds handled by WUAs was at a reasonably higher level in comparison with other elected local bodies like gram panchayat. This incidentally has distanced the farmers as well as the PRI from WUA and vice versa. Farmers left everything to WUAs to invest and complete the work which WUA also looked as a means of work generation. The power centres by virtue of funds handled and the jurisdiction/operational area also

[10] State Government appoints village Secretary for monitoring and evaluation of revenue details of villages he is in-charge of; works under Mandal Revenue Officer. Generally a village secretary looks after cluster of village in a mandal/taluka.

seem to have created a gap between the WUAs and the PRIs with both of them maintaining their own stands. With the passage of Phase I and the entry into the Phase II which has the crucial mandate of PIM in terms of convergence and collective action by all the actors, it is imperative to bridge the gap between the farmers, PRIs and the WUAs through better facilitation and it requires policy support.

6. Resources mobilization

WUA role in repairs and maintenance depends on its ability to generate resources. As per the act, provisions were made to generate revenue for WUA to self manage and achieve financially reliance and sustainability.

A closer look at the revenue flows to WUAs indicates that the major source of revenue is water fees. But the revenue department was taking enormous time to plough it back to WUAs, is a major constraint. This is due to lack of effort from the government to equip other departments and actors supposed to provide support in participatory irrigation management. The revenue in flow to WUA varied across the Telangana and Coastal Andhra regions. The water abundant regions like Godavari and Krishna WUAs seem to have control over large resources. In other words, a number of WUAs in Godavari and Krishna areas have succeed mobilizing water fee due to the availability and assured supply of water; there is comparatively better water fee collection in Godavari area. There is also scope to generate income from other resources such trees, fishery and industrial activity. On the other hand in Telangana the revenue is scarce and may not sufficient to meet maintenance and repairs. In general, tail-end WUAs have performed poor in the revenue collection.

There are other issues with reference to fisheries, trees and other resources which can provide revenue to WUAs. All these related to operational issues and in spite of clear instructions, Gram Panchayats are not permitting WUAs to take control over the revenue. Field observations indicate that:

- The revenue department with participation of TC, agriculture department officials and irrigation department engineers generally does joint survey. Revenue department prepare data without involving WUA. As a result instead of 1168 acres 1849 acres has been listed out. In fact islands and hillocks were also localized. In so far sharing records to WUA, revenue records indicate less than what has been collected.
- Whenever there is a conflict in joint Azmoish, Sarpanch and WUA members will be involved in resolving. Several conflicts have emerged arose in deciding the area of irrigation. For example, one farmer has 7 acres. He used water only for one acre; and rest was irrigated by open well. While farmer was willing to pay one acre, he was asked to pay for all the seven acres.

- The revenue from water fees has started plough back only in 2002. When the new executive committee of the WUA took office, in 2004, it has Rs. 50,000 (Plough back amount) in the account. A new account was opened and but access to earlier bank accounts was not available.

- The revenue department gives the statement to the irrigation department only at the time of plough back of funds. There is no record for verification at WUA on the actual amount being collected every year.

- GP continues to control grass and tress, though as per the act WUA is entitled to raise revenue from grass and tress. GP has already has right and continue to auction tress and grass in its jurisdiction. There is no response from GP to WUA resolution asking GP to handover. GP has also not responding to notice issued by the irrigation department to give its share from trees (rule as existed before WUA formation). Only a few GPs have responded this notice.
- GP also auctions fish from drinking water tanks, but WUA has no right on this.

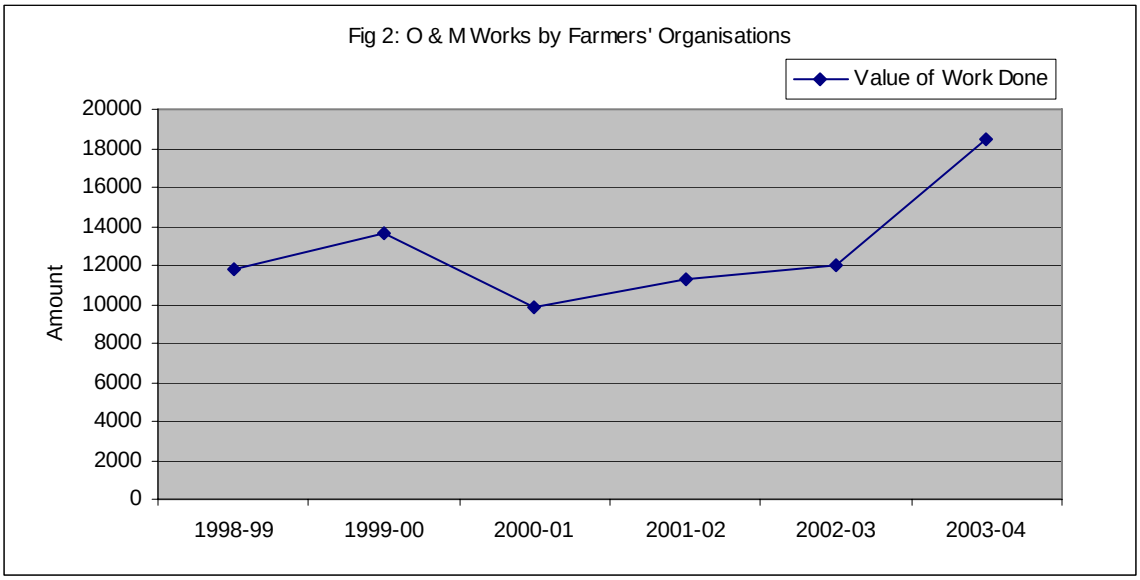
The WUAs have expressed unequivocally that they need the government support through the necessary administrative orders, sanctions and legal provisions to mobilise the resources out of various interventions centered around the irrigation systems. This has a greater role to play in the minor irrigation context. The clarity should also emerge vis-à-vis the management rights, ownership rights and the usufruct rights among different stakeholders who share the resources. WUAs prefer an open auction, which is apprehended by the communities/institutions having customary rights over it. A win-win situation has to be evolved which is possible only by facilitating through a transparent process with clear framework developed over the property rights. This includes fisheries (some level of clarity is there with legal provisions), trees, bricks, tank bed farming, ground water utilisation and supply of drinking water to towns etc.

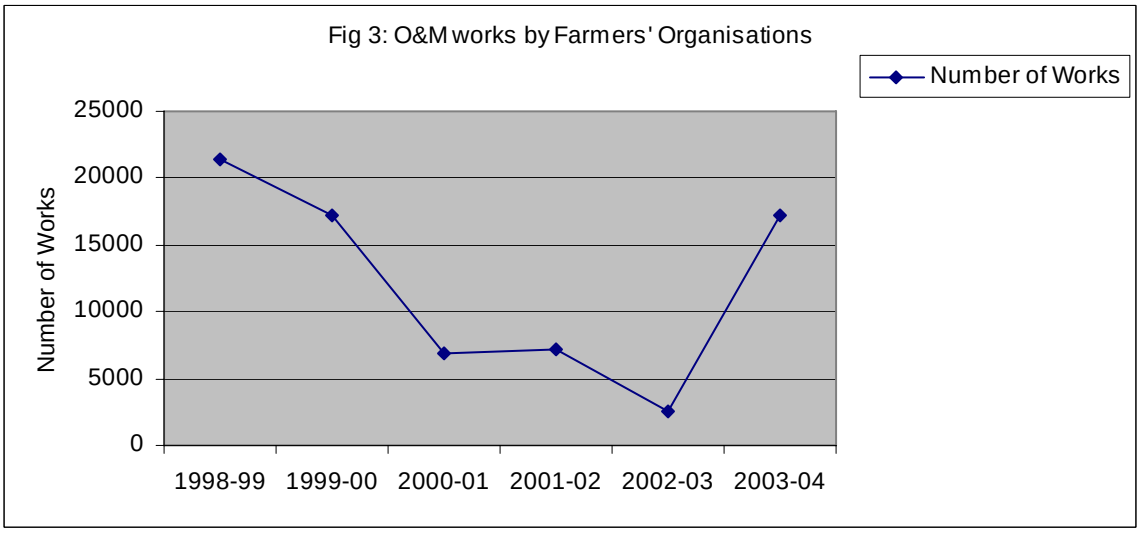
7. Operation & Maintenance

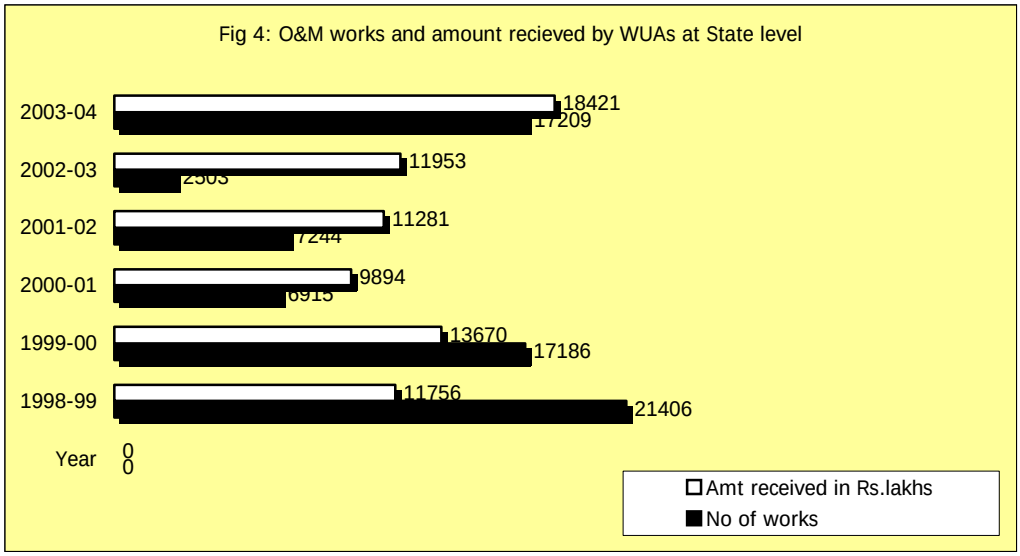
7.1 APERP Works Programme: The Andhra Pradesh Economic Restructuring Project (APERP) (Irrigation Component) is basically designed as a WUA support Programme. The Farmers' Organizations themselves undertook the minimum rehabilitation works and Operation and Maintenance (O&M) works in respect of irrigation schemes. This process enabled the farmers to acquire experience in undertaking maintenance works and also to understand the complexity of maintaining and operating the irrigation systems. This involved executing maintenance works as per the prioritization of the works after a walk-through survey. In order to rehabilitate and modernize the existing irrigation systems, the Government has obtained financial assistance from the World Bank under the APERP (Irrigation Component) with a Project Cost of Rs.9622.4 millions for achieving the following objectives: (a) Place the irrigation sector on a sustainable basis through involvement of farmers in irrigation management and effecting the cost recovery. (b) Reverse the decline in irrigated area. (c) Improve the productivity of irrigated agriculture. (d) Strengthened cost recovery for Operation and Maintenance. (e) Expansion of effectively irrigated areas in existing systems.

7.2 Operation and Maintenance Costs: The works taken up by the Farmers' Organizations during the last 6 years is given below. The total expenditure so far up to the end of March 2004 incurred under APERP is Rs.7697.5 millions. The fig 2, fig 3 and

fig 4 shows the O & M works by farmers' organizations; O & M work done and amounts received by WUAs at state level.







7.3 Minimum Rehabilitation: The minimum rehabilitation program was executed through the farmers' organizations. Farmers were exposed to a new working environment – they had to negotiate for machinery at cheaper rates, persuade the village to take up maintenance works, and maintain records to enable payment. A " mobilization advance" was made available for farmers to start the work. Subsequent payments were given on actual taking up of work. Maintenance works have been taken up by WUAs during the last three fiscal years, viz., 1998, 1999, 2000.

The Minimum Rehabilitation Programme of Minor Irrigation Tanks is taken up for 2,934 tanks at a cost of Rs.13,618 Lakhs tanks covering an ayacut of 9.07 lakh acres in phase I and another 2,014 Minor Irrigation Tanks at a cost of Rs.8,963 lakhs covering an ayacut of 5.24 lakh acres in phase II.

7.4 Mobililzaton of Resources

7.4.1 Different type of Sources

Tank-WUAs are constrained to mobilize resources, owing to conflicting rules and unclear responsibilities. The fish from the tank waters should be open for bidding. Thus, WUAs can have higher level of resource mobilization. Tank WUAs are unclear about leasing out tank bed cultivation during summer and auctioning trees and tree crops on bunds and foreshore areas. Major and medium irrigation canal based WUAs, and Distributory committees are yet to get their canal boundary maps; which would help to plant trees, auction tree products, penalize the encroachers.

(a) *Water fee:* The water fee collected in the area of the WUA forms an important component of the resources. The Government has decided to transfer the water fee on a percentage basis to the Farmers' Organizations. The following table 2 shows the water fee and allocation made in that;

Table 2: Water fee and its allocation to various agencies

Sector	Water fee per acre	Allocation				
		WUAs	DCs	PCs	GP	Irrigation Dept
Major	Rs.200	50	20	20	10	100
Medium	Rs.200	60	--	30	10	100
Minor	Rs.100	90	---	---	10	---

Source: G.O.Ms.No.115 Revenue (L.R-3) Department, Dtd: 13-02-2001

(b) *Distribution of Water fee:* One of the most important decisions that has been brought in the field of Operation and Maintenance is the linkage between water fee collected by the Revenue Department and the distribution of water fee for Operation and Maintenance works. The Government has taken yet another landmark decision by issuing orders for apportioning the water fee collected among the Farmers' Organizations for the Operation and Maintenance of the irrigation systems. The water fee collected is to be adjusted in the following ratio [vide GO Ms. No. 115 Revenue (LR3) Department dated 13th February, 2001)].

(c) *Levy of fee:* The Act also empowers Farmers' Organizations to levy a fee to achieve the objects of the Act and for performing its functions. All the members are mandated to pay the amounts as decided by the General Body of the Farmers' Organizations.

(d) *Other sources:* In addition, the WUAs can collect contribution from their members. They can also raise income from properties within the system such as auction of usufruct of trees, rent on irrigation properties, etc. Other funds as received from the Central Government as management subsidy or calamity relief would also contribute to its resources.

8. Role of WUA: The farming community as well as PRIs are appreciating emergence of dedicated institution for water management. But at the same time PRI is threatened by the presence of WUA. In some cases there is congruence between PRI and WUA in accessing the programmes such as Food for Work to carry out necessary repairs for the system improvement.

While there seem to be some role building at WUA functionaries' level, there is a gap in terms of the same at farmer's level. The farmers seem to be gradually withdrawing from their traditional role in water management/O&M and trying to shift the onus on WUAs even for minor repairs/issues. For instance the field channels need to be maintained at farmer's level, which hitherto was the practice adopted; the farmers are relying, rather demanding the WUAs to get it done now. WUAs are in turn looking up for the share of Water fees they are entitled to carry out this. WUAs functionaries are also looking for as much work as possible to be handled by them and encouraging this.

WUA role in *joint azmoish* is limited to the cases where there is a conflict. There is a huge gap between the WUA claims and the actual revenue collection. This is due to lack of proper system, records and stakes of different actors involved in the entire process (Village secretary, Revenue department, WUA, Pay and Accounts, Irrigation dept, banks). In majority of the WUAs visited, the time taken to plough back[11] the WUA's

[11] The process involved in plough back starts with joint azmoish and the farmers pay their cess as per azmoish records; some amount of cess again comes back to WUA of that respective area. This is basically to strengthen the WUA, govt has provided such option. It is dealt in detail in 11.8 section.

share in water fee is exorbitantly high (up to 2 years). Reorganization of WUAs has further complicated the process and no systems established.

- In almost all the cases WUAs are with no balance in their bank accounts. WUAs are looking up for funds and support rather than initiating the process of farmers participation in need assessment and decision making to complete the emergency/bare minimum works/maintenance at their level. Farmers also seem to be shrugging off from their responsibility and hint at the WUAs to mobilize the resources and complete the works.

- WUAs role in conflict resolution and better delivery systems to the tail end has been improved as reported by farmers. One of the reasons could be the representation of such farmers in WUA. There also has been substantial investment in improving the distributory system.

- WUAs role in curtailing the illegal lifting of water from canals by the upland farmers and often playing a role of localizing the unauthorized ayacut.

- The role of WUA is not adequately built concerning to conjunctive use of ground water; Indeed, no role was envisaged for WUAs in ground water management. But there is a need to look beyond guidelines. Massive digging of open wells and also in some cases reaching down to borewells is observed, which is a matter of concern. But WUAs have no clue how and what to handle in these circumstances. WUA's role should also need to be made prominent linking appropriately to other institutions/regulatory mechanisms.

- Farmers have no role in the PIM in the absence of mechanism to guide and involve them. It may be difficult for WUA to organize farmers; even the TC level farmers coming together will be not easy. To only get demands of farmers, but not collective, responsibility, so head reach farmers are irresponsible, while tail-end farmers demand WUA.

8.1 Water Allocation: During the study, we looked up into WUAs of following Major and Medium Irrigation projects, a) Sri Ram Sagar Project – Upper Manair Dam and Lower Manair Dam; b) Krishna; c) Godavari; d) Vamsadhara Project; e) Thandava Reservoir; f) Bahuda Medium Irrigation Project; g) Tunga Badra High Level Canal

Usually the allocation of water is based on the available water in catchment area and the land available for irrigation. Table 3 shows the water allocation made for various projects.

Table 3: showing the Actual and Design Water Allocation

Sl.No	Particulars	Allocation Quantity	
		Standard Design Allocation	Actual Allotted in the year 2001-02
1	Kakatiya Main Canal, SRSP	@ 146 KM, 9000 c/s @ 234 KM, 6000 c/s	5400 c/s 1100 c/s
2	Krishna Delta	165 TMC	125 TMC
3	Godavari Delta	---	---
4	Thandava Reservoir	4.4 TMC	4.4 TMC
5	Vamsadhara (left main canal)	2259 cusecs	1900 cusecs

Source: survey and data collected from Irrigation Departments

As per the rules to APFMIS Act, 1997, rule no.21, the Managing Committee of the respective Farmers' Organisation shall, along with the assistance of the competent authority, prepare a water budget for the area of operation under its control as detailed below in table 4;Thus preparing water budgeting for the area of operation as given in APFMIS ACT,1997 constitutes operational plan for that respective WUA, and is discussed below in the table as promise through WUA.

Table 4: Operational plan and water budgeting

Promise through WUA	Actual practice till 2005 as observed	Reason for Gap
1. One month before the onset of the Khariff season, the Project Committee shall, subject to such directions as may be given by government from time to time, work out the anticipated inflows and existing availability in the reservoir and work out the water allocation to all the Distributory Committees; the Distributory committee shall allocate to the Water Users Association in its jurisdiction: Provided that in the case of medium irrigation projects, the Project Committee shall allocate to the Water Users Associations.	**SRSP** Before beginning of the season, water availability is made clear to farmers through WUA presidents or through AEs/work inspectors. **Krishna and Godavari Delta** In the beginning of the season, Irrigation Department officials conduct walk through survey, prioritizing the needs ayacut is fixed and water is released in 50 – 50 basis.	WUAs are not aware of their roles and responsibilities Many WUA members are not interested to know
2. A farmer organization in distributing water to its member constituents shall have regard to allocations meant for drinking waters, or for any specified purpose as may be decided by government from time to time.	**SRSP** Canal water is not provided for drinking. WUAs of Tadikal, Jagityal were opposing the govt decision in providing drinking water to Warangal city.	
3. For the Rabi season, the Project Committee will determine the area to be thrown open for irrigation based upon the actual availability of water at the beginning of Rabi season. The water so available shall be allocated equitably among the Distributory Committees and water users associations. In the case of medium or minor irrigation system, equitable distribution shall be achieved by adopting circular rotation over a period	**Krishna, Godavari Delta and Vamsadara** Canal water is the main source of drinking. There is no WUA intervention in this region.	
4. Each of the farmers organization, shall draw up an operational plan which shall specify the quantity of water to be drawn on a fortnightly basis.	No WUA out of 57 visited has maintained such operational plan	They were never asked to maintain such plan
5. The drawals of water shall be monitored each day at specified gauge points as decided by the farmers organization.	**SRSP**	WUAs are not interested in maintaining such records

6. Review of the drawals and distribution shall be done by each of the farmers organization at the end of each fortnight and corrective measures taken	Gauges are available only at outlets of distributory **Krishna, Godavari, Vamsadhara** No such practice from WUA	
7. At the end of each season the respective farmers organization shall prepare a report of water received and utilized along with the area irrigated, quantity of water supply and extent of crops.	Only 5% of the WUAs visited are maintaining this record	WUAs are not accountable
8. The farmers organization shall analyse the shortcomings and deviations in water budget and report to the next higher tier.	Chamanapally II WUA of SRSP is maintaining this.	There is no motivation from WUA members
9. In respect of a minor irrigation system the water users association shall decide the operational plan, date of release of water which are to be thrown open for irrigation depending upon the storage / inflows into the tank.	Role of WUA in MI is limited only for works not for release or distribution.	Dependents believe in age old traditions

Though the WUA members had received their copy of APFMIS Act, which clearly mentions their roles and responsibilities, they hardly go through it. They are not motivated in following the roles as given in the act. Out of 57 WUAs visited no WUA has asked its share of water from Distributory / Project level committee. The upper tier which can monitor these works of WUA is not existing and hence WUAs are not performing their duties as responsible as they should be. Table 5 shows the method followed in allocating water.

Table 5: Method followed in allocating water(as observed in field)

Telangana	**Coastal AP**	**Rayalaseema**
Project Level: Water available in the project is monitored and distributed accordingly to distributaries	Project Level: No method followed in allocation	No allocation method is followed
Distributory Level: Water is allocated to each minor on rotation basis. In SRSP region it is 9 days on 6 days off.	Distributory Level: Water flow is continuous in these canals. In some part of Krishna delta it is 4 days on 3 days off. In Bheemadolu, West Godavari canals would be closed 2 months in a year.	
WUA Level: Members of WUA of SRSP and Vamsadara, compare the water level in minors to the graduations marked on the slopes of the minors, if water released flows at the level of graduation then they say water could reach tail end.	WUA Level: no method followed in allocation	WUA Level: no method is followed in allocation

8.2 Water Distribution: After the water discharged in distributaries, the irrigation department notifies WUAs of respective areas about the discharges. WUA members conduct quick meeting with the villagers representing tail and head end ayacut, in presence of competent authority and decides the quantity of water available and discuss about the crop rotation**.**

In meetings WUA members, officials and farmers take important decision about water regulating and allocation, but from the field visit it is evident that only 19% (refer table 3 in Annexure 3) of WUAs are conducting meetings and take decisions regarding crop to be grown, actual water available for irrigation etc.. It is WUAs duty to receive water from distributory and rotate water among minors but in actual only 10% WUAs are taking care of distribution, canal operation and regulation, resulting in non equity

and tail enders are depriving of irrigation water as usual. Only 8% (refer table 3 in Annexure 3) WUAs could able to provide water till tail end.

At project level, water distribution mainly depends on the quantity available in project and each distributory channel would get equal share. From distributaries water is then allowed into minors through gauged outlets. Till this point water can be measured and distributed evenly, hereafter it depends on farmers, user associations, and luskars. Water distribution also depends on the condition of canal

8.2.1 Role of President and TC Members

To perform above said functions, a President and TC members were selected through elections and made authorities of respective WUA. From the field visits, it is evident that role of TC members are negligible compared to that of WUA President. In many villages TC members said we don't know what ever work done by President and we also don't know about funds received. Before taking any decision regarding water demand, distribution, cropping pattern, works to be carried out president should discuss with TC members which one can see rarely performing. Except WUAs like Chamanapally-II, Keshavapatnam, Mustabad, Narmal.

President and TC members are expected to meet farmers once in a week. But in reality this does not happen in many WUAs. Since either president or Vice- president will come fro tail-end, s/he takes interest in tail end. The expected direction of information flow is from farmer to TC to President to laskar to AE/EE. It also flows back in the same way. The Vice-President is also joint account holder. Only president and competent authority take active part. Only farmers with problems will meet the president or TC to find solution.

In delta region, WUA Presidents are more interested towards funds and works, which doesn't require TC member and hence there is no role for TC members. In Gudlacheruvu region TC members from tail end complained that they don't know about GBM and head reach farmers hardly allow water till our fields, water from canal is taken manually using buckets (few people use diesel (manual) machine) and fill field channel. In Pedda tank of Vishakapatnam, TC members never attend any meeting and never participate in WUA works (every one here is losing interest as said by president). As per new rules, each WUA contains 6 members and President post will circulate among them in a period of 6 years.

Indenting of water by the WUAs for the water requirements under their respective operational areas is not in vogue. After the passing of first Phase of PIM (1st term of WUAs) which focused on the improvement of the physical system it is time for an effective PIM now for building the capacities of farmers/WUAs and sensitising them regarding the indenting for water. Based on the availability of water the demand should be put forward by the WUAs which has to be analysed by the department and responded to. Indenting of water also needs the prior planning of the crop water requirement which also requires the capacities to be built for the staff, the WUA functionaries and farmers.

Meeting the adequate irrigation needs of any crop during its critical stages of growth has a substantial impact on the productivity. Therefore, based on the crop selected and its critical stages, irrigation scheduling needs to be done for the entire command. For this, in the first instance, the physical system needs to be strengthened and made suitable with regulators at all required places. Though Warabandi or rotational system is being followed in some of the Major and Medium irrigation commands it has not been totally as per the farmers proactive role but department's mandate. The farmers natural option is free flow of water. Taking the farmers out of this perception and making PIM more effective through better water management needs the building of capacities in a big way through sensitization and demonstration.

8.3 Water Regulation: After a water budget is prepared, the farmers organization shall draw up a plan of water regulation as shown in Table 5 and actual practice at field level in table 6.

Table 6: Functions and Practice by WUA in Water Regulation

Functions of WUAs as specified in APFMIS Act	Actual practice till 2005 (as observed in field)
a. The dates of release and closure shall be informed to all members well in advance; b. Equitable distribution of water amongst all users shall be the main principle in water regulation; c. WUA shall draw water and monitor flows based on the operational plan prepared; d. Warabandhi Schedule (turn-Schedule) shall be prepared for each outlet in a farmers organization; e. WUA shall, carryout Azmoish of the ayacut with the assistance of the Competent Authority along with the Agriculture and Revenue personnel; and f. WUA may, for the purpose of monitoring, install such devices as may be required within its jurisdriction.	a.Information on water release passes from officials to farmers. b.Head end farmers are still having upper hand compare to tail end farmers. Only in SRSP command 8% WUAs said water is reaching to tail end. c.In Krishna and Godavari system water availability is abundant and hence WUAs/Dept never felt to regulate. d.In Thandava medium irrigation, ayacut is fixed and hence no regulation. e.Warabandhi is decided by dept. f.Only SRSP command WUAs are aware of Joint Azmoish. g. No such practice by WUA

Table 7: Actual practices in the field regarding water distribution (as observed in field)

Functions	Telangana	Coastal AP	Rayalseema
Canal Structures	Lined and working condition is good	Unlined and poor working condition	Unlined and poor working condition
Quantity of water demanded by	WUA members/farmer representatives	Water is abundant and hence continuous flow	Till the dead storage in tank, water would be released
Control Regulator and gauging	Available till inlet of minor	Not available at minors	Sluice
Water is available	Only for particular season	Through out the year	Till water level falls below dead storage

8.4 Water Use Efficiency: The understanding of Water use efficiency seems to be limited to acres per mcft of water (which has been a fixed one for ages and is mentioned only in records in most of the cases) in general keeping in dark the other critical aspects. Water use efficiency includes any measure that reduces the amount of water used per unit of any given activity, consistent with the maintenance or enhancement of water quality (Donald M. Tate / In: Principles of water use efficiency).

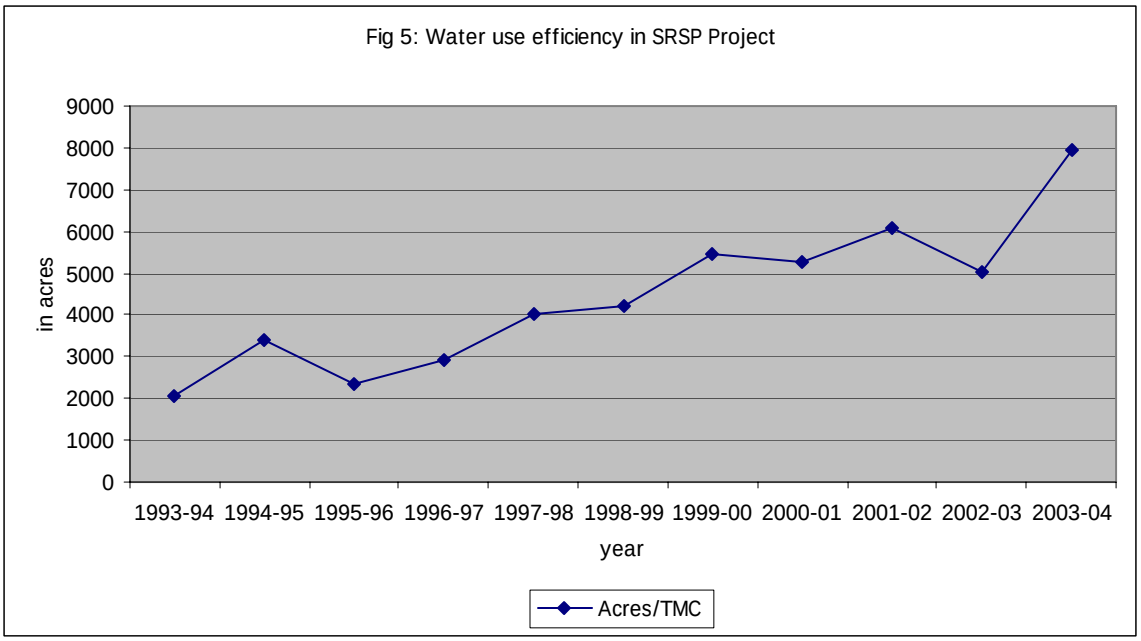
In the present context, efficiency can be explained as output per unit of water. However, computation of output is complex as it depends on the cropping pattern, physical yields and crop prices, which vary at different rates for different crops. A simpler index is area irrigated per unit of water. No doubt, this is also a rough index, given the differential demand of water by different crops. However, abstracting from short-term changes in cropping practices, it can constitute a first level indication of the efficiency of water use. The productivity indices of agricultural production i.e., area irrigated, physical yields of major crops, cropping intensity, changes induced in cropping pattern etc.

Water use efficiency can be better achieved with crops consuming less water and bringing down conveyance and field application losses through better water distribution. In majority of the cases under minor irrigation tanks, the cropping pattern is water intensive crops like rice and sugarcane. Irrigate Dry crops are rare and the standard reason quoted by all the farmers is that the soils wont permit other crops. How far this view can be technically upheld is a different debate all together. But the farmers have different arguments to put. The market forces are extremely important in deciding the cropping pattern. The important indicators, which influences water use efficiency are as follows;

8.4.1 Duty

Duty is perceived by the engineers just in terms of release of water and the capacity of the canals rather than the requirement. Duty as per the standard norms for wet and ID (How ever it is only wet practically) are recorded but its relevance to a changed cropping pattern or scheduling is not much pondered over. Demystification of technology needs to be done making farming community understand the critical terminology in PIM without which it will be a stage managed show by the technocrats. Duty is said to be the area irrigated for a given amount of water. Standard duty as per Irrigation department officers is 8 Acres/Mcft. Below graph shows the water use efficiency in SRSP, after formation of WUA and adopting warabandhi system duty of water increased from 2.54 Acres/Mcft in 1995-96 to 6 Acres/Mcft in 2001 –02.

In Tadikal WUA members unequivocally said, from utilizing less water we are getting more yield and hence water is also reaching till tail end. The same is said in Suddala village of Sultanabad mandal that people accepted to utilize less water, and they are getting good yield. Even if excess water provided to them they wont use it. M28L at KM 22.25 of D86 of Kakatiya Canal is designed to irrigate 605.4540 hec (1495.47 acres) with a design discharge of 0.5578 cumecs but actual area irrigating under this is 3098.38 acres. This also proves that the area irrigated is more from the quantity of water available. this increase in duty is also because of the works carried out by WUA in the minors and sub minors. Fig 5 shows the water use efficiency in SRSP project.



Source: SE office, LMD

In Krishna delta, the Duty of 7 acres/mcft is raised to 11- 13 acres/mcft in these years because of introducing warabandhi system due to drought condition. Earlier water was providing for 120 days and now water is given for 105 days in Krishna region but still yield remained same. In Nidudavolu region, though ayacut area irrigated is same as designed but water utilization is reduced resulting in increased duty. In Krishna – Eluru canal earlier it was 6.5 acres/mcft and now it is 10 acres/mcft.

8.4.2 Cropping Pattern

Another important factor that influences water use efficiency is cropping pattern. Paddy is the major crop grown in this region, which requires minimum 120 days of irrigation. For paddy farmers keep 6" standing water in the field. Paddy is grown in Khariff season and crop can be harvested in 6 months. Due to less water inflow into the projects water provided to canals is less, in Krishna region water provided is for 105 days instead of 120 days, as said by Engineer. Initially farmer use to keep 6" standing water but now they keep only 3" water, they realized that providing less water will result in high yield. Earlier it was 20-25 bags/acre but now getting 40 bags/acre.

In Tadikal of LMD, WUA members said, cropping pattern is changed due to shortage of water(WUA president mentioned, it is not because of water shortage but farmers are more aware of better management of water) . People who were growing wet crops are gradually shifting towards ID (maize, chilli). They realized that by doing this they will get crop early and returns would be high. In Warangal region, major crops grown are cotton (95%) and maize (5%) for cotton water requirement is less. If sufficient water is provided to them they will shift to paddy.

8.5 Acreage

Increase in area irrigated is a critical point with which a WUAs success is measured. In order to assess this, we have carried out a series of investigations to the

fields and discussions with farmers, villagers and WUA members. Field visits to the sample areas also verified that water had in fact reached further downstream where silting, clearing, etc. had been undertaken. This increase in acreage may be due to following factors;

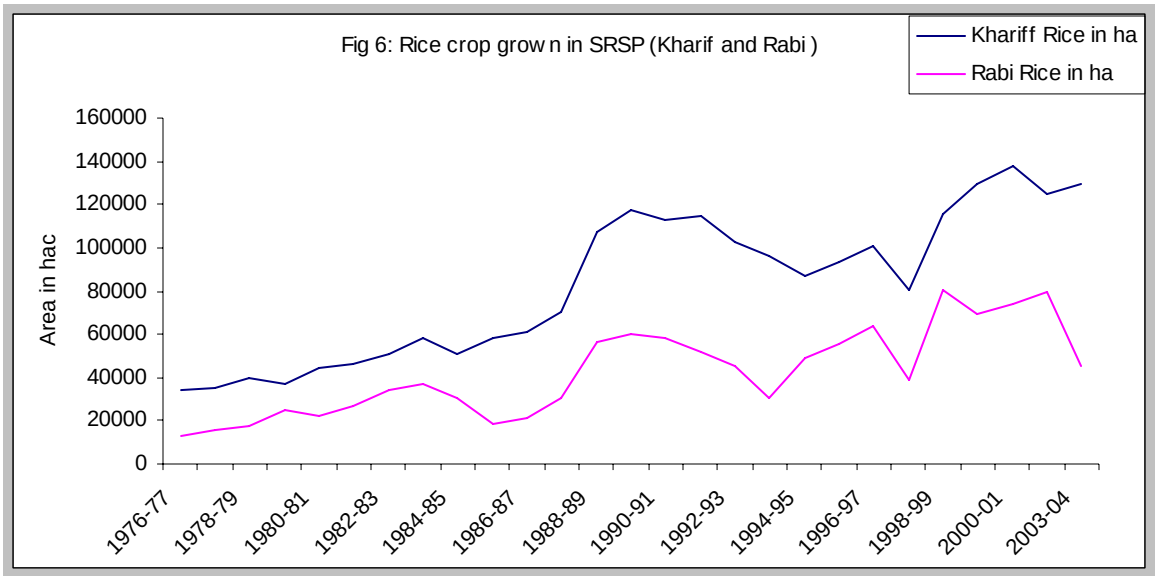
- Cleaning, jungle clearance, silting, widening of the structures
- Rotation of water i.e, Warabandhi. Which decreases the excess amount of water that was utilizing by Head reaches and middle reach farmers.
- Lining of minors, sub minors, resulted in less seepage and infiltration losses.

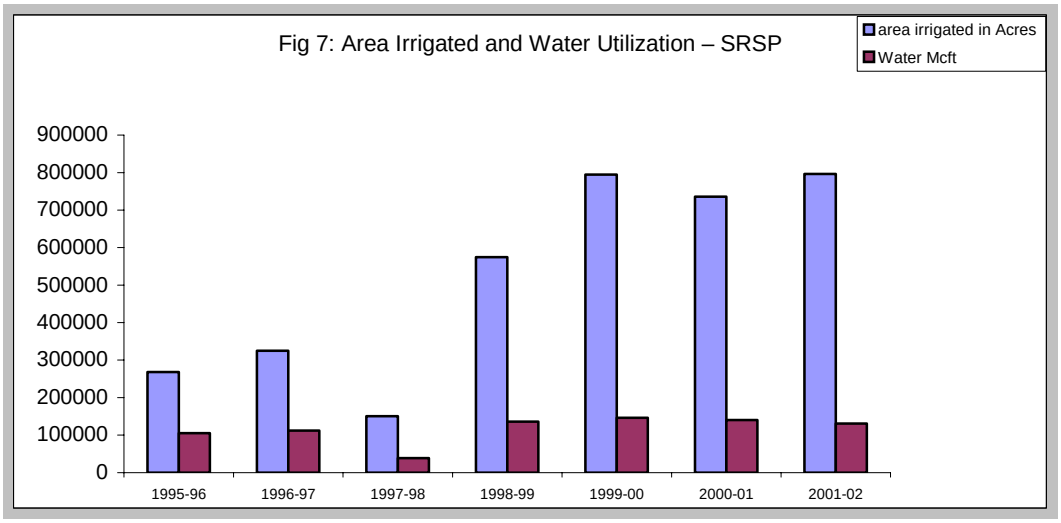
In most of the villages visited and interactions carried out with farmers in SRSP command, 100% of the sample said that there is an increase in area because water is reaching tail enders. This increase in acreage took place only once in the year 1999-00, when water flow was abundant and funds were there to carry out physical works. After that there is no increase in Ayacut because there is no water and also no funds.

Tail enders never received water in the past 15 years but now they could able to see water because of physical works carried out . But in very less area we could see tail end farmers growing paddy or any other wet crops. Still the domination is Head reaches only. Increase in acreage doesn't indicate that the tail enders got more wettings. But in actual, tail end farmer grows rainfed crops or dry crops like cotton, which consumes less water, for example Warangal which lies at 234 KM from SRSP is a tail end and the major crop grown in this is cotton (95%) and maize (5%). In Tadikal region, LMD, 60% increase rate in Ayacut. As per WUA president of Savel, Nizamabad district, the area irrigate has raised from 600 acres to 2000 acres. In Chamanapally-II, ayacut area raised from 2000 acres to 3600 acres.

A second source of data on irrigated acreage is the revenue office. In this case mis-reporting of area irrigated exists due to a strong bias on part of the revenue personnel for under-reporting the area irrigated. This leads to lower recorded acreage and thus the need to deposit smaller amounts of revenue (which might have in fact been collected) in the treasury. It is possible that this recording of area has increased of late. 60% of the sample surveyed showed dissatisfaction about the revenue records. People are ready to show the bills they have paid still there is no proper response from revenue department. Group of WUA member under D16, Tadikal said that they have a record of Rs. 10 lakhs as cess paid, but revenue department is not showing the same. The increase in area irrigated is thus partly a reflection of increased reporting and not actual increase.

The delta regions are termed as 'rice bowl of India'. The irrigation activities here are 150 years old. In Delta region, irrigated ayacut is stabilized and water is abundant in this region and hence there is no increase in ayacut irrigated. Farmers in this region has never felt dearth of water quantity and use to grow 2 wet crops per year. Role of WUA in water distribution is nil. Fig 6 shows growth of Paddy in SRSP command (refer table 2 in Annexure). Though SRSP is designed for ID crops, wet crop growers are increasing day by day. Fig 7 indicates increase in area irrigated with more or less same quantity of water due to adoption of better water management practice by WUAs.

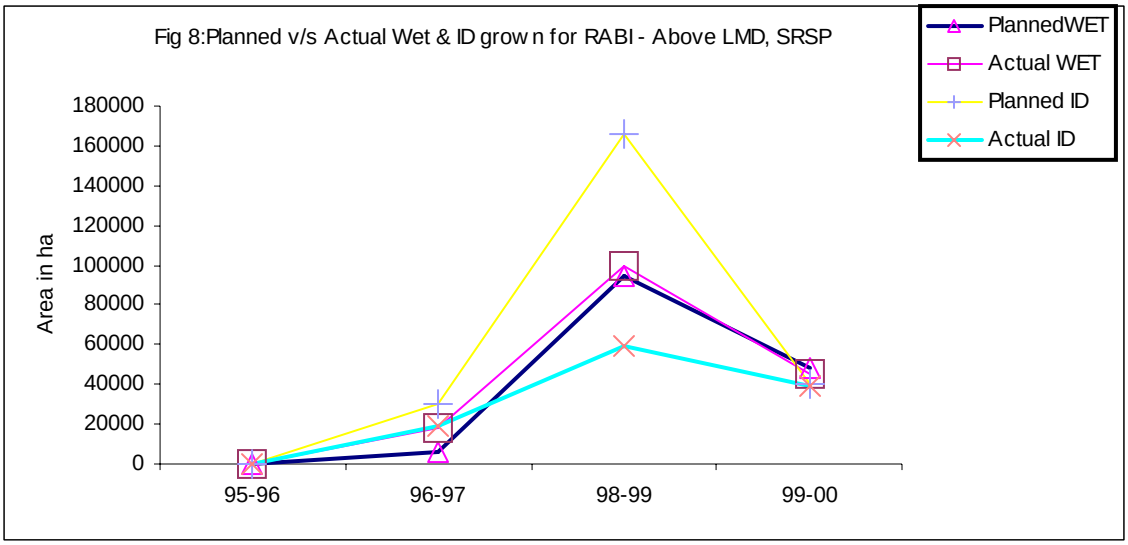




Source: SE Office, LMD

8.5.1 Planned v/s Actual Crop Grown in SRSP command

The graphs below presents the planned v/s actual crop grown in the SRSP command region – Khariff and Rabi season. In above LMD (0-146 km) i.e., fig 4 planned wet and actual wet grown is almost equal but planned ID is around 1,50,000 ha but actual grown is around 50,000 ha. But in below LMD (146-243 km) fig 5 the crops planned is equal to crops grown. Figs 8 and Fig 9 are plotted for Rabi season (refer table 13 in annexure).



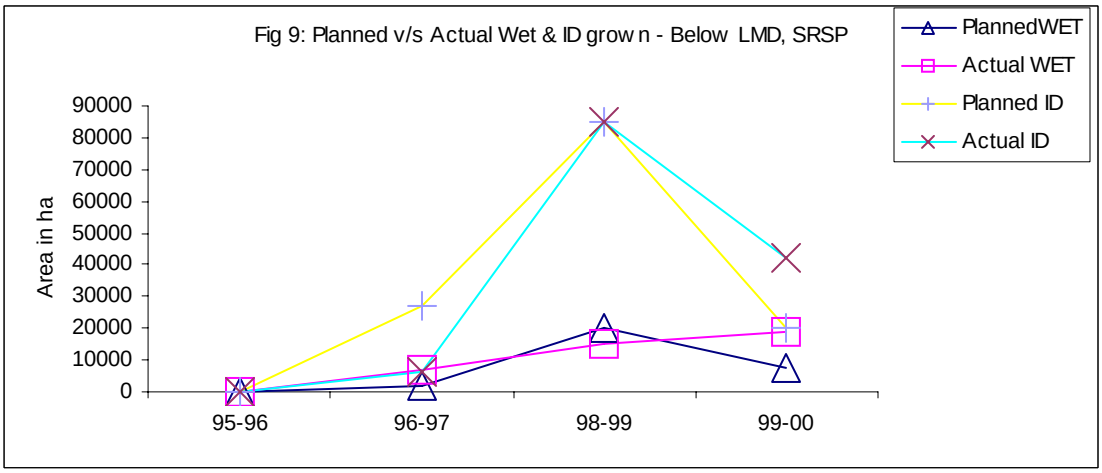
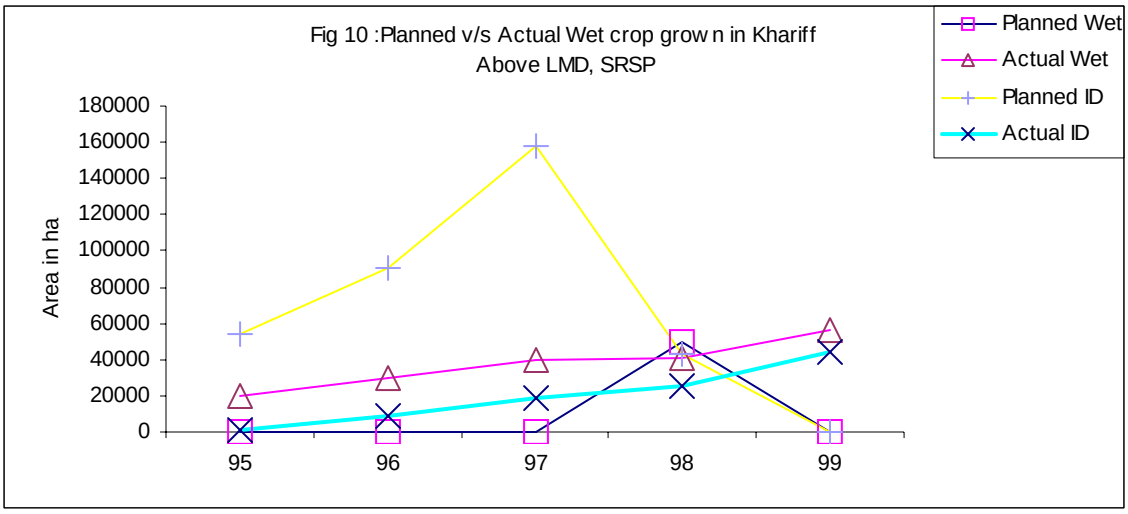
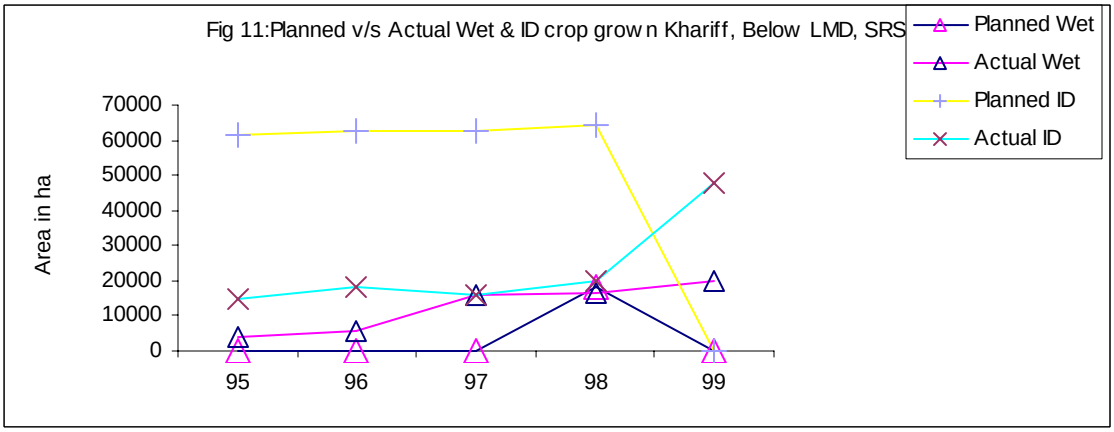


Fig 10 and Fig 11 shows the planned v/s actual crop grown in Khariff. Though the importance is given to ID crops but the actual grown is very less. Actual wet is more than the planned wet area. Actual ID grown is less than actual wet in above LMD. But in figs below LMD actual ID grown is more than actual wet.





8.6 Canal System: In SRSP command all canals including minors are lined which ease the flow and improves the distribution efficiency of water. Because of lining of canal seepage and leekage losses will be reduced. In delta region neither major canal is lined nor minors are lined. This would result in high losses and breaching problems. In LMD region, farmers know their share of water by seeing the flow measurement scale written on the slopes of the canal and distribute water among them equally. The situation in deltas' is different, the canals are unlined and water will be flowing full. Due to abundant availability of water, local people never bothered about water distribution or regulation. The mindset of delta people is completely different than others.

WUAs have concentrated mostly on the works than water management. Works have been taken up on an extensive scale under Minimum rehabilitation and other sources of funding such as Food for work, EAS etc. Works taken up were of different types, some of them resulting in the better performance of the system and some were carried out just based on the availability of funds, as observed by some farmers.

Canal System	Telangana	Coastal	Rayalseema
	Is lined and improved the distribution efficiency	No lining and is same since so many years	No lining and resulting in high loss of water

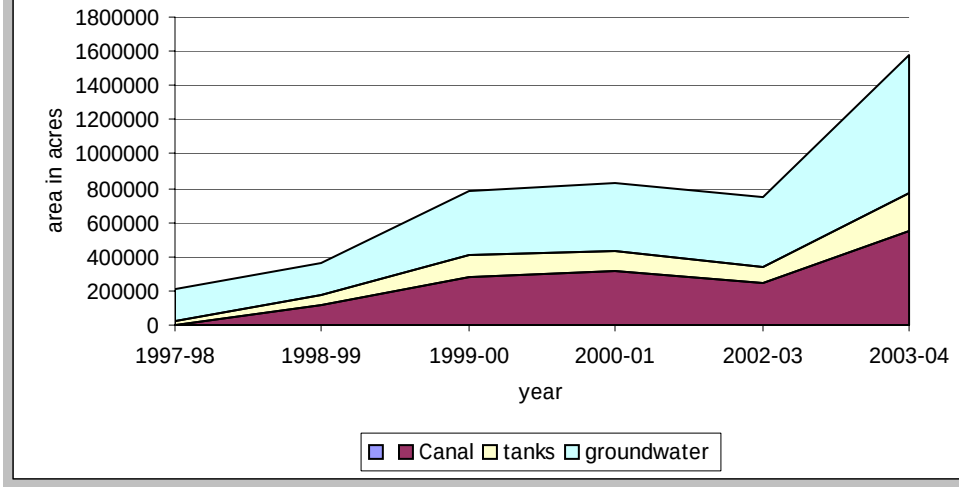
Note: Due to drought conditions water is not delivered upto the mark but considerable areas of Head and middle reach of SRSP, Telangana recived water for irrigation. And in these reached farmers have given good opine about WUA and also about yield.

9. Groundwater Exploitation

Even a few decades ago, groundwater was largely being used for domestic purposes and only marginally for agriculture. But this has changed with the availability of electrical energy, and groundwater is increasingly being used for agriculture. As per the estimates of the State Groundwater Department, the present utilization of groundwater in the State is 1.30 m ha m, leaving a balance of 1.76 m ha m for further utilization (GoAP, 2002a). Of this, 54% (0.95 m ha m) is available in irrigation command areas, and the remaining 46% (0.81 m ha m) in non-command areas. Groundwater is not freely available as surface water, nor is its replenishment as rapid. The available groundwater resources need to be used carefully, and a balance have to be maintained between recharge and extraction.

9.1 Increased dependency on groundwater: The SRSP command area has to move towards integrated water resources management; while groundwater exploitation has drastically increased, farmers have realized canal flows have greater influence in recharging groundwater. In recent years, to have better control water supplies, laced with free power supply in the state, groundwater irrigated area has improved considerably. There are more than 1.5 lakh open wells in the command area, and every year is adding another 5-10,000 open wells. Interestingly, WRD or project authorities are aware of this growing dependency on groundwater. They simply brush off these observations, as they are not under their purview. Fig 12 shows the source wise area irrigated in SRSP area.

Fig 12: sourcewise area irrigated in SRSP Area (in acres)



Source: SE office, LMD

From the field responses and visits carried out, there is 94% (22 samples) dependency on groundwater for irrigation except two villages Thotapalli and samudra Lingamcheruvu comes under minor irrigation systems, where tanks, open wells are dried and no agricultural activities is taking place. Each bore well or shallow well is dug with a cost of Rs. 40,000-45,000/-. The average groundwater table depth is 80ft-100ft for the open well and 150ft for the bore well as shown in table below. Till 2003 there were only 3521 wells (3015 open well; 506 bore well) due to drought conditions there are 3628 wells dug (2516 open well; 1112 borewell). Approximately if we consider the well digging costs Rs 40,000/ well, then the above turned out to be Rs 14.51 Crores spent by the farmers of these representative WUAs in the year 2003-04. Table 8 gives the total number of wells in Telangana Region.

Table 8: Growth in number of Wells (open well/shallow well) in Telangana Region

VILLAGES VISITED	OPENWELL	BOREWELL	TILL 2003	OPENWELL	BOREWELL	2003-04
Suddala	200	30	230	200	70	270
Pegadamadikunta	200	30	230	50	30	80
Mallapuram	200	0	200	40	0	40
Alipur	150	5	155	38	150	188
Lakshmanchanda	301	113	414	500	200	700
Moti Talab	150	10	160		0	0
Aloor	0	30	30	0		0
Thotapalli	0	0	0	0	0	0
Ladella	200	0	200	175	0	175
Lingarajapuram	30	50	80	0	2	2
Narmal	0	10	10	0	40	40
Total	1431	278	1709	1003	492	1495

Source: survey and interaction with villagers

WUAS PARTICIPATED IN GROUP DISCUSSION	OPENWELL	BOREWELL	TILL 2003	OPENWELL	BOREWELL	200-04
Savel	400	50	450	100	100	200
Jagenapali	200	20	220	200	80	280
Chalgal	100	50	150	200	80	280
Mallapur	150	5	155	38	150	188
[12]VV Raopet	100	50	150	200	100	300
Tirpally	59	43	102	100	80	180
Moogalapalli	75	10	85	75	20	95
Rayapatna	100	0	100	100	0	100
Yellampalli	100	0	100	100	0	100
Cherlapalli	100	0	100	300	10	310
Madhere*	200	0	200	100	0	100
Total	1584	228	1812	1513	620	2133

Note: Based on Group discussion held at Jagityal, Warangal.

*Madhere is situated over a dense rock bed and farmers very rarely succeed getting water in their tubewells/openwells. WUA TC member of this village had tried 12 times to dig a new well and failed every time, and is still hopeful getting

[12] WALT – Andhra Pradesh Water, Land and Trees Act – 2002, It provides Registration of existing wells and permission for new wells. State can close down existing wells, if they are found to be causing damage to environment

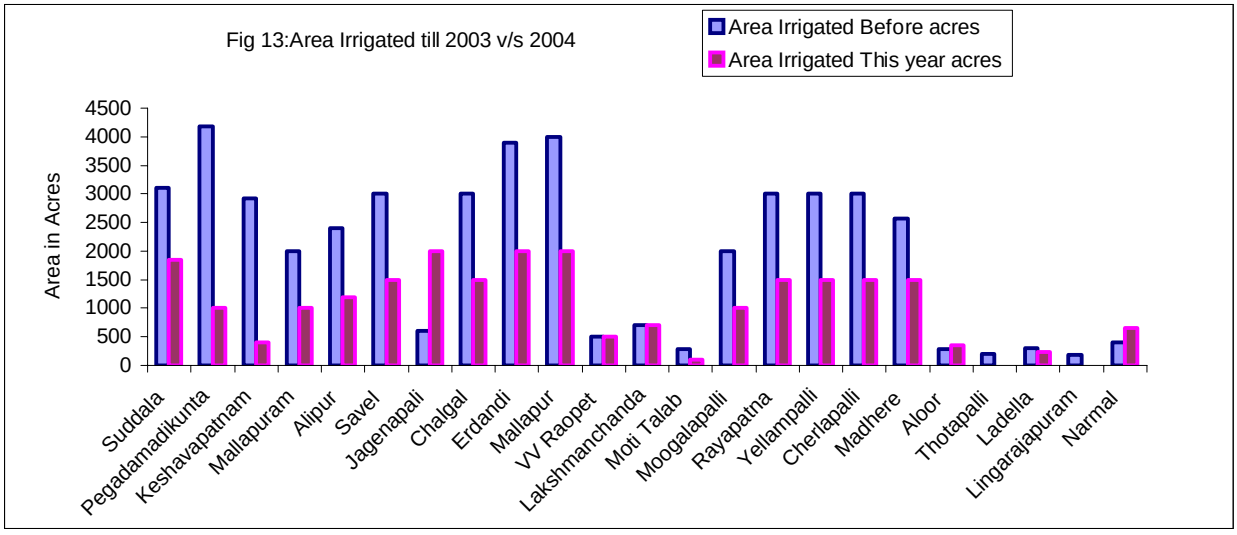
9.2 Power and Groundwater Draft: Each well is fitted with 3-5 hp pumps which runs 7-8 hrs per day. Electricity is provided free of cost to the farmers which is in turn encouraging farmers to go for a new well (farmers are unaware of WALT[1] act). This year 22442 acres have been irrigated in the sample area with 7099 wells (excluding two villages Samudra Lingamcheruvu and Thotapalli). Till 2003 there were only 3521 wells (3015 open well; 506 bore well) due to drought conditions in the year 2004 there were 3628 wells dug (2516 open well; 1112 borewell). Approximately the well digging costs Rs 40,000 per well, and for 3628 wells it is Rs14,51,20,000. Rs 14 crores spent by the farmers of these 22 WUAs in the year 2003-04. Each well is fitted with 3-5 hp pumps which runs 7-8 hrs per day. Electricity is provided free of cost to the farmers which is in turn encouraging farmers to go for a new well (farmers are unaware of WALT act). This year 22442 acres have been irrigated in the sample area with 7099 wells (excluding two villages Samudra Lingamcheruvu and Thotapalli).

3 hp pump runs for 8 hours= 2.25 KW * 8= 18 units * 2.50 = Rs.45 *7099 = Rs. 3,19,455/day
5 hp pump runs for 8 hours = 3.75 KW * 8= 30 units * 2.50 = Rs.75*709= Rs 5,32,425/day.
Assuming these pumps operate 100 days/year then the above cost ranges between Rs 3,19,45,500 to Rs 5,32,42,500.

Groundwater usage is high in SRSP command, which is growing day by day. Due to less inflow in canals people are finding groundwater as an appropriate option for irrigation. This trend is also owing to lack of collective action among farmers and getting electricity at highly subsidized cost. When we explained their total investment (on 300 wells in a given village) and power costs, farmers were aghast to hear this.

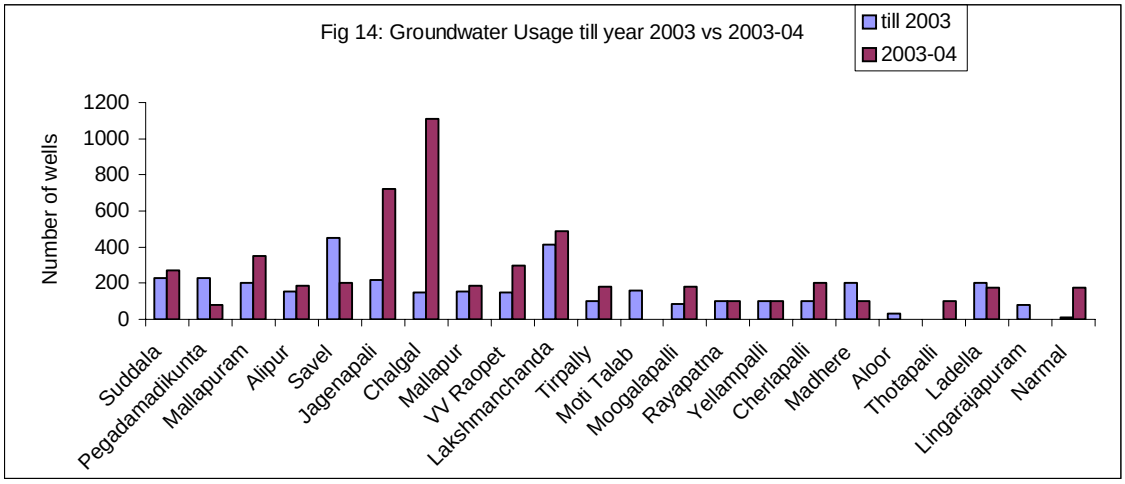
10. Effects of drought in SRSP and delta areas

Due to prevailing drought conditions since three years (2002-2005) resulted in less inflows to the reservoirs leading to less agricultural activities. Fig 13 shows the area irrigated in SRSP command area.



Most of the farmers are now going for ground water to irrigate their fields, they knew for digging a new well cost (one time investment) them around Rs.40,000 by which they can grow their desire crop whenever he wants and need not to depend on canal water

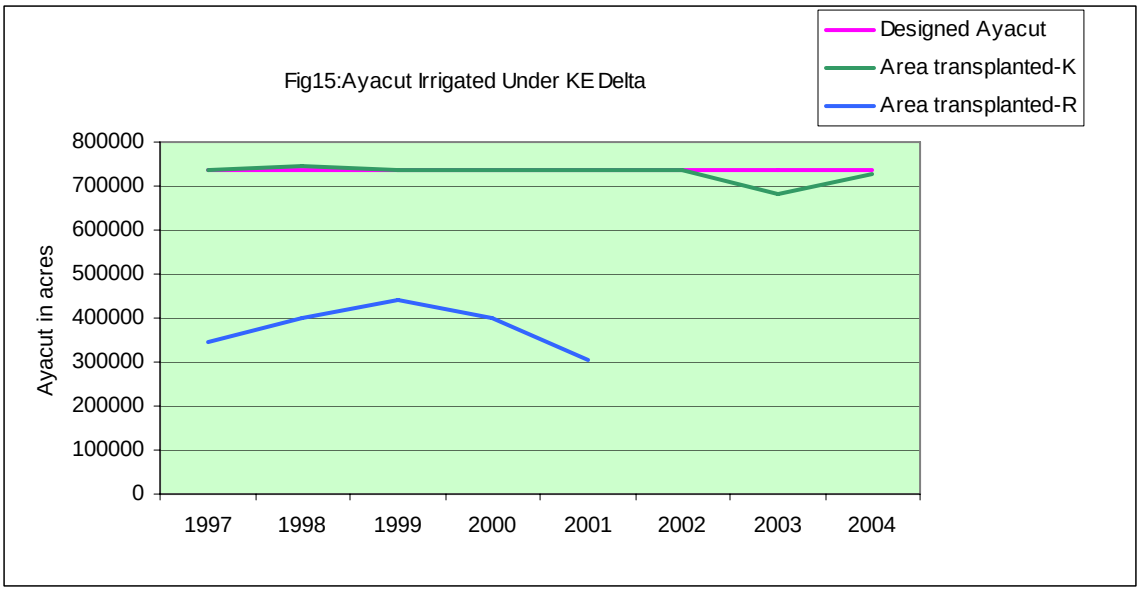
for irrigation. This has promoted a large number of people going for borewells. Fig 14 shows the growth in number of borewells till 2003 and present year.



In Duggirala and Ananthavaram of Krishna Delta, 4000 new borewells have come up in last 3 years. Every year groundwater users rate is increasing rapidly, due to easily available and need not to depend on canal water/tank water for irrigation. Small farmers in SRSP command area also going for digging new well in their fields even for area less than an acre by investing Rs.50,000.

Instead of going for a new well, they can shift to ID crops like cotton, chilli, which are commercial crops and fetches early yield compare to wet crops. A group of farmers can go for a new well and should use it on a rotation basis, with mutual understanding as done by upland farmers of Nidudavolu of West Godavari district. Small farmers with area less than one acre can take water from neighbouring wells on an mutual understanding.

Groundwater usage is also growing in many places where people were dependent on tank water and canal structures are constructed on the tributaries of respective tank, by forming obstruction to the natural flow and causing less inflow to the tank. In such cases linking of tanks with canal would be usefull. Fig 15 shows the Ayacut irrigate under Major Irrigation, Designed ayacut is 7.37 Lakh acres and the area transplanted in Kharif is equal. Due to drought conditions, water is not provided for Rabi in 2002-04.



Source: SE Office, Vijayawada

11. Some Issues

11.1 Conditions of Structures - Canals/distributaries cannot withstand the quantity of water for which it is designed

In many places visited it is observed that all canals are unlined and cannot with stand the designed capacity of the flow. In Kesarapalli, WUA members said Distributaries and Minors always breaches. Many times the lands adjacent to these flooded by canal water. In Gudlacheruvu WUA members complained that they never got water in excess, canal structures are so weak at cannot withstand full load. WUAs should mobilize funds, with which they can line minors at critical point where breaching occurs usually. WUAs can achieve this by prioritizing their needs and the amounts received can be properly utilized.

11.2 Records to be maintained

Each of the farmer organization shall maintain the following records, other than the records specifically mentioned in the Act and the rules, including an update on legal framework and any government orders. Table 8 gives the records to be maintained by WUAs as per act and as practiced observed in 2005.

Table 8: Record maintenance practise

Records to be maintained by WUAs as per Act	Practice observed in 2005	Remark
Following Maps shall be maintained by each water users association; namely:- a. Map showing the boundaries and jurisdiction of the Association, Water conveyance system, within the boundaries of the association; b. map showing the localized/notified ayacut with S.Nos., (form AA) and c. map showing the areas under irrigation not falling within notified ayacut	5 % of WUAs are maintaining maps in SRSP command.	WUAs are not interested and they are not accountable
a. Property register and records b. Water flows register and records c. Area and Crops register and records d. Cash register and records e. Minutes register and records	Cash books are available with all WUAs of Major and medium irrigation in SRSP and Coastal AP.	

A record is an important indicator, which could be useful in assessing WUA. Maps are essential because it shows the boundary of WUA and one can easily locate respective boundaries. Only 5% of WUAs have maintained this.

All WUAs are maintaining cashbook, as it is required for transactions but in WUAs of Chittoor district till now WUAs have not received Bank account, Account books from department. Irrigation Department of Chittoor had conducted training for WUA members, after one and half years of 2nd formation of WUA. In this WUA members were taught what are there roles and responsibilities. Department members who were giving training to WUA members have asked to write minutes of general body meeting, even though no WUA has conducted GBM in last 2 years they were asked to write it as they have conducted two meetings every month. One of the WUA president asking, as President of WUA I have already completed 16 months, why should I write minutes of 32 meetings. In this regard WUA president has given a written complaint to Collector against Irrigation Department. As per our asking don't you know your roles and responsibilities of WUA president? He said, no I never received any material that would say my roles and responsibilities.

11.3 Though there is warabandhi system, still tail enders are not getting water in Gudlacheruvu region

In Gudlacheruvu, farmers complained that tail enders are not getting water. Designed quantity of water is never released due to weak canal structures, whatever small quantity of water is released utilized by head and middle reach farmers only and that's why water never reaches tail end. WUA should calculate the area and appeal for the actual amount of water needed to irrigate areas in its vicinity from the higher officials. If water availability is less in project, WUA should motivate farmers to grow crops as per the water available.

11.4 Illegal Utilization - Water given for drinking purpose is being utilized for irrigation (system fed)

In Krishna and Godavari Delta it is common that tanks are filled with canal water. During summer season for the purpose of drinking, water is provided. There are 665 tanks in Krishna delta that is system fed. During field visit we observed that irrigation is taking place with tank water in Gudlacheruvu, Mustabad tank. As per asking Deputy E.E he said we provide water for drinking and but everywhere farmers use that for[13] irrigating 2nd crop. Water is abundant in this part of AP and irrigation activity is 140 yrs old and hence people hardly try to think about water management

Unlike Telangana region, water availability in this region is abundant due to Krishna and Godavari Rivers. Irrigation in these deltas have 140 years of history. In Telangana region water is available only in one particular season and water is provided for one crop due to scarcity in water. Water scarcity is new word for farmers in these deltas. Farmers in these deltas were growing two wet crops per year i.e., Paddy. Prevailing drought conditions since 3 years has made these farmers to go for single crop in kharif season. As a second crop they grow Black gram or Green gram, which requires no water.

In all the interactions held with villagers and WUA members, one general question we asked was, “what is the role of WUA in water distribution, allocation..?” In most of the sites visited WUA members said they don’t look after water distribution. Instead these members are more interested towards taking construction works. Every individual WUA is spending lakhs of rupees on maintenance and repair of channels but these works are not ensuring better water management. Only in Mustabad tank, due to these works (Rs. 9 lakhs spent on this) water is brought from a distributory which is 11 km away to the tank. In Srikakulam division, there are 1239 tanks, which are system fed. Irrigation is provided to the entire ayacut for only kharif. But depending on the availability of water, tanks are provided water for drinking water purpose. This water was also reported to be used for irrigation (unauthorized). There is no regulation of water as there is no felt need as of now. At every branch, and Major there is a cross regulator. At every minor there is an off take with a shutter. On the whole there is a regulating device for the area up to 100 acres. A strict monitoring unit should be kept which could operate for 24 hours a day and 7 days a week. WUA should strictly penalize such users.

11.5 WUA President as a Civil Contractor

No Works, No Power: WUAs feel their powers come from funds they handle to do physical works in their jurisdiction. No money is no power, according to several WUA presidents. If they have money, they can show, they are providing lining works, outlets, desiltation. Then farmers feel that WUA presidents have some capacity. When we asked, “let us say, you get enough funds to complete all required works in one year, what do you do the next year. Does it mean no power next year ?”. All of them found no answer for this. Then, to defend, after some time, they started saying, “the works will naturally collapse, and then we need to redo it”. For our follow up question “does it mean, your work quality will be so poor that it requires redoing in the second and third year?”. Again they got them selves with out answer. Seven years of WUAs working, in which three years, were funds providing, have changed the mindset of WUA presidents and also of farmers. What is worse is farmers are asking even for field channels repair and creation, government’s funds. Increasingly feeling is created that WUAs means getting funds from the government.

From the sites visited it is observed that all WUA presidents are engaged themselves in construction activities and least interest is shown in Water management activities. Many WUA presidents presume that they are elected only to carry out construction works. Roles and responsibilities of WUA president is not known to all of them except Mustabad tank WUA (ex-president). Each WUA is undertaking many works like, construction of retaining walls, construction of aprons, channel deepening, desilting, weed removal and sluice repairs. These works are carried out to improve the irrigation structures, which ease the flow of water in the system, but from our field observation it is proved that the new structure’s efficiency is same as that of the old structures.

Before sanctioning of the work department officials should analyze the work and they should promote the works asked by WUA. Cheque should contain signatures of both WUA president and the AE who promoted the work. By proper training motivation of WUA members should be changed by which they concentrate more on water management.

11.6 Fishing should be open for auction

To begin with, WUAs were given role to auction the fish from their tanks, to raise resources. But later, the fisherman societies lobbied around and got changed the government order to authorize only fisherman society to catch fish without any open auction. The open bidding for fish could have fetched easily five times more, ranging from Rs.50, 00F0 to 110,000 per tank. But the fisherman societies, linked to fish traders lobby, who in turn controls the fish catch in the entire region. The question is, while natural resources like tanks were transferred to local WUAs its resources are not fully under the control of WUA. While, the responsibility to protect the resources, in turn its augmentation is taken care by WUA, traders who are controlling the local fisherman societies harvest the dividends.

The conflict between irrigation and fish culture needs is increasing, Inflows into the tank have decreased due to overexploitation of groundwater and expansion of agriculture in catchment areas as well as construction of new water harvesting structures in catchment areas. Owing to conflicting rights to the resources, tank users associations are in a dilemma in several places. This occurs even after the states have come with a clear policy to support tank users associations and transfer management of tanks to the user groups. In Mustabad, Krishna Delta, initially fisheries department was paying only Rs.500 for WUA but WUA President took this issue to Higher authority of department and now this WUA is fetching Rs.17,000 from fishery activity. In Rayalseema region, fishing community is very strong and each mandal has a fishing co-operative society with average 100 members of fisher men involving in it. Hence they are paying WUA whenever they want as told by Dharmavaram WUA members. If in Dharmavaram tank fishing is kept open for auction, it can fetch more than 10Lakh every year which would be usefull in carrying out necessary works by WUA without depending on govt funds.

11.7 Upstream Abstraction

Water harvesting received major attention and support in the last 6-7 years. Programmes like Neeru-Meeru, watershed development, Food or work laid thrust on the formation of several structures on the ridge/up land areas. The abstraction by these structures is believed to have reduced inflows into such tanks whose catchments subsume such structures. Minor Irrigation department has also taken up such structures with volume of the water storage designed is about 0.5 mcft. There are instances as reported by Executive Engineer in Chittoor when there are 4-5 such new structures in the catchment of existing structures. In which case the abstraction is about 2 mcft. As per the prevailing norms there is no need for hydrological clearance for structures up to the capacity of 0.5 mcft and the issue of Lower Riparian Rights does not arise. The need for detailed studies does exist to understand the hydrological aspects of influence of small water harvesting structures and soil and moisture conservation structures in programmes like watershed development on the minor irrigation tanks.

11.8 Conflicts with Revenue Department

Revenue department carries out joint Azmoish in presence of WUA president and farmer. This provides area belong to respective farmer; as per this records cess has to

be paid. In Telangana region, due to active participation of WUAs in water distribution, area irrigated is increasing and joint azmoish is thus helpful in tracking the area irrigating. But in Krishna and Godavari deltas, the ayacut is stabilized and there is no change in the lands. Hence revenue department officials are careless and they never performed joint azmoish in these region. WUA members of these deltas told they never heard of it.

Out 57 WUAs visited 16 WUAs (28%) are not satisfied with revenue records and all of these are in SRSP command. Village Secretary collects water fee. Area is fixed by performing Joint Azmoish, in presence of WUA president and Irrigation Department official. The amount that returns from the cess paid by the farmers to WUA is called Plough back amount. Table 10 gives the details of joint azmoish performed in coastal and rayalseema region of Andhra Pradesh. Village Secretary in the presence of irrigation dept official and WUA president carry out joint azmoish.

Table 10: Joint azmoish in various parts of AP

Telangana	Coastal AP	Rayalaseema
Joint azmoish is performed regularly	Joint azmoish is done without presence of WUA member	No joint azmoish
WUA president and Assistant Engineer would present during azmoish		
Plough back amount takes 6months - 2 year to reach WUA		
Lot of mis-understanding with revenue department		

Many of these issues arising is mainly because of the inter departmental functions as given in table 11, there is no institution which can monitor WUAs activity and made them accountable for specific activity. Irrigation Department officials are the one who are available at site all the time, but they have not given power to, control WUA and collection of cess. Every work inspector or luskar would be given 12 to 20 villages and he cannot monitor those all the time. Revenue department collects revenue from farmers and as per observation many WUA members have complained against revenue department. following are the common reasons provided by WUA for the above,

- Village Inspectors are mis-using the amount paid to them as cess.
- Many farmers pay only one or half acre cess instead of paying full.
- In Rayalseema and Coastal AP revenue department carried out Joint Azmoish in the absence of WUA president and AE of Irrigation Department.
- Receipt issued by village secretary does not contain receipt number and some times previous years receipt is issued.
- There is no transparency in Revenue Department in Cess collected and Plough back returned to WUA.

Table 11: Conflicting legal framework over tank resources

Sl.No	Use and source of income	Agency responsible and focus of the conflict
1	Water fee	Imposed by irrigation department and collected by revenue department
2	Fishing	Fisheries department auctions fishing rights. Generally, a trader sub-leases it at a much higher amount to a fishing group. No preference to Water Users Associations
3	Silt use by farmers	Mines and Geology department has control and ownership
4	Tree nurseries and plantations in the tank bed and catchment area	Forest department claims rights
5	Ownership and management of all water bodies in the village revenue boundary	According to the 73rd amendment of the Indian Constitution, Gram Panchayaths have rights.

12. Indicators

12.1 WUAs Visited

During field visits, WUAs visited are 16 from major irrigation system, 3 from medium irrigation, 22 from minor irrigation projects, 2 belongs to anicuts and 1 lift irrigation system and also group discussions were carried out with 13 WUA members and farmers (also see Table 1).

12.2 Reorganisation of WUAs

12.2.1 Recent Elections:

- Re-elections were held in 2003 for WUAs (for nine districts held in 2004 and 2005), but not for the Distributory Committees. The delay was due to earlier delay in conducting elections and subsequently time lapse between second term elections and oath taking of WUAs has affected the PIM process.
- In 1997 WUAs were demarked as per the hydrological boundaries, but recent demarcation is with respect to area; i.e., in 2003, the area for WUAs has been re-demarcated. As a result, the number of WUAs in Telangana and Rayalaseema region is marginally reduced when compared with number of WUAs 1997. It increased in Godavari and Krishna delta areas.

12.3 Management

12.3.1 Participation:

- Tenant farmers and women participation is very limited. There was no effort to enlist women farmers in the command area and facilitate them to take part in election, as 'voters'.
- At least 5% of farmers are women farmers. However, WUAs have not maintained any record to indicate number of women farmers. No information is available regarding women participation in voting or in election in WUA.
- 34%[14] of WUA/farmers are participating in the joint azmoish. Only in the SRSP command WUA/farmers are participating in joint survey, but in other places like Rayalseema and Coastal AP, WUA members not aware of joint survey and they have not participated.

[14] Taking in to consideration only 30 WUAs in Coastal and Telangana region, i.e., Excluding Rayalaseema Tanks, since no water from 4 years and no activities by WUA.

- The maximum number times any WUA has met in the previous year (2004-05) was five times. 1.23% (out of 30 WUAs) have met for meeting in last 2 yrs. Other 33% WUAs don't have evidence to show the meeting conducted.

- All physical works are prioritized and carried out by WUA and competent authority as per the availability of resources. Because, in the present context, there are no mechanisms to seek farmers' role and to share information on financial resources.
- WUAs have not been functioning as a representative unit of all farmers. The responsibilities, decision making and benefits if any are skewed towards the chair person/vice chair person. The role of TCs is marginal and limited to getting his share of work.
- The tenant farmers have not been involved in any way in WUA, which may affect negatively in so far collective action is concerned. This is happening in spite of a provision in act for inclusive membership for tenants in WUA and sub-committee to deal with such issues. This is only indicates lack of understanding on such issues and ability to translate concerns into action.
- The participation of farmers in planning and chalking out the priorities is almost absent. Neither there is an attempt to provide the space (by the office bearers or departments) nor pro-active action by farmers.
- There is also no upward linkage in decision making process in the absence of Distributory committee and Project Committee resulting in decision making at these levels volatile.

12.3.2 Equity:

- 50% of farmers say water is reaching to tail ends.
- There is no priority in selecting items of rehabilitation giving importance to tail end

12.3.3 Efficiency:

- After re-election in 2003, 13% of the visited WUAs got income from local sources, 27 % have not received any funds from local sources out of 30 WUAs. Others replied differently, like iam new president, I don't know about the funds, I have not yet received any funds, many WUA presidents have not yet got their Account books.
- Funds are used for repair works and construction work.
- 30% of WUA/farmers said poor structures, 70% said they have maintained structures well.

12.3.4 Sustainability:

- Role of TC members are restricted in old term i.e., 1997 but now in new election it is revised and all TC members have equal rights.

12.3.5 Transparency:

- In older term WUA president had supreme role and TC members were unaware of works carried out by president but due to new scheme in WUA has resulted in transparency among committee members.

- 47% of WUAs have maintained minutes of meeting, cashbooks, records on works carried out, farmers details etc. Other 53 % have maintained only cashbooks. 13% (4 samples) of the WUAs are recording the areas irrigated under their jurisdiction.

12.3.6 Impact:

- In many places, farmers do agree that water-reaching capacity is increased with works carried out by WUAs.

12.4 Water Distribution:

12.4.1 Partcipation:

- There is no process followed by WUA members in the process of planning of crops and timely submission of consolidated application on behalf of irrigators. Only Chamanapally –II of SRSP and Kanekal TBHLC perform this specific activity (ie., 6%)

12.4.2 Equity:

- Due to drought, in Telangana and Rayalaseema region no WUAs have got enough water, except tank based WUAs.
- 57% of canal irrigation system follows warabandi system out of 16 WUAs (of major and medium irrigation projects).

12.4.3 Efficiency:

- In SRSP and Krishna delta, official data says, there is increase in acreage by adopting warabandi system. The duty of 70 acres per cusec is raised to 110- 130 acres in recent years.
- In 50% of WUA s visited, farmers felt, water is flowing till tail end due to activities carried out by WUA. Many tail end farmers in Telangana said, they have never saw water flowing to their fields, but after WUA formation and works by WUA, they are now receiving water.
- There is control over unauthorized or theft of water since farmers along with WUA members guard the tank/canal.
- Among WUAs visited, there are no conflicts over water issue.
- About 96% of the WUAs do not have measuring devices
- 13% (4 out of 30) of WUAs themselves are tampering with the irrigation system. No cases have been booked by WUAs for causing damage to the irrigation systems

12.4.4 Sustainability:

- There is drought condition since 3 yrs and hence no activity carried out in recent years. After 2003 election, WUAs have not received any grants or funds to carry out works till Jan 2005.
- In Warangal region the canal system is harmed at every single village to fill tanks in their villages. The irrigation authorities have to rush to repair those structures and it is very difficult to carry out any work during water flow in the canal.
- No measures were taken to prevent water logging and salinity control.
- Ground verification indicates that works carried out by WUAs are much better in quality and according to the requirements of local farmers.

12.4.5 Political will:

- Political interventions are present in most WUAs in terms of water allocation.
- General complaint by WUA about laskar is that, he obeys politicians and act as per their orders.
- Many tank based WUAs are supported by local politicians during lean time for civil works under various programmes and schemes.
- In many places WUA and GP members belong to two different parties and this has hampered unity among themselves and also work, since they will not share any ideas, support with each other.

12.4.6 Impact

- Less irrigation activities during last 3 years.
- Land rates in tail end areas has raised in many parts of Telangana due to water reaching till tail end.
- Crop yield levels has increased by 15-25% particularly in tail end areas.

12.5 Water Use Efficiency

12.5.1 Duty:

- The duty of 70 acres per cusec is raised to 110- 130 acres in recent years in Krishna delta due to less water inflow.
- Duty is perceived by the engineers just in terms of release of water and the capacity of the canals rather than the requirement.
- At 234 km of Kakatiya canal, design discharge is 6000 cusecs, while actual flow is only 1100 cusecs.

12.5.2 Cropping pattern:

- 20 out of 30 WUAs (i.e., 67%) grow only paddy during Kharif season, 14% grow sugarcane, 10% grow cotton and Black gram, and other 9% cultivate chillies, vegetables and turmeric.
- Paddy has assured marked price. On other hand, inadequate linkages – backward and forward has reduced the interest in cultivating vegetables and fruits. But areas nearby urban areas prefer to promote commercial crops and vegetables and fruits. Parts of Guntur district is a good example to indicate to what extent better infrastructure and linkages can promote commercial crops in irrigated belt.

12.5.3 Acreage:

- 50% farmers felt there is an increase in acreage due to works carried out by WUAs. As per the tail end farmers understanding, following are the factors, which are helping them.
    - Cleaning, jungle clearance, silting, widening of the structures
    - Rotation of water i.e, warabandi. It decreases the excess amount of water that was utilizing by head reaches and middle reach farmers.
    - Lining of minors, sub minors, resulted in less seepage and infiltration losses.

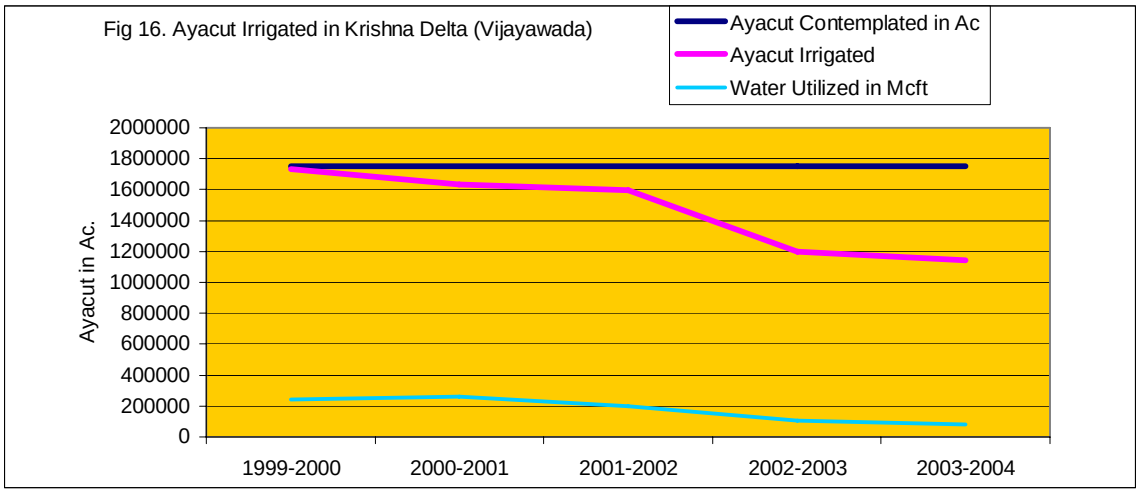


Fig 16. Ayacut Irrigated in Krishna Delta (Vijayawada)
Ayacut Contemplated in Ac
Ayacut Irrigated
Water Utilized in Mcft
Ayacut in Ac.
2000000
1800000
1600000
1400000
1200000
1000000
800000
600000
400000
200000
0
1999-2000
2000-2001
2001-2002
2002-2003
2003-2004

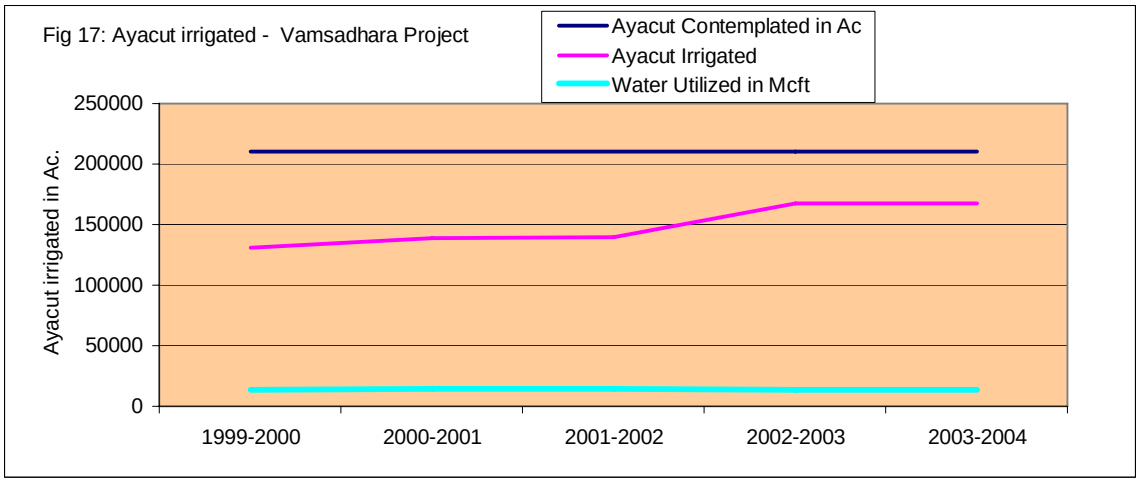


Fig 17: Ayacut irrigated - Vamsadhara Project
Ayacut Contemplated in Ac
Ayacut Irrigated
Water Utilized in Mcft
Ayacut irrigated in Ac.
250000
200000
150000
100000
50000
0
1999-2000
2000-2001
2001-2002
2002-2003
2003-2004

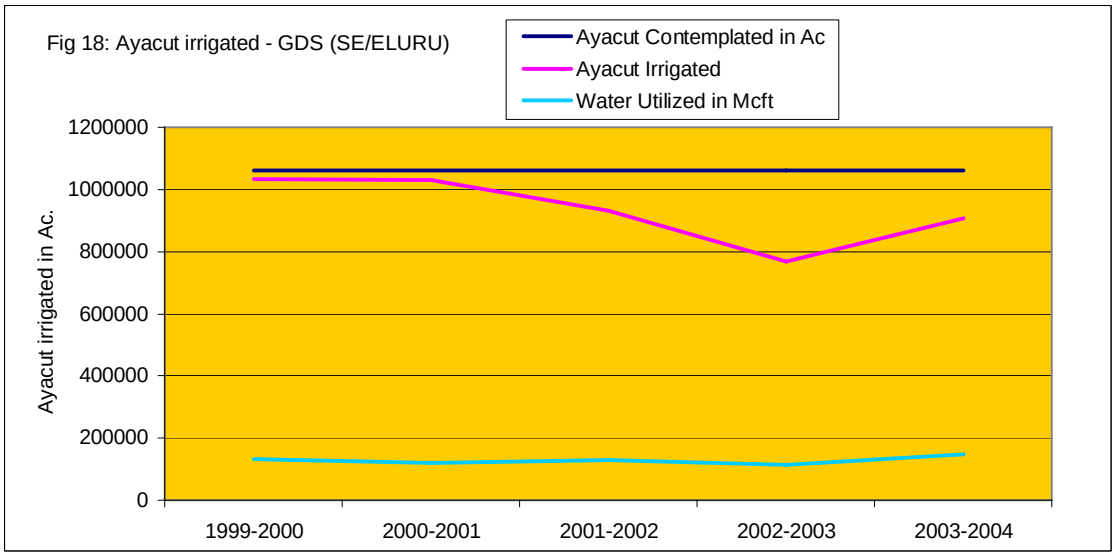


Fig 18: Ayacut irrigated - GDS (SE/ELURU)
Ayacut Contemplated in Ac
Ayacut Irrigated
Water Utilized in Mcft
Ayacut irrigated in Ac.
1200000
1000000
800000
600000
400000
200000
0
1999-2000
2000-2001
2001-2002
2002-2003
2003-2004

12.5.4 Record maintenance:

- Cash book maintained by 67% of WUAs (MI, Medium & Major irrigation)
- General body meetings were regularly held in 12% of WUAs
- Attendance by WUA members in training programmes (held in WALAMTARI) was 100% during 1997, but no training was provided till Jan 2005 for 2nd term members.
- Administrative Sanctions – All villages have received funds released by AP-III

12.6 Conjunctive Use of Groundwater

The statistics below shows details of Telangana region.

- Till 2003 there were only 3521 wells (3015 open well + 506 bore well) due to drought conditions there are 3628 wells dug (2516 open well; 1112 borewell).
- Rs 14.5 crores spent by farmers of the representative WUAs in the year 2003-04.
- There is no attempt made by WUAs in regulating digging the wells for irrigation. President of WUA-6 of Jagityal region said he had attempted 12 times to dig a well but only 2 were successful.

12.7 Operation and Maintenance

- The works taken up by the WUAs during the last 6 years is explained in the earlier sections. The total expenditure till March 2004 under APERP is Rs.769 crores.
- The minimum rehabilitation programme of minor irrigation tanks are taken up for 2,934 tanks at a cost of Rs.1361 crores covering 9.07 lakh acres in phase I and another 2,014 minor irrigation tanks at Rs.896 crores covering 5.24 lakh acres in phase II.

13. Some Suggestions

13.1 Water Allocation

Water allocation has to be at Project level, Distributory level and WUA level. Project level allocation is normally made and the stakes are defined as it involves either inter-state, inter regional or even inter-district issues. Allocation could be of 3 types namely hydraulic unit wise, i.e., Distributory, minor, sub minor etc or irrigation department administrative unit wise, i.e., Circle, Division, Sub Division, Section etc. or PIM institution wise i.e., Distributory committee, WUA. Allocation could be based on the project design or available water at a particular point of time. As per the provisions in the APFMIS Act and the observations made during the field visits, the demarcation of WUAs is based on the ayacut area and not always in line with the hydraulic units such as distributories, minors etc. The measurement of allocated water against available water, which is very important in PIM, hence seems to be hanging in ambiguity. Measurements of discharge are normally possible at the inlets of the hydraulic units or any other suitable place, which is not practiced or even appreciated to the required level either. At Project level the allocation and its measurement is relatively easy due to the fact they are monitored by technocrats on a well designed system. The allocation could be influenced politically also.

Building of capacities of the WUA functionaries and water distribution staff and appropriate provisions to measure allocated water therefore needs to be made.

- Proportionate allocated water based on storage capacity should be made. Proportional volume should be shared with DC's and measures should be taken to avoid overlapping. Allocation of water should be clear among Irrigation Systems, Administrative Units and Institutions. Wherein institution and farmer should know what is the volume of water available for them in terms of volume. Measurement should be made possible at DC, PC and WUA level.
- In Kanekal, because of political barrier, clear-cut allocation is made; later on there is no gauge since within our limit. This shows that when interstate allocation is made, one has to clearly show the quantity of water received from neighboring state and after we receive it, there is total negligence towards the same and institutions are not clear within.
- In Krishna delta, officials said duty is 78 acres/cusec and in Vamsadhara it is 110 acres/cusec. Why is such a difference exist among same department? One should not explain efficiency interms of duty, instead a separate unit that is volume should be allotted and crop productivity (yield with respect to volume of water utilized) should be identified. We should not follow blindly the old conventional method.

13.2 Skills Upgradation inadequate

Capacity building has taken a back seat over the last three years (see amount spent and number of persons trained under various topics). As the organization develops, its personnel, requires skills upgradation in areas like canal operation, system maintenance, dispute resolution, and handling joint survey (joint *azmoish*) and dealing with revenue department. Particularly over the last 13 months, since the election of new office bearers in Nov 2003, there was hardly any interaction between the TC members of WUA and WRD staff. Nor there was any orientation programme for those TC members. Indeed, in most of the places we found there is a dire need for understanding roles and responsibilities of WUAs and of WRD. Some TC members were quite angry on our query on extent of their involvement in canal maintenance, controlling unauthorized lift from canals, owing to their lack of understanding about their powers. When some1080 pumps (each with 3 to 5 hp electric pumpsets) were installed on SRSP main canal, below 234 km, to irrigate unauthorized command area, WUAs had remained mute observers. It is true even in Distributory number 30 and 31.

13.3 Capacity Building

There seem to be reasonable effort to build the capacities through training and exposure visits. The WUAs formed in recent election (Jan 2004) are yet to receive inputs to deliver their responsibilities. Some where around 20-25% functionaries are reelected and rest are new.

The learning created capacities built in the previous should not be lost and there is a potential to use them as change agents (including trainers). The content of the CB should include issues like revenue generation, collaboration with other institutions like PRI, water scheduling in addition to the institutional development and management.

Role of other allied departments in enhancing the productivity and thereby Water Use efficiency was observed to be at sub optimal levels. The need is widely perceived by all actors but systems/mechanisms to arrive at pragmatic solutions seem to be absent. The capacities of farmers and WUA to assess, analyse, plan, implement and monitor are inadequate resulting in adhocism. Skills are to be developed for a long term planning and adoption of the same for sustainable utilization.

Officials are happy that a system for local participation. They seem to have a limited capacity to facilitate the roles of different people. They continue to play a regulatory role and not able facilitate the PIM. They need be equipped with necessary skills to facilitate PIM.

Transitional issues: WUA have played role in minimum rehabilitation activities. Resources were plenty but now much of the work is dependent on plough back money. After rehabilitaiton, WUAs have to concentrate on Q & M water management and production. There is a need for re-orienting on the changing roles and priorities. Otherwise WUAs will continue to in a mind set created during minimum rehabilitation phase.

The future training strategy should include the following:

- Farmers must be trained in villages. The possible way is grouping farmers in WUA into a smaller groups and train using local resource person. A number of WUA members have already trained. They may appropriately used in future to transfer skill, knowledge and WUA operations.
- Department should play an important role in facilitating local capacity building. They need to identify and involve trained people in the local capacity building.
- It is not enough to train farmers. There is thus a need to involve GP members, Secretary and revenue members. Cooperation between them is needed as there is no proper collection system.
- The capacities built should also be correlated to the impact developing appropriate indicators

13.4 Linking SRSP canal to the Tanks under Command Area of DBM 31, Warangal

Most unfortunate is, in SRSP area, canal designs have not taken care of feeding centuries old large number of tanks (around 1300), more in tail end areas. These tanks would have acted as surplus storages and flood carriers; they could have played a crucial role during non-supply periods, particularly during summer; both for livestock and secondary purposes of human needs. Now, increasingly this problem is looming large every year. During the less-rainfall and canal non-operation periods, farmers are staging demonstrations, and raising voices to fill these tanks. In the lower parts of the main canal (below 234 km, DBM-31 area of 51,000 acres alone has some 216 tanks) farmers damage the canal structures on a regular basis, to fill up their tanks (of all sizes) to ensure adequate supplies during lean supply periods.

During our interaction with farmers of Ladella WUA under DBM 31, farmers said they are not going for 2nd crop from past 3 years, so as to provide water for cattles and for domestic purpose. Farmers felt if we link canal with tanks, they will use only tank water for irrigation and there will be no illegal taking from canals.

Following are the merits and demerits of linking tanks with canal;

Sl.no	Advantages	Demerits
1	Rise in GWT; Recharges ground water	Large scale infestation of weed in the feeder channels and tank water spreads
2	Reduction - Ground water users	Siltation in tank water spreads
3	Domestic Purpose like cloth washing, drinking water for animals and humans.	choked or leaky sluices and damaged weirs
4	Funds could be expected from Fisheries department/ Aquaculture / Coconut.	outlets with missing water regulating mechanisms viz. shutters, resulting in wastage of stored water
5	Increases the irrigation potential	Good leadership and cohesiveness in the community is must to ensure proper water usage
6	It demands constant flow in the system, which could change traditional cropping pattern	Political inference should be avoided
7	Increase in the cess	Weak tank bunds are susceptible for leakages
8	Local people can be involved in cleaning and digging feeder channels; local people's interest towards natural resources grows	
9	Fecilitate Stabilized ayacuts	
10	Drinking water quality improves	
11	Proper water management can be ensured	
12	As water is provided mainly for the drinking purpose in summer season, local people will guard the canal structures from illegal water users	
13	Reduced water scarcity	

13.5 Percolation Tanks in Rayalseema Region

Conversion of tanks into percolation tanks has been going on in a major way, especially in the Rayalseema area. The media generates lot of debate, line departments and the farmers informally, but there seems to be a wide gap in the official Govt. norms and procedures laid down for the same. This involves a multi disciplinary and multi department approach for which technical, administrative mechanisms have to be properly worked out. More over the conversions results in a huge shift in the stakeholder base with a new set of stakes built and also making some existing ones vulnerable. Socio economic aspects also therefore are to be worked out in a detailed way with lot of external facilitation and conflict resolution. The role of NGOs, CBOs and the PRIs also is significant.

With a change in the utilisation of water and increased dependency on ground water extraction, both in the ayacut and the up lands has led to the conversion of existing minor irrigation tanks into percolation tanks. The reduced inflows into the tanks forced the sealing of sluices to ensure storage of water in the tanks supporting diverse livelihoods. Ironically 'seepage loss' in irrigation vocabulary has changed to 'percolation gain' and whole new concept and subsequent issues have cropped up. Conversion of tanks in rayalseema, especially in Anantapur and Chittoor district took place on a large scale. The tank density is quite high in the area and so the ground water draft.

Users – Losers: The conversion of tanks into percolation tanks results in a new set of stakeholders and their revised stakes. There are few gainers and few losers too. Gainers are the ones who depend on groundwater that include ayacut and non-command farmers. The non-command farmers are from the upland and foreshore areas who do not have traditional rights on tank but are increasingly dependant on it in this

scenario. They play a vital role in the conversion of tanks indirectly as is evidenced in the case of Potinayudu tank in Chittoor, where the fore shore farmers have provided the cement for closing down the sluice with concrete. The major losers in the process are the small and poor farmers in the ayacut area who do not have a ground water extracting source like open well or a bore well. They don't have a right now to get water directly by surface flow in the canals and either have to depend on sharing of water or go for heavy investment on borewells up to 1 lakh there by falling into debt trap. The third option is to forget cultivation and find the alternative livelihood.

Owing to this different types of situations and conflicts arising out of it some work has been done in Anantapur district by Non Government organisations like Chaitanya, Lepakshi, where in different types of options were wore worked out for the losers through a negotiation and sharing between users and losers. The sharing of water from the existing wells or borewells, going for life saving irrigation for ID crops by syphoning water from the tank etc are some of the prominent solutions. These have been tried in Lepakshi and Cilamathur mandals of Anantapur district. Sharing of groundwater is also in vogue in Chittor district. Patnam pedda cheruvu in one example where ground water is leased at the rate of 1/3 the crop value per acre. It comes to approximately about Rs 3000 – 3500 which is approximately also equal to the land lease also

Other important set of gainers are the fisherfolk or the communities that can depend on fish rearing for their livelihood due to an increased period of storage of water. Availability of drinking water both for human and animal consumption through recharge of ground water sources and surface water storage in the tanks is a benefit all can share.

All is not well with the percolation tanks all the times owing to the fact that the people are pretty well eager to share the benefits but are nonchalant in sharing the responsibilities. The role of new stakeholders, the non ayacut farmers dependant on recharged ground water, is not clear in most of the cases as they do not form the part of those actors who have traditional rights. Even in those areas where considerable facilitation has been made by the NGOs, the sustainability of systems has a question mark as they are only informal institutions.

Conversion is not possible always owing to the hydro geological conditions prevailing. When there are dykes in the immediate vicinity downstream, the ground water recharge has an adverse impact, especially when it is parallel to the bund. The recharge may be far off from the tank in which condition the farmers will reap the benefits but do not become part of the tank system. Though many tanks have been converted to percolation tanks, they are mostly informal decisions locally by the farmers. Discussion with the Deputy Director of Groundwater, Chittoor revealed that they were never approached either by farmers or the irrigation department to study and suggest the viability of the conversions. Collector has instructed once to study the case of three tanks near Madanapalle because of drinking water shortage out of which one was suggested. The conditions normally observed are the presence of dykes and their trend, suitability of soils in the bed for percolation, movement of water in the aquifer etc. to suggest the conversion of tank into percolation tank.

Conversion of percolation tanks therefore involves complex issues, which have to be sorted out with the involvement of different institutions before venturing into it. The need for it and the alternate arrangements to be made and the role of new set of stakeholders have to be properly evolved with the proactive role of the local communities. It has to be through a learning process that modalities should emerge. In Chittoor district, a new tank has been formed by the Irrigation department after identifying a good inflows. The tank received half filling and no water was let out last year due to the non- completion of canal work. It seems that there has been a tremendous impact on the ground water recharge. The Executive Engineer observes that there is an indirect ayacut now of around 1500 acres with half filled tank where as the tank would have served a contemplated ayacut of hardly 700 acres for one filling.

13.6 Strict Monitoring

WUA and also Official associated with that should be made accountable for works/no works they have done. An authority should evaluate these works. This evaluation can be made once in a year/season. Irrigation department officials should monitor the works carried out by WUA and its usefulness.

13.7 Water Fee Collection

Though WUA is comprised of a President and TC members, only President will look after the money transactions and the works. And often TC members stay away from these responsibilities. Hence TC members should be given works like, Record maintenance, Cheque books. They should be trained in this regard. These members can take care of water fee collection and record maintenance of cess paid.

13.8 Maintaining the Records

All official records should be given to WUAs. These records should include storage levels, reservoir size, tank bed area, canal boundary, catchment area, authorized command area with suvey 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.

13.9 Promoting ID crops

Though SRSP is designed for ID crops, farmers are growing Wet crops and the number of wet crop growers is increasing day by day. Proper training should be given to farmers to grow ID crops. The importance of ID crop should be made known to them in terms of water requirement and yield. WUAs should motivate farmers to grow ID crops.

Community understands economics in their own way, no body ever looked into that dimensions of economics. Though by growing paddy farmers get profit of Rs.2000 to 5000, still they grow paddy in command area, this is because, the government has given assured market price for paddy, Rice can be stored for longer duration, Workload is less compared to other crops.

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Statement showing the works carried out under APERP – O & M programme during the period 1998-1999 with O&M grant and during the period 200-02, 2002-03 with ploughed back amount.

Statement showing the water discharge – design and actual (year wise – season wise) under K.E.Delta

Statement showing the particulars of Area Irrigated, Water fee Collected, Amount Transferred to Fos and Water Use Efficiency from 2002-2003 to 1996-1997, Vamsadhara Project, Srikakulam District.

Statement showing the Particulars of Water User's Associations, Ayacut, number of tanks and Water fee collection, 2005, Dy.Executive Engineer, Srikakulam Sub division, Srikakulam.

Statement showing the list of works executed from 1998-1999 to 2002-2003, Water User Association, Bheemadolu.

WUA Elections.2003. Unanimously Elected WUAs – Information Submitted Under Irrigation Circle, Nirmal

Annexure

Table 12: Participation and Management of WUA

WUA	MEETING HELD IN LAST ONE YEAR	CANAL OPERATION	WUA PARTICIPATION IN WATER MANAGEMENT
Suddala	Once	Farmers	Yes
Pegadamadikunta	Once	Farmers	Yes
Mallapuram	Nill	Department/farmers	No
Alipur	Nill	Farmers	No
Lakshmanchanda	Nill	Department	No
Tirpally	Nill	Department	No
Moti Talab	Nill	WUA/Department	No
Aloor	Nill	Farmers	No
Thotapalli	Nill	Nill	No
Ladella	Nill	Department	No
Lingarajapuram	Nill	Nill	No
Narmal	Four	WUA	No
Chamanapally II	Four	WUA	Yes
Emani-98	Elections to be held		----
Duggirala-97	Nill		
Anantavaram			
Kesarapalli-1	Once	Luskars	No
Mastabad	Elections to be held	Farmers/luskars	----
Gudlacherlu	Elections to be held	Department	No
Bhimadolu-			
Nidadavolu	Nill	Department	No
Tadimalla	Nill	Farmers/luskars	No
Pandalaparru	Nill	Department	No
Peddaboddapalli	Once	WUA members/Farmers	No
Thandava-WUA2		Luskars	No
Yenubilli Tank	Once	Farmers/luskars	
Devulavani cheruvu	Twice	Department	
Duppalawalasa WUA			
Rayawalasa	Nill	Department	No
Bonnavada	Nill	Department	No
Patnam Peddacheruvu Tank	Nill		
Thodatera Tank	Nill	Farmers	No
Ramanna Tank	Nill		
Vengammareddy Tank	Nill		
Tenepalli Pedda Tank	Nill	Neeradi/Farmers	No
Pothinayana Tank	Nill		
Bahuda Medium Irrigation Project	Once	Department	No

Kanchalamma Tank	Nill	Neeradi/Farmers	No
Pammadipalli Tank	Nill		
Kanekal	Elections to be held	Department	----
Udegudum	Elections to be held	Department	----
Bukkarayasamudram Tank	Nill	WUA/Department	Yes
Dharmavaram Tank	Elections to be held	Neeradi	No
Gooty tank			
Yerra Thimmaraju tank			

Table 13 :Planned Area (Thrown open for Irrigation) and Actual Irrigated Area of Kakatiya Canal upto Km 234/00 for the period from 1995-00 (Khariff)

		ABOVE LMD KHARIFF		
Year	Planned Wet	Actual Wet	Planned ID	Actual ID
95	0	20373	53985	1311
96	405	29527	90322	8907
97	0	39224	157850	18320
98	49550	40421	42545	25336
99	0	56363	0	43701

		Below LMD Khariff		
Year	Planned Wet	Actual Wet	Planned ID	Actual ID
95	0	4098	61399	14677
96	0	5874	62617	17997
97	0	15810	62617	15755
98	17988	16471	64582	19681
99	0	19675	0	47814

Table 14: area irrigated till 2003 v/s this year

Name of Village	Before	In 2005
	acres	Acres
Suddala	3098	1849
Pegadamadikunta	4188	1000
Keshavapatnam	2930	400
Mallapuram	2000	1000
Alipur	2400	1200
Savel	3000	1500
Jagenapali	600	2000
Chalgal	3000	1500
Erdandi	3900	2000
Mallapur	4000	2000
VV Raopet	500	500
Lakshmanchanda	700	700
Moti Talab	280	100

Moogalapalli	2000	1000
Rayapatna	3000	1500
Yellampalli	3000	1500
Cherlapalli	3000	1500
Madhere	2574	1500
Aloor	290	350
Thotapalli	200	0
Ladella	300	243
Lingarajapuram	180	0
Narmal	400	650

Table 15: Growth in number of Borewells in Telangana Region

VILLAGES VISITED	TILL 2003	2003-04
Suddala	230	270
Pegadamadikunta	230	80
Mallapuram	200	40
Alipur	155	188
Lakshmanchanda	414	700
Moti Talab	160	0
Aloor	30	0
Thotapalli	0	0
Ladella	200	175
Lingarajapuram	80	2
Narmal	10	40
Total	1709	1495

Table 16: Area irrigated in Krishna Delta

YEAR	DESIGNED AYACUT	AREA TRANSPLANTED-K	AREA TRANSPLANTED-R
1997	737498	734903	346620
1998	737498	747043	398113
1999	737498	737496	441000
2000	737498	737477	400000
2001	737498	735983	306638
2002	737498	737458	
2003	737498	682625	
2004	737498	727794	

Table 17: Statement showing year wise average yield, area and productions in SRSP project from 1976-77 to 2000-01

Kharif crop	Khariff Rice in ha	Khariff Maize in ha	Rabi crop	Rabi Rice in ha	Rabi Maize in ha
1976-77	34455	27017	1976-77	12535	6372
1977-78	35393	28351	1977-78	15300	6962
1978-79	39971	29032	1978-79	17940	8285
1979-80	36993	27922	1979-80	24800	12266
1980-81	44001	31467	1980-81	21926	13452
1981-82	46613	31813	1981-82	27181	17312
1982-83	51004	30775	1982-83	34598	19388
1983-84	58568	31080	1983-84	37173	20825
1984-85	50996	29644	1984-85	30446	18956
1985-86	57810	31635	1985-86	18145	11300
1986-87	61168	32924	1986-87	20897	13133
1987-88	70751	43646	1987-88	30633	21494
1988-89	107413	43633	1988-89	56802	28267
1989-90	117264	39923	1989-90	59678	27251
1990-91	113099	40513	1990-91	57816	28582
1991-92	114597	41896	1991-92	51954	24975
1992-93	102535	41044	1992-93	45299	24209
1993-94	95812	37206	1993-94	30448	12371
1994-95	86927	41895	1994-95	49053	15211
1995-96	93847	41305	1995-96	55074	26235
1996-97	100794	38377	1996-97	63921	29899
1997-98	80698	42580	1997-98	39021	23224
1998-99	115413	39851	1998-99	80271	27349
1999-00	129123	51047	1999-00	69613	24105
2000-01	137489	48715	2000-01	74096	23630
2002-02	125187	42262	2002-02	79181	23420
2003-04	129683	48273	2003-04	45396	29429

Table 18: O&M Works by Farmers' Organizations

(Rs. In lakhs)

Sl.No.	Year	Number of Works	Value of Work Done	Remarks
(1)	(2)	(3)	(4)	(5)
1	1998-99	21,406	11,756	Completed
2	1999-00	17,186	13,670	Completed
3	2000-01	6,768 + 147 tanks (6,915)	9,894	Completed
4	2001-02	6,100 + 1,144 tanks (7,244)	11,281	Completed
5	2002-03	820 + 1,703 tanks (2,503)	11,953	Completed
6	2003-04	17,209	18,421	Upto March 2004
	Total	69,489 + 2,994 tanks (72,483)	76,975	

WUA's visited during Field Visit

Sl.no	WUA	System	Village/Mandal/District	Visit Date
1	Suddala	LMD[1]	Sultanabad Mandal	1/7/05
2	Pegadamadikunta	LMD	Sultanabad Mandal	1/7/05
3	Mallapuram	SRSP[2]	Jagityal division	1/8/05
4	Alipur	SRSP	Jagityal division	1/8/05
5	Lakshmanchanda	Anicut	Nirmal, Adilabad dist	1/9/05
6	Tirpally	Anicut	Nirmal, Adilabad dist	1/9/05
7	Moti Talab	Tank	Nirmal, Adilabad dist	1/9/05
8	Aloor	Tank	Nirmal, Adilabad dist	1/9/05
9	Thotapalli	Tank	Nirmal, Adilabad dist	1/9/05
10	Ladella	SRSP	Warangal	1/11/05
11	Lingarajapuram	Tank	Karimnagar	1/12/05
12	Narmal	UMD[3]		1/12/05
13	Emani-98	Krishna	West Godavari	2/12/05
14	Duggirala-97	Krishna	West Godavari	2/12/05
15	Anantavaram	Krishna	Guntur	2/12/05
16	Kesarapalli-1	Krishna	Krishna	2/12/05
17	Mastabad	Tank	Krishna	2/12/05
18	Gudlacherlu	Krishna	Krishna	2/12/05
19	Bhimadolu-	Godavari	West Godavari	2/13/05
20	Nidadavolu	Godavari	West Godavari	2/13/05
21	Tadimalla	Tank	West Godavari	2/13/05
22	Pandalaparru	Lift	West Godavari	2/13/05
23	Peddaboddapalli	Tank	Vishakapatnam	2/15/05
24	Thandava-WUA2	Thandava	Vishakapatnam	2/15/05
25	Yenubilli Tank	Tank	Vishakapatnam	2/15/05
26	Devulavani cheruvu	Tank	Srikakulam	2/16/05
27	Duppalawalasa WUA	Tank	Srikakulam	2/16/05
28	Rayawalasa	Vamsadhara	Srikakulam	2/16/05
29	Bonnavada	Vamsadhara	Srikakulam	2/16/05
30	Patnam Peddacheruvu Tank	Tank	Tadampalli Mandal	3/9/05
31	Thodatera Tank	Tank	Sarakallu Village	3/9/05
32	Ramanna Tank	Tank	Sarakallu Village	3/9/05
33	Vengammareddy Tank	Tank	Patoor Village, Puthalapattu Mandal	3/10/05
34	Tenepalli Pedda Tank	Tank	Tenepalli	3/10/05
35	Pothinayana Tank	Tank	Pothalapatu village/ Mandal	3/10/05
36	Bahuda Medium Irrigation Project	Bahuda Medium Irrigation	Chinthaparthy, Madanapalle	3/10/05
37	Kanchalamma Tank	Tank	Rayachuti Mandal	3/11/05
38	Pammadipalli Tank	Tank	Rayachuti Mandal	3/11/05
39	Kanekal	Tungabadra High Level Canal	Kanekal Mandal	3/14/05
40	Udegudum	Tungabadra High Level Canal	TB High level canal	3/14/05
41	Bukkarayasamudram Tank	Tank	near Ananthpur town.	3/12/05
42	Dharmavaram Tank	Tank	near Dharmavaram town	3/12/05
43	Gooty tank	Tank	near Gooty Town	3/12/05
44	Yerra Thimmaraju tank	Tank	Guntakal Mandal	3/12/05

Group Interaction with WUAs				
45	Savel	Jagityal, SRSP		1/8/05
46	Jagenapali	Jagityal, SRSP		1/8/05
47	Chalgal	Jagityal, SRSP		1/8/05
48	Mallapur	Jagityal, SRSP		1/8/05
49	VV Raopet	Jagityal, SRSP		1/8/05
50	Moogalapalli	Warangal, SRSP		1/10/05
51	Rayapatna	Warangal, SRSP		1/10/05
52	Yellampalli	Warangal, SRSP		1/10/05
53	Cherlapalli	Warangal, SRSP		1/10/05
54	Madhere	Warangal, SRSP		1/10/05
55	Keshvapatnam	LMD, SRSP		1/8/05
56	Tadikal	LMD, SRSP		1/8/05
57	Chamanapally II	LMD, SRSP		1/12/05

1 = Lower Manair Darm; 2=Sri Ram Sagar Project; 3 = Upper Manair Dam

Box Item 2

Mr. Jagannatha Reddy, Bahuda WUA, Association no. 759.

Recently there was training program in Chittoor organized by the irrigation department for WUA members. In this, WUA members were taught what are there roles and responsibilities. As per president, department people asked WUA members to write minits of GBM for 16 months of their, though we have not conducted a single GBM in our region. As per our asking don't you know your roles and responsibilities of WUA president? He said, no I never received any material that would say my roles and responsibilities. In this regard WUA president has given a written complaint to Collector against Irrigation Department.

Box Item 3

Mr.Augustine, EE, Srikakulam division

WUA members are big actors, we trained them to talk infront of World Bank Officials. But actually they are not doing any works, what all they want is contract and money. During 2nd term election we could not work for 2 months and those days our office was jam-packed with farmers. Government should dissolve WUA and the respective departments should take over WUA roles and responsibilities.

Box Item 4: Case Study from Chittor

In majority of the cases under minor irrigation tanks, the cropping pattern is water intensive crops like rice and sugarcane. Irrigate Dry crops are rare and the standard reason quoted by all the farmers is that the soils wont permit other crops. How far this view can be technically upheld is a different debate all together. But the farmers have different arguments to put. The market forces are extremely important in deciding the cropping pattern. Farmers of Potinayani tank in Chittoor district gave a clearer picture behind this.

Out of the 500 acres of ayacut sugarcane is being grown in about 300 acres. The area is famous for jaggery and quite well known is the aragondam variety jaggery. Jaggery is prepared by the farmers themselves and sold in the Chittoor market. Aragondam variety is costlier than other varieties but even the inferior varieties have considerable demand for feed industry and pharmaceuticals. There is a sugar factory in Chittoor but not much goes to it. Farmers say that they prefer sugarcane to other crops because of two basic reasons. Firstly sugarcane is a water stress resistant crop which can survive stress up to 15 days (in the case of sandy soils) to 30 days (in the case of loamy soils) which is not the case with other crops. Secondly sugarcane is the only crop as per their view (in their conditions) which can fetch an advance amount even before the crop is harvested. A farmer can get money from the trader based on the sugarcane cropped area in advance which, is seldom possible with other crops. One acre of sugarcane out put value is around Rs 70000 against input cost of around Rs 28000 with a net benefit of about Rs 42000. The total value of the crop @ Rs 70000 per acre for 300 acres is 210 lakhs. The entire work of sugarcane production and preparation of jaggery involves lot of labour. On an average for the entire work 150 labour days for men and 80 labour days for women are generated per acre. Wage generated out of this is Rs 65 for men and Rs 40 for women is Rs 9750 and 3200 respectively. With a total of Rs 12950 say Rs 13000 per acre wage generated in a season (one year), the entire cropped area of 300 acres yield about 39 lakhs.

Coming to water, a total of 60 wettings are required for the entire cropping period with varied intervals depending on the stage of crop. Each wetting needs 8-9 hrs of pumping with 7.5 – 10 HP pump in bore wells and 5 hrs pumping with 5 HP pump in open wells as per the ground water situation in the area. Based on the reported average yield from the borewell of about 2.4" (0.20') the pumped water is about 4638 lph. One wetting may therefore require 41742 litres of water per acre. 60 wettings during a complete crop season may require 2.5 million litres per acre and accordingly 300 acres require 750 million litres or 26.78 mcft say 27 mcft. But normally the WUE is assumed as 6 acres per mcft in minor irrigation which comes to around 50 mcft for 300 acres. Of course conveyance losses and field application losses are high when irrigated by canals.