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For Comments/not for circulation

## **Consolidating and Strengthening PIM in Andhra Pradesh: A trendsetter in India**

K.V.Raju<sup>1</sup>

### **Part-I**

#### **Background**

Andhra Pradesh has made rapid strides over the last seven years in promoting users participation in irrigation management. Comparing to any state in India, Andhra Pradesh has gained enormous experience over the last seven years in formation, functioning and enabling water users organizations to perform better than previous years. Several studies and reviews have shown that AP has done better and has rich potential to do more. This was made possible owing to supporting political will, enabling policy and legal frame, supporting officials, improved capacity building at various levels, and more significantly, farmers have gained confidence that they can handle water related functions on their own, with technical support from the water resources department. Now is the time to move upwards and get stronger through consolidating the state's efforts over the last seven years. Indeed, recent guidelines of the CAD&WM (issued in October 2005) of Government of India have pointed out "WUAs should be in place before the project components are taken up".

#### **Irrigation Management Transfer**

Irrigation management transfer (IMT) mainly refers to transfer of responsibility (and not ownership) of government managed irrigation systems from the government to groups of farmers or water users organizations or other private entities. Transferring responsibilities has come to be seen by policy-makers as a way to reduce pressures on thinly stretched government finances, while at the same time, improving irrigated agricultural production and ensuring the long-term sustainability of irrigation systems (Geijer et al. 1996, Klozen and Samad 1995, Vermillion 1991, Brewer et al, 1999). Several countries across the world have made major efforts in this direction. The results of these IMT programmes have not yet been widely publicized, yet policy-makers should be aware of the impacts of IMT in various places in order to judge whether and how to proceed with IMT programmes. Clear cut and consistent evidence on the impact of management transfer is only beginning to become available. A review of scattered studies (Vermillion, 1997) at the global level, concludes that the various exhibits show a mixture of positive and negative results but most studies report positive results, particularly improvements in water distribution and finance.

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<sup>1</sup> Centre for Ecological Economics and Natural Resources, Institute for Social and Economic Change, Bangalore. Email: [kvrju@isec.ac.in](mailto:kvrju@isec.ac.in).

**Why WRD engineers prefer IMT ?.** Several rounds of interactions and meetings held across the state<sup>2</sup> during early 2006, revealed the following reasons for preferring IMT by the irrigation engineers of the Water Resources Department of Andhra Pradesh:

- a) Higher involvement of users
- b) Better water regulation
- c) To increase water use efficiency
- d) Better transparency in irrigation water supply and regulation mechanism
- e) Improvement in irrigation revenue collection
- f) Reduction in tail end problems
- g) More relief to WRD staff at all levels
- h) WRD staff can focus more on their professional skills and jobs.
- i) Users can have better control on works carried out
- j) Better communication between users and WRD staff
- k) Higher levels of collective action by users
- l) More revenue to the government
- m) Better capacity building for users

Interestingly, the irrigation engineers of WRD have also indicated what the management transfer of irrigation systems to users means for them. In our meetings the WRD engineers listed out the following benefits of IMT.

- a) Water allocation by users
- b) Canal structures and related property management and control by users
- c) System maintenance by users
- d) WUAs will hire required luskars and other field staff
- e) Crop planning and water distribution by WUAs
- f) WUAs will take care of irrigation and drainage in their areas
- g) Water fee collection and additional resource mobilization by WUAs
- h) Conflict resolution, enforcing incentives and disincentives by WUAs

#### **Gains to WRD staff**

- All interested engineers will get a chance to focus more on their professional skills, rather than more of administrative works.
- Each project will have freedom to demonstrate its potential and prove at the end of each crop season and the year, as to how they have achieved it and how other projects in the state can learn from this.
- These selected engineers (at various levels – JE to CE) will be in high demand in future years, as the state and several others states in India and many countries, will embark on large scale replication of this process.
- The selected engineers will be provided special training both within the state and outside.

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<sup>2</sup> As part of the consultations with different levels of WRD staff across the state, meetings (separately for all levels of engineers, separately for WUAs, sometimes combining both) were organized at project level, where in they were encouraged to talk and express their opinions freely on various aspects of irrigation, PIM and IMT. In each of these meetings, many a times it has become robust debate on future of irrigation in the state. Meetings were held during the 2<sup>nd</sup> week of March, 3<sup>rd</sup> week of March in PJP, RDS, Krishna, Godavari projects, 4<sup>th</sup> week of April 2006 in SRSP, and NSP projects. In these meetings, most of the engineers (40-70) and WUAs (ranging from 15-25 WUAs) participated for 4-7 hours.

### **Pilot Scheme from Kharif 2006**

During Feb-March 2006, the Principle Secretary, Special Commissioner of CAD, and Special Commissioner of WALAMATRI had wide ranging discussions with concerned senior and field staff of the following projects and its WUAs on present status and possible options for its improvement. Based on these discussions and suggestions made by the project level engineers- both in the meetings held in Hyderabad and followed by interactive sessions held in the respective project sites (shown below), the WRD has planned to initiate the process of phase-II reforms in the irrigation sector:

- i) to enhance water use efficiency
- ii) to utilize professional skills of engineers
- iii) to improve livelihoods of water users
- iv) to improve water fee collection so as to have more funds for works
- v) to enhance the main system management and also lower levels of the project
- vi) to have productive participation of water users at all levels

Project	Interactive session held on
RDS	20 March 2006
Jurala	21 March 2006
Krishna	22 March 2006
Godavari	23 March 2006
SRSP	26-27 March 2006
Nagarjuna Sagar	01 May 2006

Based on the above table, pilot schemes was planned for initiation from Kharif-2006 in some 5.8 million acres, covering 8 projects.

- The field staff and WUAs of these selected projects will be provided training through regional training centers by WALAMATRI.
- Based on field engineers and WUAs suggestions, an action plan to rehabilitate the canal system will be taken up before the onset of monsoon on a priority basis. To begin with works prioritized by the local WUAs, will be taken up and other works to complete the process will follow this.
- All selected WUAs have to sign an MOU to initiate this process. In this MOU, rights and responsibilities of field engineers and WUAs would be explained. This process will be completed by before the beginning of kharif –2006.

### **Immediate steps required in the Pilot projects for 2006-07**

- a) **Minimum rehabilitation of the canal system:** A major bottleneck is lack of physical system restoration to minimum performance level before IMT. Owing to financial crunch the WRD thinks it is the responsibility of WUA. In practice, the system remains constrained to perform. After irrigation management transfer, WRD field staff feels relieved, as it has been demonstrated in several places, across the state, from the frequent complaints and harassment from farmer's complaints. WUAs on its own are unable to handle physical renovation, owing to lack of funds or even technical support from WRD. All WUAs, both during the field visits and during the discussions with WUAs and WRD field staff emphasized the need for canal system restoration as pre-condition to IMT.

- b) Canal operation rules and local cultivation pattern:** In most of the command areas, discussions with WRD field staff and WUAs have indicated that there is a good potential to refine the existing rules for canal operation. This should be done in tune with changed cropping pattern or with consultation with WUAs for the desired cropping pattern. In any case, this need not change the planned structural design of the canals. In Andhra region, desiltation of canals in 1997-98 had enabled advancing of rice transplantation and further enabled the tail end areas to get more water. The crop schedules have to be changed to achieve better yield levels, and improved utilization of available water. Though farmers can use 90-100 days duration paddy variety owing to long duration flows of canals. Farmers use 130-155 days paddy. However, a series of consultations and realistic planning with the agriculture department (not discounting SRI paddy), water resources department, and WUAs should facilitate improved crop plans. If required, WRD has to advance its water distribution schedule, which in turn requires canal system upgradation, largely pertaining to bringing the entire system to designed discharge levels and modify canal operation rules.
- One of the key constraint faced by WUAs is, lack of information on water releases- both on quantity and time. In the absence of any speedy communication facilities, farmers have to use whenever it flows in their canals. WUAs are demanding the WRD, on a priority basis, to provide better communication gadgets to WUAs. That would help them to plan their minor and sub-minor canals to rotate and distribute water. Considering the State's advancement in using information and communication technology, this should not be a constraint in pilot projects.
  - Gap between designed and actual discharge levels at distributory and minor levels needs attention by both the top level and field staff. Owing to this gap, even after IMT, WUAs are finding it difficult to cope up with the demanding situations in practice. Unlike locally non-stationed official field staff, the WUA office bearers have to face the music being based in the same village.
- b) Can WUAs play multiple roles ?:** In the pilot projects, as part of learning mechanism, WUAs should be encouraged to play irrigation plus activities to protect members interests. Because, in several discussions with WUAs, they had mentioned about inadequacies faced by member farmers in providing backward and forward linkages. Fulfilling this requirement would enable to achieve higher value addition to their produce. If necessary, these arrangements need to be linked with other existing structures. Otherwise, WUAs just focusing on water may not enhance rural livelihoods. Some of the key allied functions are: a) procurement of paddy, b) supplying of inputs of good quality, c) linking up with marketing, storage and other associated activities. This has become essential, as users asserted, owing to the absence of other organizations. They can also set up e-choupals, as successfully demonstrated in Madhya Pradesh by ITC.

- c) Lack of linkages:** To enhance the value chain in irrigated command areas, the state, specifically CAD has to underline the urgent need for provision of backward and forward linkages to enable farmers to reap the benefits of irrigated agriculture. In the present circumstances, severe inadequacies in both input supplies and marketing facilities, farmers unable to get returns to sustain their investments. Increasingly farmers feel, in addition to water as one input, WUAs should take care of crucial aspects like other inputs (fertilizer, pesticides, good quality seeds) and forward linkages (including assistance in procuring foodgrains and vegetables, marketing, and storage facilities). This would enable WUAs to effectively collect water fee from users. At the same time, WUA can provide better prices to producers. The vicious circle has to be broken somewhere and move towards a systematic approach. To support fruits and vegetables cultivation and increasing livestock activity (coming up in several parts of irrigated command areas) it needs HOPCOMS model of Karnataka or mother dairy model of the National Dairy Development Board, or streamlining and strengthening raitu bazaar. The irrigation command areas of AP will provide good potential to replicate e-chaupal system of ITC being operated in Madhya Pradesh over the last few years. This would enable farmers to get better and guaranteed prices at market rates and also to provide both forward and backward linkages with on-line communication facilities. Alternatively, WUAs with WALAMTARI need to explore the possibilities of joining hands with local NGOs or cooperatives, such as Mulkanoor Cooperative Society in Karimnagar district, which is successfully working for more than two decades.
- d) Help in water fee collection:** First, the State has to provide legal provision to empower the WUAs to collect water fee. Second, WALAMTARI has to mount up a regional training programme for capacity building on water fee collection, book maintenance, penalizing defaulters and maintaining cash and bank accounts. In deed, WUAs can be given the option of retaining up to 70% of estimated collection, and 30% has to be deposited with the government. This should be prior condition for releasing the water in the subsequent crop season. Field discussions indicated that as part of better mobilisation of funds, a) WUAs should try to contract out water fee to local groups, b) canal bunds, can generate Rs.15,000 – 50,000/year, c) Charge 50% or more water fee for non members of WUA, d) All trees on canal lands should be with WUAs for use rights.
- To ensure better water fee collection, all financial and licensing/permit/renewal agencies may compulsorily demand water fee paid receipt and No Objection Certificate from WUA office, including mobile, power bills.
- e) Capacity building is the urgent need:** The state should make mandatory to all WUAs and all WRD field staff to undergo training. To begin with this should be implemented in the pilot projects. WALAMMTARI should play handholding role during the initial years of WUA. It need to facilitate course-correction measures in each pilot project. If necessary, it need to set up spear-head teams in each of the pilot project. This would help to scale up over time and area. These spread-head teams can work as trainers in the future. The spread head team should consist of three persons – a) engineer from WRD, b) agronomist from the

agriculture department, c) community development specialist, hired from WALAMTARI or NGO. Several WUAs in the field wanted regional level training programmes to handle local issues. But WALMI owing to inadequate staff and resources could not handle all the requirements. When WALMI had a full pledged social science division, with committed senior staff, it could provide intensive training, and took the lead from the frontline to facilitate formation of WUAs. Otherwise, users may form the WUAs, but they may not be able to function. A structured training course for various levels of WUA office bearers (separately for presidents, treasurers, and secretaries, and progressive farmers) and officials (top level, senior level, middle level, and junior level) are essential. These courses have to come up with well-conceived contents and lesson plans with course material preferably in Telugu language. A good mix of oral and visual media techniques need to be mounted up both at the state and regional training centers. WALMI need to be equipped and strengthened as a center of excellence in training and action research. All this needs hiring of good training professionals to cater the local needs. However, these capacity building activities have to be in tune with the IMT programme planned by the WRD.

**f) Field staff constraints:** Field staff of WRD faces several constraints to work on PIM. Some of the key points, which several junior engineers (JE) across the state stressed are: a) All decisions/letters should directly got to WUAs rather than via CE/EE, b) JE's can't focus adequately owing to other engagements and work load, c) Need a separate person on full time at JE level at Sub-divisional officer (SDO) office, d) SDO office has 20,000 ha. One JE for PIM and one SDO for PIM is required to supervise and assist WUAs and they should be provided with associated expenses. Because, JE and SDO need to a) attend and set up village level committees, b) attend WUA meetings, c) help in assessing irrigated area, and d) help in collecting revenue by imposing rules.

**g) Savings to government:**

- **Major gain to field staff:** Owing to severe shortage of staff at field level, the existing staff feel that they are relieved a lot after formation of WUAs and transferring the responsibilities of irrigation management. In spite of the savings in staff time and size, yet the government is able to earn better revenue compare to earlier years. Field staff also underlined that after WUAs taking over, there is less number of complaints and conflicts for water. Hence, they strongly urge for more WUAs in all command areas.

**h) Some WUAs are defunct or less dynamic:** Field observations across the state indicated the following reasons: a) Promises made by the department staff during the transfer stage are not fulfilled. It includes, i) minimum rehabilitation of the system to receive designed or close to the designed discharge, ii) non-provision of the assured supplies, iii) inadequate capacity of the canals to carry required discharge, iv) non-availability of famerwise landholding records (supposed to be provided by the irrigation department at the time of transfer), v) non-availability of WUA area map with clear boundaries, vi) lack of supplies on

time and in required quantity, vii) Inadequate cooperation between WRD's field staff and WUAs in handling many field issues, largely owing to lack of staff in the WRD, viii) There is no grievance cell for the WUAs at the project level and lack of mechanism to quickly respond to the WUAs grievances. On the other hand, WRD staff is overloaded or working with one-half of the sanctioned staff.

**i) Minimum conditions required:** Across the state WUA office bearers and officials underlined minimum conditions required to promote PIM in the command areas. They can be summarized as below. In deed, several of these conditions are rarely considered either in the formation or system transfer stage. Hence, these conditions have become more crucial for the proper function of WUAs.

1. Minimum physical rehabilitation
  - a. to enable the water distribution system to perform as per the designed pattern.
  - b. Installation (or renovation) of guage records and shutters wherever is required to regulate water
  - c. The work allotment by the WRD may be in proportion to water fee collection levels by the WUA.
2. Drawings, maps and records of distribution system transferred, land owners details, canal alignment and discharge levels as per the design, and suggested cropping pattern
3. After transfer, both the concerned sub-divisional and divisional level office should be made accountable for the next five years in delivering the mutually agreed discharges both on time and in required quantity. This should be reflected in the MOU.
4. WUA should be formed much before system rehabilitation is planned. In planning (minimum) rehabilitation of the system, WUA should be involved from the beginning, both in walk thru survey and prioritizing the works. All these meetings should be held in the concerned village for transparency and clarity.
5. PIM cell (of WALAMTARI) or identified wing of the WRD
  - a. should form a spearhead team of three persons (irrigation engineer, social scientist, and agronomist) to initiate the dialogue with the users and to provide orientation to users. The spearhead team should maintain record of progress made for each WUA, indicating kind of support provided to the WUA and outcomes on a regular basis.
  - b. The PIM cell need to develop an effective database and monitoring and learning systems for WUA performance.
  - c. The PIM cell need to be authorized to give allotment for repair based on joint survey of the proposed system for transfer.

**j) Modern technology and management of the canal system:** Both the field staff and active members of leading WUAs stress the need to bring in modern technology and high quality in all civil works related to command areas. If decisions are taken on lining of main and distributory canals, then the work should be assigned to major companies to provide high quality work with pre-fabricated concrete slabs. That would enhance the life span and less prone to

damages and they have longer durability. These contractors/companies can also be made responsible for a long-term (20-30 years) maintenance work at no cost. They can also explore repair (in a few cases, build) – operate-transfer of the canal system. These field staff and active members of WUA also gave a comparison of modernizing national highways and its quality.

**k) Measuring WUAs performance:** Criteria for WUAs performance assessment has remained unclear across the states in India. The WRD in states like, Gujarat, Andhra Pradesh, Maharashtra, Karnataka and Bihar, largely goes by a) no of WUAs, and b) area irrigated by WUAs. This is very much in tune with standard practice of WRD in measuring their irrigation systems performance by area irrigated in kharif and rabi seasons, and on the other by discharge levels. Rarely, there is a scope to indicate extent of tail-end area irrigated, reduction in conflicts owing to WUAs better functions. But there is a wide variation across the agencies and WUAs on assessment criteria itself. The perception of success and its measurement varies across these agencies, as summarized below. As part of indicators to measure successful WUA, it should consider: getting water to entire area, Tail-end irrigation, economic level improvement by better production levels, water fee assessment collection, M&R of canal system, water efficiency use, marketing of agricultural produce. Performance measurement criteria should include: i) WUAs, ii) support provided by the WRD staff, and iii) outcomes on crop-seasonwise, and on annual basis.

Criteria given below are based on extensive discussions (both formal and informal) held during our field visits with WUAs members, its office-bearers, WRD field staff and senior officials, WALAMTARI faculty, NGOs, and others. In the pilot scheme, the following criteria may be used and at the end of crop-season and one year this criteria may be modified based on lessons learnt.

#### Measuring WUAs performance

WUA	WALAMTARI	WRD
<ul style="list-style-type: none"> <li>• Reduction of water conflicts</li> <li>• Extent of tail-area irrigated</li> <li>• Water availability on time and quantity</li> <li>• Crop diversification</li> <li>• % water fee demand collection</li> <li>• % of funds spent on O&amp;M</li> <li>• % of designed area irrigated –seasonwise</li> <li>• Staff hiring (luskars, water fee collectors, office records)</li> <li>• Enforcing penalties</li> <li>• Tradable water rights</li> </ul>	<ul style="list-style-type: none"> <li>• Acres/cusec</li> <li>• Area – irrigated</li> <li>• Production tons/acres</li> <li>• Conflict management</li> <li>• No of office bearers and ordinary members trained</li> <li>• Records maintenance</li> <li>• No of meetings held</li> <li>• Matters discussed in the GBM</li> <li>• Attendance in these meetings</li> </ul>	<ul style="list-style-type: none"> <li>• Water use efficiency</li> <li>• Water fee collection level (% of annual demand, b) % of arrears collection)</li> <li>• % reduction in non-irrigated area in tailend area</li> <li>• Area getting a) all irrigations, b) more than 50% irrigation, c) less than 50% irrigation</li> <li>• % of water fee funds spent on repairs</li> <li>• % increase in crop yields</li> <li>• Minimum 70% farmers as members</li> <li>• 2 meetings/month with 70% attendance</li> <li>• Achieving 80% of the designed irrigation intensity</li> <li>• Diversification around core-activity</li> <li>• Democratic function</li> <li>• Crop-diversification</li> <li>• Resource mobilization from non-water fee sources (trees, fish, grassland &amp; others)</li> </ul>

### **Key decisions proposed for Kharif-2006**

1. In the 1<sup>st</sup> year (2006-07) 8 lakh acres for IMT. Then, 3 times area increase every year.
2. Lessons learned in the 1<sup>st</sup> year and subsequent years would help future plans and M&L.
3. Complete joint azomish in the pilot areas before kharif-2006. Hire locals, if need. Provide all WUA command area maps, technical details and data to all WUAs/DCs.
4. Selected areas will represent a) most of the projects in the state and b) all reaches –head, middle, and tail.
5. All SDOs, AEs, EE, SE (of selected areas) will be provided IMT training.
6. All presidents, VP, TCs and others of WUAs, DCs, will be provided IMT training.
7. Probationary engineers (some 50) will be selected to focus on IMT cells after training.
8. MIS will be established in all IMT cells + documentation + good communication by WALAMTARI. Probationary engineers will handle it.
9. Performance measuring indicators in place.
10. Score card for SDO performance.
11. Score card for WUA/ DC performance.
12. Get local-based, experienced engineers as WALAMATARI staff to coordinate IMT activities. They will be given special training
13. Release funds for repairs and maintenance by end April. (Most of it break into smaller budget items to reduce procedural delays like tendering)
14. Prioritise works to be completed by June 2006.
15. Funds release in tune with water fee collected (Bihar gives 70% of water fee collection)
16. One possibility is Rs.100/acre for now. Later workout water fee collections, and required plough back funds.
17. Develop monthly monitoring and learning procedures at all levels.

### **Part-II**

#### **Consultations with Field Level Engineers and WUAs**

During March-April 2006, a series of meetings were organized in different project sites to discuss with local engineering staff of various levels and members of WUAs. These consultation meetings largely focused on a) understanding current constraints, b) possible options, c) roles the existing WRD staff of various levels can play, d) responsibilities WUAs can handle, d) assistance required from the state government and other agencies. The field visit schedule, included a) on 20<sup>th</sup> March, 2006 discussions with CAD, b) on 21<sup>st</sup> March visits to RDS area, c) on 22<sup>nd</sup> visit to Vijayawada and then Krishna project, and d) on 23<sup>rd</sup> visit to West Godavari project. Sri Swargam Srinivas, Commissioner, CAD; Sri G.Kishen, Special Commissioner, WALAMTARI; representatives from NGOs- Jalsapandana, IRDAS, and a few consultants (Madhuri Navale, Rahul Sen) and others participated in these meetings. CAD coordinated all these meetings. During

these field trips, the team visited the following projects: a) RDS, b) Jurala, c) Krishna Delta, d) Godavari Delta. Summary findings of these meetings are listed below.

**Need for IMT:** The local engineers and WUAs have argued out many reasons for promoting IMT in their area: These are: a) Involvement of users, b) Better water regulation, c) To increase efficiency/quality control, d) To have more transparencies, e) To enable to reach closer to designed irrigated area and to have grip on actual irrigated area, f) increasing revenue, g) To reduce tailend problems, h) To increase water use efficiency, I) Reduce unnecessary pressure and pains to the department, j) Easy communication by the department, k) Better collective action, l) More revenue to department, m) Capacity building.

**Areas identified for Irrigation Management Transfer:** After a series of consultations with field level engineers, the following areas are identified for irrigation management transfer. This is also approved by the local WUAs.

A. In Krishna delta area has 2 Divisions, 6 Sub-Divisions. The Sub-Divisions identified by local engineering staff in the meeting are:

	Acres
a) Gudiwada Chanal	44,705
b) Gudlavalleru – Bantumalli Canal	65,000
c) Polaraju Kikalur SDO Vijayawada	45,000
d) Kikalur – Ungutur Chanal	9,000
e) Ponukumadu Chanal	7,000
f) Seethampet chanal Bandar (SDO)	5,000
g) Managerkodu	5,000
h) Bheemanadi	25,000
i) South Chanal	35,000
<b>Total:</b>	<b>2,39,000 acres</b>

SDO officers of Krishna Delta who are keen on going for training: Gudiwada -V.V.K. Subba Rao, DEE, Bantumallikare-B. Venkateswara, DEE, Polaraju-K. Venkateswar Rao, DEE, Ungutur (to be identified), Ponkunadu-N. Nageswar Rao, DEE, Seethapet ( to be identified), South Chanal-S. Tirumala Rao, DEE, Managerkodu and Bheemanadi-B. Venkateswar Rao, DEE.

B) Guntur Circle: In Guntur Circle area, following areas are identified for irrigation management transfer at SDO level.

Duggirala -	High level chanel	24,000	G. Ramakrishna
	Westside chanel	22,000	
Repalli -	Vellatur chanel	28,000	Narasaiah
	Isukapalli chanel	26,000	
Bapatla -	T.S chanel	24,000	Koti Reddy
	Appuram chanel	25,000	
	P.T chanel	23,000	
Chirala -	Bapatla chanel	16,000	K. Venkateswar Rao
	Stuvartupuram chanel	16,000	
	Sautharaoside chanel	10,000	



on reservoir, storage, canal flows, l) if to fill gap command, we need more discharge, m) now, even tail end areas are getting water – couple of irrigations, n) all lining work, desiltation work, under employment guarantee scheme.

In case of **Krishna delta** area: a) Empower WUAs/DCs to evict encroachments and bring back to full carrying capacity, b) In Krishna delta, owing to floods, lot of area moved to fish culture (150,000 acres). CAD denotified this area, c) from providing irrigation water. Yet, WRD collects Rs.500/acre as water fee, d) Need clear allocation to irrigation and fish culture, e) Need first joint azmoish.

For effective IMT, WUAs need agreed designed discharge information on the following dates: a) Kharif – by June 15<sup>th</sup>. By May 15<sup>th</sup> water availability should be known, b) Rabi -December 15<sup>th</sup> to March 13<sup>th</sup>. By November 15<sup>th</sup> availability of water should be known. In both crop-seasons, designed discharge guarantee should be up to 80 percent.

**Minimum Database:** Each WUA/DC/PC should have the following database to move towards IMT: a) area map of WUA (plot maps, survey no.), b) crop pattern and area seasonwise, c) water delivery schedule and gauge record data, d) number of farmers and categories, e) In the WUA/DC/PC office display water flow levels and dates. Above material – copies with CAD and WALAMTARI and on websites, f) MIS with WUA, DC, PC, WALAMTARI, CAD.

**Steps required in the next 5 months are:** a) Training for key farmers, b) Training on collective action, c) Water distribution, moving towards equity, d) Water management, e) Methods and benefits of water fee collection, advantages, f) System maintenance, main system management, g) Collect arrears on instalment basis, h) In the training programme concerned division-level officials should be there, I) Crop-water requirements, j) All training programme should be local system specific and in two parts - general followed by project specific.

**Broad action points:**

- At WALAMTARI training: a) Resource material, b) Case studies, c) Exposure visits, d) 2 parts (i) general (ii) Project specific, e) Separate training fish tanks
- WRD needs to confirm at the beginning of each crop season: a) agreed quantity of water at various levels of canal network, b) date of deliveries, c) suitable crop pattern, based on soils condition.
- After IMT local WUAs can do: a) PC can decide on allocation area for (i) irrigation (ii) aquaculture, b) O&M, c) Water fee collection, d) Evict encroachment, e) Clear all bunds.
- Encroachments on canal bunds has to be evicted: a) WRD should be made, b) accountable, b) Desilting canals, c) WRD staff regularly travel + shutters should have locks, d) No unauthorised supplies, e) WUAs should have powers to evict, though APFMIS Act provide, provisions – S.O. Luskar, A.E. should follow and help WUAs.
- If WRD can do minimum rehabilitation and install measuring devices and clean canals, jungle clearance, then WUAs can follow up.
- DC/WUAs agree if rehabilitation done based on joint walk-through survey on one lakh acres, then it is possible to sign MoU for IMT.

- WUAs require: a) Removal of unauthorized pipes, b) 50% damage in shutters system because of desiltation below bed problems, c) Chemical treatment not possible, it is a continuous process, d) Priority is: Minimum rehabilitation, installation of measuring devices, completing cleaning of all channels, Jungle/weed removal, desilting the canals, removal of any encroachments, e) Main system management, f) dealing with encroachments city limits, g) handling drains in urban areas (e.g, Guntur has 56 drains), .
- Each WUA may differ in prioritizing the activities.
- Encourage livestock to use village tanks, rather than canals, which will damage bunds.
- System hand over to WUA/DC/PC should include, a) Water allocation, b) Property, c) Water regulation, d) Starting/inventory, e) Human resources/lascars, f) Tax collection, g) Other resource mobilization, h) Crop planning, I) Drainage and irrigation.

**Monitoring the IMT by the Department:** a) Water use efficiency with WUA and without WUA, b) Percentage area getting water in tail end area (before and after), c) Change in cropping pattern – designed and actual, d) increase in tax collection, e) increase in crops yield levels, f) resource generation from grass lands, trees, collection of fines and any other revenue sources.

IMT would result in several benefits. Possible benefits to the department as listed by the engineering staff are: a) Reduction in problems for department functioning, b) Improved water deliveries, c) O&M activities, identification, implementation – satisfactory, d) Main system planning can be concentrated, e) Less complaints, f) Increase in revenue, g) Reduction in expenditure by the government.

### **Part-III**

#### **Irrigation Sector Reforms – Promoting Pilot Models in Andhra Pradesh**

##### **Piloting the activities through NGOs**

To enable the State of Andhra Pradesh in its irrigation sector reforms to move further, we are planning to initiate pilot level activities to build on the existing structure and efforts made in the irrigation projects. To begin with 10 model WUAs (Distributory/Major/Canal) will be selected from each Circle and pilot NGOs. The following selection criteria may be followed to select the pilot sites based on the field situations.

1. It should have 80% water assurance for irrigation.
2. Willingness of WUA functionaries and have good leadership.
3. Preferably progressive farmers area.
4. Cropping pattern preferably some area ID and paddy or one crop paddy another crop ID.
5. Identified extent of Tail end deprivation. 20% area of the design command under the selected Distributory/Major/Branch canal and willingness to put efforts to reduce the tail end problem.

6. Water tax collection should be from average to good (60 to 80%) and willing to collect water tax above 80%.
7. Existing strength of government staff and field functionaries in that Distributory/Major/Branch canal.
8. Extent of ground water irrigated area.
9. Water use efficiency (60 to 70% duty and willing to adopt high duty levels).

### **MoU with WUA for subsequent maintenance**

1. Preliminary discussion with Model WUA functionaries on subsequent maintenance of canal system.
2. In turn WUA functionaries have to conduct managing committee meeting or general body meetings in their respective WUAs. If they accepted or approved in the managing committee or general body meetings the following activities may be taken up in the model WUAs.
3. MoU should clearly indicate that WUA will take care of (a) operation and maintenance, (b) water distribution to all designed area holders, including tail enders, (c) improve water use efficiency, (d) collect water tax above 75%, (e) resolve water related conflicts, (f) make efforts to follow high-income giving crop pattern all reaches head middle and tail.
4. WUA performance will be measured on the basis of WUA rating format or PSA chart.

### **Benchmark survey**

To know about the WUA functioning status benchmark survey need to be conducted in model WUAs. This is very important to know the progress and impact can be assessed. Rating and bench mark of WUA on four key parameters (1) Participation & Dialogue, (2) Self Management, (3) Water Use Efficiency, and (4) Innovations & Technology Adoption.

### **Awareness building**

1. Orienting the WUA functionaries and field functionaries on irrigation reforms or introduction PIM concept.
2. Conducting one exposure visit to PIM implementation projects in the state or any other state in India.
3. Creating awareness among the farmer community about the irrigation system Participatory Irrigation Management and tax collection.
4. Wall writings and film show on water management in model WUA villages.
5. Organise Kalajatha programs.
6. Orientating the WUA functionaries on Participatory Situation Analysis and Rating format to assess the WUA performance (Poster).

### **Capacity building of WUA functionaries**

Roles and responsibilities, water management and improved cropping practices. Intensive trainings and exposures need to be organized to WUA functionaries to get clear understanding on water management.

### **Office establishment**

After the orientation meetings office establishment process need began, location identification at Panchayati office or any government building available or rented office.

### **Records procurement**

Begin with 7 basic records need essential to run the WUA office. This records need to be procured from different sources, i.e., Revenue department and Irrigation department.

### **Water tax**

To get plough back amount for O&M works first they should participate in joint Azmoish or TC wise crop extent irrigated area details to be collected and tax demand should be known by each TC member. WUA president able to tell about water tax demand and collection and balance status.

- Advantages of WUA taking over of tax collection
- Resolution by WUA on WUA taking over tax collection

### **Tail end deprivation**

Identification tail end deprivation areas in each WUA (TC wise). Based on this data, preparation of participatory plan for reducing water wastage, better water regulation for increasing water use efficiency at WUA level. This process of discussions leads to increase water available for productive use and water travel towards the tail end. Better water regulation will be followed.

### **O&M action plan**

O&M action plan to be prepared with participatory approach keeping in view of expected plough back funds to the WUA. When implementation is taking place social audit boards and work boards to be installed to increase transparency in the WUA. Along with cashbook, ledger, measurement book also should be available with WUA.

## **Water management**

All model WUA need have crop water requirement plan, prepare and display of water release schedule at WUA office. Each WUA have to maintain the gauze record to know the water discharge. Adopting WARABANDI or Rotation practices to reduce tail end deprivation. Able to tell about water use efficiency of respective WUA.

## **Impact**

- Increased awareness on water management
- Established WUA office and well record maintenance
- Water release schedule preparation and implementation
- Increased water tax collection
- Timely taking up O&M works
- Decreased tail end deprivation
- Appointing of private people (even local agents) for water tax collection incentives basis, with clear MoU between the WUA and agent
- SRI paddy method adoption

## **Proposed activities in Pilot WUA/Distributaries**

1. **Office Establishment:** Initially competent authorities have to take more responsibility to motivate the WUA presidents for establishment of office. In due course WUA president will take lead role to run the office in systematic way. Then competent authority will play supportive role.
2. **Updating records:** Procurement of records from different sources would be done by the competent authority. Maintenance and updating of the records is WUA responsibility. Otherwise WUA can appoint one person for regular maintenance of the records and pay for him with generated resources.
3. **Daily gauze record:** WUA has to give this responsibility to the existing laskars/work inspectors (private/government) on rotation basis. WUA president/CA will monitor this. Based on the data CA will calculate water use efficiency.
4. **TC wise Ayacut, farmers list, crop wise extent, water requirement and tax demand:** CA has to facilitate the meeting with WUA functionaries to carry out this exercise along with village secretary, laskars and work inspectors. After this each TC has to note down the crop wise extent. Based on data available demand will be assessed. Water tax can be collected in a efficient manner.
5. **O&M Plan:** CA has to facilitate this process along with WUA functionaries for identification and prioritization of the works. Cost estimation will be done by the CA. After completion of this process, O&M plan should be approved in the general body meeting.
6. **MoU/Resolution:** Before starting of O&M works MoU will be signed by the WUA functionaries. This has to be read in the general body meeting.
7. **Social audit boards & work board:** After sanction of WUA plough back for O&M works, sanctioned works can be written on the social audit board. After

immediate completion of O&M works, WUA president should install each work site work board. In the similar way they have to write on the social board at public places.

8. **Crop water requirement & water release schedule:** The CA should provide water availability information to the WUA. Based on the water availability in the project cropping pattern will be decided by the farmers and WUA functionaries. Based on the proposed cropping pattern water should be released.
9. **First irrigation to tail end:** CA will facilitate the meeting along with WUA field functionaries, TC wise DP wise tail end area need to be identified. Based on that plan for WARABANDI or on off system may be adopted in consulted with other farmers in the DP.
10. **WUA Regular meetings (MC & GB):** Every month one Managing Committee meeting will be conducted. This meeting will be facilitated and organized by WUA president and supported by competent authority. For every crop season one general body meeting to be organized by WUA functionaries. All the farmers have to participate in this meeting. Based on the resolutions WUA functionaries should act upon for further activities.
11. **Capacity building (prescribed training modules):** To create awareness among the community. Training programs and mass communication programs should be conducted for all the stakeholders. Here we need to take external support (NGOs/or professionals) to carry out these activities.
12. **Cost benefit analysis (water used verses production):** Crop wise extent of area irrigation verses water utilised. Per mcft irrigated area can be calculated. Crop wise yields calculated. Water used verses yield per mcft should be calculated.
13. **Extra revenue generation (Membership fees, etc.):** Auctioning of grass on the canals, fruit plants, canal silt. This amount totally can be utilized by the WUA. Punishment or fine to the illegal irrigation. WUA functionaries have to take responsibility/initiate on the same.
14. **Establishment of FFS (SRI):** WUA functionaries will identify progressive farmers list. In convergence with agriculture department new technologies may be adopted. Here CA may organize exposure visits to the farmers for the same farmer fields. Farmers will learn from the farmer's experience.
15. **Appointment of private laskars by WUA:** Wherever field functionaries are not available those places WUA can appoint laskars on contract basis. Laskars payment should pay by the farmers on kind/cash farm acres wise.
16. **Transferring existing government laskars to the WUA:** So far there is no coordination between the WUA and field functionaries. Field functionaries totally under control of the irrigation department. When WUA and field functionaries work together then only it is possible to reduce tail end deprivation. Otherwise it is very difficult task. Keeping in view of this it is proposed that field functionary's remuneration should be released to the WUA, in turn WUA will pay for them. This is policy decision how far it will be possible we have to see.

## Part-IV

### **Building public-private partnership for irrigation services: Emerging Trends in Andhra Pradesh**

Andhra Pradesh has already held a series of consultation meetings with its field officials of different levels during March-April 2006. On the other hand, lot of spade work has been carried out within the CAD wing of the WRD, to understand the status and roles and performance of the WUAs within the State.

Following are some of the suggestive models to promote public-private partnerships in the irrigation services.

Model	Key features	Assumptions
<b>Users Cooperatives at Project level</b> e.g, producers coops <ul style="list-style-type: none"> <li>• Amul</li> <li>• HOPCOM</li> <li>• Apples of HP</li> <li>• Floriculture</li> <li>• Fruits &amp; Vegetables</li> </ul>	<ul style="list-style-type: none"> <li>• Producers are members</li> <li>• Backward and forward linkages</li> <li>• Collective effort</li> <li>• No middlemen</li> <li>• Profit or loss shared</li> <li>• Better price and support services</li> <li>• System O&amp;M</li> </ul>	Integrate inputs and market linkages for all irrigators-members
<b>WUAs/DCs</b>	<ul style="list-style-type: none"> <li>• Responsible for specific activities related to               <ul style="list-style-type: none"> <li>○ Water acquisition</li> <li>○ Water distribution</li> <li>○ O&amp;M</li> <li>○ Water fee collection</li> <li>○ Dispute resolution</li> </ul> </li> </ul>	Existing policy and legal framework supports
<b>Private development agencies at project level</b> (including a group of retired engineers, agriculture professionals, NGOs)	<ul style="list-style-type: none"> <li>• Undertakes as is where is basis</li> <li>• Highest bidder will get the assignment for a fixed term</li> <li>• System O&amp;M</li> <li>• The agency on its own through WUAs will handle               <ul style="list-style-type: none"> <li>• Water acquisition</li> <li>• Water distribution</li> <li>• Water fee collection</li> <li>• Water fee retention</li> </ul> </li> </ul> <p>The agency can undertake any other activity to enhance the project performance levels and mobilize additional resources, without depriving the customary rights of all users.</p> <p>Through wide-ranging consultation meetings opinions and concerns need to be collected from all stakeholders.</p> <p>Contractual arrangements with clear terms at project or part of the project level.</p>	Possible project sites <ul style="list-style-type: none"> <li>• NRP</li> <li>• RJS</li> <li>• SRSP</li> <li>• Krishna</li> </ul> <p>In the preliminary and informal round of meetings, SRSP bidding started from Rs.50 crores went upto Rs4500 crores.</p> <p>In NSP, started from Rs.1500 crores and reached to Rs.50,000 crores.</p> <p>Bidding price justified</p> <ul style="list-style-type: none"> <li>• Tourism</li> <li>• 30% shift in crop diversification freedom to operate</li> <li>• give water without depriving farmers</li> <li>• allow forward/ backward linkage</li> </ul> <p>all variables introduced</p>

<p><b>Financial institutions-private agencies-User organisations</b></p> <p>e.g, In Maharashtra ILFS, is planning for a couple of projects with Jain irrigation systems</p>	<ul style="list-style-type: none"> <li>• system level transfer as is where is basis</li> <li>• all infrastructural investments will be carried out by the agencies</li> <li>• system O&amp;M, water fee collection, water distribution, water use efficiency is handled</li> <li>• user pay principle in practice</li> <li>• no or less defaulters</li> <li>• system level performance will improve</li> <li>• over all agricultural growth, with multiplier effect will be in place</li> <li>• water conveyance loss drastically reduce</li> </ul>	<ul style="list-style-type: none"> <li>• Infrastructure and financing agencies like ILFS and L&amp;T and other may show interest</li> <li>• Financially sustainable</li> <li>• Higher level of accountability</li> <li>• Higher level of water use efficiency</li> </ul>
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### Promoting Plough back of water fee collection

As a first step, the State WRD, for the first time has succeeded in transferring the water fee collection to WUAs as per the APFMIS Act, 1997. From the year 2005, it will be a regular feature in the state<sup>3</sup>. The finance department has issued government orders to allocate of water tax to water users associations and its classification of expenditure. In the absence of such a clear order, the local Mandal Revenue Officers (MRO) were constrained from disbursing the water tax funds to WUAs. This was clearly identified and discussed as one of the issue in a rapid assessment of WUAs made in 2005 (Raju et al, 2005). This has triggered the initiatives both in the WRD and Finance Department from early 2006. Now the proposed procedures (as per the GO dated 22-08-2005) are:

- a) The MROs shall collect the water tax and credit to the consolidated fund of the state under "0029 Land Revenue".
- b) The concerned MROs shall apportion the water tax collected at the rate prescribed to the WUA/DC/PC/GPs (as per the APFMIS Act, 1997) concerned, based on the actual collections made in that particular area for each quarter.
- c) The MROs shall issue proceedings to the concerned WUA/DC/PC/GPs under intimation to the concerned executive engineer/Pay and Accounts Officer (irrigation)/District Treasury Officer in the districts.
- d) The regular irrigation/project division under whose jurisdiction the WUAs are functioning shall prefer a bill to the concerned PAO/APAO (irrigation) based on the proceedings issued by th MRO concerned. The PAO (irrigation) shall admit payment to the WUA/DC/PCs concerned, based on the bill presented by the Divisions concerned from out of the maintenance grant of the respective project for which LOC (letter of credit) will be issued by the Chief Engineer concerned.
- e) The apportionment of the water tax where WUAs are not functioning or not in existence for any reason shall be made directly by MRO to the irrigation department, which will take-up necessary operation and maintenance works as per the departmental rules and procedures in vogue against the LOC released under maintenance grant of the project.
- f) The PAO (irrigation) shall admit for payment from out of maintenance grant of any project/scheme only against specific allocation by the MRO concerned.
- g) In respect of maintenance works relating to camp colonies and other contingent maintenance works on projects, which do not relate to maintenance of irrigation sources with reference to water tax collected and also in emergent situations like

<sup>3</sup> Government of Andhra Pradesh, Finance (BG-1) Department, Memo No.18239/826/A1/BG/2005, dated 22 August 2005.

- flood damages, breaches and flood protection works expenditure shall be met against the specific sanction of HOD from out of the grant available with him under common establishment under non-plan.
- h) In case sufficient budget provision is not available under the maintenance grant to release funds as per the proceedings of MRO, the executive engineer concerned shall intimate the fact to respective HOD and also to the government in the I&CAD department for making additional allocations in consultation with the finance department.
  - i) In case of gram panchayats are concerned, the Commissioner of PR&RE shall take action for making specific provision in budget under "2515- other rural development programmes-MH 198-Assistance to GPs-Assistance to GPs for maintenance of irrigation sources- other grants-in-aid" based on the previous year's collection of water tax in the GP areas as reported by the chief commissioner of land administration. The treasuries concerned are authorized to adjust the amounts of GP accounts based on the proceedings issued by the MROs by debiting the expenditure to the above head of account.
  - j) The chief commissioner of land administration is requested to furnish the details of irrigation potential created or developed in the project/scheme area wise on the basis of which water tax collected in the previous year to the government by 31<sup>st</sup> August of every year so as to enable to make sufficient provisions in the next year budget under respective heads of accounts of the HODs concerned.

In practice, the overall streamlining took almost eight months to start releasing funds to the WUAs. By early September, 2006, against the total amount (Rs.345 million) to be released, Rs.154 million was released to around 550 WUAs (though more WUAs have received the funds, data is not readily available). By early September 2006, nearly Rs. 27 million has already been incurred for various works by these WUAs<sup>4</sup>.

### **Key achievements by CAD**

- 1) Till September 2006: a) WUAs (village and areas) from notification; b) All distributories computerisation and maps, c) Project maps generated on WUA notification basis; d) WUA Qualitative survey record on performance; e) WUA performance for 2000 to 2004; f) 12 AEEs being trained on the methodology; g) APSRAC analysing 8 indicators- Total irrigated area, irrigation intensity, cropping pattern, crop yield, crop productivity per unit of water, uniformity in water distribution per unit of water, digitisation of project boundaries and GIS cells with Collector Nellore and Anathapur.
- 2) Water audit exercise has begun on the lines of Maharashtra. To begin with in the NSP project and later on it will be expanded to 7 more projects.

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<sup>4</sup> Source: I&CAD, 2006.

3) On water tax front, a) the irrigation department will raise demands for irrigation and non-irrigation purposes, b) enable the WUAs to collect and retain, c) enabling plough back of arrears as per the recent government orders, and d) charge royalty on non-irrigation use of water and streamlining the procedure for demand and collection of it.

4) Pilot NGOs have been promoted to : a) To create awareness among farmer community on Irrigation Water Management; b) To strengthen the Water Users Association; c) To build Capacities of WUA functionaries for better functioning of WUAs.

These NGOs (IRDAS, KVK, MARI in SRSP area, Jalaspandana and APARD and WCUSS in KC canal area), Jalaspandana in PJP and RDS area) in promoting WUAs, training, SRI paddy, MOUs with WUAs, and facilitating better tax collection (more details with tables to be added).

5) A team of 11 training coordinators have hired to: a) operationalise PIM, b) institutionalize of irrigation management, c) carry out the capacity building activities, d) create understanding about social issues, e) to liaisoning between the CADA and irrigation circles. Together they have covered 1702 WUAs in 55.15 lakh acres. (more details to be added).

## **Part-V**

### **Resource Mobilization for Irrigation Management Transfer**

Irrigation management transfer requires additional resource mobilization. What is important is whether you need more or less additional resources if you were to make similar improvements in the system without any transfer. Because, system improvements are essential to increase the system performance levels, even without transfer. The worldwide experience has indicated that there are definite benefits from irrigation management transfer. So, some of the interesting questions are:

- Why are additional resources required?
- How are the states meeting these expenses?
- What would take to implement transfer throughout the state.
- What can be done?

#### I. Why additional resources are required?

- Infrastructure development/rehabilitation
- Training and capacity building
- Financial support to WUA for their operations
- Establishment costs or O&M costs
- Repairs and maintenance
- Revenues
- Net effect

#### II How are the states meeting these expenses?

1. Illustrations from different states
2. Sources of income for various states
3. How some states, which have transferred generated the additional resources
4. Has it all been borrowing (from the Bank) or grants?

5. In 1&2, financial implications of irrigation management transfer are, how the states are meeting them, what it would take to implement transfer in other places
- III What would take to implement transfer throughout the country?
1. Continuation of (5 of II)
- IV What can be done?
1. To raise the required resources
    - Permit WUAs to charge whatever they want
    - WUA should have control over village properties
    - If WUAs have control of system, they will put their own money into maintenance
    - Suitable policy modifications

Resources mobilization for IMT includes the following.

Each of these resources has to be mobilized by both the state and WUAs.

- a. Financial Resources
- b. Capacity Building
- c. Water Management
- d. Services
- e. Linkages

## 1. **Financial Resources**

### **By State**

- Budgetary allocations
- Market borrowing through autonomous financial agencies
- Revenue from water, land, and market produce
- Donor support
- Multi-lateral agencies loans
- Savings from IMT through establishment (including staff size, time) and O&M costs

### By WUAs

- Water fee
- Area basis season-wise contribution (cash and kind)
- Fish auction
- Trees, grass, and fruits selling in canal bunds
- Hiring out agricultural implements
- Allied activities and services
- Distributory and Project Committees borrow funds from banks

## 2. **Capacity Building**

### **By State**

- Suitable policy and legal framework and its effective implementation

- Orientation to officials and elected leaders of the state
- Appropriate structures and systems
- Define roles and responsibilities of the state and WUAs
- Training and skill upgradation on regular basis
- Performance assessment criteria
- Incentives for good performance
- Effective monitoring system at all levels

#### By WUAs

- Involve all stake-holders in WUA formation, functioning and decision-making
- Incentives and disincentives for stake-holders participation
- Performing member-centered functions
- Leadership
- Rule-making
- Rule-enforcement
- Factors contributing to learning in WUAs
  - New and challenging goals/directions for WUAs
  - Processes and mechanisms for improvement/innovation, such as common platforms for raising issues and developing solutions, monitoring mechanisms, visits (learning by example)
  - Catalytic agents functioning as facilitators of the learning process
  - Reasonable expectation and assurance that the system will respond and solutions will emerge

### 3. **Water Management**

#### **By State**

- Redesign and implement realistic water management plans in consultation with project and distributory committees
- Minimum physical rehabilitation to support above
- Allocation, and discharge of water as per the designs
- Accountability of irrigation staff
- Bulk supplies to WUAs; no individual farmer supplies
- WUAs are responsible for water distribution

#### By WUAs

- Water acquisition, distribution, and management plans
- Regular information diffusion plans on water release dates and discharge levels at different reaches
- Alternative plans, in case of water scarcity
- Plans for season-wise crop pattern and crop-water requirement
- System maintenance and operation plans and its regular monitoring
- Regulation of all types of water resources (surface and ground) utilization within the area

### 4. **Services**

#### **By State**

- Main system management, including headworks
- Preparation of technical survey and estimates
- Supervision of works execution

#### By WUAs

- Input supply – seeds, fertilizers, pesticides
- Storage and marketing facilities by distributory or Project committee
- Crop-loans and crop-insurance
- Agricultural implements and machinery

### 5. **Linkages**

#### **By State**

- State-NGOs-Research institutions-WUAs for design, implementation, monitoring, and mid-course correction
- State-aid/loan agencies-local financial agencies-WUAs for raising funds, disbursement, and maintain financial discipline

#### By WUAs

- WUAs-local organizations-agricultural extension agencies-inputs supply and marketing agencies
- WUAs (at distributory and project level)-NGOs-Research institutions or organizational design, stakeholder control, and to evolve and implement organizational principles based on local conditions
- Build-up functional linkages in a federal manner with WUA distributory committee-project committee-apex body at state level
- These linkages enable WUAs to:
  - Mobilize water users
  - Strengthen WUA in its negotiations with the environment
  - Serve as conduit for strategic resources to flow to the WUA
  - Provide developmental inputs
  - Assist in routine function of WUAs

## **Part-VI**

### **Design and Implementation of Preliminary Steps and Processes**

At the outset, the proposed design of steps and processes is only an ending of the beginning. Beginning to move towards more efficient irrigation system and improved performance of both users and service providers across the state. All this to enable the irrigation systems to generate more income levels to its stakeholders and to the state gross domestic product.

The state of Andhra Pradesh has heralded Phase-II reforms in the irrigation sector to strengthen its Phase-I (from 1997-2004) reforms. In Phase-I, the state has introduced required policy and legal frame and facilitated creation of 10842 WUAs covering major, medium and minor irrigation projects in the entire state. Owing to change in the political regime in the year 2004, the same tempo could not be maintained. Then in the year 2005-06, it has picked up the path and made efforts to strengthen the earlier Phase-I by designing adopting several processes in a sequential manner as shown below:

- a) delineation of boundaries of large WUAs and DCs, and 2<sup>nd</sup> term elections to those user organisations during the year 2004-05.
- b) Refining roles and responsibilities of WUAs and DCs (to be reconstituted probably by end 2006), more towards irrigation management, rather than mere execution of civil works.
- c) Strengthening irrigation department and CAD wing to focus more on irrigation management in project completed areas and playing an improved role to support WUAs and DCs
- d) Restructuring and strengthening the WALAMTARI to play more proactive role in capacity building of both engineers and water users in the state.
- e) WRD playing more critical role in creating and strengthening institutional reforms in the state to move towards realizing the AP state Vision-2020.
- f) All these efforts to focus on, as discussed in the AP state Vision-2020, to enhance the contribution of irrigated agriculture in the state GDP from a mere Rs.6,000 crores to its potential of Rs.15,000 crores, by raising the water use efficiency levels, increasing agricultural productivity levels through crop diversification and enabling more allied activities in the irrigated belt of the state.

### **Setting the Stage: March-August 2006**

Across the state, a team of commissioners along with training coordinators and specialists had a series of consultations both with user groups and local engineers during the months of March-April 2006. Earlier reports (Report-2) provide more details of these visits and discussions held. Based on these suggestions following steps were introduced during the April-August 2006.

1. Training Coordinators (here after TC) were appointed on a temporary basis to facilitate coordination of capacity building activities and introduction of improved cultivation practices (e.g, SRI) at project level.

2. TCs are expected to coordinate and help the local SE circles, EE divisions and Sub-divisions to prepare their workplan to facilitate improved water management and move towards enhanced water use efficiency.
3. Exposure trips were organized to both engineers and user groups to Maharashtra and Karnataka and also within Andhra Pradesh to understand and adopt improved water use efficiency methods, water audit, strengthening WUAs, maintaining improved database.
4. Wherever, good NGOs were available, they were hired to play TC role on wider scale.
5. During June-August, several formats were designed and introduced at all levels of irrigation circles. e.g, a) water audit, b) training calendar, c) SRI method of rice cultivation, d) establishing model WUAs, e) identifying entrepreneurial farmers to work as roving trainers, f) maintain better data base on designed and actual area irrigated across crop seasons, g) use of groundwater within command area across crop seasons.
6. For all the above (5), a series of consultation meetings were held with the all SE and EE level engineers and user groups.
7. Formats and procedures to be followed to fill up these formats were discussed and actually demonstrated by end August 2006.
8. For the first time, all these filled up formats and constraints faced and further steps required were discussed in the review meeting held at the CAD office, Hyderabad on 7-8 September 2006. That was a major step towards making the monthly review meetings more productive and institutionalizing these processes.
9. On the evening of 8<sup>th</sup> September 2006, a brainstorming meeting was held to discuss exclusively the issues and opportunities for TCs and challenges they need to face. Besides to what extent the CAD and other allied agencies.

The following sections largely cover the future steps required to strengthen the TCs role and responsibilities and steps to institutionalizing these processes.

### **Proposed Steps**

The proposed steps are part of the five-year programme to move towards irrigation management transfer. The initial 2 years (four crop seasons) will be invested in creating models at the project level (mostly at a circle level) refining the procedures and strengthening the capacity of both engineers and user organisations; the later 3 years would be time to reap benefits and to make course corrections, and scaling up to cover the entire state.

- 1. Goal-centric approach:** The entire processes should be goal-centric. Thereby, all proposed or locally to be undertaken activities, directly or indirectly should be able to influence positively the set goal of the programme. The programme goal is to create an enabled environment to facilitate enhanced income levels to all users in the irrigation system through improved water use efficiency, higher agriculture productivity, efficient management of the entire irrigation system, and enable engineers to perform in a more professional manner.

- 2. Enable engineers to do professional job:** the programme goal will be better realized through moving towards management transfer of the irrigation system. Unless the management is not transferred to the users, the local engineers are completely drowned in a large number of day-to-day activities. This gives very little time and energy for the engineers to do their professional job. The state need to create an environment for the engineers to perform their professional jobs and platform to prove their professional skills. At present, 95% engineers at all levels confirm that they are not doing professional job, but ending up of doing more of administration and unskilled jobs, in which neither they are trained nor interested in. Engineers, at all levels, in the completed projects or completed portions of a incomplete project, should largely work as system managers. The State should enable these engineers with necessary skill upgradation short term courses (Thinksoft efforts may also focus on this). The engineers, on a selective batches may be sent to task specific short-term training programme to either to Centre for Public Policy in the Indian Institute of Management, Bangalore or Institute of Rural Management, Anand, Gujarat.
- 3. Create necessary procedures and provide approvals for smooth functioning:** The CAD office has to identify the constraints in facilitating the above (1 and 2) and design formats and procedures to resolve it. Wherever necessary, required government approvals have to issued as government orders or circulars to facilitate all actions undertaken are protected. In deed, during April-August 2006, the CAD office has largely covered this dimension based on earlier field visits and wide discussions. Suggested formats largely cover: a) water indent, b) water releases, c) waer utilization, d) rainfall and evaporation, e) staffing pattern and operation and maintenance expenditure, f) annual water audit, g) benchmarking. For the formats please see Annexure-1. *(Padma, pl add all the formats in the same sequence in the annexure).*
- 4. Create Spear-head teams:** The State of Andhra Pradesh has 312 Distributories covering all Major and medium irrigation projects in the state.
- a. Each spear head team to begin with can focus on 10 DCs (and related WUAs)
  - b. Gradually a spear-head team can expand this to 30 DCs, subject to size, irrigation circle jurisdiction and area coverage.
  - c. However, a spear-head team should work within a project jurisdiction.
  - d. The job –chart of a spear-head team is shown in Annex-2. The job chart should include joint azmoish in all WUA areas, and creating benchmarking data base and creating micro-plans compulsorily.
  - e. The spear-head team will have monthly, crop-seasonwise, and annual targets and procedures to follow on a regular basis, as shown in Annex-3.
  - f. Based on applications received for the WALAMTRI advertisement, in recent months, more TC members may be hired based on their experience and skills. This should be completed by end October.

## **5. Provide orientation and strengthen spear-head teams:**

- a. Performance measurement criteria and indicators of measurement need to be finalized. The measurement has to be monthly, end-seasonwise and annual basis. The inadequacies should be identified and mid-course corrections need to be carried out on a regular basis. Necessary formats need to be developed in consultation with TC and local SE and the CAD office.
- b. TCs need skill upgradation and strengthening on a regular basis. This can be carried out through exposure visits to:
  - i. National Dairy Development Board in Anand and their mechanisms to handle spear-head teams to set up primary milk cooperative societies (Contact NDDDB, Southern Regional office, Bangalore)
  - ii. E-choupal mechanisms to build local groups and taking care of forward and backward linkages (Contact: ITC office, Hyderabad)
  - iii. Tarun Bharat Sangh, Alwar District, Rajasthan, to understand how their field workers organize Jal Yatras and coordinate field groups on a regular basis.
  - iv. DHAN Foundation, Madurai, to understand how TC roles can be played better and how their management skills can be strengthened.
- c. Each TC or spear-head team leader should be provided with a base level laptop (around Rs.32,000 each) along with internet card (reliance has this gadget). This would enable all TCs:
  - i. to regularly make their field notes on daily basis,
  - ii. maintain records
  - iii. organize meetings at various levels,
  - iv. prepare meeting notes for circulation
  - v. listing field observations
  - vi. maintain given format based data base
  - vii. regularly send emails to all TC colleagues and the CAD office, and to SE and EE offices
  - viii. receive all communications and circulars from the head office and others.
  - ix. Internet connection can be limited to one-hour a day. This can be reviewed after some time.
- d. Each TC should develop budget and manpower requirement sheet – monthly, crop-season wise, and annual basis.
- e. On a trail basis, TCs should implement water tax assessment and collection in a selective 2-3 WUAs per year. And compare this database with the irrigation and revenue database. This would help to reduce information gap, help to refine the database, and understand the field constraints. However, this should be done, after joint azmoish is completed. To do this on-spot verification, palmtops (somewhat similar to bus conductors or electric power meter readers bill printing machines) should be given at the rate of one palm-top per spear-head team. The spearhead team may hire and train a local

graduate (preferably commerce or science background) to do this job at the end of every crop-season. The palm-top machine should have in-built format to indicate, season, survey no, land size, area irrigated by sourcewise (canal, groundwater, and number of irrigations), crop variety, yield levels and facility to modify it later, if required. This would be a perfect database to understand the value contributions by the each project, and required interventions to improve it.

- f. Each TC should maintain (or collect in the given format) the expenditure statement at SDO, EE, and SE and CE level with indicating all items of expenditure. This should be compared on a yearly basis, as to how management transfer has increased or decreased the expenditure levels and on which items. This should be on crop-season wise and annual basis.
- g. Similarly, at from WUA and DCs on crop-season and annual basis, collect expenditure statements covering all items to understand, as to how, their expenditure has behaved over the years, due to management transfer of irrigation system.
- h. The CAD office may collect and compile this at the state level as part of its MIS.
- i. The spear-head teams should make all efforts to understand and maintain a good data base of their system, including
  - i. Extent of gap command and reasons in specific locations
  - ii. Extent of groundwater use, its timings and locations and implications
  - iii. Actual functions carried out by the WUA and DC and reasons for deviations from the given functions, and actions initiated to reduce this gap
  - iv. Constraints faced by users in increasing agricultural productivity and income levels, particularly small holders. And what kind of potential exists and how CAD can help along with other agencies.
- j. Identify what kind of coordination at SE/EE/SDO level and at State level is required. Who should do it and how this should be done ?

**6. Form Distributory Committees:** By end December 2006, it is necessary to form DCs (and later PCs) to facilitate WUA functions and to have better control on water audit mechanisms. TCs should identify potential roles and changes required, if any, in the APFMIS Act, 1997, in view of the undertaken management transfer activities. Kind of capacity building activities required for DCs also need to be identified.

**7. Capacity Building on a compulsory basis for both WUAs/DCs and Engineers:** In view of rich dividends realized owing to earlier capacity building activities, it is essential to carry out the following:

- a. Complete one time orientation training (of 3 days) to all members of all WUA committee members. This can be done on a simultaneous basis across the state by all TCs with the help of WALAMTARI and local resource persons. This can be completed in October 2006.

- b. In November, focused training programme for only presidents (3 days) of WUAs on more specific issues and their roles and responsibilities, by early November 2006.
- c. All engineers on a) water audit, b) benchmarking, c) MIS, and d) maintenance of formats, e) on IMT during Oct-Nov 2006.
- d. Formation of DCs by end December 2006.
- e. First round of orientation to DC presidents and executive members on their roles and responsibilities by early Jan 2007.
- f. At the end of each training programme, course evaluation and training needs should be carried out through specific formats.
- g. At the CAD level with WALAMTARI support, one person on a full time basis, need to keep track of:
  - i. all training programmes happening at present, and forthcoming details,
  - ii. arrange exposure visits both within the state and outside the state for best performing WUAs/DCs and Engineers. This should be an incentive to better performing persons.
  - iii. Every year 100 DC presidents, 200 WUA presidents and 200 engineers (of different levels) should be focus persons. They should be on a regular touch with the TCs, part of exposure visits, source of feedback for all purposes, and act as change agents. Later these persons can work as triggers for future change. A methodical database should be maintained on these persons, their contributions, and roles played. This is one investment the state should surely make as part of its vision plan. Thereby, 500 persons in the state would be spoke persons and ears for the CAD. Even after the first year, these persons should be regularly keep in touch and update them on all activities.

#### **8. Initiate steps for management transfer to user organisations:**

- a. Identify what kind of responsibilities the engineers are willing to transfer to WUAs and DCs, which would enable engineers to get free from day-to-day activities. TCs need to come up with the list.
- b. Water acquisition at the regulated points to DC or WUA on agreed quantities and timings. Build database and timelines to do this.
- c. Water distribution below distributory by DC and below minor/sub-minor by WUA on their own decision-making and with their own manpower.
- d. All repairs and maintenances below Distributory at their own cost through respective WUAs
- e. Conflict resolution by DC and WUA at their level and at their cost.
- f. Levying penalties to individuals and WUAs for violating the norms decide by the DCs.
- g. Additional resource mobilization (besides water tax) by WUAs and DCs for their own expenditure.
- h. Water tax collection and getting plough back and maintaining accounts.
- i. Maintaining all relevant database and MIS related to their jurisdiction.

- j. Accountable to all users and the WRD.
- k. Irrigation circles and its engineers at all levels should focus on:
  - i. System management functions,
  - ii. Technical improvement activities,
  - iii. Approvals of any technical works and major civil works in the system and
  - iv. Water use efficiency activities
  - v. Importantly ensuring availability of water in agreed quantity and timeliness at agreed locations for DC and WUAs.
- l. WUAs and DCs need to work out the water entitlements at different levels and for each user (preferably on crop-acre basis) based upon water availability in the storage and assurance by the SE.

### **9. Monitoring and learning mechanisms:**

- a. First, all review meetings (monthly and end-season) may be conducted in Telugu language. This would help the all levels of staff members to interact freely and express their opinions in comfortably.
- b. Formats may continue to be English to enable later linking up with aggregation and processing at macro level.
- c. The review meetings need to be necessarily held in Hyderabad. On a rotation basis, this can be held at the project sites. That would enable the local staff to learn organizing and presentation skills.
- d. On crop-season wise follow rating system for all WUAs and DCs. See Annex-2 for the formats to be used at WUA level.
- e. Based on all these WUA and DC data system and the CAD office at the state level has to generate macro level crop-season and annual water audit sheet, and systemwise performance criteria.
- f. WUA and DC performance should be measured crop season wise in a) reduced gap between designed and actual irrigated area, b) water tax collected, c) plough back money received, d) innovations carried out, e) resource mobilization level (other than plough back funds), f) number of meetings held for members, g) water use efficiency, h)
- g. Monthly (every last Monday morning) video conferencing with all SE and District collectors and TCs on progress made and constraints to be resolved. Follow up action, based on this conference, need to be taken care by the CAD office, Hyderabad.
- h. Each TC should maintain and email on monthly basis the following:
  - i. Activities carried out
  - ii. Constraints faced
  - iii. Follow-up required from CAD and SE/EE/SDO level
  - iv. Any help required
  - v. Places visited and purpose
  - vi. Innovations introduced by
    - 1. by TC on his own
    - 2. enabled the SE/EE/SDO to introduce
- i. Create a common email group (as part of apwaterreforms web site). One possibility is [TC-CADAP@apwaterreforms.org](mailto:TC-CADAP@apwaterreforms.org). This group besides sending emails and queries to all concerned should send their weekly statements on every Monday morning before 10 a.m. The CAD office

maintains individual and the whole group reports in a condensed format. In deed, the fixed and simple formats may be designed to fill up on every Monday morning.

- j. In every review meeting, besides different things, also focus on:
  - i. one of the focus item should be on database – designed, actual, and reasons for deviations, and actions initiated to reduce the deviations. (provide formats)
  - ii. resource mobilization by (besides plough back funds)
    1. WUA
    2. DC
    3. PC

This resource mobilization may be from auction of grass lands, trees, fish, sand, desilt soil, groundwater recharge tax, penalties, late fees, and any other.
  - iii. Steps initiated to enhance water tax collection
- k. In how many locations guage records are functional and actual water flows are measured both by a) irrigation dept, b) WUA, and c) DC. According to TC and EE, in how many locations, installations of guage records are essential to improve the water audit mechanisms, and likely investments required.
- l. The CAD office should have a monthly newsletter, in Telugu language, indicating TC activities, progress made in water audit, WUAs and DCs best performances, recent government circulars, contact numbers of all TCs and grievance cell numbers and persons contact details. Many other things may be added to this newsletter over time. This can be started from the 1<sup>st</sup> week of October. The newsletter can also work as monthly communication channel to all WUAs and DCs.
- m. Design formats and follow up on end-season basis to workout agricultural value production at the SE and CE level. This would help to understand improvements made over time and future interventions required based on constraints identified.

**10. Accountability of total Water Resources:** Based on the Public Accounts Committee report findings, government of Andhra Pradesh has asked the CAD to work out the following. It is also owing to findings of Maharashtra that, its non-irrigation royalties has raised to Rs.470 crores from Rs.70 crores, after meticulously working out the details. The AP government feels, its non-irrigation royalties can earn easily, if proper accounting is done, Rs.350 crores, which is adequate for all its irrigation projects O&M expenditure. Thereby, required steps are:

- a. accounting total water resources used – for irrigation, non-irrigation purposes like drinking water, industries, leisure activities, environmental requirements, power generation and others.
- b. Based on the water charges for a) consumptive and b) non-consumptive use, the TCs and SE should workout on the given format (see Annex-5).
- c. Total water tax (both for irrigation and non-irrigation use) to be collected at the project (or state) level, what is actually collected, who

is currently utilizing these funds, how these funds can be redirected to WRD activities, so as to enable to meet the WRD requirements on annual basis.

- d. Procedure required at EE and SE level to regularly collect and maintain the extent of non-irrigation water use, both category and location basis.

**11. Recruitment of field professionals and training course faculty to support IMT:**

Based on earlier steps by the WALAMTARI for recruitment of professionals, some 53 applications were received. In the first round of screening, some 27 applicants were short listed (for a) field training coordinators and b) faculty at various levels). The final list will be announced by end October, 2006, based on the selection procedures approved by the WALAMTARI' Executive Meeting held on July 17<sup>th</sup>.

- a. Field training coordinators will work as members of the spear-head team.
  - i. Initially for two months freshers will work with the experienced TCs in the field. Based on their performance they will be moved to new project sites.
  - ii. Based on performance measuring criteria spearhead team members will be upgraded to team leaders of the spearhead teams. Later they will be promoted to Division level coordinators and then to Circle level coordinators and then to Project level coordinators. Necessary incentives and facilities will be provided to perform their duties.
- b. Faculty will be recruited to exclusively coordinate training courses for engineers of different levels and DC presidents and WUA presidents and also for spear head team members. These courses have to be specially designed based on TCs feed back, identified training needs of engineers and WUAs and DCs. These courses will be held both at the regional levels and also at the CAD office. Some of the suggested courses related to IMT are:
  - i. Water auditing and water use efficiency
  - ii. Building up and maintaining effective database and MIS and GIS to enable better decision-making
  - iii. Structure and functions of WUAs, DCs, their roles and responsibilities.
  - iv. Enabling engineers to handle management functions
  - v. Enabling WUAs and DCs to handle management transferred activities
  - vi. Maintaining office records and conducting meetings
  - vii. Updating on policies and legal framework in the State and in to other states.
  - viii. Assessment of water tax, collection, plough back, additional resources mobilization and maintaining financial discipline.



<b>Action Plan -Irrigation Management Transfer in Andhra Pradesh – Proposed in March 2006. Based on field discussions with farmers and engineers.</b>								
<b>Key Players and Actions</b>	<b>Persons responsible</b>	<b>March-06</b>	<b>April-06</b>	<b>May-06</b>	<b>June-06</b>	<b>July-06</b>	<b>Aug-06</b>	<b>Sept onwards</b>
<b>CAD/WRD</b>	Commissioner							
1. Formal communication to all commands, on IMT and its advantages and process		y						
2. invite proposals from PCs/DCs/WUAs on things required		y						
3. Invite proposals from local circles on steps to be taken		y						
4. Based on 2&3 consolidate physical and fiscal actions		y						
5. Initiate action								
5.1 coordination mechanisms			y					
5.2. Complete plough back funds to WUAs/DCs/PCs			by 10th					
5.3. WRD and WUAs complete all physical works				15th May				
6. Third party monitors quality and volume of works of WUAs	by WRD staff		y	y				
7. Provide office space for DCs and PC with all records (WUAs use GP office space- 5-10% fund)		y						
8. Design performance M&L criteria	At every level							
9. Establish a IMT cell at divisional level								
<b>WUA/DC/PC</b>								
1. Complete Joint azmoish in all WUAs/DCs/PC + walk-thru survey (in joint azmoish, identify kharif, rabi, summer area - designed and actual, identify minimum rehab, & WRD approval),			y+ kharif	rabi+				
2. Complete membership of all members with minimum of Rs.10/acre			y					
3. Form sub-committees for finance, works, water distribution			y					
4. Sign MOUs for water fee collection, and retention with WRD				y				
5. All (1-4) for DC and PC				y				
6. Dummy DC/PCs- performance measuring criteria on monthly, seasonwise, yearly			y					
7. GBM to discuss and resolve on IMT, mini rehab, and sub-committees		y	y	y				
<b>WRD</b>								
1. Develop plans- monthwise (M06-M07), for IMT			y					


2. Measurable outputs and indicators to measure			y					
3. In centives and disincentives			y					
4. Requirements from govt (finance, works, staff, skills, equipments)				y				
5. Training requiements, frequency, levels			y	y				
<b>Agri Dept (CAD &amp; WALAMTARI role key)</b>								
1. Complete soil testing in all selected projects.			y					
2. Suggest less water consuming and high profitable crops			y					
3. Cultivation guidelines & 5 acre demonstration sites in place					10 th May			
4. Develop required backward and forword linkages in all places					y			
5. Link up with extention centers, KVKs, DAATTC, RARS, FTC			y	y				
6. Coordinate with subsidies, loans, inputs and marketing.			y	y				
<b>WALMATARI</b>								
1. Based on SE and WUA meetings finalise training plans		y		early april;				
1. Lesson plans for a) WUAs, b) DCs, c) PC				10 April				
2. Prepare training material & case studies on identified areas				10 April				
3. Start training programmes in regional centers			y	y	y	y		
4. Training programme for NGOs, roles and outputs			y	y				
5. Separate training prog for different levels of engineering staff			y	y				
6. Establish MIS on trainees, needs, skill upgradation, feedback			y	y				
7. Get set of faculty for IMT, & provide intensive orientation			y					
8. Fill up all positions required (60% professionals)			y					
9. Professionalise administrative & accounts staff			y	y				
10. Help soil testing, suggest suitable crop pattern, establish coordination Mechanism with other departments				y				
11. Establish 9 to 6 (6 days a week) help line on IMT.			y					
12. Establish a resource center on IMT (materials, cases, lessons, G.Os, funds)				y				
13. Get 50 probationary eningeers for IMT cells at Division level for MIS & IMT								
14. Provide incentive (of 25%) to persons on deputation.				y	y			
15. Complete recruitment process at all levels by end April, advt by end March-06			y					

<b>NGOs</b>								
1. Identify roles & responsibilities, outputs, measurable indicators in IMT			y					
2. Identify training needs, frequency, & levels			y					
3. Inputs required from CAD, WALMATARI & others			y					
4. Design mechanism for monitoring and learning processes			y					
5. Develop ph-I action plan (M-July) and year long plans			y					
6. Design performance measuring criteria - key indicators								
7. Incentives and disincentives								
Note: a) Form task forces with above lifelines to complete above tasks								
b) Month end review meetings by principal secretary								

"KVRaju"

<kvraju@isec.ac.in> 

[View Contact Details](#)

<b>To:</b>	"swargam srinivas" <ssswargam@yahoo.co.in>
<b>Subject:</b>	 Re: Irrigation Management Transfer
<b>Date:</b>	Mon, 26 Feb 2007 14:24:09 +0530

Dear Sri Srinivasgaru,

Attached pl find the revised version (File name: CAD-Reprot5-final-revised-260207). In this Part-II has been completely revised and reduced to 5 pages (from the earlier 17 pages) by restructuring and rewriting the entire section, as you will see. In case if you get the filled up formats from the respective projects, please insert them accordingly. That should not be a problem.

Pl feel free to make any suggestions to improve the current version.

Many thanks for sparing your time and energy to move on this path. I would like thank all your team members (both in office and in field) for sparing their time and thoughts during our extended discussions in the field. I really liked all those efforts. I sincerely hope, somebody lwill follow up all these efforts to move towards the irrigation management transfer, at least in those indicated areas on a pilot basis.

Pl ack.

best regards

raju