

The World Bank

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
INTERNATIONAL DEVELOPMENT ASSOCIATION

New Delhi Office
70 Lodi Estate
New Delhi – 110 003
India

Telephone : 24617241/24619491
Cable Address: INTBAFRAD
Mailing Address : P.O Box 416
Facsimile : 24619393

December 8, 2009

Mr. K. S. Sripathy
Chief Secretary
Government of Tamil Nadu
Fort St. George, Chennai, Tamil Nadu, India

Dear Mr. Sripathy:

**Tamil Nadu Irrigated Agriculture Modernization and Water-Bodies Restoration and
Management (IAMWARM) Project- Implementation support mission
October 21-30, 2009**

I would like to thank you for the assistance provided by the Government of Tamil Nadu (GoTN) to the latest Implementation support mission for the INIAMWARM project. Please find attached the mission's aide memoire, which was discussed during the wrap up meeting held in Chennai on October 30, 2009 and chaired by PWD Secretary Mr. Ramasundaram.

I am pleased that the project continues to make good overall progress. In order to sustain this progress, I would like to bring the following key critical issues to your kind attention.


- **SWARMA:** The establishment of the State Water Resources management Agency continues to be seriously delayed. It is my understanding that establishing a nodal office for SWARMA, with some degree of autonomy and headed preferably by an IAS officer, could provide a start for the process of SWARMA formation. The legislative backing for a full-fledged authority would be obtained at a later stage. The nodal office would engage into consultations with various stakeholders, raise awareness, and initiate the process of capacity building for planning, managing, and regulating water resources in the state.
- **Timely Completion & Quality of WRO Civil Works Packages** – To date, it is estimated that around 73 percent and 33 percent of the planned civil works packages under Phase I and Phase II sub-basins respectively have been completed. By now, it was expected that most of phase I works should have been completed. Delays appear to be concentrated in Chennai (66 percent) and Trichy (68 percent) regions. I call on your support to ensure that all phase I works are completed as soon as possible, particularly that Phase III packages are about to be tendered, which would lead to an increased pressure on WRO regional resources to supervise all the works adequately.
- On the Quality side, we are pleased to see that suggestions given by previous missions on the execution of canal works have been implemented which would greatly promote good quality of construction and durability of canal lining. Further improvements need to be made to the compaction of earth fill on the sides of the tank embankments, and in conducting the required quality testing. It was agreed during the mission that this issue would be urgently attended to and that testing equipment would be procured and put to direct use with adequate personnel, in order to accomplish the execution of the works to the needed quality standards.

- **Monitoring and Evaluation.** We are also pleased to learn that the Government order for the recruitment of the Monitoring and Evaluation consultant has been issued, and we look forward to the finalization of the contract as quickly as possible. We would like to reiterate the importance of recruiting a full time Monitoring and Evaluation officer at MDPU level in order to collect, compile, manage, and standardize data from all implementing agencies, and liaise with the external consultant, once hired.
- **Other Project Consultancies.** The long delays in the recruitment of the support organization consultancy can seriously impact the progress under the Participatory Irrigation Management (PIM) component. This would be unfortunate, especially after the project has achieved significant milestones in the formation of Water Users Associations in many project sub basins. Other project consultancies that we hope will get finalized soon are the Information management system consultancy and the construction quality management and technical supervision consultancy. The latter is increasingly important in light of the quality aspects described above and with the expected start up of phase III civil works;

Thank you for your kind attention and for your continued support to this important project. Please do not hesitate to contact Rabih Karky, the task team leader, or Anju Gaur in our New Delhi office, for any questions or clarifications on this letter or on the attached aide memoire.

With regards,

Yours sincerely,



Roberto Zaghera
Country Director, India

Attachment: *Aide Memoire*

cc: Mr. Anup Pujari, Joint Secretary (FB), Department of Economic Affairs, Government of India
Ms. Kavita Prasad Director (FB), Department of Economic Affairs, Government of India
Ms. U.N. Panjiar, Secretary, Ministry of Water Resources, Government of India
Mr. S. Manoharan, Additional Secretary, Ministry of Water Resources, Government of India
Mr. L. Rynjah, Advisor, (WR) Planning Commission, Government of India
Mr. Rajaretinam, Secretary to Chief Minister, Government of Tamil Nadu
Mr. S. Ramasundaram, Principal Secretary, Public Works Department, Government of Tamil Nadu
Mr. Gnanadesikan, Secretary, Finance, Government of Tamil Nadu
Mr. K. Nanda Kishore, Secretary, Agriculture, Government of Tamil Nadu
Ms. C. Muthukumarswamy, Secretary Animal Husbandry and Fisheries, Government of Tamil Nadu
Mr. Vibhu Nayar, Project Director, IAM WARM Project
Mr. Jeyaraman, Engineer-in-Chief, Water resources Organization, Government of Tamil Nadu

Aide-Memoire
Tamil Nadu Irrigated Agriculture Modernization and Water-bodies restoration and Management project -Implementation support mission – October 21-30, 2009

I- Introduction

A World Bank implementation support mission¹ visited TN during the period of October 21-30, 2009 to review the implementation progress of the TNIAMWARM project. The mission would like to convey its appreciation to all line departments and to MDPU management and staff for their warm hospitality, their positive collaboration and their time and effort in facilitating its work by providing the information requested and organizing field visits.

II- Key project Data

Project Data		Current Ratings and Flag		
		<i>Summary Ratings</i>	<i>Last</i>	<i>Now</i>
<i>Board Approval Date</i>	<i>01/23/2007</i>	<i>Development Objectives</i>	<i>S</i>	<i>S</i>
<i>Effectiveness Date</i>	<i>04/09/2007</i>	<i>Implementation Progress</i>	<i>S</i>	<i>S</i>
<i>Closing Date</i>	<i>03/31/2013</i>	<i>Project flags</i>	<i>None</i>	<i>None</i>
<i>MTR date- Planned</i>	<i>September 2009</i>			
<i>MTR date- rescheduled²</i>	<i>February 2010</i>			
<i>Original Loan Amount</i>	<i>US\$485 million</i>			
<i>Amount Disbursed³</i>	<i>US\$111.41</i>			

III- Achievement of Development Objective - The development objective of the project is for selected sub-basin stakeholders to increase irrigated agriculture productivity in a sustainable water resources management framework. There is increasing evidence that with the completion of irrigation infrastructure rehabilitation works, currently estimated at 73% across project area, and with the adoption of improved cultivation and intensification practices (such as SRI), irrigated agriculture productivity is going up, and farmers income is likely to increase. On the water resources management front, progress observed on the formation of the Water Users Associations is encouraging and similar progress is needed on the establishment of the State Water Resources Management Agency (SWARMA) and the basin boards to ensure an integrated and holistic approach to water resources planning and management in the state. The monitoring and evaluation function needs to be strengthened to ensure accurate and timely reporting on project indicators. Contract negotiations are on-going with the M&E consultant, following the issuance of the government order, and are expected to be finalized soon.

IV- Implementation progress / issues – The project is currently in its third year of implementation. Implementation progress and issues for all components are presented below.

Component A: Irrigation Systems Modernization in a sub basin framework

¹ The mission consisted of Rabih Karaky (Team Leader), Anju Gaur (Water Resources specialist), R.K. Malhotra (Construction Quality specialist), Anand Srivastava (Procurement specialist), B.S. Sathe (Livestock Specialist), M.C. Nandeeshha (Fisheries Specialist), Benjamin Obrien (Agricultural Specialist), Mohan Gopalakrishnan (Financial Management Specialist), Shankar Narayanan (Social Development Specialist), Melissa Williams (Communication Specialist), Sitaramachandra, Machiraju (Agricultural marketing specialist). Vibhuti Narang provided support to the mission from the World Bank Delhi Office.

² Given that the project became effective in April 2007 and is scheduled for closing in March 2013, it was agreed that MTR would be conducted in February 2010.

³ See Section V- Financial management for more details on disbursement figures.

Progress - Phase I civil works packages: 71% completion rate until Sept 09 across all regions (based on expenditures reported)

- Pollachi region: 91% completion
- Chennai region: 66% completion (more effort needed)
- Trichy region: 68% completion (more effort needed)
- Madurai region: 77% completion (more effort needed)

Phase II civil works packages: 33% completion (based on expenditures reported)

Quality

- Good quality of canal lining works observed in Pollachi region; Quality control tests on the concrete lining conducted and documented.
- Repairs/ re-construction of irrigation sluices, repairs of surplus weirs and anicuts, and the associated concrete/ masonry works progressing well in Trichy and Madurai regions.
- Compaction of earth-fill on sides of tank embankments remains a grey area and needs to be urgently addressed. For existing works, deploy hydraulic excavators fitted with steel plate attachment. For works yet to be taken, contractors should mobilize and deploy short width power rollers / vibratory power rollers to ensure full compaction to specified density.
- Improvement also needed on conducting the field density tests to the frequency required by Technical Specifications.
- OK Card system maintained, however need to be translated o Tamil to ensure proper participation by Water Users Associations.

DPRs for Phase III- WRD- A total of 25 DPRs for Phase III sub basins have been reviewed and cleared from technical angle with a corresponding number of packages of 90. The mission has requested that the revised DPRs duly incorporating all comments given by Mr. Malhotra be sent to the Bank for final clearance. Subsequently, the procurement plan shall be cleared.

Component B: Agricultural Intensification and Diversification

Department of Agriculture, Department of Horticulture, Tamil Nadu Agricultural University DoA and DoH⁴ report to be on track to achieve current year physical and financial targets however expenditure to date in this financial year has been low. Expected to improve with monsoon and revised administrative sanction approved.

The DoA, DoH and TNAU report that 43 860 ha of demonstrations/expansion area has been achieved to date with more than 190 000 ha (100 000 in previous mission) of impact area adopting technologies (DoA and TNAU). This represents a significant portion of the estimated 341 000 ha Ayacut area of the first and second phase sub basins. Increased production of crops due to the project has been reported at greater than 600 000 MT (PAD target of 500 000 MT at end of second year).

Independent monitoring and evaluation is urgently required to validate this data. Furthermore achievements should be recorded based on actual area cultivated, not based on inputs given. Site verification should take place with survey number for corresponding demo plots and impact area plots (sample) being recorded and presented to HODs⁵ for certification. Though the standard of reporting on physical and financial progress has improved considerably as recommended in the previous mission, there is still some room for further improvement. For instance, it was observed in one district that one department was reporting 100% physical achievement but 0% financial achievement for the same year.

⁴ DoA= Department of Agriculture; DoH: Department of Horticulture; TNAU: Tamil Nadu Agricultural University.

⁵ HOD: Heads of Departments

Agencies are reporting results of yield increases achieved as a result of project interventions and the DoH is also providing income data for various crops. To further strengthen the validity of comparisons with “local average” or “conventional” results the methodology of collection of this data needs to be documented as well as the source of prices used for income data. TNAU has also reported on the number of beneficiaries receiving training, taken on exposure visits and recipients of other informal trainings, it would also be useful to know the number of beneficiaries of demonstrations and the number of impact farmers covered.

It has been suggested that TNAU now has ample data on the scope and impact of SRI and should take steps to formally analyse and publish these results. This would also help shed light on the important factors that are needed to increase the adoption rate of SRI and help explain the significant variation in SRI yield figures reported between TNAU (30%-40% increase on average) on one hand, and DoA (much higher yield premium) on the other.

Overall the quality of demonstrations observed has been maintained from the improved standard observed in the last mission. The high quality demonstrations and interventions appear to be influencing farmers in that they now seem to be more accepting of the messages that are being delivered by the extension workers, and are more willing to become “impact area” farmers. The sequencing of demo area to impact area is nonetheless important, and though some “impact farmers” may be willing to adopt the new technology/crop at the same time as it is being demonstrated, it is likely that a lag would exist, and farmers would tend to wait and observe the results of the demos.

The convergence between the line departments and the TNAU in delivery of messages and project interventions is a significant achievement. It has also been encouraging to see that dovetailing with other programs such as ATMA and the Integrated Cereals Development Program developing. There still remains a large gap in farmers knowledge of water use efficiency, farmers require capacity building in efficient irrigation practices such as matching crops with soil types, field levelling and drainage, and irrigation duration and scheduling methods, this also applies to drip irrigation. Simple tools, such as the leaf colour chart for determination of nutrient status in paddy, should be developed for irrigation management. A good example of this would be a soil moisture probe.

As mentioned in the previous mission IPM and INM are intermediate outcome indicators for the project. It has been observed that many farmers have had their soil tested by the project and are following an integrated approach to nutrient management however IPM requires strengthening. Plant protection products are being promoted and procured by the project, it is stressed that the use of these products are required to fit into an integrated pest management plan, preferably one developed specifically for the particular crop. It was observed during field visits that farmers generally have a low knowledge of the overall concept of IPM and are still reliant on extension staff to make pest management decisions on their behalf. It was also observed that information related to pest management for horticultural crops was sourced from the “Crop Production Techniques of Horticultural Crops” which was last revised in 2004 that provides no specific information in relation to IPM. As it is due for revision it is strongly suggested that the project takes some steps to ensure that IPM gets included. It is also recommended that the project review the pest management plan developed as part of the ESA and ESMP.

During the Mission a “Pulses Workshop” was conducted and resulted in a preliminary agreement to develop a partnership with TATA to scale up production of pulses in two project sub-basins. This is a very good initiative. When developing the pilot activity, thought may be given to other strategic partners that may have a comparative advantage (for example for the supply of irrigation equipment, machinery and/or certified seed) to help to ensure sustainability of the interventions.

The demonstration of Rice Fallow Pulses is a good example of a zero tillage technology and is well promoted by the project. This could be an excellent entry point for the adoption of

Conservation Agriculture in Tamil Nadu especially in fields where farmers have access to water for supplemental irrigation. A proposal for a pilot into CA will be developed, and possibilities of dovetailing with the pulses initiative will be explored. The pilot proposal would consist of technical support, training and equipment and a contingency fund.

The positive results of the IAMWARM interventions are becoming apparent however the interventions are not necessarily designed to run beyond the end of the project, particularly for TNAU. It is suggested that project staff review the extension success of the project and consider possible policy changes that could see the lessons learned through the project to become institutionalised and provide a report on this before the mid-term review.

Steps should be taken to improve outreach. For instance, it was reported in one sub basin that number of beneficiaries for one of the departments was 1806 in 2007-08 with a total demonstration area of 385 ha. In 2009-10, the total demonstration area planned is 1275 ha, however the number of beneficiaries is 1600.

Agriculture Engineering Department (AED)

Micro Irrigation System (MIS) It was reported that until March 20, 2009, AED has completed 2000 ha against an annual target of 24051 ha for MIS and 838 farm ponds against annual target of 1100. Out of a total of 34 packages for MIS procurement, 10 major packages are meant to be installed in 22000 ha but the potential area has been identified only for 6000 ha. While the supplier is making his efforts, AED need to put extra efforts in order to enhance MIS adoption (see Annex V for steps to consider)

Farm Ponds The mission would like to reiterate that (a) Farm pond does not necessarily mean fish pond. Farm pond can be constructed for water harvesting only; (b) farm pond does not have to be necessarily 30 m x 30 m. Depending upon the runoff and catchment, the size can vary. In case of water harvesting, it can be deeper if needed. A template has been attached (Annexure V) to determine the size of farm pond and runoff; (c) farm pond with fisheries should be encouraged particularly in humid and semi-humid regions where the potential for runoff is at least 50% of total water requirement in the pond.

Farm Mechanization AED should encourage new improved implements while supporting required input for usual practices. AED may like to run some demonstrations of portable MIS and fuel pumps/any other water lifting devices (not more than 1-1.5 HP) to facilitate irrigation from farm ponds. These devices could be provided through WUAs along with Farm Mechanization components.

Pressurized pipe irrigation system .The mission reviewed five out of total seven underground pipe irrigation systems. It was found that it took more than two years to make them functional and yet none is effectively so. Some common issues observed include (a) Poor design and layout: expecting one borewell to serve 40-60 ha command, (b) Energy connection and availability, (c) Theft of cable, and (d) Fixed fund allocation irrespective command area.

AED is advised to seek help of experts to design economic and feasible pipe irrigation system considering modern practices and available sources. It is advised to engage a professional to rectify all the pipe distribution system. The systems have been designed to provide additional source of water while the objective of the system was to improve conveyance efficiency of unlined channels. The challenges to use tank water through pipe distribution were cropping pattern (paddy) and energy availability.

Monitoring and learning- In order to learn from completed activities, the following information would be useful:

1. The continuation of farm ponds by farmers with and without fishes after the demonstration.
2. MIS adoption pattern with respect to cropping pattern and sub-basins.
3. The actual usage of implements to understand the needs of the area. For this purpose WUA may be trained to maintain a register and record revenue earned by renting the implements.

DPR for Phase III: The mission reviewed DPRs and finalized a target of approximately 6000 ha in 20 subbasins. The potential in other 10 sub-basins was not found substantial. Considering the slow adoption of MIS, the target for MIS has been kept very low against a potential of 22000 ha. It was agreed that progress will be reviewed in a year and efforts will be made to improve the proposed area under MIS and narrow the gap between the potential and actual installation. If AED foresees more opportunities for water management in proposed or excluded sub-basins in future, they should propose it. *Finalized DPRs have since been cleared.*

Animal Husbandry Department

Achievement of Financial Targets: Against the financial allotment of Rs 789 lakh for Phase I and II subbasins for years 2007/08 and 2008/09, the utilization (expenditure) was Rs 592 lakh, leaving the unutilized amount of Rs 197 lakh. The target for FY 2009-10 for Phase I and II sub-basins is Rs 408 lakh. The achievement upto 30th September 2009 is Rs 22.78 lakhs only. The mission suggests that DAH may take early action to implement the program so that the financial targets are fully achieved for FY 2009/10.

DPRs and Physical/Financial Target for Sub-basins of Phase III: The DAH has prepared the DPRs, including physical and financial plans, for 20 sub-basins of Phase III. The total outlay is Rs 386.562 lakh. The bank has approved the DPRs of 20 sub-basins subject to further procurement clearances and certain observations/changes in the revised DPRs. DAH has indicated that AH activities will not be taken in the remaining 10 sub-basins of Phase III, mainly because AH is a low profile activity and there is a low breedable cattle/buffaloe population in these sub-basins.

Performance records required to analyze the impact of inputs on the project performance: As per PAD, the important relevant performance parameters for Animal Husbandry would be increase in fodder production, improvement in milk production and rate of conception and decrease in calf/adult mortality and hybrid sterility. The mission recommends that data may be collected and analyzed, on a sample basis, within and outside the project area (with and without project) for conception rate, calving rate of animals and also for other parameters listed below.

Artificial Insemination and conception rate of animals: Achievement till 30th September 2009 was 4.12 lakh inseminations (74.8 %). Percentage conception had slightly increased (from 47.38% to 49.86%) over a two year period. Considerable variation observed in the conception rate between sub-basins of Phase I. Mission recommends that DAH analyses the reason for variation and take suitable measures improve the performance. The data of 2007/08 showed that the average calving rate was 45.78%. There is a scope for further improvement. The mission suggests that data on this issue for all sub-basins may be collected during the FY09-10.

Availability of SEVGs: Out of 65 SEVGs, 57 (87.8%) are in position, leaving a gap 8 SEVGs. Five SEVGs will be required for Phase III sub-basins. Mission suggests that DAH may take early action to appoint the required number of SEVGs. Further, till these vacancies are filled up, DAH may continue to deploy the departmental staff to take up the required work so as to achieve the desired performance.

Production of green fodder and Azolla demonstration/cultivation: The target of coverage of green fodder area of 2668 ha for years 2007-08 and 2008-09 for Phase I and II sub-basins

achieved. Some slow down during the first half of 2009-10, reportedly due to late and scanty rainfall this year; but DAH field staff assured that the target for 2009-10 will be met. The target of conducting 60 'demos' of azolla demonstrations and input distribution to 600 beneficiaries was also fully achieved. Mission observed that both green fodder and Azolla programs have been well received with some farmers even increasing cropping areas of CO3 fodder and Azolla on their own. There is also increased demand for these activities from farmers, and the mission recommends that DoA and AHD discuss at the HOD level the subject of limitation of gap areas allocated to fodder crops.

Initial results have shown that there was considerable variation in fodder yields between sub-basins, which appeared to be related to the availability of water. Mission suggests more data be collected and that this issue may further be studied by DAH during FY 09/10. Mission suggests that DAH may encourage the farmers for taking CO3 with hedge lucerne in a row plantation, and guide farmers to adopt suitable cultivation practices (proper spacing of plants and runing/harvesting foliage at a suitable height). Mission suggests that DAH may prepare suitable guidelines and a pamphlet on this subject and give a wide publicity in the field.

Infertility treatment and healthcare camps: Mission commends that target of holding 1380 camps for 2007-08 and 2008-09 for Phase I and II sub-basins was fully achieved with good response from farmers. The achievement during 2009-10 (till end of September) was 42%. Mission observed a need for streamlining and achieving uniformity in record keeping on animals treated during the fertility camps and tracked/treated thereafter during the subsequent follow-up visits. This information will help to know the success rate of follow-up visits. This will also help to take a view on the possibility to rationalise the number of follow-up visits. The mission recommends that DAH may design a suitable proforma to achieve uniformity in record keeping by all sub-basins and the same may be circulated to the field staff.

Deworming of animals, Farmers' training programs and farmers' interactive meetings: Mission commends the efforts of DAH that the targets for these programs for Phase I and II sub-basins for years 2007/08 and 2008/09 were achieved. Mission suggests that these efforts be continued in FY 2009/10 for all sub-basins. Mission observed a need to ensure a higher participation of women in the training programs since animals were mostly managed/reared by women in the farmers' households. Mission has observed a considerable delay in conducting the program on farmers' trainings/interactive meetings during the first half of FY 2009/10. Mission suggests that in future such delays should be avoided. Mission further suggests that the DAH may take immediate action in the matter so that the targets are fully achieved during the remaining period of FY 2009/10.

Fisheries Department

A total of 12 sub-basins under phase I and phase II were visited to see fisheries activities. Several of the proposed activities are progressing as per the approved plan within the basin area. Some of the activities like aquaculture in farm ponds, seed nursing in cages and hygienic fish sales through kiosks, have made positive impacts in several places. Based on the observations made and interaction had with various stakeholders, following issues identified may be considered to improve the project outputs under the fisheries component.

1. Technical efficiency of the seed banks under operation is far below the efficiency limit fixed by the Department. Although only one crop has been taken up so far, it is necessary to address this problem and demonstrate clearly the economic viability before handing these seed banks to beneficiaries. Those seed banks that have not been put into use in Kottakaraiyar and Manimuthar basin should be technically audited to put them into usage, after correcting the problems.
2. Among the nine ornamental fish culture units established under phase I, performance of some of the units are far from satisfactory. While paying due attention to improve the efficiency, it is necessary to give proper attention for the selection of beneficiaries under

Phase II and Phase III sub basins. Selection of beneficiaries with entrepreneurial attitude and providing them with the technical support and market linkages would help this activity to be successful.

3. Most of the anticipated fish production under the project has to come from tank fisheries. Though results obtained through stocking the irrigation tanks under phase II of the project are satisfactory, there is need to increase production substantially to achieve the fish production target fixed under the project. Further, there is a need to gather adequate information on baseline production, impact of stocking on increasing fish production and improving the livelihoods of people who are dependent on the tanks. In order to sustain fish production from these tanks, it is necessary to link up seed nursing in farm ponds, cages and seed banks and stocking of these reservoirs.
4. Farm ponds have been reported to yield an average production of 3750 kg/ha. However, in many instances, the profitability is not very high. In order to enhance income from these farm ponds it is suggested to promote seed nursing as the primary activity followed by growing of table size fish with the left over seed may be taken up. In addition, dykes should be utilized effectively for growing horticultural and high value timber crops.
5. To make the kiosks much more successful, it is suggested to modify the design to accommodate few facilities necessary for hygienic storage and marketing of fish within the existing outlay. To increase the income of these kiosks sale of value added fish products may also be encouraged to be taken up.
6. Production of technical manuals based on the experienced gained in pond fish culture, seed nursing in cages, aquarium fish production and kiosks may be undertaken. This will help to enhance the operational efficiency and output of the activities under third phase.
7. Efficient utilization of the Field Activity Monitors appointed by building their capacity should be undertaken. These monitors should be utilized for training of farmers and effective implementation of the project activities.

Department of Agriculture Marketing

The mission reviewed the progress made by the project under agricultural marketing component. The project has formed about 481 commodity groups mobilizing farmers from the project areas and covering 18 commodities. About 92 percent of the marketing infrastructure planned in Phase I sub-basins has been completed as on 30 September 2009. It has been reported that these 176 structures like drying yards, storage godowns, etc. facilitated handling of 4,840 metric tons of commodity benefiting 3,457 farmers. The mission visited Varahanadi sub-basin (Villupuram), South Vellar sub-basin (Pudukottai) and Parambikulam Aliyar sub-basin (Coimbatore) to review the progress in agri-marketing component. The mission interacted with commodity groups and visited Agri-Business Centers at these places.

1. *Capacity building of Farmer Groups:* The project has organized exposure visits, technical trainings, interface workshops (with corporate buyers), etc. for commodity groups formed in Phase I and Phase II sub-basins. About 53 percent of the IEC budget has been spent on exposure visits alone. Though farmers gave good feedback on the capacity building activities, there is immense scope for improving knowledge management and learning function. The mission observed that the training outcomes significantly vary across sub-basins. A cadre of expert trainers and best practitioners needs to be developed who are then equipped with standard training modules, training aids and materials and case studies developed by the project. This will greatly mitigate transmission losses in delivery of training programs. Likewise exposures need to be carefully planned and executed with clarity on objective function for each visit locations. Focus of these activities could include crop management, post harvest processing, quality improvement, value addition, commodity marketing, etc. Training should also focus on increasing unit value realization of farm produce and reducing in production, processing and marketing costs for farmers. It would be worthwhile for the project to organize joint exposure visits for client farmers to cover complementary themes. For instance, DoH, AED and Agriculture Marketing department could organize a joint visit covering various steps/processes involved in a particular value chain.

2. *Agri-business Centers (ABCs)*: ABCs have become operational in 9 sub-basins (Phase-1). These centers managed by farmers are providing marketing support for select crops like copra, paddy, maize, groundnut, gingelly, chillies, pulses and vegetables. They reportedly handled 3390 metric tons of commodities valued at US\$ 1.01 million so far. The commodity groups around ABC at Thimmankuthu in Pollachi area requested for larger drying area and copra drying units. The project may consider, on merits, to divert the savings in IEC component to support acquisition of small equipment useful for local level value addition. The mission is of the opinion that ABCs can absorb enhanced marketing if current leadership managing the structures are provided systematic business orientation. The project is also advised to work annual activity plan for each ABC to ensure their viability/sustainability and replicability. The mission strongly recommends the project to tie-up with a few reputed private agribusiness companies, farmers' federations and NGOs who have demonstrated interest to partner with the project for managing ABCs. The project agreed to examine the pilot alternate business models for managing ABCs such as (a) **Franchisee** of private sector agri-business company; (b) **Producer collective organization** affiliated to NGO/Farmers' Federations; (c) **SME** run by agri-professionals experienced in managing agri-clinics

3. *Public-Private Partnerships in Agri-Business Sector*: The project has reportedly facilitated 239 MoUs with private parties for marketing of 13 commodities. It is reported that about 24,194 metric tons of commodities valued at US\$ 2.62 million were sourced from the commodity groups under the MoUs. The mission recommends building longer term relationship with these firms. More recently, the project has entered into an arrangement to support Tamil Nadu Agricultural Marketing Federation (TANFED) for procuring pulses under its Minimum Support Price (MSP) operation. About 9 metric tons of pulses were procured from three villages so far. Similarly, the project engaged with M/s Tata Sons Ltd to explore collaboration opportunities under National Pulses Mission. The mission encourages the project to develop strategic partnership with Tata and other groups for value chain coordination. The project agreed to pursue private sector partnerships in a systematic manner. In order to identify alternate business models for linking farmers' organizations, SMEs with agri-businesses in processing, retail and export sectors, it has been proposed to organize a conference during February-March 2010 (TBC). The proposed conference will aim at structured dialogue with private sector large buyers, processors, retail chains and private agri-service firms) to explore areas of possible collaboration.

4. *Staff trainings*: The mission reiterates the immediate need to provide training and exposure to staff of Commissionerate of Agricultural Marketing & Agri-Business (CAM) on aspects related to agri-marketing and private sector led agri-business models. These could include exposure to (a) Agribusinesses models like ITC E-Choupal, DSCL Kisaan Hariyali Bazaars; (b) contract farming initiatives of Jain Irrigation, Pepsico, Tata Chemicals/LT Overseas/PAFC; (c) Producer Companies set up by Madhya Pradesh District Poverty Reduction Project; and (d) MSP procurement through Commodity Procurement Centers by AP Rural Poverty Reduction Project. Visits to value chain coordination sites in agri-commodities and fresh fruits and vegetable sectors like ITC (Pune, Hyderabad), Metro Cash & Carry (Hyderabad), Spencers and Food Bazaars (Chennai) would be useful.

Agri-Business Development Facility- ABDF

The mission reviewed the proposal of MDPUCAM to set up the ABDF at Tamil Nadu Industrial Investment Corporation (TIIC). Accordingly, met with Ms. Sheela Rani Chunkath IAS, Chairperson, TIIC who indicated their inclination to host ABDF and offered to constitute a dedicated cell with agri-business professionals for supporting the facility. Even while bank approval will be subject to compliance with fiduciary and procurement guidelines, the mission suggested the project/TIIC to develop a concept note on ABDF giving its objectives and components /activities for consideration of the bank.

Other issues: Use of project funds. The mission sought clarifications on whether some project funds might have been allocated to non-project entities (social welfare dept, Panchayats unions, others) for activities that are outside the scope of the project. The project director assured the mission that this is not at all the case, and that no budget allocation is being made for non-sanctioned project departments and for activities that are ineligible under the project.

Information, Education, and Communications (IEC)- See Annex VI for full details

TN-IAMWARM's communications activities include folk theatre; demonstration plots; site visits and exposure tours; formal training sessions, informal meetings; leaflets; wall paintings; pamphlets; crawler messages; slogans; interviews and advertisements on radio and television; T-shirts, hats, and other promotional items; a new quarterly newsletter; and IAMWARM on Wheels. Currently each line department in each sub-basin creates its own IEC campaign and the focus is largely on operational communications. Short-term recommendations are to continue to focus IAMWARM on Wheels messages to specific technical issues (e.g., SRI) in phase 1 and 2 sub-basins, include the name of the WUA that will manage and maintain infrastructure works on all future IAMWARM signs, now that WUAs have been formed, use the quarterly newsletter for both operational and strategic communications, plan joint communication products addressing critical issues, clarify technical messages across all departments and sub-basins, create technical guides for WUAs and other groups, and refine success stories to reflect more outcomes and impacts rather than inputs.

Component C: Institutional Modernization in Irrigated Agriculture (See Annex VII for policy related issued)

Of the 1047 Presidents and 4770 Territorial Constituency (TC) members to be elected for the 1047 WUAs that are part of the 3rd year sub-basins 806 Presidents and 3202 TC members have been elected as of October 5, 2009. Election schedule has been prepared for the remaining 241 Presidents and 1568 TC members for the 3rd year sub basins as well as vacant posts of 83 Presidents and 812 TC members for the 1st and 2nd year sub-basins and these are expected to be completed by November 15, 2009.

Orientation Training to WUA Presidents: Of the 1250 WUA Presidents elected for 1st and 2nd year sub-basin WUAs, a two day orientation training program has been provided to 1100 WUA Presidents in coordination with IMTI Trichy. Similar orientation training is planned for 3rd year sub-basin WUA Presidents as well and is expected to be completed by December 31, 2009. The PIM Cell at Engineer in Chief WRO office in collaboration with the PIM Cells at the 4 Regional Chief Engineer Offices has played an important role in completing the 3 year sub-basin elections and this is a commendable achievement that needs to be continued. This effort would require the constant monitoring and support of Secretary PWD, PD, Engineer in Chief WRO, as well as the District Collectors of the concerned districts. The mission requests that such support be continued.

Appointment of Support Organizations (SOs): The appointment of SOs has been inordinately delayed and is already affecting the pace at which the PIM component of the project is progressing. It has now reached the stage of receipt of proposals from Consultants and WRO expects the SOs to be in place by March 2010. The mission reviewed the procurement process for SOs with the concerned WRO-PIM Cell and MDPU specialists and outlined the step by step process to be followed to expedite the appointment of these agencies. Given the importance of the SO in building capacity of WUAs as well as ensuring a strong relationship between WUAs and WRO and other line agencies, the mission recommends that this activity be reviewed at regular fortnightly intervals at the EIC office.

Improving participatory planning processes for Detailed Project Report (DPR) preparation by WRO: At both the 1st year sub-basin WUAs visited in Chennai region and one of the six 2nd year sub-basin WUA visited in Madurai region, the mission found that

walkthrough surveys had not been conducted and the project design had not been based on consultation with farmers on their priorities. As a result the investment made under the project had according to the farmers ignored certain critical aspects. It is important that these sub-project investments be revisited to confirm if the farmers' contention is true and if so whether additional activities need to be made from other WRO funding sources, or if farmers and WUAs could be better informed. The mission recommends that the Regional PIM Cell in coordination with the concerned Executive Engineer undertake this task under the overall guidance of the Advisor PIM at EIC office and provide necessary recommendations.

Exposure visits for WRO and MDPU officials to learn from PIM experiences in Maharashtra and Gujarat. The mission suggests that WRO in coordination with MDPU plans and undertakes an exposure visit to learn from PIM experiences in Maharashtra (Waghad and Ozar Projects) as well Gujarat (Development Support Centre projects in Dhari area). Such exposure visits have been systematically organized by the Principal Secretary Command Area Development and Irrigation Department in Andhra Pradesh and have been found to be very useful.

Change Management - The Training Coordinator and the Social Development Specialist at MDPU in coordination with the AED specialist have conducted convergence training workshops with line departments in all of Phase I and II sub-basin districts. As one of the key outcomes of these workshops, line departments have chosen 16 model villages to implement activities in a convergence mode. Each line department is expected to take the lead in two model villages and ensure that all the activities of all the other line departments are implemented in a convergence mode. Change management training can enhance effective and coordinated client service delivery by line departments to farmers and WUAs in the long run, and may contribute to long term project objectives.

Irrigation Research Fund (IRF) The mission has learned that call for proposal has been issued and that the IRF is expected to provide its first research grant by January 2010. This activity needs to pick up at a much faster rate given the wealth of topics that can be analyzed and the lessons that could be learned.

Component D: Water Resources management

SWARMA: The mission discussed the subject of SWARMA with GoTN authorities. This has been a long pending issue that has seen little progress to date and happens to be a legal covenant under the project. Though it is preferred that SWARMA is created as an authority with legislative backing, the Bank understands that this may not be a feasible option at this point due to political economy aspects. Nonetheless, discussions with GoTN centered around the idea that SWARMA could be initiated by creating a nodal office, headed preferably by an IAS officer, to begin the process of wider consultations among various stakeholders, create awareness, and build planning and management capacity, keeping the door open for legislative backing in the future. The model of the CSRMA office could be followed as an example in this regard. The mission was promised that this option would be seriously considered and looks forward to hearing about its progress.

Cooum – The mission met with Nodal Coordinating officer, CSRMA, and discussed progress on cooum sub basin plan preparation. The mission was informed that the sub basin plan for the rural portion of the cooum which includes inputs from all concerned line departments under the project would be submitted to the Bank for review/clearance. The mission was also informed that there are plans to create a Chennai river authority which would include both the cooum and Adayar subbasins.

Component E: Project management Support

M&E – The mission is pleased that the GO for the commissioning of the M& E consultancy has been issued and looks forward for the contract with the selected consultant to be signed and

work commencing. The mission strongly recommends that a competent full time M&E specialist should be recruited at MDPU (as stipulated in Annex III of the PAD), in order to consolidate and manage data received from the various implementing agencies, and collect MDPU's own data. The M&E specialist will also liaise with the selected consultant and the various line departments on the many facets of the M&E work.

Communication specialist MDPU currently lacks a Communications Specialist critical to the strategic, operational, and administrative communication activities of the project. This position should also be filled as quickly as possible to ensure the continuation and focus on project communications.

V- Environmental & Social safeguards

Environmental activities under the project and adherence to environmental safeguards would be looked at by Mr Anupam Joshi, environmental specialist during a visit to the project in the near future. Mr. Joshi was unable to join the mission due to illness. The six monthly progress report on the project compliance with the provisions of the ESA and ESMF should be a consolidated piece that summarizes the relevant issues across sub basins and in particular addresses how environmental and social externalities caused by project activities are being recorded and addressed. At present a very large number of documents describing various environmental activities under each sub basin, are being sent to the Bank as part of the six monthly progress report. This needs to be standardized and consolidated. The Environmental and Social Specialists on the team can provide some practical advice to the project on the format/information needed to go about fulfilling this task.

It is important that if land acquisition takes place as part of project activities, the record of such land acquisition with specific details of the individual, the extent of land acquired, his or her landholding and other asset details and a record of the process of assessing the impact using the formats provided in (Section 7.9 on Pages 262 and 263 of) the Environmental and Assessment Report for the project is made available by WRO through MDPU. The mission would like to emphasize strict adherence to this agreed procedure as per the agreed Environment and Social Management Framework (ESMF) for the project and urges that this important agreed procedure be duly followed. The data for all land acquisition, if any, should be submitted to the Bank no later than November 15, 2009

VI- Procurement

The mission discussed the procurement issues pending with the line departments and MDPU and it was agreed that all concerned would expedite the processing/responding to the issues raised therein. The details are hereunder:

1. Review and Updating of Procurement Plan

The mission and the Project reviewed the procurement status of major items planned for the financial year 2009-10 as per Procurement Plan. The mission advised that procurement plan should be annually updated and time schedule adhered to. The WRD procurement plan will be prepared and furnished to the Bank soon after the DPRs for Phase III are finalized and submitted to the Bank. 20 contract packages of WRD will be prior reviewed by the Bank. The line departments were advised to combine the small packages to form larger size of packages as much as possible to achieve economy in procurement by obtaining possible bulk procurement discounts and reducing the administrative works.

2. Updating of Schedule of Rates and inclusion of missed out items in Data analysis

- Shivaraman committee had submitted its recommendation to the GOTN in 2004-05, however, the recommendations have only partly been accepted and the Government decision on the balance substantial part of these recommendations should be expedited.

This is necessary so that future bids are invited on the realistic cost estimates based on the SOR revised close to date of issue of invitation of bid to include all the relevant factors in the data analysis (or rate analysis), particularly

- the overheads of contractor
 - appropriate profit for contractors
 - all applicable taxes and levies etc.
 - Updated current market rates of inputs (both material and labor)
- Till such time the above necessary change could be affected to data analysis, the fact that the above key cost elements are missing from the data analysis, should be taken into cognizance during decision making in the bidding process
 - Efforts to be made to improve the existing bidding/contracting climate to enhance competition and improved deliveries and quality of works under contracts

3. Improving Competition

- The mission expressed its concern over poor response from bidders.
- Mission noted with concern that contractors workshop agreed during the last mission was not organized and it was agreed that the same shall be conducted at least at Chennai and other appropriate locations (if possible) in the state to discuss the reasons for the poor performance and genuine issues of contractors, before launching the phase III packages of WRD. This workshop will also be used to make the contracting community aware of excise/custom duty exemption and availability of smooth and committed cash flow under the project.

4. Quality Assurance:

- The procurement cell of MDPU would support all prior review procurement documents/ communications from all PIUs/line departments and assist and guide them, as the case may be. MDPU will facilitate quality, uniformity and consistency of proposals/responses being forwarded to the Bank for prior review and adopt suitable quality assurance measures for those contracts under post review.

5. Procurement Capacity and Quality Enhancement

- **Capacity of MDPU** MDPU now has 3 members in team and the mission noted that MDPU has built a good team to support the procurement under the project. The mission, however, expressed its concern regarding the capacity of the line departments (including WRD) to undertake the procurement in line with WB methods and guidelines. Mission suggested that the MDPU capacity should be fully utilized to enhance procurement capacity of all line departments and to help them out in procurement related matters.
- **Training of Heads of Procurement and MDPU Procurement officers**
 - The mission expressed its satisfaction on the ongoing 2 days training programme under which about 1,100 officers of the MDPU and line departments have been trained. Mission advised that all members of Procurement cell of MDPU, all heads of procurement of line departments shall be nominated for intensive and detailed training.
 - It was agreed that the officers dealing with procurement in 3 new circles will be trained in procurement methods of World Bank before launching of procurement process.
 - As agreed in the mission of March 2009, the Project will conduct a tailor made training program of 7-10 days addressing specific capacity building requirements of the project and include detailed training in general overview and NCB works & Goods and Consultancy following World Bank methods of procurement. In each line department an officer, (other than head of procurement, in those cases where the head of procurement have already been trained), will be provided intensive training to ensure continuity in case of transfers or job rotation etc. becomes

inevitable, however, the GOTN will ensure that the project team members are not transferred for the entire project period of or for at least 3 years.

6. Post Review of Contracts Awarded during FY 2008-09

The mission informed that the post review of a sample of contracts awarded during 2008-09 under the project would start by mid December 2009 and requested the MDPU and all line departments to provide all support for successful completion of the same by the Bank's Consultants M/s. GPCL engaged for this purpose. The MDPU and line departments assured full support and cooperation.

7. Project Consultancies

- M& E Consultancy: Govt. has approved RAS & issued G.O on 28.10.2009.
- Topographic and Cadastral surveys: The Project has forwarded to the Bank on Oct 28, 2009 copies of complaints received from M/s Secon and the replies sent to the firm. The individual evaluators report on the appeal of M/s Secon Pvt. Ltd. has also been sent to the Bank on 27.10.2009.
- Construction quality Management and Technical supervision: Pre proposal conference minutes, and draft amendment with required details were sent to Bank on 20.10.2009.
- Basin Planning including knowledge base, DSS Development.: Reply to the clarification and Modified TOR received from Engineer-in-Chief, WRD sent to World Bank on 23.10.2009.
- Enterprises Information Management systems: 53 firms responded and shortlist finalized and sent to Bank on 16.10.2009. Bank's comments received on 28.10.2009.
- Design support for Modernization of Irrigation Systems: Estimate and TOR received and the same was returned to SE, Designs on 19.10.2009 to obtain comments of the Technical Advisory Committee.
- Selection of Support Organization for capacity building of WUAs: RFPs issued for pkg. 01 on 12.10.09 and latest by 22.10.2009 for pkg. 06.

VII - Financial Management

1. Disbursements: The disbursement under the project is as under:

Financing from	IDA	IBRD	Total
Allocation	159.41	335.00	494.41
Disbursed *	51.91	33.77	85.68
In pipeline with Bank/CAAA/Project**	17.10	8.63	25.73
Total Disbursement	69.01	42.40	111.41
% Disb.	43.29 %	12.66 %	22.53 %

* includes SA-Advance of USD 8.00 million under IDA and USD 17.00 million under IBRD

** Claims in pipeline with Bank & CAAA (relating to IDA component for quarter ended June 30, 2009) of USD 8.20 million and with the project (for the quarter ended September 30, 2009) of USD 17.53 million approx..

2. The project has been timely in the submission of the quarterly IUFRRs and disbursements have been made for expenditures reported till quarter ended March 31 2009. There are some differences and delays in the quantum of grant released by GOI to GoTN against the IDA credit (as agreed during negotiations). While this has not had any impact on the funds flow to the project it is suggested that the project finance staff and staff from the finance dept have a discussion with CAAA to understand and resolve this issue.
3. **Budget & Funds Flow:** The budget proposed for the financial year 2009-10 is Rs 5330 million which adequate and compares favorably with the final budget estimate of 2008-09 which was Rs 3310 million. There are no constraints in funds availability with the various implementing departments.

4. **Accounting, Financial Reporting and Internal Control:** the project is obtaining monthly reports from all the line departments and the project expenditures reported by the line department and the state AG are being reconciled on a periodic basis and adjustments, if any, are being reflected in subsequent quarter's IUFR. However expenditure reports (for project account codes) have not been received in the current financial year from the AG (A&E). It is suggested that the project follow up with the AG on this issue. The project submitted the IUFR for the quarter ended June 30, 2009 in a timely manner and the draft IUFR for the quarter ended September 30, 2009 was also shared with the mission. Some changes in the IUFR formats to reflect component allocation, year to date and cumulative to date expenditure was agreed with the project. It was agreed that the IUFR for the quarter ended September 30, 2009 will be submitted along with this additional information. Sub basin wise comparison of budget with actual expenditure for the six month period ended Sept 30, 2009 was also shared with the mission.
5. As the phase III sub basins will start implementation soon it was agreed that a training program for phase III finance staff in all departments will be organized by December 2009. In addition there is a need to provide refresher training to the nodal officers in the various line departments.
6. **Internal & External Audit:** a meeting with the internal auditors was held during the mission. The internal auditors have submitted the final reports (2nd report) and the draft report (3rd report) to the project. After internal review the same will be shared with the Bank by November 30, 2009. In addition project response on the actions taken on the 1st report was also discussed and the project will submit its response by November 15, 2009. The external audit reports for the project for the year 2008-09 (project and TNAU) was due by September 30, 2009. While the audit has been completed, the issue of report is pending for due to issue of final reconciliation certificate by AG (A&E) for the horticulture dept. The audit report of TNAU was shared with the mission and it was noted that the financial statement as provided in 2007-08 is missing. It was agreed that the same will be obtained from the auditors and submitted to the Bank by November 30, 2009.

VIII- **Proposed timing for next mission**

It was agreed that next mission will be the Mid-term review (in line with project effectiveness and closing dates) and it will take place tentatively during the month of February 2010,

Annex I- Agreed Actions

S.No	Actions	Date by ⁶
1	Submit the IUFRR for the quarter ending September 30, 2009 with the additional detail on overall allocation, YTD and CTD expenditures by project component.	Nov 30 2009
2	Submit external audit report (Project & TNAU) for the year ended March 31, 2009	Nov 15, 2009
3	Submit the contract wise expenditure details (all contracts in WRO and contracts over USD 100,000 (equiv. to Rs 50 lacs) for other line departments as part of 6 monthly progress. The next report will be for the period ending Sept 30, 2009	Nov 30, 2009
4	Training to Phase III sub basin finance staff	Dec 31 2009
5	Submit response on review comments on 1st internal audit report and share the IIInd and IIIrd internal audit reports.	Nov 15, 2009 Nov 30, 2009
6	Testing equipment needed for conducting field density tests on earth fill layers- to be procured	December 15, 2009
7	One day refresher training mini workshop to be convened jointly by CE, DRCS and each Regional Chief Engineer to make the construction & quality control engineers again fully conversant with the construction procedures, quality control and quality assurance aspects. Contractors should also participate in these workshops.	December 31, 2009,
8	Assistant Engineers, quality control and construction be provided hands-on and on-job training' on the use of testing equipment. Formats, listing sequence-wise procedure and calculations to determine field density, should be printed and furnished to all AE's and AEE's	December 31, 2009 ,
9	Share the farm pond and other guidelines with field staff and check the technical requirement prior to installation.	Ongoing
10	Rectify the existing pipe irrigation systems, 1. Visit successful pipe distribution system 2. Engage experts (TNAU or other expert). 3.	Dec 31, 2009
11	Finalize design of R3 distributary	Dec 31, 2009
12	Finalize design of a tank in association with TNAU.	Dec 31, 2009
13	Organize trainings/workshops on innovative techniques in water management for staff.	Ongoing
14	MIS demonstration through WUAs	Ongoing
15	M& E Consultancy: Award of Contract after Bank NOC for final contract document on 22.11.2009	Expected date of commencement 1.12.2009
16	Topographic and Cadastral surveys: Bank's NOC is awaited for proceeding with the process of hiring the consultant. **	Expected date of commencement 15.01.2010
17	Construction quality Management and Technical supervision:	Expected date of

⁶ Dates are as agreed upon at the time of the mission;

	Necessary amendments were discussed and agreed to on 29.10.09, and accordingly project to make necessary changes and send back to the Bank for final approval-	commencement 25.04.2010
18	Basin Planning including knowledge base, DSS Development: EOI to be published by Dec 15, 2009	Expected date of commencement 07.07.2010
19	Enterprises Information Management systems.: Project to finalize and send back to Bank	Expected date of commencement 17.06.2010
20	Design support for Modernization of Irrigation Systems: EOI to be published by Nov. 15, 2009	Expected date of commencement 07.07.2010
21	Selection of Support Organization for capacity building of WUAs	Expected date of commencement 08.02.2010 to 03-03-2010

**** The Mission advised the Project that as advised in the mail sent on September 30, 2009, there should be no negotiations of the quoted prices after Bank provides clearance for proceeding with the process of hiring the consultant.**

Annex II – Physical and Financial Achievements for WRD

Sl.No.	Name of Region / Phase	Number of Sub Basins	Number of Packages	Agreement Value	No. of Tanks proposed for Rehabilitation			No. of Ancient proposed for Rehabilitation			Supply channel Proposed for Rehabilitation in KM			Expenditure upto previous month				Expenditure During the month		Cum Exp upto the month		Total Expenditure up to the month	Percentage of Expenditure	Liabilities
					Total	In progress	Completed	Total	In progress	Completed	Total	In progress	Completed	Tank	Non Tank	Tank	Non Tank	Tank	Non Tank					
1	Chennai Phase I	1	8	1396.566	137	22	113	28	10	14	323.73	154.74	166.50	707.79	150.80	23.96	1.82	731.77	152.62	884.39	63.33	3		
2	Chennai Phase II	3	6	2312.720	93	74	5	12	5	0	256.54	71.73	0.00	315.93	164.52	0.00	0.79	315.93	166.31	481.24	20.81	21		
3	Madurai Phase I	3+	23	16061.52	834	197	612	74	14	41	376.61	0.00	289.96	9756.85	53.66	866.38	104.80	10623.23	158.48	10791.71	67.13	164		
4	Madurai Phase II	1 part	15	5737.16	228	146	12	73	22	9	87.69	15.45	5.60	1533.73	427.11	256.79	31.80	1790.52	458.91	2249.43	39.21	40		
5	Pollachi Phase I	2	16	7587.00	0	0	0	0	0	0	770.44	43.95	712.82	0.00	6280.98	0.00	296.12	0.00	6557.10	6557.10	86.43	32		
6	Pollachi Leftout Packages	0	10	4922.50	0	0	0	0	0	0	692.45	388.91	323.54	0.00	1985.22	0.00	497.07	0.00	2462.29	2462.29	50.02	14		
7	Trichy Phase I	2+	15	13873.35	566	413	129	141	28	113	745.51	116.54	626.48	4292.47	3823.96	370.16	45.16	4682.63	3869.12	8531.75	61.50	9		
8	Trichy Phase II	5	17	8611.83	357	207	0	80	35	1	47.33	138.30	16.43	1567.42	30.72	217.35	0.00	1780.77	30.72	1811.49	21.03	3		
9	Total Phase I	9	72	43940.94	1537	632	854	243	52	188	2908.73	884.14	2118.30	14787.11	12254.64	1260.62	944.97	16017.63	13199.61	29217.24	66.64	30		
10	Total Phase II	16	38	16661.71	678	427	17	165	62	10	816.63	226.48	22.03	3413.08	622.36	474.14	32.59	3987.22	654.34	4542.16	27.26	9		
11	Grand Total	25	110	60502.65	2215	1059	871	408	114	178	3724.26	909.62	2140.33	18170.19	12876.99	1734.66	977.56	19904.85	13854.55	33759.40	55.80	41		

Phase - I & II Progress upto the Month of September 2009
Abstract

(Rs. in Lakhs)

As per Agreement Value

WATER RESOURCES DEPARTMENT
Phase - I Progress upto the Month of September 2009
Abstract

(Rs. in Lakhs)

Sl.No.	Name of Region / Phase	Number of Sub Basins	Number of Packages	Agreement Value			No. of Tanks proposed for Rehabilitation		No. of Aicut proposed for Rehabilitation		Supply channel Proposed for Rehabilitation in KM			Expenditure upto previous month		Expenditure During the month		Cum Exp upto the month		Total Expenditure up to the month	Percentage of Expenditure	Liabilities	Total Expenditure including
				Total	in progress	Completed	Total	in progress	Completed	Total	In progress	Completed	Tank	Non Tank	Tank	Non Tank	Tank	Non Tank					
1	Chennai	1	8	1396.566	137	22.113	28	10	14	323.730	154.740	165.500	707.790	150.800	23.980	1.820	731.770	152.620	884.390	63.326	39.340	9:	
2	Madurai	3+	23	16061.52	834	197.612	74	14	41	376.61	0.00	289.96	9756.85	53.68	866.38	104.80	10623.23	158.48	10781.71	67.13	1642.84	12:	
		1 part																					
			16	7587.00	0	0	0	0	0	770.44	43.95	712.82	0.00	6280.98	0.00	296.12	0.00	6557.10	6557.1	86.43	320.95	6	
3	Pollachi	2	10	4922.50	0	0	0	0	0	692.45	388.91	323.54	0.00	1965.22	0.00	497.07	0.00	2462.29	2462.29	50.02	151.36	2	
			10	4922.50	0	0	0	0	0	692.45	388.91	323.54	0.00	1965.22	0.00	497.07	0.00	2462.29	2462.29	50.02	151.36	2	
4	Trichy	2+	15	13873.35	566	413.129	141	28	113	745.51	116.54	628.48	4292.47	3823.96	370.16	45.16	4662.63	3869.12	8531.75	61.50	935.00	5	
		1 part																					
			15	13873.35	566	413.129	141	28	113	745.51	116.54	628.48	4292.47	3823.96	370.16	45.16	4662.63	3869.12	8531.75	61.50	935.00	5	
Total		9	72	43840.94	1537	632.854	243	52	168	2908.73	884.14	2118.30	14757.11	12254.64	1280.52	944.97	16017.63	13199.61	29217.24	66.64	3089.49	31:	

Annex III - Update on DEA Portfolio review meeting (Aug 31, 2009) agreed actions

Tamil Nadu Irrigated Water		
Constraints	Mitigation measures	By when
<ul style="list-style-type: none"> Completion of WRD packages, particularly for Phase I need to pick up at a much faster rate. 	<ul style="list-style-type: none"> Better monitoring from WRD engineers to ensure that works are completed on time 	<ul style="list-style-type: none"> Most of Phase I packages with a value of around \$65M have a contract period of 18 months with expected end dates in Sept and Oct 09.
<ul style="list-style-type: none"> Delay in finalizing the hiring of key project consultants (Topographic & Cadastral Survey M & E: Support organizations for WUAs, Construction Quality Management, Decision Support System) 	<ul style="list-style-type: none"> Faster processing particularly after past procurement problems have been resolved. Adhere to procurement procedures agreed with the Bank to avoid unnecessary further delays. 	<ul style="list-style-type: none"> October 09 for most of the consultancies currently under processing.
<ul style="list-style-type: none"> Procurement issues 	<ul style="list-style-type: none"> MIDPU to exercise adequate checks while forwarding the proposals and documents from Line Departments to the Bank for review. Training of staff of line departments engaged in procurement to improve their capacity 	<ul style="list-style-type: none"> On-going
<ul style="list-style-type: none"> Delay in formation of Agribusiness Facility (ABDF) 	<ul style="list-style-type: none"> Bank has provided assistance as was agreed in past portfolio review meetings. Requires more effort on the part of GoTN to set up ABDF. PWD Secretary proposed the idea of SPV which could be followed on during next mission 	<ul style="list-style-type: none"> October 09
<ul style="list-style-type: none"> Difficulty in achieving targets for AED activities, particularly micro- 	<ul style="list-style-type: none"> More effort needed from AED engineers to canvass farmers. Consider working together with Horticulture department to present package Revise activities for feasible interventions 	<ul style="list-style-type: none"> Next mission/ Mid-term review
		<ul style="list-style-type: none"> Update- following the mission <ul style="list-style-type: none"> 73% of Phase I works completed to date- Extension of a number of contracts. More effort needed, particularly in Chennai and Trichy regions. Government Order for M&E issued and contract negotiations under way Progress needed on Support Organizations consultancy. Other Consultancies under processing. On-going Discussions took place with THIC. Next step would be preparation of the concept note for the ABDF Slight progress has been achieved. Issue to be further discussed during upcoming Mid-term review mission in February 2010

irrigation.			
Establish and maintaining SWARMA-	<ul style="list-style-type: none"> • Revise the set-up proposed in the GO issued to enable the formation of an effective SWARMA – This would also accelerate the implementation progress for component D 	<ul style="list-style-type: none"> • October 09 	<ul style="list-style-type: none"> • Still Pending. Discussed with Chief Secretary- Establish nodal office headed preferably by an IAS officer, keeping path open for legislation, being considered by the GoTN.

ANNEX IV Component A: Irrigation Infrastructure Rehabilitation Works

a) Field Visits to Works in Trichy Region

The Mission made field visits to the following works during the period, October 23 – 24, 2009

1. Keeranur periyakulam big tank (Package No.1) in Agniyar sub basin
2. Ammakulam tank (Package No.1) in Ambuliyar sub basin
3. Avudaiyarkovil Anicut in South Vellar sub basin
4. Avudaiyarkovil tank (Package No.6) in South velar sub basin
5. Kanur tank (Package No.5) in Pambar sub basin
6. Kilakulam tank (Package No.2) in Pambar sub basin

Mission Observations/Comments

The repairs/ reconstruction of irrigation sluices; repairs/reconstruction of surplus weirs & anicuts; and the associated concrete/masonry works were observed to have been done to satisfactory quality and workmanship. However, further improvements are needed to be made on the strengthening of tank bunds with particular reference to the compaction of earth fill on sides and conducting the density tests to the frequency required by the Technical specifications.

- i) Keeranur Tank Bund. 6,000 m³ of earth fill have reportedly been palced in the bund section out of the total quantity of about 10000 m³.

The mission observed some deficiencies which are outlined below:

- Presence of stones and clods of size bigger than 7.5 cm in the top earth fill layer in a substantial reach.
- Presence of dead wood in a part of the top earth fill layer
- Compaction of earth fill on side slopes of the Bund section not being adequately done;
- No density tests conducted on earth fill placed on sides during the process of strengthening of bund section.
- The O.K.cards do not have **Tamil** version of the activities net work corresponding to those printed in English on the O.K.cards. Accordingly, the WUAs cannot understand these activities and are, thus, unable to realistically participate in filling up of OK cards.
- Frequency of conducting density tests of compacted layers is not adequate; more density tests are required to be conducted to fulfill the requirements of technical specifications. Presently, most of these tests are being got done from the nearby Engineering Colleges who take about a week or 10 days to furnish the test results. Next earth fill layers were some times reportedly placed without waiting for the result of density test on the previous layer in order to expedite the work which is not a desirable feature.
- Compaction of only the earth fill layers in the top section of the bund is being done through vibratory power roller. The benches reportedly cut on the side slopes being not of adequate width to allow the deployment of power roller, the earth fill on sides was reportedly compacted only partially by the bucket of the hydraulic excavator. The compaction of earth fill on sides was thus not adequate.

ii) Amankulam Tank Bund. On the raising and strengthening of the 1370M long Bund (listed at Sl.No.2 above) also the above mentioned deficiencies were, by & large, observed. Further more, the top layer, as observed, was found to be infested with substantial vegetation embedded into the earth fill. It appeared that the vegetation in the borrow area was not fully removed while excavating the earth for transporting it to the tank bund. " *Some Separation cracks*" were also observed on this tank bund which can be attributed to inadequate compaction and that such cracks can cause slippage of earth fill if left untreated.

iii) Avudaiyar Kovil, Kanur and Kilakulam Tank Bunds. Here also, the raising & strengthening of these bunds suffer from almost the same deficiencies as have been outlined above. It was brought out by the Project Engineers that these being Phase-I works, the

contractors were not fully geared and mobilized for undertaking mechanized compaction and that they were also not well versed with correct construction procedures.

iv) *The rehabilitation works in Kilakulam tank are almost completed. The farmers at this tank apprised the Mission that the reach, LS 347 m to LS 517 m between the two Irrigation sluices was earlier associated with seepages occurring from the downstream slope upon every filling of the tank to FTL, and that they were scared of such seepages which might occur during the forth coming filling season also despite the bund having been strengthened.*

Mission Suggestions for tackling the seepages.

The concerned engineers and the farmers should closely monitor the behaviour of the strengthened tank bund in respect of the occurrence of seepages and the locations there –of during the current filling season. *In case the seepages occur, “inverted fitters” may be provided to avoid formation of “piping”.* Meanwhile, Chief Engineer, DRCS, should be consulted on the permanent remedial measures to be taken after depletion of the tank for stoppage of seepages. *Provision of “Inverted fitter” was explained by the mission to all the Engineers at site. The methodology of “inverted filter” is illustrated in the enclosed Sketches I & II.*

v) Avudaiyar Kovil Anicut. The rehabilitation works are nearing completion. The body wall has been provided with M20 grade skin wall concrete cladding. *Construction quality and workmanship of body wall was observed to be satisfactory.* In respect of the concrete apron, better "finish" of the concrete surface could have been achieved. *The workman ship on the construction of protection walls in R.R.Masonry was observed to be satisfactory.*

Quality Control Tests. It was satisfying to note that the requisite routine tests had been conducted through the local Engineering College. However, the quality control requirements in respect of the masonry construction had not been determined and recorded. These include: testing the mortar cubes for their compressive strength and determining the actual consumption of mortar per cubic meter of masonry raised to ensure achieving the acceptance criteria ($\pm 3\%$ of 40%) of a good masonry construction. *The Regional Chief Engineer assured the mission that these quality control requirements would be fulfilled in future.*

vi) Surplus Weir in Kanur Tank. *The new body wall of the surplus weir constructed in M10 concrete (in replacement of the damaged brick body wall) was observed to be of satisfactory workmanship and quality. Requisite routine quality control tests had been conducted and documented.*

b. Field Visits to Works in Madurai Region:

The following rehabilitation Phase II works were inspected during the period October 25 – 26, 2009.

1. Kinnimanagalam Kela Kanmoi tank bund in Therkkar Sub Basin, (Package P02)
2. Valandur tank in Therkkar Sub Basin (Package P03)
3. Thimmanatham tank in Therkkar Sub Basin (Package P04)
4. Sennelperi Anicut in Uppar Gundar Sub Basin (Package P01)
5. Bed Dam in Sindapalli Uppodai Sub Basin
6. A. Ramalingapuram tank in Sindapalli Sub Basin

Mission Observations/ Comments:

TANK BUNDS:

Gradation of borrow area soils needed for raising and strengthening of all the tank bunds has been duly got done and documented. However, the type of soil/ nomenclature of the soil type has not been mentioned in the classification of soils. The requisitely needed parameters of borrow area soils for determining the degree of compaction of compacted layers in terms of Proctor density viz. maximum Dry Bulk Density and Optimum Moisture Content, have also been got determined from the local Engineering Colleges / Main Quality Control Laboratory, Madurai and recorded.

The mission, through discussions with the concerned field engineers, quality control engineers and the contractors as well as through perusal of photographic records, noted that the earth fill placement on raising the above tank bunds from the then existing bund top to the designed TBL had been compacted with heavy vibratory power rollers. In respect of the strengthening of

bund sides, the benching was reported to have been done, but the bench widths being narrow, standard power rollers could not be deployed for the compaction of earth fill on sides. To the mission query, it was intimated that efforts were made to compact the earth fill layers through impact of the hydraulic excavator's bucket. Thus, the compaction of earth fill layers placed on the sides of tank bunds was deficient. Further more, density tests were noted to have been conducted only in the earth fill layers placed for raising of the tank bunds viz. in the height from the then existing top bund level to the newly designed top bund level. No density tests were reportedly conducted in the earth fill placed on side slopes in the process of strengthening of bund sections. The side slopes were observed to be loose in some reaches with the presence of gullies as well as the separation cracks here and there and did not exhibit the needed compact appearance. *Inadequate compaction of earth fill on sides is the principal deficiency observed in all the above listed tank bunds.*

Another major shortcoming observed by the Mission relates to the lack of availability of requisitely needed equipment for conducting the field density tests by the construction and Quality Control Assistant Engineers to cope up with the work load. The needed equipment includes; core cutters, rapid moisture meters and weighing balances. Also, the existing strength of the quality control set up needs to be strengthened through induction of quality control assistants for assisting the Assistant Engineers, Quality Control in expediting the density tests. Presently, soil samples are being sent to the nearby Engineering Colleges for conducting the density tests. As noted from the records, a period of 10 days to 14 days is taken by these institutes to furnish the test results. Some samples are also being sent to the Main Quality Control Laboratory, Madurai which takes as much 3 to 4 weeks to furnish the test results, since this Lab is staffed with only one Assistant Engineer assisted by only 2 unskilled persons and that he himself has to be made fully conversant with test procedures to expedite testing of soil samples.

Mission Suggestions:

- The construction and quality control engineers should be made fully conversant with the whole range of correct procedures and technical specifications relating to the raising and strengthening of earthen tank bunds. This can be done by the respective Regional Chief Engineers through conducting a mini workshop in their respective regions. The concerned contractors should also participate in these workshops. The help of Chief Engineer, DRCS be taken as needed.
- The existing shortcomings should be promptly addressed in the Phase I and Phase II Tank Bunds still to be raised and strengthened. The sides should be appropriately and adequately benched and, there-after, the earth fill layers on the side slopes should be compacted to specified density through deployment of power rollers / vibratory power rollers of short drum widths (+/- 1.0M width) by the respective contractors. The mobilization of short width drum (of +/- 1.0m width) power rollers / Vibratory power rollers should be made mandatory both in the balance tank bunds (Phase I and Phase II) as well as in the phase III rehabilitation works on the tank bunds. No earth fill placement be allowed on any tank bund till the contractors mobilize the requisitely needed short width drum power rollers/ vibratory power rollers.
- As for the existing inadequately compacted earth fill on the side slopes of the tank bunds, since raised & strengthened, the concerned contractors be directed to deploy the hydraulic excavators with them for compacting the side slopes with the impact of their buckets to the optimum extent. The contractor engaged on the A. Ramalingapuram Tank has arranged a device comprising 1.0M x 1.6M steel plate fixed to the bucket which, when attached to the boom of the hydraulic excavator, provides a good "compaction mechanism" for reasonable consolidation of earth fill on the slopes. The other contractors be advised to get such device fabricated and deployed. Regional Chief Engineers should ensure that the strengthening works on the tanks should be considered to be complete only when the earth fill on upstream and downstream sides of the bunds is duly compacted by the impact of the hydraulic excavator's bucket attached with steel plate. Where ever, the earth fill needed to strengthen the bund sides is of small magnitude and the width of benches is narrow, such a device can also be used for

compaction of earth fill layers on these benches. However, the thickness of such layers may not be kept more than 15 cm.

- *A very large number of tank bunds are required to be raised and strengthened in Phase III. Also, substantial number of tank bunds in Phase II are still to be taken up for strengthening. In order to accomplish the execution of these works to the needed quality control compaction standards, Regional Chief Engineers of Madurai, Chennai and Trichy should identify realistic requirements of core cutters, rapid moisture meters and weighing balances which be procured the soonest during the current rainy season to enable the construction & quality control engineers to use these devices for expediting the field density tests and meeting the requirements of Technical Specifications on "frequency of testing".*

- The existing quality control set up should be strengthened the soonest through induction of the needed Lab Assistants in the Main Quality Control Laboratories at Madurai, Chennai and Trichy along with the associated unskilled helpers on contract basis.

- The mission through inter-action with the Assistant Executive Engineers and Assistant Engineers, Quality Control observed that they were conversant with conducting the field density tests on soils with "Core Cutter Method" with their own hands. In respect of the Assistant Engineers, Construction, it is suggested that they be provided comprehensive 3 to 4 days" hands-on-training" & "re-training" to make them fully competent to conduct such tests themselves. Printed "Form-ats" listing squencewise procedure and calculations to determine the field density of compacted soil should be furnished to all the Assistant Engineers to be deputed for receiving such training.

Thimmanatham Tank Bund.

It was observed that the 7.0m high Thimmanatham Tank Bund (listed at Sl. No.3 above) had been raised and strengthened to 1.5:1 slope (u/s) and 2:1 slope (d/s). This being a fairly high earthen bund (of height more than 5.0 m), it shall be appropriate to strengthen this bund to 2:1 slope on upstream instead of the presently adopted 1.5:1 slope.

(Refer Indian Standard 12169-1987 Guidelines for Embankment Sections) It is suggested that the Regional Chief Engineer should promptly consult Chief Engineer, DRCS regarding strengthening of the u/s slope to 2:1.

Sennelperi Anicut in Upper Gundar Sub Basin:

Construction of the down stream concrete apron and the cut off wall have been completed. Reparis of the R.R.masonry body wall of the anicut through pointing of the eroded/open joints with 1:3 cement sand mortar is in progress. The mission observed the repair procedures being implemented to be conforming to the Technical Specifications, viz: raking of joints to 25 mm depth, cleaning of raked joints with water jet, preparation of mortar on a steel sheet, and filling of mortar in the cleaned raked joints etc.

The mission suggests that on the execution of such like jobs in future, following actions should also be taken:

- Mortar Cubes should be cast and tested for 28 days compressive strength.
- "Jar Test" should be conducted by the engineers (and duly recorded) to assess the correctness of the proportioning of mortar mix ingredients done by the contractors.

Bed Dam in Sindapalli Uppodai Sub Basin:

Construction quality and workmanship of the various components of this work, comprising the concrete bed dam, scour vents & shutters, u/s and d/s aprons, and guide walls were observed to be of acceptable standard.

It was also satisfying to note that the O.K Card system had been implemented and that the requisite quality control tests on water, sand, coarse aggregate, steel, and concrete had been duly conducted and recorded.

A.Ramalingapuram Tank in Sindapalli Uppodai Sub Basin:

The rehabilitation of this tank bund of 4.0 maximum height and 1900 M in length constitutes Phase II work. It is being raised and strengthened through placement of black cotton soil brought from the adjoining borrow area. Besides the strengthening of the tank bund the other rehabilitation works comprise: construction of a leading channel to each of the 3 sluices, repairs of these sluices, and repairs to the surplus weir through skin wall treatment being reportedly associated with leakages from the body wall.

Mission Observations/Comments.

(i) To the mission query, it was apprised that the bundh was being strengthened to 1.5(H):1.0(V) upstream slope and 2 (H):1(V) downstream slope. The soil used for strengthening being swelling black cotton soil, the upstream slope should not be steeper than 2 (H):1(V).

(ii) Heavy vibratory power roller was observed to have been deployed on the compaction of earth fill layer being placed about 0.25M below the designed top bund level (TBL) with due moistening arrangement.

As for the compaction of the earth fill placed earlier on the bundh sides, the mission was apprised that benching of the slopes was done and that extra earth was also placed to enable deployment of power roller for compaction. However, field density tests in only the upper layers had been got conducted and documented. Such tests should also have been conducted for the earth fill layers on the bund sides.

(iii) The mission was shown a device arranged by the contractor comprising 1.0M x 1.6 M steel plate fixed to the bucket of the hydraulic excavator. This device when attached to the boom of the hydraulic excavator provides a good mechanism for a reasonable compaction of earth fill on slopes. The mission appreciates this intervention. This mechanism should be comprehensively aged for the compaction of both the upstream and downstream slopes of the bundh, which, presently exhibiting loose appearance. Being black cotton soil, it is all the more important to have compacted slopes.

c) Field Visits to Works in Pollachi Region.

The mission made field visits to the following works during the period, October 27 -28, 2009.

1. Rehabilitation of left out reaches in Poolankinar Branch Canal at L.S. 8.750 Km and Gomangalam Distributory at LS 21.120 Km of Parambikulam Main Canal (Package No.11/PALAR)

(i) Poolankinar Branch Canal (7710m-11160m). Field visit was made to selected reach of this canal at about LS 8000 – 8100 m.

Mission Observations/Comments.

The overall workmanship of the PCC slab lining placed in this canal was observed to be satisfactory. As per record shown to the Mission, CNS soil was reportedly placed on the sub grade based on the swelling pressures as per Indian Standard, IS 9451: 1994 and compacted to the specified density of 95% Proctor density.

(ii) Nomenclature same as listed at 1 above (Package No.11/PALAR)

15 R Distributory (Length =1506m) at Km 11.154 of Poolankinar Branch Canal.

(iii) Rehabilitation of left out reaches in Udumalpet Main Canal Distributories between reach, LS 17.400 Km to 38.200 Km (Package No.6/PALAR)

Chinnaverram Patti Distributory, 18 R (Length 1600m)

(iv) Rehabilitation of left out reaches in distributories of Udumalpet Main Canal between reaches LS 0.000 to 17.400 Km.

Kannamanaickenur Distributory (Length 1200m)

(v) Rehabilitation of Distributory off taking in between LS 0.000 Km to 14.100 Km of Vellakoil Branch canal (Package No.22/PALAR)

1.775 Km Left Distributory (Length 1400 m)

Mission Observations/Comments

The Mission (March 24 – April 10, 2009) had made field visits to the canal rehabilitation works in the Pollachi Region on April 09 and 10, 2009 and observed some deficiencies on the sub grade preparation and the in-situ concrete lining operations. The mission had made a number of suggestions for effecting improvements in these two key activities.

The current mission (October 21-30, 2009) during field visits to the lining works in progress in the selected reaches of 15 R Distributory, 18R Distributory, Kannamanaickenur Distributory, and 1.775 Km left Distributory observed that almost all the suggestions outlined by the March 24 – April 10, 2009 mission were now being successfully implemented on the execution of these works.

These include : Preparation of smooth and hard subgrade duly consolidated; use of graded aggregate and addition of air-entraining agent (AEA) in the concrete mix; no application of

plaster over the concrete lining; induction of an effective compaction device comprising clamping of a needle vibrator on to a steel plate for efficient compaction of sub grade and concrete lining; moistening of sub grade through fine spray nozzle from gardener's cans; placement of concrete lining in 'continuous operation' instead of placement in alternate panels; provision of proper shaped contraction joint grooves in the lining through deployment of a template of specified dimensions; and putting hessian bags on slopes duly sprinkled with water and water ponding on bed lining for ensuring efficient curing of lining. Also, in pursuance of the mission recommendations, quality control testing of concrete lining (since placed and completely cured) through extraction of concrete cores and their testing has also been got done by the Engineers to determine the extent of fulfillment of the "acceptance criteria" specified in the Indian Standards IS456:2000. Perusal of the quality control test records furnished by the Superintending Engineer, it was noted that random coring had been done in the following channels:

- I) Chinnaveerampatty Distributory (18R)- Package No 06/PALAR
- II) Bolarapatty Distributory - Package No 06/PALAR
- III) Parambikulam, Main Canal, LS 39.500 Km – 87.400Km (Package No 8)

Testing of concrete cores was got done through the local engineering colleges at their laboratories and the test results, duly tabulated and furnished by these institutes indicated confirmation of the quality to the Indian Standards acceptance criteria.

The actual implementation of March 24 – April 10, 2009 mission suggestions in the field has helped in promoting construction quality and is appreciated. This should be continued.

Further Action Point

The filling of the contraction joints by approved sealing compound should be meticulously and properly done as was explained to the field engineers. The quality control engineers should strictly monitor the filling operation.

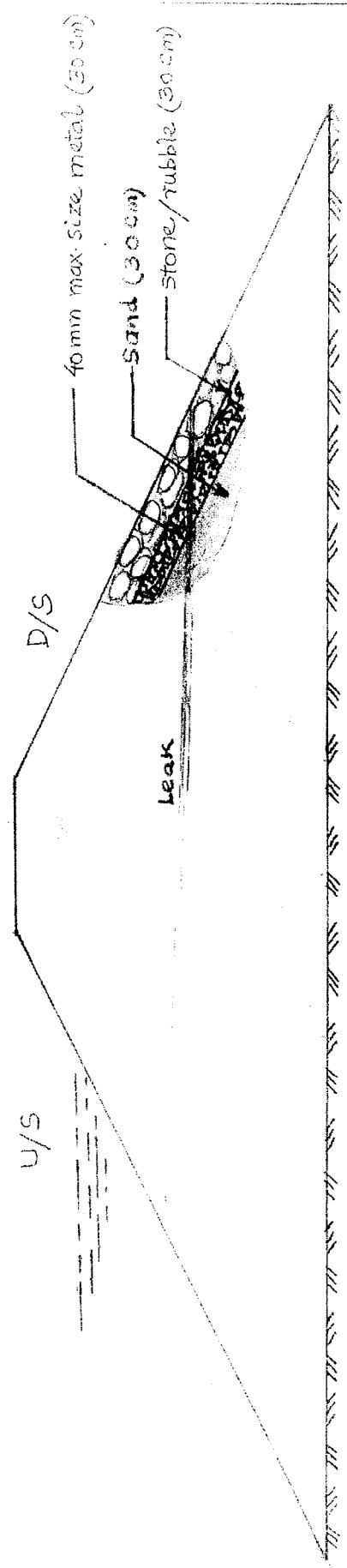
This work should be taken up only after the curing of lining has been completed. Prior to the filling of joints by approved sealing compound, all the grooves should be thoroughly cleaned of all foreign matter (viz sand, slit, any set grout concrete etc) and the grooves be kept dry during the filling operation.

R.K. Malhotra

SKETCH I

Tackling Leakage through the Earthen Tank Bund

OPTION 1: A 'bowl shaped' excavation should be made in the downstream slope and a filter consisting of sand, gravel or metal and stone/rubble should be placed in the 'bowl'. The sand layer is to be placed against the leakage face.



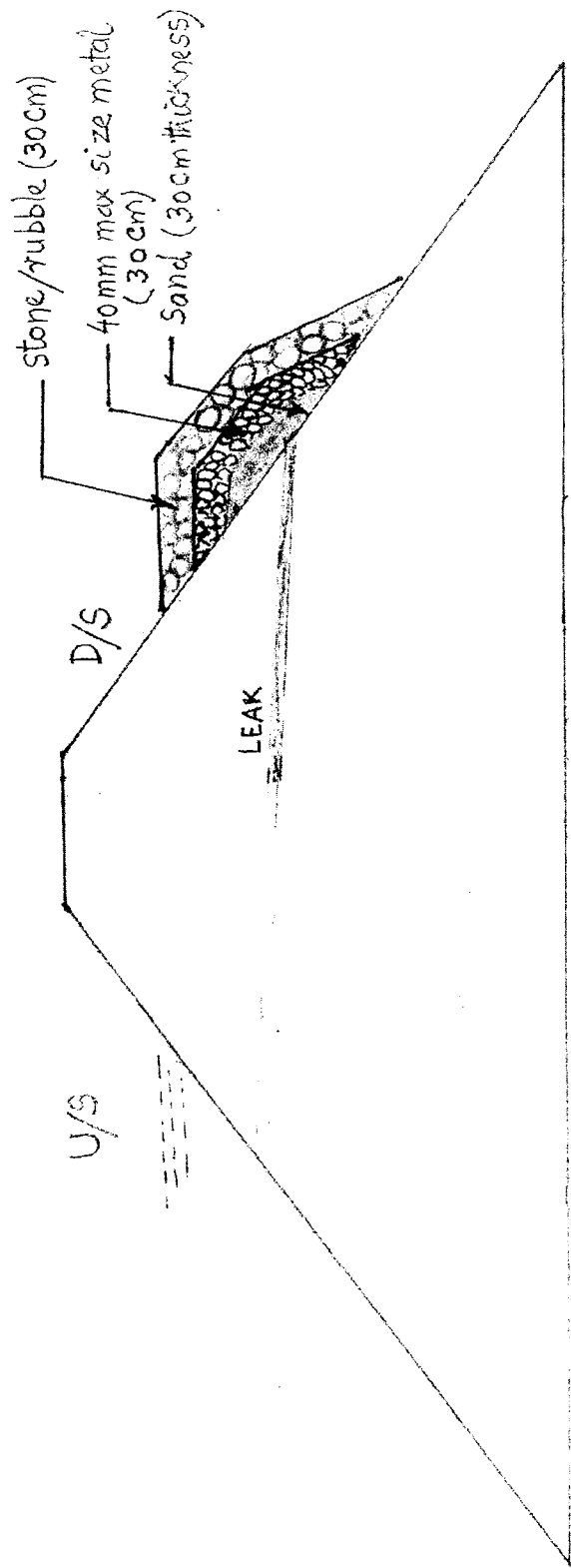
Methodology of "Inverted Filter"

SKETCH II

Tackling leakage through the Earthen Tank Bund

OPTION 2: If the leakage is substantial or when the 'bowl shaped' excavation in the d/s slope

not considered safe or feasible, the "INVERTED FILTER" should be placed directly on the slope after removing any vegetation etc from it.



Annex V- Agriculture Engineering Department (AED)

The mission visited Sinkottariyar, Arjunanadi, Kottakariyar, and Manimuthar Subbasins in Southern region. The mission reviewed existing AED project activities including micro-irrigation systems, pressurized underground pipeline, farm ponds and mechanization.

Micro Irrigation System (MIS) It was reported that until March 20, 2009, AED has completed 2000 ha against an annual target of 24051 ha for MIS and 838 farm ponds against annual target of 1100. Out of a total of 34 packages for MIS procurement, 10 major packages are meant to be installed in 22000 ha but the potential area has been identified only for 6000 ha. While the supplier is making his efforts, AED need to put extra efforts. In order to enhance MIS adoption through AED would require to address the following:

- a. The expectations of farmers due to other programs by TNAU and Horticulture where agricultural inputs are provided with the MIS.
- b. The loan from the bank for copay.
- c. It was found that farmers were adopting after observing the benefits for entire season till the production. In order to promote and set an entry point, it was advised that AED may provide some sets to WUA in proportion to potential command area. The target farmers could be influencing person in term of awareness and who has the seasonal/perennial crop so that benefits could be disseminated sooner.

Farm Ponds The mission would like to reiterate following and request AED to convey to engineers in the division/sub-divisions:

1. Farm pond does not necessarily mean fish pond. Farm pond can be constructed for water harvesting only.
2. The farm pond does not have to be necessarily 30 m x 30 m. Depending upon the runoff and catchment, the size can vary. In case of water harvesting, it can be deeper if needed. A template has been attached (Annexure III) to determine the size of farm pond and runoff.
3. The farm pond with fisheries should be encouraged particularly in humid and semi-humid regions where the potential for runoff is at least 50% of total water requirement in the pond.

Farm Mechanization The AED should encourage new improved implements while supporting required input for usual practices.

4. AED may like to run some demonstrations of portable MIS and fuel pumps/any other water lifting devices (not more than 1-1.5 HP) to facilitate irrigation from farm ponds. These devices could be provided through WUAs along with Farm Mechanization components

Pressurized pipe irrigation system During last mission it was agreed that the feasibility and design report for underground pipe distribution in R-5 distributary would be provided. The estimate and design were shared for one pilot outlet. It was recommended to follow example of outlet of Veruvadampalayam Distributary in Palar Sub-basin which has recorded a saving of more than 70% over flood irrigation. In order to convey WRO for distributary schedule, it would require to show the current supply and proposed supply with no change in total amount.

1. The mission reviewed five out of total seven underground pipe irrigation systems. It was found that it took more than two years to make them functional and yet none of the five was effectively functional. Some common issues were;
 - Poor design and layout: Expecting one borewell to serve 40-60 ha command.
 - Energy connection and availability
 - Theft of cable

- Fixed fund allocation irrespective command area.

It is advised to engage a professional to rectify all the pipe distribution system. The systems have been designed to provide additional source of water while the objective of the system was to improve conveyance efficiency of unlined channels. The challenges to use tank water through pipe distribution were cropping pattern (paddy) and energy availability.

2. AED is advised to seek help of experts to design economic and feasible pipe irrigation system considering modern practices and available sources.

Monitoring and learning- In order to learn from completed activities, the following information would be useful:

4. The continuation of farm ponds by farmers with and without fishes after the demonstration.
5. MIS adoption pattern with respect to cropping pattern and sub-basins.
6. The actual usage of implements to understand the needs of the area. For this purpose WUA may be trained to maintain a register and record revenue earned by renting the implements.

DPR for Phase III: The mission reviewed DPRs and finalized a target of approximately 6000 ha in 20 subbasins. The potential in other 10 sub-basins was not found substantial. Considering the slow adoption of MIS, the target for MIS has been kept very low against a potential of 22000 ha. It was agreed that the progress will be reviewed next year and efforts will be made to improve the proposed area under MIS and narrow the gap between the potential and actual installation. If AED foresees more opportunities for water management in proposed or excluded sub-basins in future, they should propose it. *Finalized DPRs should be sent to the Bank for issuance of final clearance. These have since been cleared.*

How to construct a Farm Pond

The ideal farm pond should be dug into the ground in a naturally low-lying area. Some of the soil that is removed can be used to construct an earthen berm around the pond, which should be planted with trees and grasses for stability. The shade and wind protection provided by the raised mound and vegetation will reduce evaporative losses. Greater depth of the pond and less surface area will also reduce evaporative losses. The maximum depth can be limited with respect to impermeable layer and/or purpose (such as fishing). However, digging deeper than 5 meters will increase the expense of the digging, and increase seepage loss due to increased water pressure on the ground. A pond that is about 10 meters by 10 meters and 3 meters deep is an ideal size. The pond should have an inlet and an outlet (as shown in the picture) lined with rock to prevent erosion. These features will need to be linked into a larger drainage plan which directs water into the pond, and receives any overflow water. A small settling pit at the inlet will help remove silt, and can be more easily cleaned than the whole pond. The sides of the pond should be sloped for stability

The pond should be sized to hold about 50% of maximum runoff, so that it will fill up even in a dry year. Maximum runoff can be calculated by considering rainfall intensity and duration, watershed area, and slope, soil type, and land-use throughout the watershed. A rough estimate is that a 1 hectare watershed in red soil can yield 250 cubic meters of water, which is enough to fill the pond shown in the picture on the previous page. Individuals with some expertise in hydrology can develop such rules of thumb relevant to the physical characteristics of particular regions.

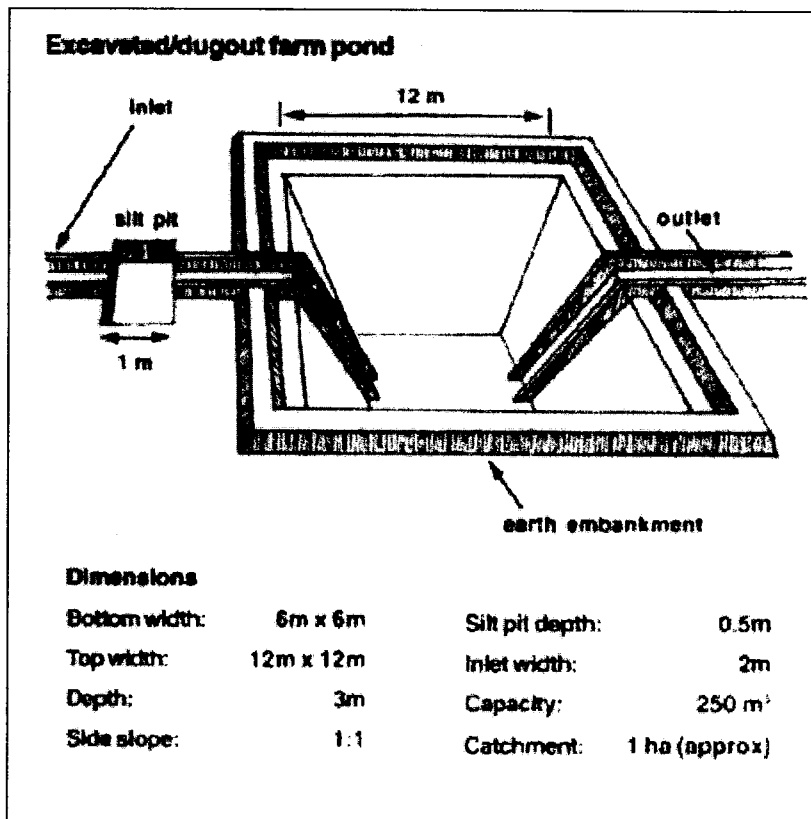
Another question is whether the pond will be discharging or recharging. If the pond is higher in

the watershed and / or the soil is permeable, it may function more as a percolation pit than as a pond. If the pond is lower in the watershed and the water table is high, it may naturally fill with ground-water. It is important to decide whether the goal is to facilitate infiltration of water, or to maintain surface water in the pond, which can be easily accessed for water needs. In the latter case, it may be necessary to line the pond to reduce permeability. Possible linings include: clay, bentonite, stone or brick, cement, rubber, plastic, etc. If a farm pond maintains water for 80 percent of the year it can also be used for raising fish.

If it is not possible to create a sunken pond because the soil is too shallow, or excavation is too expensive, one can build walls on the surface to create a surface pond. This picture shows a combination of terraces, channels, and surface pond.

**Refer attached excel sheet to determine farm pond size and water available for irrigation.
Reference**

India Water Portal. <http://www.indiawaterportal.org/node/7048>





Performance of Proposed Farm Pond Design

Input Parameters (update for each region and farm pond)		Value s
Rainfall (mm)	P	612
Famer holding (Ha)	Af	0.50
Catchment area (Ha) (include upstream fields contributing to runoff)	Ac	1.00
Irrigation depth per irrigation (cm) during Kharif	IDK	5.00
Irrigation depth per irrigation (cm) during Rabi	IDR	3.00
<u>Actual Farm pond Size</u>		
Length (m)	L	12.00
Width (m)	W	12.00
Depth, D (m) (with respect to impervious layer)	D	4.00

Final output

Runoff potential (cum)	4634
Actual storage (cum)	576
Available net irrigation depth per fill (cm)	6.91
Number of potential fillings	8.05
Available total irrigation depth (cm)	55.61
Number of potential irrigation during monsoon (with multiple fillings)	11.12
Number of irrigations during rabi	2.30

How much runoff can be harvested?

Climate data

Rainfall P	Update for each region	612 mm	24.09 Inch
CN	Refer CN sheet		63
S (1000/CN-10)	$S = (1000/CN-10)$		5.87 Inch
la (0.2S)	$la = 0.2S$		1.17 Inch
Runoff (q)	$q = (P-la)^2 / (P-la+S)$	463 mm	18.24 Inch
Runoff coeff c1	$c1 = q/P$	0.76	0.76
Potentail Runoff Volume (cum)	$Q = Ac (Ha) * q$ (mm)	4634.18	Cum

Farm Pond Storage

Surface area of farm pond As (cum)	$As = LWD$	144.00
Percent of holding required to be harvested entire water	$PH = As / Af * 100$	2.88
Actual Storage volume (cum)	Qa	576.00

Water Available for irrigation

Available water Qa (cum)	Qa	576.00
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Evapo and Seepage Losses (%)	E	40.00
New Available water (Cum)	$NAW = Q * (100 - E) / 100$	345.60
Available net Irrigation depth (cm)	$Dn = NAW * 100 / (A * 10000)$	6.91
Number of potential fillings	$NF = Q / Qa$	8.05
Kharif season		
Irrigation depth per irrigation (cm)	IDK	5.00
Number of irrigations from one filling	$D1F = Dn / IDK$	1.38
Number of potential irrigation during monsoon	$NI = D1F * NF$	11.12
Rabi Season		
Irrigation depth per irrigation (cm)	IDR	3.00
Number of irrigations during Rabi (3 cm each)	$D1F = Dn / IDR$	2.30

Annex VI Information, Education, and Communications (IEC)

Overview of current activities. TN-IAMWARM's IEC includes a broad set of activities and products: folk theatre; demonstration plots; site visits and exposure tours; formal training sessions, informal meetings; leaflets; wall paintings; pamphlets; crawler messages; slogans; interviews and advertisements on radio and television; T-shirts, hats, and other promotional items; a new quarterly newsletter; and IAMWARM on Wheels. Currently each line department in each sub-basin executes its own IEC campaign in support of its activities.

Observations and Recommendations - Communication activities can be divided into three main areas, each with different audiences:

- **Strategic Communications.** Positions IAMWARM and its issues relative to other programs and practices in the State and the Country. It consists of evidence-based information that advocates changes in policies and practices from key audiences. The link with M&E is critical for strategic communications.
- **Operational Communications.** Moves relevant messages and information to stakeholders within the project in support of project goals. Operational communications in this case includes the training, demonstrations, and exposure visits and the products that reinforce messages from those events to promote the behavior change sought from farmers regarding water use and cropping patterns.
- **Administrative Communications.** Outlines the rules and procedures to move information through the project systems so that front line project staff can implement high-quality, effective IEC.

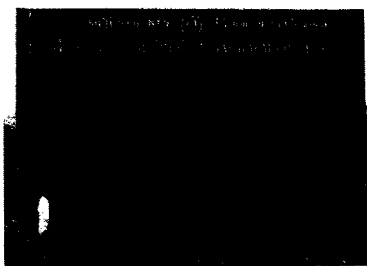
Currently, the number of communications products and activities is significant, but they largely focus on operational communications and there are efficiencies to be gained in the system. For instance, IEC can benefit from improved coordination between departments and with the IAMWARM Communications Specialist in the MDPU. This could result in clear and consistent messages on issues while making the most of IEC budgets by achieving economies of scale in printing and other costs. Given current staffing issues (see below), the recommendations are divided into short-term recommendations that can be adopted immediately and longer-term actions that can be adopted once staff issues are clarified.

Short Term Actions

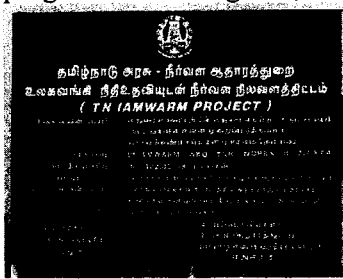
IAMWARM on Wheels. This has good outreach to communities, reaching 5-6 villages in one day with a common message. Representatives from each line department also accompany the van, so there is convergence in the messages delivered. It is recommended to target market days and festivals for IAMWARM on Wheels events in order to reach the maximum number of farmers. Also, staff should start stratifying the content to better meet farmer needs.

IAMWARM signs. IAMWARM signs, which are installed at all infrastructure sites, demonstrations, and expansion areas should have a similar look (branding) so that viewers automatically recognize IAMWARM's presence even from a distance. (see pics below). Signs for future infrastructure investments should also include the water user association (WUAs) that will be responsible for the infrastructure, which builds a sense of ownership among the WUAs and informs the general public of who is responsible for operating and maintaining the investments. Signs should also be consistent in the contact information of authorities on the signs: e.g., name, phone number, office location.

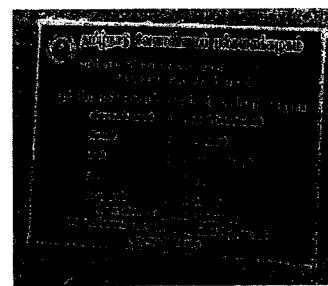
IAMWARM Quarterly Newsletter. This is a new product that meets both operational and strategic communication goals. The communications teams at MDPU can use this product to reinforce activities and behaviors of project staff and beneficiaries by profiling individuals or teams who exhibit best practices in their work—e.g., farmers diversifying from paddy to conserve water, district teams making good progress on convergence, etc.



1 Sign at WRD Tank Rehab near Trichy



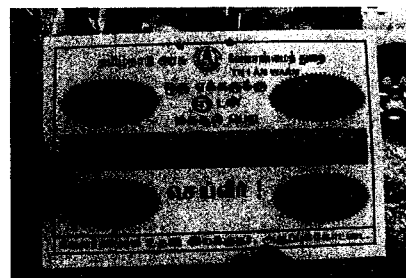
2 Sign at WRD Tank Rehab near Madurai



3 Sign at precision farming demonstration near Madurai

Converged Communications. Many WUAs are requesting that their field canals be lined to improve water management. Some departments support this decision (AED) while others would recommend against it (WRO). IAMWARM could pilot converged communications by creating a decision support document on lining of field canals—what are the capital costs, what are the recurrent costs, what are the maintenance labor requirements, what are the actual benefits to be gained, etc. This information, provided in one leaflet by all concerned departments, helps WUAs make informed decisions about their investments. The pilot could be expanded to cover other technical messages that require inputs from multiple departments.

Clarify technical messages. Departments need to review the messages in their current communication products to ensure clarity and consistency of the messages. For instance, the 5 critical steps to SRI should be central to SRI wall paintings and other signs, and the wording of those steps should be consistently applied.



4 Sign at an SRI demonstration that includes 2 of the 5 critical steps

Create practical technical guides. In some areas, training and exposure visits need to be reinforced by practical communication materials that help WUAs and other groups perform their new duties. For example, posters that help farmers understand how to distinguish quality in different product in ABC centers, quick reference guides on how to maintain micro-irrigation systems, etc. Gaps in technical knowledge dissemination need to be systematically identified and filled with targeted products.

Refining Success Stories. Some of the success stories produced by the departments reflect work done (inputs) but not the result of that work (outcomes and impacts). For instance, success stories on infrastructure works discuss the engineering rehabilitation needs and actions. However, they should focus on how the rehabilitation impacted the farmers who rely on the infrastructure. Success stories should describe the problems farmers faced because of degraded infrastructure. How were their livelihoods affected? It should then explain how the rehabilitation addressed the farmers' problems, and include data to back up the claims (e.g., increased storage capacity, better water flow, etc.). It should then, ultimately, how farmers' productivity and incomes increased as a result of the rehabilitation.

Longer-term Actions

IAMWARM's communications specialist and capacity building specialist should collect all of the training materials produced by each line department in each sub-basin for the different technical topics and identify the best practice training program designs and standardize those across the sub-basins to ensure high-quality training to all farmers. Even the design of exposure visits should be reviewed to ensure that the critical messages are being transmitted to participants and that debriefing sessions reinforce the messages.

Ultimately, TN-IAMWARM's communications should be done in a converged manner, consistent with the goals of the project. Communications should be clear, concise, and consistent across the departments, and joint campaigns should be launched on issues critical to the project. For instance, SRI involves 2 or more departments, but their materials and guidance notes should not be different. Convergence areas on issues need to be systematically identified and then communication campaigns should be launched.

IAMWARM also needs to increase its strategic communications targeting politicians and decision makers in the government. One "hypothesis" of the project is that convergence delivers better results than "business as usual", so indicators of improved service delivery need to be identified and tracked to build the evidence in support of IAMWARM's hypothesis. This requires a functioning M&E system to gather and aggregate the data from project activities (e.g., increased storage capacity, increased productivity, higher incomes, etc.) and reinforce the data with case studies of beneficiaries.

Annex VII- Policy Issues related to PIM

Reimbursing WUA share of Additional Water cess (AWC) to respective WUAs. The GoTN had vide Revenue Department GO dated September 24, 2003 decreed that AWC of Rs.21/- per acre (being 30% of the AWC of Rs.70/- per acre for wet crop) and Rs.18/- per acre (being 30% of the AWC of Rs.60/- per acre for irrigated dry crop) be treated as the WUA's share of AWC and be reimbursed to the respective WUAs in proportion to the amounts collected from the command areas of each WUA. This process has been delayed largely on account of the delays in calculating the specific WUA wise entitlements of AWC. The mission recommends that this matter be reviewed in coordination with concerned District Collectors to ensure that the AWC amounts due to WUAs is calculated and reimbursed to them. This will be an important source of revenue for WUAs and will enhance their interest in undertaking Operations and Maintenance of the irrigation systems that are handed over to them.

Fishing rights in Tanks: WUAs have been requesting WRO and MDPU to be given preferential allotment of fishing rights on Tanks that they are managing. As of now the fishing rights are auctioned by the Fisheries department to the highest bidders and bidders include Fishermen's cooperative societies, other private agencies, Panchayats, WUAs etc.. As a starter, it would be good to collect information on the agencies that have been given fishing rights on each of the Tanks in the project area and this information then used to judiciously decide on how best to ensure improved incomes for all stakeholders including fisher-people directly dependent on fishing, WUAs as well as other stakeholders. PD has initiated a process requesting Secretary PWD to help look into this matter in coordination with Secretary Fisheries and the mission recommends that this important issue be decided upon at the earliest.

Review workshop on PIM Act and PIM Rules with involvement of WRO officials, WUA representatives and other line department officials. At the review meeting with WRO Engineers in Madurai region, the mission was apprised of several specific needs for amendments to PIM Act and Rules that the WRO officials felt were needed. For instance, the roles and responsibilities of the competent authority i.e. the concerned WRO official at the WUA level needs to be specified and guidelines developed for their functioning to ensure that they are able to effectively carry them out. Similarly several WUA Presidents and TC members repeatedly requested that their roles and responsibilities require to be specified more clearly including the sources of finance for WUAs etc. In order to effectively address these requests, the mission suggests that the PIM Cell at WRO with facilitating support from MDPU specialists organize a review workshop on the PIM Act and PIM Rules with involvement of WRO officials, WUA representatives and line department officials in each of the 4 regions. This would help develop an agenda not only for review of the PIM Act and PIM rules to incorporate experiential learning from their implementation thus far but also to develop further the PIM related training agenda for WRO as well as IMTI Trichy to make it more need based