

December 24, 2008

Mr. K.S. Sripathy
Chief Secretary
Government of Tamil Nadu
Fort St. George
Chennai 600 009
Tamil Nadu

Dear Mr. Sripathy:

Tamil Nadu Irrigated Agriculture Modernization and Water-Bodies Restoration and Management (IAMWARM) Project – Implementation Support Mission (October 13-24, 2008)

Thank you for the assistance provided by the Government of Tamil Nadu (GoTN) to the latest Implementation support/supervision mission for the TNIAMWARM project. Please find attached the mission's aide memoire, the draft of which was discussed during the wrap up meeting held in Chennai on October, 29, 2008 and chaired by the Finance Secretary Mr. Gnanadesikan.

The mission informs me that the project continues to receive full attention and support at the highest level in the GoTN. I would like to thank you and the concerned secretaries for your continued engagement. I understand that a large number of first year Water Resources Organization (WRO) packages are currently under various stages of implementation and that the mission was given assurances that they will all be completed on time, despite the delay caused by unseasoned rains early on. I also learned that several line departments have successfully implemented their planned activities for phase I sub basins, and are starting implementation in phase II sub basins. I am also pleased to hear that the work on the Cooum sub basin restoration and management (CSRM) has begun with the appointment of a nodal officer and the setting up of the CSRM office.

I would like to bring the following critical points to your attention:

- ***Overdue Legal covenants.*** *Despite good progress, a number of legal covenants under the project have still not been complied with.* These include the establishment of the State Water Resources Management Agency (SWARMA) with the necessary legislative backing, the recruitment of the Monitoring and Evaluation consultancy, and the establishment of the Irrigation research fund. While it is expected that the last two covenants would be complied with soon, we are concerned about the delay in establishing the SWARMA, which was to be established by December 31, 2007, as per dated legal covenant. The recent letter, sent by PWD secretary to the Bank, on the subject of SWARMA, is currently being reviewed and will be responded to shortly.
- ***Formation of WUAs in all project sub basins.*** The formation of around 2500 WUAs following the Tamil Nadu Farmers Management Irrigation Systems (TNFMIS) Act is a fundamental activity under the project, which had seen little progress to date. Significant efforts were recently made, particularly by the PWD secretary and the WRO PIM cell, to

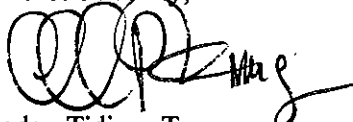
expedite the formation of WUAs in Phases I and Phase II sub basins. I welcome the commitment of GoTN that this activity shall be completed by December 27, 2008, as was agreed at the end of the mission. I would like to take this opportunity to strongly recommend that the project builds upon the newly generated momentum by swiftly moving to form the WUAs in Phase III sub basins – the largest phase under the project yet- It is essential that the formation of WUAs in phase III sub basins proceeds in parallel with the onset of the physical project activities to ensure successful implementation of the third phase.

- **Staff Shortage:** Despite the significant efforts that were taken by some departments early on to address the problem of staff shortage, it appears that this remains a common problem among many implementing agencies. I call on your assistance in making sure that suitable steps are taken by the various line departments to fill up all vacant posts as soon as possible, with no more than 15% vacancy level, to avoid any negative impacts on project implementation in the future.
- **Agriculture Engineering Department** – While many departments are able to show results on the ground, the AED department appears to be facing some difficulty in implementing its project activities mainly micro-irrigation and pressurized underground pipeline systems. High targets have been set for AED activities under the project, and serious efforts have to be made to achieve them. As a first step, I understand that AED will be preparing, and sharing with the Bank, a strategic action plan that identifies the problems it is facing and recommend suitable actions.
- **Overdue annual audited financial statements** – The annual audited financial statements for the financial year ending on March 31, 2008, which were required to be submitted to the Bank by September 30, 2008, are overdue. We kindly urge that this gets submitted as soon as possible in compliance with the legal agreements.

Thank you for your kind attention and continued close monitoring of this important project and I continue to rely on your support and leadership to ensure that the issues raised above are urgently addressed. I am confident that the hard work of both the GoTN and the Bank team will help this project to continue on the right track. Please do not hesitate to contact Rabih Karaky (rkaraky@worldbank.org), the task team leader, or Anju Gaur (agaur@worldbank.org), co-task team leader in our New Delhi office, for any questions or clarifications on this letter or on the attached aide memoire.

With regards,

Yours sincerely,



Amadou Tidiane Toure
Acting Country Director, India

Attachment: *Aide Memoire*

cc: Dr. Alok Sheel, Joint Secretary (FB), Department of Economic Affairs, Ministry of Finance, Government of India
Ms. Kavita Prasad, Director (FB), Department of Economic Affairs, Ministry of Finance, 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. S. Rajarethinam, Secretary to Chief Minister, Government of Tamil Nadu
Mr. S. Audiseshiah, Secretary, Public Works Department, Government of Tamil Nadu
Mr. K. Gnanadesikan, Secretary, Finance, Government of Tamil Nadu
Mr. Surjit K Chaudhary, Principal Secretary, Agriculture, Government of Tamil Nadu
Ms. Leena Nair, Secretary, Animal Husbandry and Fisheries, Government of Tamil Nadu
Mr. Vibhu Nayar, Project Director, IAM WARM Project
Mr. Muniasamy, 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 13-24, 2008

Project Data		Current Ratings and Flag		
		Summary Ratings	Last	Now
<i>Board Approval Date</i>	01/23/2007	<i>Development Objectives</i>	S	S
<i>Effectiveness Date</i>	04/09/2007	<i>Implementation Progress</i>	S	S
<i>Closing Date</i>	03/31/2013	<i>Project flags</i>	None	None
<i>Original Loan Amount</i>	US\$485 million			
<i>Amount Disbursed</i>	US\$43.3 million			

I. Introduction

1. A World Bank implementation support mission¹ visited Tamil Nadu during October 13-24, 2008 to review the implementation progress of the TNIAMWARM project. The mission initiated its work with a series of meetings with the Multidisciplinary Project unit (MDPU) and the Head of Departments (HODs) of the various implementing agencies. It then proceeded to visit the following sub basins/districts Varahanadhi sub basin (Villipuram), Upper Vellar Sub basin (Salem), South Vellar and Pambar sub basins (Pudokottai), Manimuthar, Kottakarayar, and Pambar Sub basins (Sivagangai and Ramnad), Arjunandhi, Sindapalli Uppodai and Senkottaiyar sub basins (Virudhunagar), Aliyar and Palar sub basins (Coimbatore), Chinnar subbasin (Perambalur), Therkar, Upper Gundar (Madurai), to interact with the staff at the sub basin/district level and get a closer look at the implemented project activities. The mission would like to convey its gratitude and appreciation to all line departments, MDPU and WRO personnel for their hospitality and their time and efforts in facilitating its work by providing all information requested, and organizing field visits.

2. The mission is pleased and highly values the continued attention and support that the project continues to receive at the highest level in the GoTN. Field visits undertaken by the concerned secretaries and by the project director have been very helpful in monitoring implementation progress and ensuring that deficiencies are immediately attended to.

¹ The mission consisted of Rabih Karaky (Team Leader), Srinivasan Raj Rajagopal, (Water Resources Specialist), Anju Gaur (Water Resources specialist), Nagaraja Rao Harshadeep, (Environmental Specialist), Winston Yu (Water resources specialist), R K. Malhotra (Construction quality specialist), Anand Srivastava (Procurement specialist), Anupam Joshi (Environmental Specialist), Jagdish Anand (IT Specialist), B.S. Sathe (Livestock specialist), M.C. Nandeasha (Fisheries Specialist), Sitaramachandra Machiraju (Agribusiness specialist), Ben Obrien (Agricultural specialist), Prasad Modak (Consultant, Environmental management). Mohan Gopalakrishnan (Financial management specialist) visited the project in early October 2008 to look at financial management issues. Shankar Narayanan (Social Development Specialist) participated for one day. Genevieve Connors (Water resources specialist) also joined the mission for a few days to learn lessons from the Cooum Sub-basin work for a larger proposed river clean-up effort in other areas.

3. The project is now in its second year of implementation with project activities well under way in the nine phase I sub basins, and starting in the sixteen phase II sub basins. Work in 58 of the 67 Phase I WRO packages is under progress and the mission was assured that all first year works will be completed on time. Phase II works are also starting soon. Several line departments have successfully implemented their first year activities and some of their second year activities for phase I sub basins, and are starting implementation in phase II sub-basins. The Work on the cooum sub basin restoration and management (CSRMA) has also begun with the appointment of a nodal officer and the setting up of a CSRMA office.

4. The mission is also pleased to note that the project has succeeded in mainstreaming the preparation efforts required for the second year (and subsequent years) of project implementation, thus incorporating lessons learned from first year start-up delays and improving staff efficiency and productivity. The efforts of MDPU and the different implementing line departments, in this respect, are very much appreciated. The mission also commends MDPU for its close monitoring of project activities by conducting frequent visits to project activities sites, and helping in resolving bottlenecks.

II. Key Issues

5. **Bifurcation of the Public Works Department and Formation of a specialized Water Resources Department:** Two Government Orders have been issued for the bifurcation of PWD and the formation of a specialized WRD. The mission requested the Engineer in Chief (EIC) to furnish an update on the implementation progress regarding the bifurcation efforts. The Bank team has offered to assist the EIC in strengthening the newly bifurcated specialized WRD. It was agreed that the EIC would provide the update by November 15, 2008. An update has since been shared with the Bank.

6. **SWARMA:** The GoTN informed the Bank that the draft act for SWARMA has been cleared by the law department and is currently under a second round of circulation. The PWD secretary informed the mission that all efforts would be made for the draft act to be tabled in the November-December 2008 State assembly session, if possible. If not, then it shall be presented at the February-March 2009 session for sure. The mission stresses that the establishment of SWARMA, with legislative backing, is a dated legal covenant (December 31, 2007) under the project.

7. **Formation of WUAs** The mission has expressed its great concern regarding the slow progress in the formation of WUAs under the project, especially for Phase I and II sub basins where project activities have been underway. This situation is compromising the fundamental concept of the project to work with and target WUAs as project beneficiaries. There are around 2500 WUAs to be formed as per the Tamil Nadu Farmers Management of Irrigation systems (TNFMIS) Act in project areas. The primary responsibility of forming the WUAs rests with WRO, particularly the PIM cell. These associations are to be formed in a phased manner matching the sub-basins being brought under implementation in each year. Whereas the civil works and the various agricultural and allied activities are being implemented in Phase I and Phase II sub basins, this institutional building activity under the project has seen little progress.

8. Both the GoTN and the mission appreciate the importance of achieving immediate progress on this activity, despite the fact that the date of the legal covenant associated with the formation of WUAs is April 2010. In this respect, the PWD secretary was very supportive and gave his instructions that all efforts should be immediately mobilized by the WRO engineers to complete the necessary forms and hand them over to the various district collectors for publication, and that

the WUAs elections for Phase I and Phase II sub basins must be completed on or before December 27, 2008. The mission agreed to this date and worked intensively with the WRO engineers of the concerned sub basins to resolve bottlenecks in preparing the requisite documentation for the conduct of the elections by the agreed date. The office bearers of the WUAs have to be elected according to the provisions of the TNFMIS act. Number of activities involving preparation of village maps with survey numbers, data collection for the preparation of eligible voters list and other measures involved in notifying and conducting elections are required to complete the elections of office bearers and registration of WUAs.

9. The Project Director (PD) advised the mission that the information required can be collected within a shorter time-period with the cooperation of the District Collectors involved and their revenue officers. The mission visited most of the collectorates with the PIM cell staff and WRO officials to explain to the collectors the information required to be gathered. The Project Director also advised all the Collectors to assist the PIM team and WRO staff to complete this exercise as expeditiously as possible.

10. Given the crucial importance of this activity, the mission requests GoTN to monitor this activity at the highest level, including revamping the PIM cell, in case of poor performance. All activities leading to the elections would be closely monitored by the PIM cell under the supervision of the Engineer-in-Chief with the support of Project Director in working with the district collectors. It was agreed that all WUAs would be in place for the first and second year sub-basins by no later than December 27, 2008. The formation of phase III WUAs will also be completed as soon as possible.

11. **Irrigation Research Fund (IRF)** The mission worked closely with WRO and MDPU to initiate the IRF to be supported under the project along the lines of the WRRF. This fund is open to all stakeholders to participate. A brainstorming meeting was organized with several current and retired Engineers, and chaired by the PD and the EIC. (See Annex I for a list of suggested topics that were discussed). Participants identified the important need to effectively manage the IRF and ensure broad dissemination of research findings to various communities of practice. Possible outlets for publicizing this fund were also discussed (e.g. print, website, and library). It was decided that the IRF committee would consist of members from WRO (including the EIC, Chief Engineer, DRCS, etc.) and invited outside academics and civil society members who would serve on a rolling basis. An operational manual was drafted with the support of the mission, including eligibility requirements for proposal selection and evaluation criteria. WRO agreed that the requisite Government Order would be issued immediately to both establish the IRF and its committee. Establishing the IRF is a legal covenant under the project with a long overdue date (December 21, 2007) and with which the project has not yet complied. The mission stresses that non-compliance with project legal covenant may lead to downgrading of project implementation status rating, which could affect disbursement. The Bank team worked with MDPU and WRO staff in preparing the draft Government Order. It was agreed that the IRF and its research committee would be set through the GO by no later than November 30, 2008.

12. **Phase III of the project** The GoTN and the Bank agree that a balanced and parallel implementation of all project components is essential to achieve the development objective of the project. As the project gears off to begin the preparation and subsequently the implementation of phase III, the largest phase yet with 38 sub basins, it is essential that progress is concurrently achieved on a number of related activities to ensure smooth and successful implementation. These activities include: (i) initiating and making satisfactory progress on the formation of WUAs in phase III sub basins; (ii) addressing the key challenges encountered in project implementation so far (e.g. staff shortage issues); (iii) factoring in lessons learned (successes/areas of needed

improvement) in phase III planning; and (iv) finalizing all key consultancies, essential for proper design, implementation, monitoring, and quality management under the project.

III. Review of project implementation

13. The mission has reviewed the overall progress of project implementation. The mission commends the GOTN and the project authorities for their serious commitment and engagement in accelerating the implementation of project activities. Given the large size and scope of the project, there are naturally some areas in need of further improvement which the mission has identified during its visits and would like to bring to the attention of project authorities. Common findings among two or more implementing agencies are summarized below, and detailed findings for every implementing agency are treated thereafter. Further and more specific details are included in the annexes.

- a) **Staff Shortage:** (Agriculture, Ag marketing, Fisheries, WRO, Agricultural Engineering Department- AED, Animal Husbandry Department -AHD). This appears to be a common problem across many implementing agencies under the project. WRO has shortage of staff in the regional quality control laboratories. There is one joint Director from the fisheries department looking after department activities in two districts (Sivagangai, and Puddokotai) across four sub-basins, and she has no mode of transportation. In some districts Agricultural Department (Ag D) and Department of Horticulture's (DoH) many staff posts are vacant and there is also a problem with some turnover of staff in senior positions at the District level of sub-basin nodal officers. AHD (shortage of veterinarians) and AED are also suffering from staff shortages. There is one deputy director ag marketing who spends 3 days per week in Puddokottai district and another 3 days in Sivagangai district. The mission appreciates the early efforts that were taken to restructure the agriculture department and make more staff available to other departments. The mission urges that these efforts continue and that suitable steps be taken by the various line departments to fill up all vacant posts as soon as possible to avoid any negative impacts on project implementation. Staff vacancies should be reduced to no more than 15% to ensure proper project implementation.
- b) **Standardize reporting.** Reporting by line departments is still not consistent, neither within nor between departments, despite the presence of standardized reporting formats. In some instances, it was found that achievements are being reported based on inputs distributed rather than on actual area sown (DoH, AHD); It is recommended that the standardized format established by MDPU be strictly adhered to, and reporting gets done based on targets, commitments, and actuals.

WRO

14. The mission split into teams and made extensive field visits to selected Phase I WRO works under construction. General key findings are recorded in this section, with detailed package-wise observations and recommendations for improvement included in Annex III.

15. **Implementation progress:** Generally there is modest progress in the implementation of WRO packages with some regions performing better than others. Packages in the Pollachi region (particularly Aliyar sub basin) are progressing well. The progress in implementing the packages of the Chennai region is partially satisfactory given the small sizes of the packages. In Tiruchi region, the physical implementation of the WRO packages appears to be progressing fairly well, however in Pambar little progress has been achieved. The implementation progress of the Madurai region is less than satisfactory (25% progress has been achieved). On average, implementation progress in first year sub basin works is little less than 50%. The mission was

informed that there were 3 episodes of heavy unseasoned rains which rendered a lot of tank work impossible. The project, however, reassured the mission that the pace of the work has picked up and will continue at a faster rate and that all first year civil works will be completed within the 18 months contract periods.

16. Construction, and Quality Control / Quality Assurance (QC/QA) The mission also focused on the construction quality of works, construction procedures being adopted, and the extent of the adequacy of quality management system in place. An encouraging forward movement was observed to have taken place on the execution of masonry and concrete works to satisfactory construction quality and adoption of OK card system. However, the earth fill placement and its compaction on the strengthening of tank bunds remains a grey area and needs to be addressed. (e.g. site visited in Varanhanadhi sub basin). The mission was informed that the GoTN has taken action against errant officers. This is a welcomed good governance step. The mission recommends close monitoring of the contractors as well.

17. An encouraging feature observed by the mission being that contractors in some packages have since commenced mobilizing power rollers of various types including vibratory power rollers for undertaking mechanized compaction of earth work in some sub basin packages visited by the mission. However, this was found not to be the case in other sites visited by the mission. The mission recommends that WRO field staff pay particular attention to this issue. In order to ensure that correct construction procedures are followed and specifications are meticulously implemented, the mission suggested improvements to the current OK card system on tank bund works. A sample comprehensive OK card devised by the mission and agreed to by WRD is enclosed (see Annex III) for requisite adoption in the field. Also, taking into account the magnitude of the rehabilitation works and wide spread-out of these works, the existing quality management system needs to be appropriately strengthened through establishment of exclusive quality control divisions in Trichy, Pollachi, and Chennai regions through re-deployment, to strengthen the existing staff, who are doing a good job of laboratory testing. Laboratories need to be better equipped as well. It was agreed that quality control testing laboratories in all regions be made fully functional, duly staffed and equipped, with the needed tested equipment by December 31 2008.

18. Expeditious induction of the third party construction supervision and quality control consultant to fulfill the needed requirements of quality assurance is also required. In addition, field engineers, both on construction and quality control, need on-job orientation, guidance, and training to make them fully conversant with the correct construction procedures and the quality control requirements to achieve the objective of quality in constructed works.

19. In general site supervision by WRO engineers in non-performing sub basins should be closely monitored. It appears that regular supervision is not being carried out by the Assistant Executive Engineer (AEE) and the Executive Engineer (EE) in several of the packages visited. The mission recommends that appropriate action be taken to remedy and improve this situation. Superintending Engineers should get involved more in the monitoring and supervision of works.

20. Display boards are placed in all works visited. The mission was pleased to find that the recommendations from last mission to place display boards outlining the activities, including relevant cross-section drawings have been carried out. The WRO staff should continue to do the same for all packages.

21. Agreement Periods: The mission noticed that agreement periods seems to have been drawn up with little regard to volume of work, value of work, expected capacity of the contractor

to carry out the work and the capability of WRO to supervise the works. These agreement periods should be based on actual number of working days required and then adjusted at the time of signing of contract to take into account rainy seasons, holidays, etc. At present, the current practice is that, at the time of tender notification, no PERT charts are prepared and rational contract durations are estimated but an across the board duration of 18 months is being adopted. Since this duration is announced at the time of tender notice, if a contract is signed in October the contractor gets 18 months less two rainy seasons whereas if the contract is signed in February the contractor gets 18 months less one rainy season. This anomaly has to be corrected. The mission strongly recommends that all non-performing contracts be reviewed to assess the man-power and machinery requirements to complete the contracts within the scheduled period and all future contract agreements be drawn up based on a rational engineering approach.

22. **Contract Management:** In a number of packages visited, the contractor has not deployed the machinery required as per the contract. This has not been brought to his and WRO senior management attention by the field supervisors. This is one of the reasons for poor contract performance. The mission recommends that detailed construction activity charts be prepared taking into account the rainy season, religious holidays etc and the requisite machinery, manpower and resource schedules be derived from that. This would help in better contract management on a weekly basis. WRO staff also requires contract management training. Unless contract management improves, physical and financial progress would be slow and works would not be completed in the stipulated time

23. **Selection of Construction Materials:** Construction materials are being tested properly in most packages. The mission recommends that senior staff such as the SE and the CE ensure that these results are being incorporated in the designs.

Agriculture, Horticulture, Tamil Nadu Agricultural University (TNAU)

24. Generally the implementation of this component has been well executed and much credit must go to the three departments. Most of the targets set for first year Phase I sub-basins were met and significant progress has been made on second year Phase I and Phase II sub-basin activities.

25. The success of implementation of SRI continues to be a significant achievement of the project. The Commissioner for Agriculture, impressed by the technology, introduced by IAMWARM, has set a state target of 7.5 lakh ha of SRI for 2008/09. The lessons learned from SRI need now to be adapted to other project crops, such as pulses and maize, and fruit and vegetables so that similar achievements can be realized. The project has responded to the success of SRI by changing the focus of paddy demonstrations to SRI. This demonstrates dynamic management and is a positive indication for the future.

26. It was noted during field visits that field level staff are keeping records on the demonstrations conducted, which include details on the lot number, inputs provided, total subsidy, and follow up visits. Separate records were kept for yield data. It is stressed that there is need to once again ensure that the demonstrations are recorded and reported in terms of the actual area sown.

27. Generally the distribution of demonstrations appears to be sound using the scaling up factors e.g. 1 ha demonstration for 7 ha impact area for SRI and 1:10 ratio for other crops. However it was noted that in some areas there was a tendency to cluster unnecessarily large numbers of demonstrations with the presumption that the impact area will be in neighboring

villages/areas, for example in Tuvar (Manimuthar sub-basin) that has a reported area of paddy of about 160 acres there were 25 SRI demonstrations underway and another 20 planned by TNAU. While it is understood that these demonstrations are attached to different impact farmers, it would assist the project to geographically spread the clusters. The mission has recommended that the implementing agencies prepare maps which clearly show the proposed location of demonstrations during the planning phase. A base map should be supplied by the WRO that shows the implementation sequence of rehabilitation so that demonstrations can be coordinated with the improved reliability/delivery of water. These maps should be compared between agencies to assist in convergence.

28. The mission has been informed that impact area farmers are receiving technical advice, training and exposure visits, but no input support is provided. As such it is a credit to the project that to date a large impact area has been achieved.

29. In Upper Vellar sub-basin the village of Abhinavam an excellent example of convergence was visited. At the site a pond had been constructed and stocked with fish, a vegetable seedling nursery had been constructed, SRI was being grown and commodity interest groups have been formed. To build upon this initiative the District Collectors have been requested to suggest a list of villages equivalent to 16 per sub-basin where similar convergence demonstrations could take place. The project should ensure that project benefits are spread among several beneficiaries within these villages.

30. During the previous mission TNAU agreed to conduct a water balance investigation to scientifically determine the amount of water savings from SRI. Two measurement sites were observed, the first in Varagandhi using a partial flume and a second in Thekar using a V notch weir device. A further 40 ha of measurement sites have been established, but results have not yet come out. Research proposals for more comprehensive analyses on the water savings resulting from SRI may be solicited under the Irrigation rehabilitation Fund.

31. The Agricultural Technology Management Agency (ATMA), a GoI program was initiated in nine districts in 2006, and is this year becoming active in a further 19 districts. Wherever possible, linkages between ATMA, WUAs and project demonstrations should be promoted. While TNAU is achieving very good results in the field, at the close of the project the direct linkage between farmers and researchers will cease. To ensure farmers have continued access to technology it is recommended that the project benefits from the ATMA network to link farmers and WUAs to field schools (FFS), and researchers to Block Technology Teams. Also, as mentioned in the PAD, the project should make use of the District Strategic Research and Extension Plans (SREPS) to formulate DRPs for phase three sub-basins.

32. In general the results of the AgD demonstrations in 2007/08 have only had modest increases in yield as compared to those conducted by TNAU in the same crops (in the same sub-basins). For instance in Kottakaraiyar Basin yields for pulses, maize and groundnut were 0.56, 3.23 and 1.50 t/ha for AgD demonstrations while those of TNAU were 0.88, 4.33 and 2.10 t/ha respectively. This discrepancy was identified as partially the result of the higher level of support provided by TNAU during the first year. This was resolved to a certain extent when the decision was made to match the level of support with TNAU demonstrations, though the level of supervision by TNAU will still be much higher due to presence of SRFs. Yield results should be continuously monitored.

33. The Department of Horticulture highlighted the need for the employment of technical input persons (TIPS), however the mission recommends that this be done on a need-basis only,

especially that the department was still able to meet most of its targets without these staff. It is suggested that DoH staff work closely with AED staff to harmonize drip irrigation demonstrations with horticultural crop demonstrations.

34. It is understood that there is sufficient levels of training for village level support staff, however there is still the need for strengthening of sub-basin nodal officers, particularly now that the departmental restructuring process is complete. It is suggested that new nodal officers undergo full project training while existing officers receive refresher courses. The HODs need to provide project induction training with the assistance of MDPU to every new entrant to the sub basin. As there can be a high rate of turnover of staff officers, line departments with MDPU support have to develop a simple institutional memory mechanism for which new staff members can be rapidly appraised of project activities.

35. TNAU have made considerable progress in developing prototypes of automated machinery (for cono-weeders and transplanting of SRI seedlings). Though these are excellent initiatives, wider scale production of these machines should be carefully assessed based on the need and capacity of farmers for uptake. Furthermore it should be kept in mind that these machines are to be ultimately used by farmers through the WUAs once they are formed. In the case of SRI transplanter, it was noted that where seedlings produced in the field were used, there was a much higher incidence of gaps. TNAU could easily conduct an analysis of gaps on yield, to determine the impact of gaps on final yield.

Agriculture Engineering

36. The performance of the AED department under the project is in need of significant improvement. AED's project activities include micro-irrigation systems, pressurized underground pipeline and farm ponds. Procuring and installing micro-irrigation systems has been hampered by the legalities of reflecting the tripartite relationship between the supplier, farmer, and the department, and the subsidy issue in the bid document. This has now been resolved and the Bank has issued its no objection recently. Meanwhile, and in order not to stall the implementation of drip irrigation, the Bank has granted AED for the second year in a row a waiver to procure and install drip in 2000 ha following GOI procedure. Of these 2000 ha, 290 ha have been achieved so far, and the mission was informed that working orders for 882 ha have been issued.

37. **Low rate of Micro Irrigation System adoption:** There appear to be systemic problem in the promotion and installation of micro irrigation systems. AED needs to step up its canvassing effort's campaign to identify the target farmers who are interested in adopting micro-irrigation and prepare the list of beneficiaries for the intended annual target of 24,000 ha. Field visits have shown that the AED subdivision officers could do more to canvass the farmers about DRIP irrigation. The mission suggested that AED teams up with horticulture, when the beneficiaries' lists are being prepared, as it is likely that a subset of Horticultural farmers would be interested in DRIP irrigation, once they are informed of its benefits. Also the Support Organizations to be recruited for capacity building of WUAs can assist in the awareness campaigns. With the possibility of WUAs coming in place by end 2008, some of the awareness and extension issues may be resolved.

38. **Supplying over-designed system:** During one site visit, it was noticed that the systems were supplied over designed. For instance in one case, drip irrigation systems were provided at closer spacing than required to facilitate intercropping in Banana crop. In other case of Sugarcane, the drippers were provided with higher discharge rates than required. Actual drip systems are being designed by the suppliers and verified by AED staff. Over-designing the

system is possibly leading to an increase in its cost leading to the farmer getting only about 35% to 40% in real subsidy amount as opposed to 50% subsidy. It is hoped that the L1 bid approach recommended by the APC during project preparation, and which has been finalized would provide some relief to this problem by improving competition.

39. AED engineers should check and ensure that the systems are not over designed and are tested with clear indicators. For that, specific monitoring and performance indicators should be included in the specifications and in the tripartite agreement of the bid documents to make sure that the systems are designed correctly, as is stipulated in the no objection letter issued by the Bank. AED may not have adequate trained staff with the necessary computer software. If this is the case, then training and software may be provided. The mission requests that AED shares with the Bank the proposed monitoring/performance indicators. AED should also satisfy that there is no ponding beneath drippers and no surface runoff in case of sprinklers.

40. The mission is concerned that with the current business as usual mode, there is a serious risk that the overall project target of about 100,000 ha to be brought under micro-irrigation system may not be achieved. It was learned that, prior to and without IAMWARM project, AED typically undertakes 2000 ha of micro-irrigation systems annually. AED is therefore requested to come up with a strategic action plan to rectify the situation, and the Bank will provide needed assistance. It was agreed that AED would send their action plan to the Bank by December 15, 2008 for review and comments. AED is also asked to review the performance of its staff under IAM WARM and make necessary adjustments by December 31, 2008.

41. **Sprinkler** Sprinkler systems were shown in Varahanadi and South Vellar. In Varahanadi, the sprinkler system was provided one month ago while in South Vellar farmer uses during post monsoon season for groundnut and vegetables. Therefore it was not possible to see the system physically or operationally in the field. During installation, the performance of system should be monitored by noting if there was any surface runoff during irrigation.

42. **Pressurized pipe irrigation system** The pressurized pipe irrigation system was demonstrated in Chopkanathapurram. The system was designed based on annual water requirement of crops and was supposed to supply water requirement of 82 ha through two wells with a total yield of 268 lpm or 0.0241 ha m/day @15 hr pump run/day. Consideration should be given to supply from tank as was suggested in pervious mission. Pressurized pipe irrigation was meant to replace surface water channels from tank, and not to supply the water from bore wells. Moreover, one of the sites visited, has been selected next to a Sago mill which is creating competition with the groundwater requirement. If AED staff needs training in the design of pressurized systems from a surface water source, then this may be provided.

43. **Farm Ponds** Overall farmers are receptive of farm ponds. The mission recommends that site selection be made considering the rainfall pattern, and source of water availability. There is need to set selection criteria of sites and also develop guidelines so that implementing engineers are clear about the purpose of the activity. The mission cautions that farm ponds should not be drawing primarily on ground water for fish rearing. Instead they were to be installed as runoff ponds to provide supplemental water at critical production stages and incidentally derive additional positive effects from fish production. The mission has provided a sketch for proper construction methodology for farm ponds in Annex IV.

44. **Farm Mechanization:** AED wanted to revise equipments listed for handing over to WUAs, once they are formed. They enquired if power tillers could be included and the target for

Solar poly tunnels and chilly drier could be reduced. The mission suggests that an official submission be made to the Bank with full rationale and design details for further consideration.

Animal Husbandry²

45. **Farmers' training programs, interactive meetings, Infertility cum healthcare camps etc:** In order to create awareness amongst the dairy farmers about IAMWARM AHD program, several activities such as farmers' training programs, interactive meetings, distribution of educational material, holding infertility camps for treatment of animals and for supply of mineral mixture, de-worming medicines for calves etc at the camps were taken up by AHD field officers during 2007-08 and targets were fully achieved. These programs will also be continued in 2008-09. Mission is happy to note that AHD is confident that the targets of above programs for all sub-basins of Phase I and II, except perhaps the infertility camps, will be completed satisfactorily. During the mission's visits in both the years, it was observed that the selection of target beneficiaries was satisfactory and the response from farmers was very high. Mission appreciates the efforts made by the AHD in this regard considering the fact that this was a task of carrying an additional load of work by their field officers for the IAMWARM Project.

46. **Green Fodder Production:** Mission observed that the response from farmers to supply of fodder slips and seeds was very high and the targets for 2007-08 were achieved satisfactorily. AHD is confident that the targets for 2008-9 for phase I and II sub-basins will also be achieved fully. Mission appreciates the efforts done by the AHD field officers in this regard. Mission observed that transportation of CO3 fodder slips from the Government farm over a long distance to the farmers' fields located/scattered in distant villages is a problem. Mission observed that there is a good possibility of selecting some progressive farmers in the villages who can be trained and motivated to produce and supply green fodder slips to the nearby needy farmers. This procedure will also help to spread the green fodder program horizontally with a greater speed and achieve the long-term objective of a sustainable green fodder production program taken by the farmers themselves. The response from progressive farmers and AHD field officers to this suggestion was very positive. It is urged that AHD may initiate this activity, on a pilot scale, in a few selected sub-basins, in year 2008-09.

47. Mission observed that records were being kept on quantity of seed/slips supplied by the AHD to the farmer and the area available with him for fodder cultivation. However, data on actual quantity of fodder produced by the farmers was not available. It is recommended to start keeping this data, for accurate reporting and monitoring purposes, in each sub-basin. The AHD field staff reacted positively to this suggestion and agreed to develop the methodology for keeping records from 2008-09 in collaboration with MDPU and TANUVAS.

48. Mission visit to the fodder plots of Dairy Farm Chettinad indicated that as compared to CO3 fodder, CO4 gave more yield and was more succulent. It is likely that feeding CO4 helps get more milk yield. Mission suggests that AHD may conduct a small comparative feeding trial using CO3 and CO4 fodder at the farm and record the effect on milk yield. If CO4 feeding is found to give more milk yield, fodder slips of CO4 could be produced at the farm for supply to the farmers in IAMWARM project. AHD officials in Chettinad farm gave positive response to this suggestion.

49. **Procurement of Semi-Auto-Analysers (SA)** It is proposed to procure 5 SA to improve the efficiency of diagnosis of nutritional / metabolic disorders in animals. Mission noted with

² This section is still in interim mode, and is subject to change based on further discussions.

satisfaction that the orders for supply have been placed and SA are likely to be delivered very soon. The mission suggests that the SA may be placed in different regional DI Laboratories of AHD where large number of samples is regularly received for diagnosis of above mentioned disorders. It may also be ensured that each laboratory has a suitably qualified and experienced officer supported by a laboratory technician. It is further suggested that with a view to improve the efficiency and usage of the machinery/equipment, the concerned officer and technician may be deputed for a hands-down training of 3-4 days duration at the Veterinary Clinical Medicine Department of TANUVAS at Chennai.

50. Keeping records on cross-bred calves born from AI coverage, calf mortality and milk production: Mission was happy to note that few crossbred calves were produced with efforts of AI in the IAMWARM project villages and many more are likely to come up in near future. Mission appreciates the efforts done by the SEVG and the AHD field staff. Mission feels that now the time has come that farmers and SEVG are motivated to maintain proper records on the performance of these calves in terms of growth, sexual maturity, milk production, mortality etc. These records will help to determine achievement of the project during the impact/ monitoring studies. The methodology to keep these records at the field level needs to be developed. It would be desirable that the AHD along with MDPU may discuss the issue with TANUVAS to hold a brain-storming session/workshop to determine the methodology to start keeping the field data from year 2008-09.

51. Filling up vacancies of Self Employed Veterinary Graduates (SEVG) In 2007-08, after the issue of payment of honorarium to SEVG was resolved, some progress could be made in recruiting the SEVG. As of 10th October 2008, out of 65 SEVG required for phase I and II sub-basins, 48 are in position, leaving a gap of 17 SEVG. (It will be pertinent to note that additional 72 SEVG will be required when phase III sub-basins are taken up). AHD said that despite a few practical problems, it was trying to fill up the vacant positions. While the mission appreciates the steps being taken on this issue, it has urged AHD to fill up the vacancies of SEVG as early as possible so that the required activities of SEVG can be taken up in a time-bound manner. Mission has also urged that till the SEVG vacancies are filled, the targets of SEVG may be achieved by deploying the staff of AHD. The AHD has responded positively to this suggestion.

52. Likelihood of present SEVG switching over to the GOTN Jobs Many present SEVG have appeared for the recruitment examination of TN Public Service Commission for Veterinary Officers. The results are likely to be announced very shortly. If selected, they will opt for the Government jobs. This will have further problems in achieving the SEVG targets. It is urged by the mission that if the present SEVG are selected for the Government jobs, they may be retained in their present sub-basins and given the same task of SEVG, till completion of TNIAMWARM Project.

53. Achieving targets of Artificial insemination In the sub-basin level, there are separate targets fixed by AHD for AI by SEVG Unit and AI in infertility camps.

(a) AI Target for SEVG: In case of 9 sub-basins of phase I which were started in year 2007-08, out of the total target of 255000 A.I. for FY 2007 and 2008, the achievement up to 10th October was 25658 AI. In case of Phase II sub-basins which were taken up in year 2008-09, out of the total target of 36000 AI for SEVG, achievement up to 10th October 2008 was 2499 AI. The AHD informed that the backlog of AI in 2007-08 was filled by deploying the staff of AHD in the sub-basins to carry out AI using Government resources (semen straws, LN2 etc) and the same help will have to be given in the year 2008-09. Figures given by AHD HO official associated with the mission

showed that total AI done by the Government institutions in 9 sub-basins of Phase I during 2007-08 was 288817. These figures of AI are for all the villages in the sub-basins; separate figures for selected villages covered under SEVG Unit were not available. The mission suggests that for correct assessment of achievements of the SEVG units, the figures of AI done by the SEVG and by the AHD staff in the selected villages covered under SEVG Unit for years 2007 and 2008 may be assembled for all sub-basins of Phase I and II. The data could be further examined and discussed with AHD during the next mission.

(b) AI Target for Infertility camps: Out of the total target of 45000 AI for phase I sub-basins for years 2007 and 2008, achievement till 10th October 2008 was 26399 AI. For the sub-basins, of Phase II, out of the total target of 4500 AI for year 2008-09, the achievement till 10th October 2008 was 868 AI. The AHD officials said that the target will be completed satisfactorily by the end of the FY 2008-09 by deploying the staff of AHD. Apparently many infertility camps are being held outside the selected villages falling under SEVG. Therefore the AI figures can not be exclusively used to assess working of SEVG unit.

54. The mission has urged the AHD that considering the non-availability of SEVG, the given AI targets may be completed by deploying the staff of AHD wherever there is a shortfall in achieving the target. Mission appreciates the help so far given by the AHD in this regard. During the mission's discussion with the Secretary AHD and the Commissioner this point was highlighted. They assured that all required support will be given to fulfill the targets.

55. **Procurement of semen straws and Liquid Nitrogen (LN2)**: At present, semen straws and LN2 for the IAMWARM project are being procured by the respective Regional Joint Directors of AHD by calling quotations (local shopping). This is being done till such time TNLDA is approved to do this job. The Bank forwarded the procurement assessment capacity questionnaire to MDPU on June 18, 2008. The filled-in questionnaire was submitted to the Bank after a gap of over 4 months on October 20, 2008. The same is under review.

56. There is only one agency namely National Oxygen Limited Pondicherry (NOL) supplying LN2 to TNIAMWARM project and AHD. The AHD officials in Villupuram and Coimbatore districts informed that the company has reduced the supply drastically for in last few months, apparently on account of reduction of LN2 output in the factory due to frequent power shortages. If this position continues, it may lead to serious problems of non-availability of LN2 resulting into loss of semen quality. It is urged that AHD may keep a close watch on the supply of LN2.

57. During the wrap up meeting, Commissioner AHD said that as per bank NS procurement guidelines, quotations from 3 parties are required. However, in Tamil Nadu only one party (NOL) was quoting for LN2. The mission informed that since it was a procurement issue, this may be taken up with the Bank's procurement department.

58. **Difference in price of LN2 supplied to AHD and the IAMWARM project**. During the field visits, AHD officials at regional level mentioned that during 2007-08, the rates of LN2 quoted by NOL were same for AHD and the IAMWARM project. However, during 2008-09, the company was quoting a higher rate (Rs 20 / liter) for supply to IAMWARM project. as compared to the AHD (Rs 15/liter). The justification given by NOL was that the quantity of LN2 required for IAMWARM was much smaller as compared to the quantity required for the AHD. During the wrap up, this point was discussed. Mission suggested that since the ultimate user agency (AHD) for two projects is the same, there was no reason why the supplier should charge two

different rates. AHD was requested to discuss the issue with the supplier and ensure that rate of LN2 supply is same for the AHD and the IAMWARM project.

59. **Supply of veterinary Medicines/drugs etc by TNMC** The requirements of AHD as well as IAMWARM project are being procured by TNMC. Mission observed that there was considerable delay in the supply to TNIAMWARM. Mission appreciates that during the year 2007-08, medicines for IAMWARM project were provided, on a replenishment basis, by AHD out of its own stocks. Mission observed that even in 2008-09, there is a considerable delay in supply of medicines. For example, the medicines indented for the year 2007-08 were being received now and that too in smaller quantity. This was affecting the program of Infertility Camps under the IAMWARM project. Furthermore, requirements of 2008-09 may only be supplied by the fag end of the year. This will further hamper the progress of IAMWARM project. It is suggested that AHD may take up the matter urgently with TNMC and ensure that regular and timely supply is made to the IAMWARM Project

Fisheries

60. To hasten further progress of the successful beginning of the fisheries activities through the TN-IAMWARM project, the support mission suggests the following steps:

- (a) **Ensure adequate manpower** to provide technical support to farmers and document the results. There is shortage of manpower to carry out the activities and this aspect should be addressed early as the area of operation is expanding and farmers are seeking continued technical support to sustain the activity.
- (b) **Timely completion of farm pond construction** and transfer to Fisheries Department would help in timely completion of the activities. On most occasions, the farm ponds are built by AED and handed over to Fisheries Department just before the end of financial year. As there will be no water at that time coupled with non availability of fish seed, has been resulting in the postponement of aquaculture activity.
- (c) **Use family approach targeting both husband and wife** in all the training and intervention activities. At present, only the head of the family who is generally husband participates in training and all activities by the department is focused on the head of the family. Hence, change of strategy to empower both men and women with knowledge and skill is suggested.
- (d) **Diversify fish species and fish culture practices** to enhance aquaculture productivity in the project area. At present only Indian Major Carps namely Catla, Rohu and Mrigal are promoted as per Detailed Project Report. It is recommended to include 3 other carps available in the country namely Silver carp, Grass carp and Common carp to be promoted in the project. In addition, improved strain of GIFT tilapia now being permitted by the Government of India should be considered for introduction in the project.
- (e) **Promote knowledge based fish marketing strategy** through fish kiosk to enhance fish consumption. Information available on the health benefits of fish should be displayed in vernacular language in fish kiosk.
- (f) **Build capacity of the project staff on technological progress** accomplished in fisheries to have improved output from the project. Staff knowledge on diversified aquaculture technologies like integrated fish farming, cage culture of fishes and ornamental

fish culture should be strengthened by exposing them to apt knowledge and places where such accomplishments have already been made.

(g) Ensure proper documentation of the results for scaling up of activity within and outside the project area. Project has made good progress in nursing of fish seed in cages. The data available from the first phase should be analyzed and used for further planning.

(h) Expand the Aquaculture in irrigation tanks: This component was included in the second year sub basins and in Swethanadi basin, three tanks (total of 53 ha water spread area) have been stocked. It was reported that remaining irrigation tanks will be covered once adequate water is received.

Detailed information are presented in the enclosed annex V.

Agriculture Marketing and Agri-Business

61. The mission reviewed the progress made by the project under agricultural marketing component and discussed the revised DPRs for Phase II sub-basin. The mission informed the project that prior approval to Phase II sub basin plans is required before any expenditures are incurred, if these expenditures are to be reimbursed by the Bank - Phase II DPRs for Ag marketing were sent to the Bank on Oct 20, 2008 and are currently under review.

62. Visits were made to Varahanadi sub-basin (Villupuram), Upper Vellar sub-basin (Salem), Palar sub-basin (Coimbatore) and Parambikulam Aliyar sub-basin (Coimbatore) to review the progress in agri-marketing component. The mission interacted with Jain Irrigation, MGP Farmers Federation and Banara Growers and Traders Association. The mission facilitated a brief meeting with International Finance Corporation to explore collaboration opportunities between their investee companies and farmers covered by the project.

63. *Staff position:* Considerable number of district level staff positions in Commissionerate of Agricultural Marketing (CAM) is still vacant. Suitable steps may be taken to fill up all vacant posts as soon as possible. The project has decided to contract agri-business professionals for placement as 'Marketing Facilitators' (MF) for each sub-basin. Two persons have since been recruited and placed in Palar and Aliyar sub-basins and the project agreed to complete recruitment for remaining positions by the end of Jan 31, 2009.

64. *Staff trainings:* The project must give top priority to provide training to CAM staff on aspects related to agri-marketing and private sector led agri-business models. These could include exposure to ITC E-Choupal (TN, AP, MP), Mahindra Shublabh (TN, AP), DSCL Kisaan Hariyali Bazaars (Haryana, PJ), Contracting farming initiatives like Jain Irrigation (Maharashtra), Producer Companies set up by Covenant Center for Development's (TN) and Dhan Foundation (TN), AP Rural Poverty Reduction Project and MP District Poverty Initiatives Project. Similar visits to value chain coordination site in agri-commodities and fresh fruits and vegetable sectors would be useful.

65. *Value chain studies*: The importance of value chain study for certain key strategic crops/commodity sub-sectors cannot be over-emphasized. WB cleared the ToRs for value chain study covering market oriented crop diversification and product studies proposed by the project. The project is working with few private sector companies for market linkage with certain important crops like maize, chillies, fruits and vegetables, etc. It was agreed that product specific studies for key commodities, rather than a comprehensive broad study, would be conducted to strategically engage value chain partners. The same TORs could be adapted after reducing the scope. The Bank team will work with the project team in November to revise the TORs.

66. *Capacity building of Farmer Groups*: During the field interactions, the farmers provided feedback on the capacity building activities of the project. They found post harvest trainings and exposure visits outside the State very useful. The farmers requested for enhanced capacity building support during the entire crop duration (in both pre and post harvest phases). While continuing with direct trainings and exposure visits, the project has also proposed to use best practitioners in agri-marketing for extending the reach of community level trainings. The mission recommends the project to develop a coherent strategy for capacity building of best practitioners and their engagement for village training. Focus of these activities could include crop management, post harvest processing, quality improvement, value addition, commodity marketing, etc with focus of such trainings will be on ways to increasing unit value realization of farm produce and reduction in production, processing and marketing costs for individual farmers.

67. *Agri-business Centers*: Buildings for Agri-Business Centers (ABCs) are nearing completion in about five sub-basins. The works have been initiated in another four places. The mission visited one completed ABC in Yembel. The project is advised to immediately work out business models for the nine ABCs to ensure their viability/sustainability and replicability. 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 models below for facility management and provision of agri-services to the farmers in the Phase-1 sub-basins. The Bank team will assist in providing information and guidance examples on how the models below may be piloted. It was agreed that the project will send to the Bank an action plan describing steps to be taken to pilot various models for ABC facility management by Nov 30 2008.

- *Franchisee* of private sector agri-business company
- *Producer collective organization* affiliated to NGO/Farmers' Federations
- *SME* run by agri-professionals experienced in managing agri-clinics
- *Departmental initiative* but physical infrastructure leased out to private parties.

68. DAM/MDPU may like to explore different business formats for ABCs that exists in the country including Covenant Center for Development's Gram Muligai Company Limited (TN), MGP Farmers' Federation (TN), Indira Kranti Patham (AP), South Indian Federation of Fisherman Societies (Kerala), Mahindra Shublabh (TN, AP), Rallis Kisan Kendras (MP), ITC E-Choupal (AP, MP), Tata Kisan Sansars (UP, Haryana, Punjab) and

DSCL Kisaan Hariyali Bazaars of (Haryana, Punjab). However, it is pertinent to note that each of agri-service models mentioned above differ in terms of the service offering, revenue streams and organizational form.

69. *Dialogue with Private Sector:* The mission was informed about project initiatives in firming up partnerships with processing firms for procuring maize, chillies, coconuts, fruits and vegetables. The mission recommends the project to create incentives for both producer and buyers to build longer-term relationship for value chain coordination. The project agreed to engage private sector in a strategic manner and organize an "Agri-business Conference" during March 2009. The Bank team may assist in recommending potential speakers. 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. Chennai Office of International Finance Corporation offered to facilitate meetings with their investee agri-business companies and partners in this endeavor.

70. The mission interacted with one such partner, Jain Irrigation that has diversified interests in irrigation systems, bio-technology, fruits and vegetable processing, etc. It is working around banana value chain in Coimbatore and Theni area and established strong value chain linkage with banana farmers and traders. It is supplying tissue culture based plant material for banana and providing marketing support. There exist considerable scope to develop and extend banana value chain in both districts by encouraging investment in value chain infrastructure like ripening chambers, cold storage and refrigeration based logistics by private sector. The project has also engaged with a large export house engage in export of chilly extracts and oleoresins. The project may develop an action plan by November 30, 2008 for value chain development for chilly crop in Sivagangai, Theni and Virudhunagar areas and formalize marketing arrangements. The Bank team specialist will be visiting Chennai in early November 08, and will assist in the development of the action plan. On the similar note the project has tied up with Marico Industries for supply of 5 MT of copra every week from Pollachi area in Coimbatore district. The company has offered to provide training and capacity building support for coconut growers on quality improvement and grading. It is worthwhile to consider complementing the strategy with a dedicated supply chain infrastructure like ABCs or collection centers for chilly and copra farmers in the project area. Similar scope exists for optimizing value chain efficiency for maize farmers tied with Suguna Feeds and Santhi Fortunes in Coimbatore area..

IV. Procurement

71. The mission reviewed the status of the Procurement with GOTN and an agreed action plan was prepared. The procurement of major items planned for the year as per Procurement Plan were reviewed. The PD agreed to provide the current status of these packages. The status of some of the packages reviewed and action plan is attached as Annex II.

72. The bulk of the Procurement under the Project relates to rehabilitation of tanks and is to be executed by the WRO. Project informed that out of the 67 first year packages (including post review cases), 58 packages have been awarded, and 9 packages were re-bid. Out of these 9 packages for 4 packages, 2 bids have been received, for 1 there was no response, and in balance 4 cases single bid has been received. Bid evaluations and recommendation for this will be expedited and sent for Bank's review. The proposal for re-invitation for 1 package for which no

bid was received will be sent to the Bank for review with justification and details of action proposed for increasing competition.

73. The mission has informed that the post review cases under the Project would be subject to review subsequently as a normal post review procedure. The mission requested the PD to provide the list of all contracts awarded during the period of July 01, 2007 to June 30, 2008, by October 31, 2008.

74. Mission was informed that the Project has started incorporating price adjustment clauses in the bid documents for the contracts with construction period of 18 months or longer. The mission also suggested that price adjustment clauses may be provided in contracts exceeding 6 months to mitigate risks related to volatility of prices of inputs to contractors, as is being done in other states. During the wrap-up meeting, the finance secretary informed that a clause for the 6-12 months contract already exists.

75. While the price adjustment takes care of risk related to the price volatility during the implementation period, the gap between the current market price and the estimate prepared by the Project is still not addressed. To address this risk, the mission suggested that future bids should be invited based on realistic estimates and on SOR that includes all relevant factors, particularly overheads; profit for contractors; applicable taxes and levies; updated current market rates of inputs (both material and labor), including cement, steel, bricks, sand, stone chips/ballast, and other relevant materials etc. as applicable for the item. The BoQ should be reviewed to ensure greater accuracy.

76. Capacity building of procurement teams of line departments and WRO. PD informed that MDPU has now 5 members in team and the mission noted that MDPU had built a good team to support the procurement under the project. The capacity of the line departments to undertake the procurement, in line with WB methods, remains a grey area in need of improvement. The Mission suggested that the Heads of Procurement of MDPU and all line departments and all members of MDPU procurement cell (on rotation) be nominated for intensive training in ASCI, Hyderabad or NIFM, Faridabad or ILO Turin. Other local training venues could also be explored, if available. During the Wrap-up meeting the finance secretary informed that the Technical assistance fund (TAF) could be utilized to finance the procurement training.

77. The mission expressed that now the strength of the Procurement cell in MDPU should be fully utilized and all the procurement documents and correspondence of all the departments should be routed through MDPU. The department procurement cell (DPC) would review all procurement document/communications to ensure their quality and uniformity. MDPU will provide the management support and coordination for all procurement to be carried out by the different implementing agencies, as required. MDPU will then forward these documents to the Bank for review/no-objection after reviewing them for quality and consistency with WB guidelines and Standard Bidding Documents requirements as agreed in the Loan/Credit/Project Agreement.

78. Procurement status of all line departments was also discussed with the concerned Departmental representatives and next steps were identified. Some common issues needing attention were highlighted. These relate to the need for incorporating broad based neutral specifications and determining the market availability, especially incase of new type of agriculture implements.

79. *Computer equipment and installation of communication infrastructure:* Procurement Plan related to Computers and Peripherals, Computer Furniture, as well as the Procurement of LANs, improvements in the field offices of WRO where these computers will be installed and WAN in the offices of WRO were discussed for revision and appropriate packaging. The revised procurement plan was recently furnished to the Bank for review. The Bank has since reviewed and cleared a number of packages, while seeking some clarifications on the remaining packages before issuing clearance for those.

80. Project informed that in case of the procurement of rotavators the proactive approach (such as wide publicity, presentation to the prospective bidders on the bid structure and risk mitigation measures etc.) taken by MDPU helped to increase competition. The mission suggested that the details of this commendable effort should be captured in a *case study* and disseminated to all line departments in the Project and also shared with the Bank.

81. Mission informed that the packages above the prior review threshold as per Project Appraisal Document (PAD) and those specifically agreed in the procurement plan for prior review (as first package) only need to be sent to the Bank for prior review. The rest of the packages which would be subject to post-review need not be sent to the bank for its prior review. Detailed status of various procurement packages and consultancies are included Annex III.

Consultancies

82. *Monitoring and Evaluation:* With project activities already under implementation in phase I and Phase II sub basins, it is absolutely essential that the contracting of the Monitoring and evaluation consultancy gets finalized immediately. Valuable time has been lost on interpreting Bank procurement guidelines related to the eligibility of firms for short listing in the past. The Bank and GoTN worked for quite some time on resolving this issue. Things have since progressed and the Bank has issued the no objection for the technical evaluation report and it was agreed that the combined evaluation report along with the recommendation of the winning firm and a copy of the agreed and initialed draft contract will be forwarded to the Bank for review and no objection by November 21, 2008, following which the consultancy would be immediately finalized.

83. *Construction Quality management and technical supervision:* TORs were cleared by the Bank on Aug 08, 2008. Short list was received by the Bank on October 22, 2008. It was agreed that the consultancy would be awarded by March 11, 2009. The mission noted its concern that the budget allocated to this consultancy 5 crores (vs 15 crores as was specified in the PAD) is low given the excessive large quantity of civil works that are implemented under the project. The mission shared this concern with GoTN and has received assurances that the selection of the consultant would not be constrained by the revised low budget.

84. *Topographic and Cadastral Survey:* The revised technical evaluation report was received on October 17, 2008, and is currently under review. A detailed time table for processing this consultancy has been prepared and it was agreed that the consultancy would be awarded by December 31, 2008.

85. *Enterprise Information Management Systems:* The mission has received the revised procurement plan for the IT component in the project in which this consultancy is included. Again, it was noted in the revised PP, that the budget for EIMS consultancy is reduced from 20 crores as stipulated in the PAD to 4.5 crores. The mission will review the TORs which were

received recently to determine if this big drop in budget is justified. The mission recommends that the REOI gets immediately published, after it is cleared by the Bank.

86. Support Organization for the mobilization and capacity building of WUAs. The mission had a lengthy discussion with the project authorities on this consultancy assignment. Two options were discussed. These options were forwarded to MDPU via Bank email dated October 13, 2008. Project would take a decision to move forward in one direction best suited to the Project. The estimated contract value being below the prior review threshold, the process does not require the prior review by the Bank.

87. Decision Support Systems The Decision Support Systems (DSS) Consultancy, to be managed by CE, IWS was also discussed. Since this is a relatively new area of work for IWS, the mission discussed in detail DSS concepts and examples and how this can be adapted for the proposed work. The mission received a draft of the DSS ToR and will assist IWS in its revision based on discussions held on the scope, timing, and spatial focus. The mission also urged publishing the EOI, after a draft is shared and cleared by the Bank, at the earliest to ensure that the Consultancy would also be useful for defining project activities in targeted sub-basins.

88. Timely processing of procurement documents: The Bank and the GoTN agreed to work together to ensure that all procurement and consultancies related issues are addressed in a timely manner and with no delays from either side.

V. Financial Management

89. The overall FM performance is considered moderately satisfactory. There is adequate budget provision for the year 2008-09 (Rs 590 crores), there are no constraints in funds availability with the various implementing departments and the IFR for the quarter ended June 30, 2008 has also been submitted. The project has selected the consultant (CA firm) for internal audit and the contract is expected to be signed by the end of October 2008. During the mission a discussion was held with the selected firm to discuss the scope, key issues and presentation of the internal audit report. The project also shared the comparison of sub basin wise DPR costs, DPRs annual budgets, and actual expenditure till date (June 30, 2008) and it was agreed that the same will be provided semi-annually (with every other IFR and together with the six month progress report) on an on-going basis. In addition contract details and expenditures by contract are being compiled and will be submitted to the Bank by December 31, 2008.

90. The key issue to be addressed by the project is the quality and timeliness of the financial reports being sent by the various implementing departments which form the basis of the quarterly IFR. A review has indicated that (a) financial reports have not been complete (Agriculture Dept) and in a few instances advances have been reported as expenditure (Fisheries and Agriculture Marketing). This has resulted in the Bank having to make deductions while approving the claims for re-imbursments. It was agreed that the following quality assurance mechanisms will be put in place for internal review process before submission of IFRs.

- a. Internal consolidated financial report to be signed by both the nodal officer and the finance officer of each line department before submission to MDPU.
- b. Checklist to be developed which will be completed by each department confirming the internal controls applied before submission to MDPU. This will include no. of entities from whom report is missing, if any, status of reconciliation with AG, confirmation that no advances have been reported as expenditure etc

- c. The training handbook will be translated in Tamil and shared with the field offices of various line departments.
- d. MDPU will obtain the monthly accounts from the AG (A&E) and compare the same with the expenditure reported by the line departments for significant variances.

91. The external audit report is now overdue due and is expected to be submitted by November 30, 2008. Further delays in submitting the external audit report may lead to suspension of disbursement.

VI. Environmental & Social issues

92. During the previous mission it was agreed that by May 2008 an Environmental Specialist would be recruited in MDPU and an officer of the level of the Superintendent Engineer at WRO would be given charge of the regional environment cells (Chennai, Coimbatore, Madurai), which has not yet happened. An Executive Engineer in the MDPU is currently holding additional charge of the Environment Cell. Due to lack of a skilled environmental specialist, facilitation of ESA implementation, appraisal of sub-basin plans from an environmental perspective (with appropriate checklists for each sub-basin/package) and consolidated monitoring and reporting on environmental aspects across implementation agencies is not taking place. The project authorities agreed to depute/appoint one young enthusiastic environmental engineer who could proactively undertake independent monitoring of ESA implementation and also enhance positive environmental gains of the project through replication at other sub-basins. It was agreed that orientation, training and capacity building of the environmental engineer would be undertaken once he/she joins MDPU.

93. The mission noted that only few awareness activities have been undertaken so far, however, a number of activities have been proposed for the current year. The mission suggested that the Environmental Cell should undertake an evaluation of compliance status with the provisions of the ESA. Furthermore, the Environment Cell will monitor selected project investments to see whether the concerned departments are putting in place the mitigation measures, as given in the ESA. The mission was pleased to note that regular water and soil sampling is being undertaken and integrated in the project GIS. The mission suggested to also analyzing presence of any residual pesticides and fertilizers in water, soil and crop samples.

94. The mission interacted with the Director, TNAU to discuss methodologies for estimating methane emissions from conventional paddy and SRI farms so as to develop a proposal for generating carbon credits. It was agreed that TNAU would list the possible methodologies and share with the World Bank, through MDPU, and also identify SRI and conventional farms (control plots) where experimental setup could be placed for measuring methane emissions.

95. **Social safeguards-** The agreed Environmental and Social Management Framework (ESMF) for the project requires that all project affected people (such as those who lose assets or livelihoods or have to be resettled) including those who are being removed from "encroached" land due to a project intervention should be provided adequate assistance to retain or improve their standard of living. Lack of title to the land is no bar for providing such assistance. In accordance with this provision in the agreed ESMF for the Project, the project shall carefully document each case of such project affected people and ensure that the Resettlement Action Plan for each such Project Affected Person (PAP) is carefully developed and approved by the Bank before being implemented to ensure that the affected person is able to at least retain if not improve his or her standard of living.

VII. Governance & Accountability Action Plan (GAAP)

96. The GAAP plan as agreed under the project, and included in the PAD features the following key elements: (a) enhance disclosure of information, (b) facilitate civil society involvement; (c) Develop a credible system to handle comments, suggestion, and governance, (d) define clearly incentives and remedies available, and (e) Develop monitoring indicators for compliance with the above elements and for impact on outcomes.

97. The mission positively noted that the OK card system, which requires farmers' representatives (later on WUAs) among others, to participate in monitoring the progress WRO civil works, appears to be well adopted under the project. Furthermore, the project has a very well designed and rich website where information and documents, related to the project is disclosed. The mission also recognizes the good governance step taken by the PWD secretary in suspending errant officers in Varahanadhi sub basin, because of the low quality of civil works implementation there. This is a commendable measure that sends a firm message for all nodal officers across all project sub-basins.

98. The Bank team will work with the GoTN to continue to address the key elements of the GAAP plan. In this respect, the formation of WUAs for Phase I and phase II by December 27, 2008 and their wider participation in monitoring construction works, along with the accelerated engagement of key consultancies such as M&E, MIS, support organizations, and third party technical quality supervision of works will contribute significantly to the main elements of the plan.

VIII. Other issues

99. **Water Resources Research Fund** The Water Resources Research Fund (managed by CE, IWS) was set up under the TN WRCP project and has financed over a hundred inter-disciplinary water-related studies. Even after the closure of this project, the fund has commissioned studies using the corpus created after reimbursement as per the agreement with the GoTN. Under IAMWARM, the WRRF is expected to continue its activities along similar lines to the last project. The mission noted that this is not yet taking place and advised that should additional resources be needed by the WRRF to carry on its program activities, these resources can be made available from the project (possibly from the IRF allocation, if needed). The research advisory committee would meet to outline new topics for consideration in a new round, and proposals sought, evaluated, and awarded at the earliest. Clear distinctions must be made between the topics covered under WRRF and IRF. In addition, the mission recommended that previous (and all future) WRRF studies publicly available on appropriate websites to further strengthen dissemination efforts.

100. **Project progress reports** Progress reports are to be furnished to the Bank every six months with one annual report on outcome indicators to be submitted as well. The next progress report is due on October 31, 2008. It was agreed that the next report shall incorporate both physical and financial progress, package-wise (all WRO packages, and all other line department packages beyond a reasonable threshold for each line department – threshold limit to be agreed upon).

101. **Cooum Restoration & Management** Though the Cooum is only one of many sub-basins under the project, it has a unique characteristic in terms of rural-urban connection of issues and critical and sensitive nature of problems. The Bank has acquired additional resources to recruit consultants to assist the project in preparing an integrated framework for a sub-basin plan for the Cooum. The Cooum Sub-basin Restoration and Management (CSRМ) activity is underway. A

CSRM nodal officer has been appointed for the newly setup CSRM Office. The Chennai Basin SE and staff have just refurbished an office for the CSRM and are in the process of appointing one EE in charge of the Cooum sub-basin with appropriate fiduciary powers and budget. In addition, the Chennai Corporation, metrowater and the University of Madras have deputed a person each for the CSRM office. It was agreed that the necessary orders for carving out a Cooum division in WRO from among the existing divisions would be carried out by no longer than November 30, 2008 and the CSRM would start functioning on the same date.

102. The mission undertook field visits and held detailed discussions with a number of stakeholders, including at a Stakeholder Workshop convened to brainstorm on CSRM issues and options. (See Annex VIII). The mission stressed the need for focused and timely work on the Cooum to provide an integrated framework for IAMWARM and other investments in the sub-basin, as well as provide lessons for investments on Adayar (Phase III sub-basin) and other sub-basins with similar problems. A summary of field observations for cooum is presented below, with more details in Annex VIII.

a. Nearer the city some tanks are not being used for irrigation and some have been encroached by urban dwellers. These tanks can be used as flood storage mechanisms with pre-determined releases to the river through automated controls. This would ensure ecological flows in the river reach through the city. The Bank team will assist the CSRM office to initiate the necessary surveys and designs in this regard. It was agreed that initial GIS work would commence by no later than November 30, 2008.

b. Initiating awareness-building activities (immediate upgradation of the prototype Cooum website; discussions with government agencies, schools/colleges, NGOs, private sector and other stakeholder groups; launching a Cooum design competition, etc.). This will include a new set of targeted stakeholder meetings that moves away from WRO/MDPU to various locations along the Cooum. It was agreed that awareness creation activities will be started by no later than 30 November 2008.

c. At the mouth, dredging is to be done on a continuous basis to keep the mouth open and to take advantage of the tides in maintaining acceptable water quality in the last five kilometers. It is essential that detailed mathematical as well as physical model studies be initiated immediately. It was agreed that decision on the modeling of the river flow system with tide regulation through automatic gates would be taken by no later than November 30, 2008.

IX. Communication with the Bank

103. The mission requested that all communication with the Bank should be done through MDPU. The different implementing agencies would kindly appreciate that it would not be possible for the Bank to communicate with all eight departments separately and in the spirit of convergence, all correspondence ought to be routed through MDPU who will review and scrutinize the documents to ensure their quality and uniformity before forwarding them to the Bank.

IX- Agreed Actions³

Action	Responsibility	By
SWARMA: Review completed and act presented to state legislature – (paragraph II-2)	WRO, MDPU to follow up	Nov-Dec 08/March 09
IRF activation GOs (fund, committee) - (paragraph II-7)	Engineer-in-Chief, WRO	30-Nov-08
WUAs elections finalized in Phases I and II sub basins of the project (paragraph II-6)	WRO; MDPU to assist	27 Dec-08
WUAs elections finalized for Phase III sub basins (paragraph II-6)	WRO, MDPU to assist	As quickly as possible
EIC to provide an update on the status of the Bifurcation efforts (paragraph II-1)	EIC, WRO. MDPU to follow up	15-Nov-08 (was sent)
Develop a standardized reporting system for all project activities and have it in place (paragraph III-1-b)	MDPU	15-Nov-08
Installation of computers - (paragraph IV-9)	WRO/MDPU	31 Dec-08
Various Procurement issues – See Annex III		
DSS EOI Published (paragraph IV-17)	CE, IWS	30-Nov-08
Contract for Internal Audit Consultancy to be signed (paragraph V-1)	MDPU	31-Oct-08
Submit IFR for September 30, with the agreed QA mechanisms (see text on FM) and the sub basin wise DPR, sub basin wise annual budgets, and cumulative costs (paragraph V-1)	MDPU	15-Dec-08
Submit external audit report for the year ended March 31, 2008 (paragraph V-3)	MDPU	30-Nov-08
Submit the contract wise expenditure details as of June 30, 2008 and then as part of the six monthly progress report (paragraph V-1; VIII-2)	MDPU (FM and procurement)	15-Dec-08
Submit six monthly progress report as of April 30, 2008; including package-wise information on physical and financial progress (all WRO packages, and all other line department packages above a specific threshold for each line department to be agreed upon) (paragraph VIII-2)	MDPU	31-Oct-08
Provide the list of the contracts awarded during the period of July 01, 2007 to June 30, 2008 for post review. (paragraph IV-3)	MDPU	31-Oct-08
Award the Consultancy for Construction Quality Management and Technical supervision (paragraph IV-13)	CE, DRCS/WRO	11-Mar-09
Establish separate Quality Control Divisions under the respective Chief Engineers, Trichy, Pollachi, and Chennai Regions through deployment.	(EIC / WRD)	31-Dec-08
Quality Control Testing Laboratories in all regions be made fully functional, duly staffed and equipped, with the needed testing equipment. (paragraph III-4)	CE, DRCS / EIC / WRD)	31- Dec- 2008
Meticulously enforce OK card system on the strengthening of tank bunds through adoption of enclosed OK card form (paragraph III-5)	EIC / PD – MDPU	Henceforth
Arrange to carry out improvements in the various works suggested in the enclosed Mission Field Report. (see Annex)	EIC / PD – MDPU / Regional CE's)	Henceforth

³ Actions agreed were as of the end of the mission, and as revised in following drafts.

CE- DRCS, along with the respective Regional CE to conduct and complete on-job discussion sessions with the field engineers to make them fully conversant with job-specific technical specifications, construction procedures, and quality control requirements. (paragraph III-6)	CE, DRCS, Regional Chief Engineers	31-Dec-08
AED to submit its action plan for improving the implementation of its activities (paragraph III-25)	AED	15-Dec-08
AED to review performance of its staff under IAM WARM and make necessary adjustments. (paragraph III-25)	AED	31-Dec-08
Complete recruitment for remaining Market Facilitators positions (paragraph III-58)	MDPU/DAM	31-01-09
Project will send to the Bank an action plan describing steps to be taken to pilot various models for ABC facility management. (paragraph III-62)	MDPU/DAM	31-Nov-08
Deputing/Appointing a full-time Environmental Engineer at MDPU for supervising the implementation of the Environmental and Social Management Plan in the Env & Social Assessment (for project activities) (paragraph VI-1)	MDPU	31-Dec-08
Assigning a full-time Superintendent Engineer level staff at WRO in charge of Regional Environment Cells to institutionalize mainstreaming of environmental considerations into WRO activities (during and beyond project)- (paragraph VI-1)	WRO	31-Dec-08
Evaluation study for checking the compliance of sub-basin plans with proposed measures in the ESA- (paragraph VI-1)	Environment Cell	31-Mar-08
Cooum – EE appointed for CSRSM with appropriate fiduciary powers and budget- (paragraph VIII-3)	Engineer-in-Chief, WRO	30-Nov-08
Cooum- Necessary orders for carving out cooum division (paragraph VIII-3)	Nodal Officer, CSRSM- WRO	30-Nov-08
CSRSM begin functioning from its temporary location and initiate efforts to finalize location for permanent location. (paragraph VIII-3)	Nodal Officer, CSRSM	30-Nov-08
Cooum- Initial GIS work to start (paragraph VIII-4 a)	Nodal Officer, CSRSM	30-Nov-08
Cooum- Initiate awareness creation activities (paragraph VIII-4 b)	Nodal Officer, CSRSM	30-Nov-08
Cooum- Decision on the modeling of the river flow system with tide regulation to be made (paragraph VIII-4c)	WRO- Nodal Officer, CSRSM	30-Nov-08

Annex I- Possible Topics for the Irrigation Research Fund (IRF)

The objectives of the IRF are to: (1) introduce innovative types of approaches and technologies for irrigated agriculture in Tamil Nadu and build a framework for encouraging appropriate research on these aspects; (2) improve ability to pilot and promote awareness of state-of-the-art technologies and systems for improving irrigation and drainage; and (3) improve partnerships with WRO and outside agencies/experts to improve modern multi-disciplinary irrigation management, including technical, social, environmental, economic, and institutional aspects.

Irrigation and Drainage Technology

- Design Innovation (including hydrologic design requirements)
- New Irrigation & Drainage Technologies
- Conjunctive Use (including efficient recharge)
- Dam/Tank Safety
- Improved tank systems management
- Environmentally-sound technology development and deployment (including effective management of weeds, pests, silt, pollution, ecosystem management)
- Effective management and alternatives to sand mining
- Low-Cost Lining - e.g. Locally-manufactured systems using local materials, etc.
- Innovative approaches for degraded land management
- River training and maintenance works

Decision Support Systems and Operations Control in Irrigation and Drainage

- Real-time and planning support (including monitoring and modeling)
- Modern Computerized techniques (including use of modern remote sensing, GIS, communication systems, telemetry, automatic controls, handhelds)
- Maintenance expenditure tracking (asset management)

Multi-sector Innovations in Irrigation

- Micro-irrigation (drip, sprinkler)
- Agricultural innovation for water conservation
- Groundwater management (artificial recharge)
- Power and water nexus in irrigated agriculture
- Agricultural & Water Productivity improvement
- Waste management in urban and peri-urban canals
- Innovative approaches to estimating crop water requirements
- Other energy and water conservation measures
- Catchment management (sand mining alternatives)

Disaster Management

- Flood management
- Drought management

Institutional & Policy Innovation

- Water User Association/Participatory Irrigation Management functional improvements
- Department capacity-building innovation (including Change Management)
- Irrigation Water Pricing
- Public-Private-Partnerships
- Governance
- Effective stakeholder participation

Monitoring & Evaluation

- Choice of Parameters
- Modern Surveys
- Studies to evaluate various aspects of irrigation

Information & Outreach

- Collection of irrigation statistics – modernizing information systems/database to get reliable data
- Benchmarking irrigation systems
- Public communications - how to reach public, farmers, industries, municipalities effectively to improve water
- Study on Studies – how good, how effective, how disseminated, how implemented, doing pilots, can dept work w consultants for pilots
- Lessons learned from other countries/states

Special Topics

**Annex II- Item wise Details of discussion with Project Director
(held on October 15-16, 2008)- Updated on Oct 22, 2008**

S.No.	ITEMS	DESCRIPTION	PRESENT STATUS
1	WRD I.T - PROCUREMENT PLAN- PP	IT Procurement Plan	Revised Plan received on Oct 18, 2008 and under review. <i>No objection for a number of packages in the plan has been issued on November 10, 2008 and comments were sent on remaining packages.</i>
2	22 / IAMWARM / ICB / WRD/ LAN /06-07	Providing local area net work	The project advised to rework the bid documents for review of the Bank after the PP for IT is reviewed and NOC is issued.
3	02 / IAMWARM / NCB / EIC WRD/ COMPUTER /06-07	Procurement of computers furniture	The Bid documents would be reviewed once the PP is reviewed and NOC issued/ <i>Update: No objection for this bid document has been issued on November 26, 2008</i>
4	01 / IAMWARM/ ICB / WRD/ COMPUTER /06-07	Procurement of computers – peripherals	The Bid documents would be reviewed once the PP is reviewed and NOC is issued./ <i>Update: No objection for this bid document has been issued on November 11, 2008</i>
5	01/ IAMWARM / WRO/ CONSULTANCY / MIS 06-07.	Enterprise Information Management systems.	The EOI is under review and would be cleared for publication shortly. <i>Update: TORs have been reviewed and it was found that the revised cost estimate proposed by the project is too low. Project and Bank team to discuss this issue further</i>
6	01/IAMWARM/AJN /WRO/UVB/NCB /06- 07	Rehabilitation of Periyar & Kovilar Reservoir Canals, Anicuts, Supply channels and tanks Upto Watrap - Viragasamudram tanks in Arjunanadhi sub basin in Watrap Block / Srivilliputhur Taluk of Virudhunagar district	Clarification to the Bank's letter dated 24-07-2008 received on October 17, 2008, the same is under review. <i>No objection has been issued on November 26, 2008</i>
7	02/IAMWARM /AJN/ WRO/ UVB/ NCB/ 06- 07	Rehabilitation of Anicuts, Supply channels and tanks below Watrap - Viragasamudram tanks upto Nathampatti Anicut in Arjunanadhi sub basin in Watrap, Srivilliputhur & Sivakasi Blocks / Srivilliputhur & Sivakasi Taluks of Virudhunagar district	Clarification to the Bank's letter dated 24-07-2008 received on October 17, 2008, the same is under review. <i>No objection has been issued on November 26, 2008</i>

8	05/IAMWARM /AJN/ WRO/ VB/ NCB/ 06- 07	Rehabilitation of Anaikuttam & Golwarpatti Reservoir system and Non system tanks, its Anicuts and Supply channels in Arjunanadhi sub basin in Peraiyur Taluk of Madurai district and Sivakasi, Sattur&Virudhunagar Taluks of Virudhunagar district	Clarification to the Bank's letter dated 18-09- 2008 received on October 17, 2008, the same is under review.
9	09/ /IAMWARM/ VNSB / WRO/ LPBD / NCB / 06-07	Rehabilitation and Modernization of Anicuts, Flood Banks, Supply channels and all tanks covered under Varahanadhi Sub Basin in Mailam, Vanur Block in Tindivanam & Vanur Taluk of Villupuram District	No response to 5 th call. Proposal for re- invitation of bid received by the Bank on October 17, 2008, the same is under review.
10	11/ /IAMWARM/ VNSB / WRO/ LPBD / NCB / 06-07	Rehabilitation and Modernization of Anicuts, Flood Banks, Supply channels and all tanks covered under Varahanadhi Sub Basin in Kanai, Koliyanur, Vikkaravandi Block Villupuram Taluk & District	Proposal for rejection of bids and re-invitation of bid received by the Bank on October 17, 2008, the same is under review.
11	PROCUREMENT OF GOODS USING TNLDA as procurement agency	Procurement Capacity Assessment Questionnaire to be Submitted by MDPU	The Bank forwarded the questionnaire to MDPU on June 18, 2008. The filled-in questionnaire was submitted to the Bank after a gap of over 4 months on October 20, 2008. The same is under review. <i>No objection was issued on November 19, 2008</i>
12	02/ IAMWARM / WRO/ CONSULTANCY / SURVEY 06-07.	Topographic and Cadastral surveys.	Technical evaluation report forwarded to the Bank on Oct 01, 2008 was not in format. Bank requested on Oct 01, 2008 to send the report in the WB Evaluation report format. The revised report is received on Oct 17, 2008, the same is under review <i>Bankhas reviewed and provided comments November 24, 2008</i>

13	SV/FIS/CW-1	Construction of Fish Seed bank	The Bank sought clarification to the proposal of rejection of bid on September 19, 2008. The Project response was received on Oct 21, 2008, which is being reviewed. <i>Update: The Bank has issued no objection on November 4, 2008</i>
14	04 / IAMWARM / WRO/ CONSULTANCY / QUALITY MANAGEMENT 06-07.	Construction quality Management and Technical supervision.	TOR cleared by the Bank on Aug 08, 2008. Short list was received by the Bank on October 22, 2008, which is under review. <i>Bank has reviewed and provided comments on November 19, 2008</i>
15	01 / IAMWARM / COSULTANCY/ SO 08-09	Selection of support organization to provide consultancy services for formation and capacity building of WUAs and commodity interest groups (CIGs)	Two options were discussed with PD. Project would take a decision to move forward in one direction best suited to the Project. The estimated contract value being below the Prior review threshold, the process does not require the prior review by the Bank

Annex III - Component A: Irrigation System modernization in a sub basin framework- Detailed mission report

The mission split into two teams to visit selected Phase I WRO works. The first team visited works in the Upper Vellar, South Vellar, Pambar, and Manimuthar sub-basins. These included anicuts, bed & check dams, supply channels, and tank bunds as well as irrigation sluices and channels.

The list of 17 packages covering some 29 works visited by the first team is appended in the enclosed.

The mission focused on the construction quality of works, construction procedures being adopted, and the extent of the adequacy of Quality Management System (QMS) in place as well as further actions required to be taken to effect improvements, wherever needed. The mission observations / comments and suggestions are broadly outlined in the following paragraphs:

Mission Observations / Comments

(a) Anicuts, Bed Bars

The anicut and bed bar works mainly comprise body wall of RR masonry / concrete / skin wall around the masonry body wall, upstream & downstream concrete aprons incorporating toe-walls, and RR masonry flank / wing walls. Some anicuts involve new construction, whereas, the others are being rehabilitated through extensive repairs. Stone revetment on side slopes, both upstream and downstream of structures, has been provided in some anicuts as a protection arrangement.

Observations

Construction: It was satisfying to observe that concrete mixers were being deployed for production of concrete of various grades and that volumetric proportioning of concrete mix ingredients was done through proper 'gauge boxes'. The contractors had also mobilized and commissioned fuel-operated needle vibrators for vibration and consolidation of concrete. These mixers were reported to have been used for the preparation of mortar as well for RR masonry construction.

Construction Quality: Visually, the quality and workmanship of the concrete and masonry construction is satisfactory and is of acceptable standard.

Quality Control Tests: The mission perused the quality control test record of various inputs/outputs maintained by the field engineers and noted that the routine quality tests on sand, coarse aggregate, mortar, concrete, steel bars had been duly conducted and recorded. In addition, water samples were also occasionally got tested for their suitability. The tests were mostly got conducted through the nearby engineering college laboratories. *Whereas, it is encouraging that QC tests were and are being conducted and recorded, the frequency of tests needs to be increased to fulfill the requirements of technical specifications.*

OK Card System: It was satisfying to observe that OK card system, an important element of the Quality Management System, was being maintained for the concrete and masonry works. However, it needs to be expanded to specifically include some additional items as explained below in the paragraph on "suggestions for further improvements."

Suggestions for further Improvements

- (i) **Proportioning of Concrete Mix:** Whereas gauge boxes have been and are being used for volumetric proportioning of concrete mix ingredients, there is a need to add correct and calibrated quantity of water in the concrete mix instead of approximate quantity. Presently, an old steel bucket is being used for addition of water. It is suggested that the contractor should procure and use transparent plastic buckets of, say, one litre and five litres capacity (with the five litre bucket duly calibrated with red paint marks). This would ensure addition of correct and specified volume of water in the mixer drum, being vital for maintaining the specified water-cement ratio (W/C) and the slump of the concrete mix.
- (ii) **Water-Cement Ratio (W/C):** Water – Cement ratios of 0.60 and even higher ones are reported to have been used in the concrete mixes during the construction of works. Towards fulfillment of the “durability requirements” of concrete, it is suggested that, in future, W/C ratio should be strictly monitored by the field engineers and it be restricted to 0.50 – 0.55 range. Any increase in water-cement ratio beyond 0.55 adversely affects the durability of concrete since it would substantially decrease the “durability factor” and significantly increase the “co-efficient of permeability” of concrete. In this context, addition of correct quantity of water through calibrated containers as outlined in (i) above is of paramount importance.
- (iii) **Consolidation / Vibration of Concrete:** It was satisfying to note that proper fuel-operated needle vibrators were being used for vibration of concrete. However, when thin sections of plain or reinforced concrete are required to be consolidated, it is suggested that “plate vibrators” be used for effective consolidation. The contractors have fuel-operated needle vibrators. *Conversion of such a vibrator into plate vibrator can be conveniently done by clamping it on a steel plate. This device is depicted in the coloured Photocopy (enclosed). Such a simple device can also be very successfully deployed on the compaction of sub-grade to be prepared for the placement of CC lining as well as for the consolidation of cast-in-situ cement concrete lining.*
- (iv) **Stone Revetment:** Stone revetment (23 cm thick) has been placed in a reach on side slopes, upstream & downstream, of the *Periya Anicut* structure. Whereas, “binder wall” has been provided at the location of termination of the stone revetment, no such binder wall was observed to have been provided at the location of the commencement of the revetment. It is suggested that, for the long-term durability of stone revetment, either a “binder wall” is constructed both at the location of commencement and at the termination of revetment or alternatively a “key trench” is excavated within the subgrade at each end and stone revetment provided in these trenches as an integral part of the revetment in the reach between the commencement and termination points.

This arrangement is illustrated in Sketch A (enclosed). Methodology for the provision of “toe wall” and “bottom trench” for the stability of stone revetment on side slopes is also illustrated in this Sketch.

The above provisions are in conformity with the Indian Standard Specification.

- (v) **Masonry / Concrete Flank Walls:** Several anicuts have long and high masonry flank / wing walls on the upstream & downstream of these structures. Some anicuts have such walls in concrete. *The mission observed that, whereas, the ends of such walls had been duly anchored into the subgrade (such as the walls in the Alagapuram Anicut), the ends of such*

walls in some other anicuts had not been properly anchored. As for example, the Kalappur Anicut is associated with very long and high concrete walls (of good construction quality & workmanship) and the mission, during inspection of the downstream walls, observed that the ends of these walls had not been anchored with the result that large scale erosion of the subgrade soil was taking place in the immediate vicinity of the end portions of the walls. Similar is the case in some other anicuts also, such as the walls in Singipuram Anicut. *It is suggested that proper anchorage of the end portions of masonry / concrete flank walls into the subgrade, wherever not provided, should be provided now.*
Methodology of anchorage is broadly illustrated in Sketch B (enclosed)

(vi) **Quality Control Tests:** Presently, quality control tests relating to the determination of silt content and organic impurities in sand are not being conducted. These are simple tests and should also be conducted on some representative sand samples in future and documented.

(vii) **Back-fill behind Flank / Wing Walls:** Placement of back-fill in a methodical manner is one of the essential requirements of good construction. *The mission, based on field visits observations, suggests that this important activity should be implemented in future as per the following sequence after the completion of the construction of flank / wing walls:*

- Remove all rubbish, set mortar, stones etc from the area behind the wall to be back-filled.
- Scrap & remove the base soil to ± 15 cm depth.
- Initiate placement of back-fill soil in suitable layers of ± 30 cm thickness.
- Remove, through hand picking, all stones / clods of size more than 10 cm from within each layer.
- Sprinkle water on the layer as & when needed.
- Appropriately consolidate each back-fill layer with suitable hand tampers / pneumatic tampers / earth rammers till the specified top level is reached.

(viii) **Weep Holes in Flank Walls:** The mission observed that, where as, weep holes had been provided in the flank walls of some anicuts (such as Panchathi and Kalappur anicuts etc), the same had not been provided in the flank walls of some of the other anicuts, such as the wing wall of the Panankadu anicut. It is suggested that the provision of weep holes should be considered during the construction of wing walls in future.

(ix) **OK Cards:** *It is suggested that the following items be also specifically included in the OK Cards.* In case printing of new OK Cards is not feasible, additional paper may be appended to the available printed cards and the suggested items be hand-written:

Reinforcement

- Specified cover in the drawing ----- mm
- Actual cover (as erected) ----- mm

Back-fill behind structures/Flank walls

- Removal of rubbish, set mortar, objectionable material etc. from the area to be back filled -----
- Placement of back- fill soil in layers and appropriately tamped/consolidated -----

It is also suggested that a separate OK Card be introduced on the " re-construction of sluices" in tank bunds

(b) Manivilunthan Bed Dam (Package No. 3 – Upper Vellar Sub- Basin)

The 1.2 m high concrete bed dam, incorporating reinforcement, is reported to have been constructed in M15 grade concrete mix. The contract was awarded in February 2008. The main structure was observed to have been completed and the construction of wing walls is still to be taken up.

As per IS 456: 2000, the R.C.C. structure has to be constructed in not less than M20 grade concrete. In future, compliance of this specification should be ensured. It is felt that even in this case, since the contract was awarded in 02/2008, approval of WRD and concurrence of Bank could have been obtained for construction of the structure in M20 grade against the M15 grade provided in the contract.

(c) Supply Channel – Thiruppathur Big Tank
(Manimuthar Sub-Basin, Package No. 1)

The channel incorporates side retaining walls, each of about 115 m in length, constructed in M10 grade concrete. Visually, the construction quality and workmanship are of good standard. Requisite routine quality control tests have also been conducted and recorded. *However, proper “anchoring” of the walls at the ends into the sub grade has not been done. This should be provided now (refer para (a) (v) above).*

It was also observed that due to lack of any “drainage arrangement”, the uncontrolled flow of rain water into the channel at several locations was causing large scale erosion of sub grade soil resulting in to heavy deposition of eroded soil on the channel bed. *It is suggested that the regional Chief Engineer should examine the provision of suitable “drainage arrangements” and appropriate “inlets” (for controlled flow of rain water in to the channel) to tackle the existing situation. CE, DRCS may also be consulted in this regard.*

(d) Construction of Groyne
(South Vellar Sub-Basin, Package No.5)

This is an important structure being constructed in close vicinity of the river. The mission feels that the construction of such structures should be based on the designs/drawings approved by CE, DRCS which has not been done in this case. *Regional Chief Engineer, Trichy assured the mission that the designs of this Groyne would be get reviewed and approved from CE, DRCS and action initiated to incorporate any modifications suggested by him.*

(e) TANK BUNDS

- **Raising and Strengthening of Tank Bunds:** *Mechanized compaction of earth fill to specified density has been observed to be the main “grey area” in the raising & strengthening of tank bunds. Correct construction procedure on the placement of earthfill is required to be adopted and implemented. It has, however, been very encouraging to observe that the contractors have since commenced mobilizing power rollers of various types including vibratory power rollers of 1.20 m drum width for undertaking the compaction of earthwork. A marked awareness about the need for “quality compaction” amongst the engineers and contractors was also quite evident in the field. However, both the engineers and the contractors need orientation and guidance on the methodology (best suited) to be adopted to achieve the objective of acceptable quality in the constructed work duly conforming to sound engineering principles and Indian standard requirements.*

In order to ensure that correct construction procedures are followed and the technical specifications are meticulously implemented, the mission suggests introduction of OK Card system on tank bund works also. *A sample OK Card devised by the mission and agreed to by the WRD is enclosed for prompt adoption and strict implementation in the field.*

- **Reconstruction of Sluices in Tank Bunds:** The mission during field visit to the Kallukulam & Vagarankulam Tanks (Package No. 2 in South Vellar Basin) observed that correct construction procedure was not being followed on the activity relating to the reconstruction of the irrigation sluice. The field engineers were explained the methodology to be adopted. *It is suggested that copies of the Bank Mission Report (April 21-25, 2008) on the "Review of Second year Sub-Basin Plans" be given to all engineers down to the Assistant Engineers level. This report outlines the construction procedure to be adopted duly illustrated in a typical sketch.* In special situations, to be duly authorized by the concerned Superintending Engineer, the tank embankment may be allowed to be cut to 3(H):1(V) slope instead of the recommended 4(H):1(V) slope.

(f) Quality Management System (QMS) :

Presently, only the regional Chief Engineer, Madurai region has an exclusive Quality Control Division under him and there is only one Sub Division on quality control under the regional CE, Chennai region. Taking in to consideration the huge magnitude of the rehabilitation works to be executed and the wide spread out of these works, it is essential to strengthen the existing management system by establishing full fledged Quality Control Divisions in Trichy, Pollachi and Chennai regions. Also, there is a need to make the quality control laboratories at Pollachi and Trichy fully functional through induction of the needed staff and provision of the needed equipment. The OK Card system comprises a very important ingredient of QMS and it was satisfying to observe during extensive field visits to the Phase I works that this system had taken firm roots and was being implemented on the concrete and masonry works. It is of paramount importance to introduce the OK Card system on priority on the Tank Bund works also to effectively address the deficiencies presently existing on the earthfill placement and its compaction to the specified density. The mission has devised a comprehensive OK Card (sample form-at of the card is enclosed) for requisite adoption in the field the soonest possible. This would ensure sequence wise meticulous enforcement of specifications to achieve the objective of good quality construction.

(g) Monitoring the Quality of Masonry Construction

The acceptance criteria of a good masonry construction is governed by the actual consumption of mortar per cubic metre of masonry raised. It is taken as 40% or 0.40 m³ mortar / m³ masonry. A variation of $\pm 3\%$ is allowed. Variation of more than 3% on the lower side (viz lower than 37% or 0.37 m³ of mortar per m³ of masonry) is not acceptable. Variation of more than 3% on higher side (viz more than 0.43 m³ of mortar consumption per cubic metre of masonry) should be at the cost of the contractor.

It is suggested that in the future masonry construction works, actual consumption of mortar / m³ of masonry raised at the end of every day be worked out and recorded for assessment of the quality of construction. It shall be good to introduce such a practice for assessment of quality on a continuing basis

List of Phase - I works visited by the Mission (first team)
(October 17 - 21 , 2008)

1. Upper Vellar Sub Basin..

Package No.1 : (i) Periyar Anicut (ii) Singapuram Anicut
(iii) Abinabam tank.

Package No.2 : (i) K. Chokkanathapuram tank (ii) Alagapuram Anicut

Package No.3 : (i) Manivilunthan bed dam (ii) Panakadu check dam

2. South Vellar Sub Basin

Package No.1 : (i) Avarankulam Anicut (ii) Melenellikulam Anicut
(iii) Nellikulam Anicut.

Package No.2 : (i) Kallukulam & Vagarankulam tanks

Package No.3 : (i) Sadayampatti Anicut (ii) Gudalur Anicut
(iii) Rarapuram Anicut

Package No.5 : (i) Construction of Groyne (ii) Panchathi Anicut
(iii) Sembodai tank

3. Pambar Sub Basin

Package No.1 : Marungai tank

Package No.2 : Senathi Kanmoi (tank)

Package No.3 : Karur tank

Package No.4 : Poovadaierendal tank

Package No.5 : Pilluvasai tank

4. Manimuthar Sub Basin

Package No.1 : Thiruppathur Big tank

Package No.3 : Kavadaikulam tank

Package No.4 : (i) SR Pattinam supply channel
(ii) Kanchirampeechari tank

Package No.7 : (i) Perumi tank (ii) Kalapur Anicut

Package No.8 : Sengulam tank

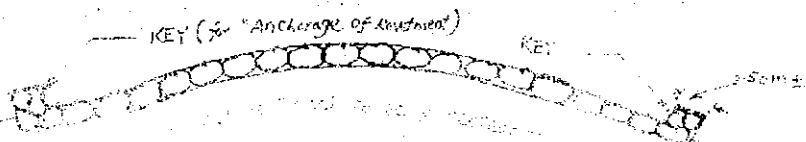
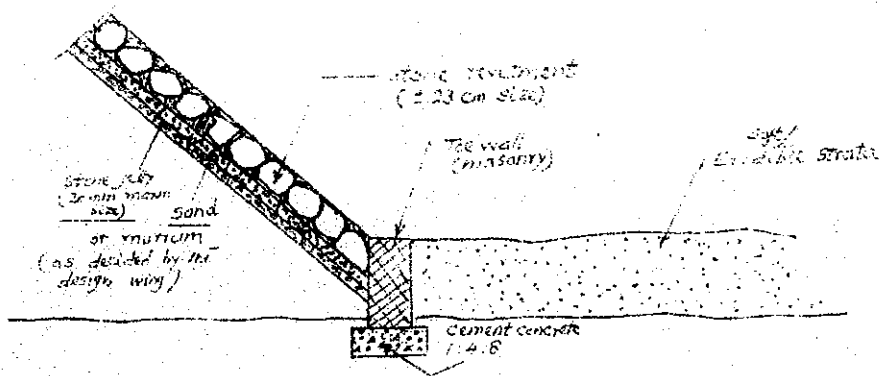
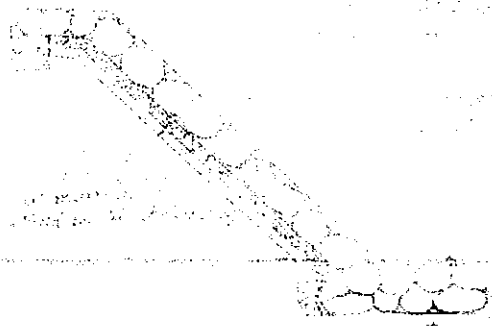
DEVICE FOR CONSOLIDATION OF SUBGRADE AND CONCRETE

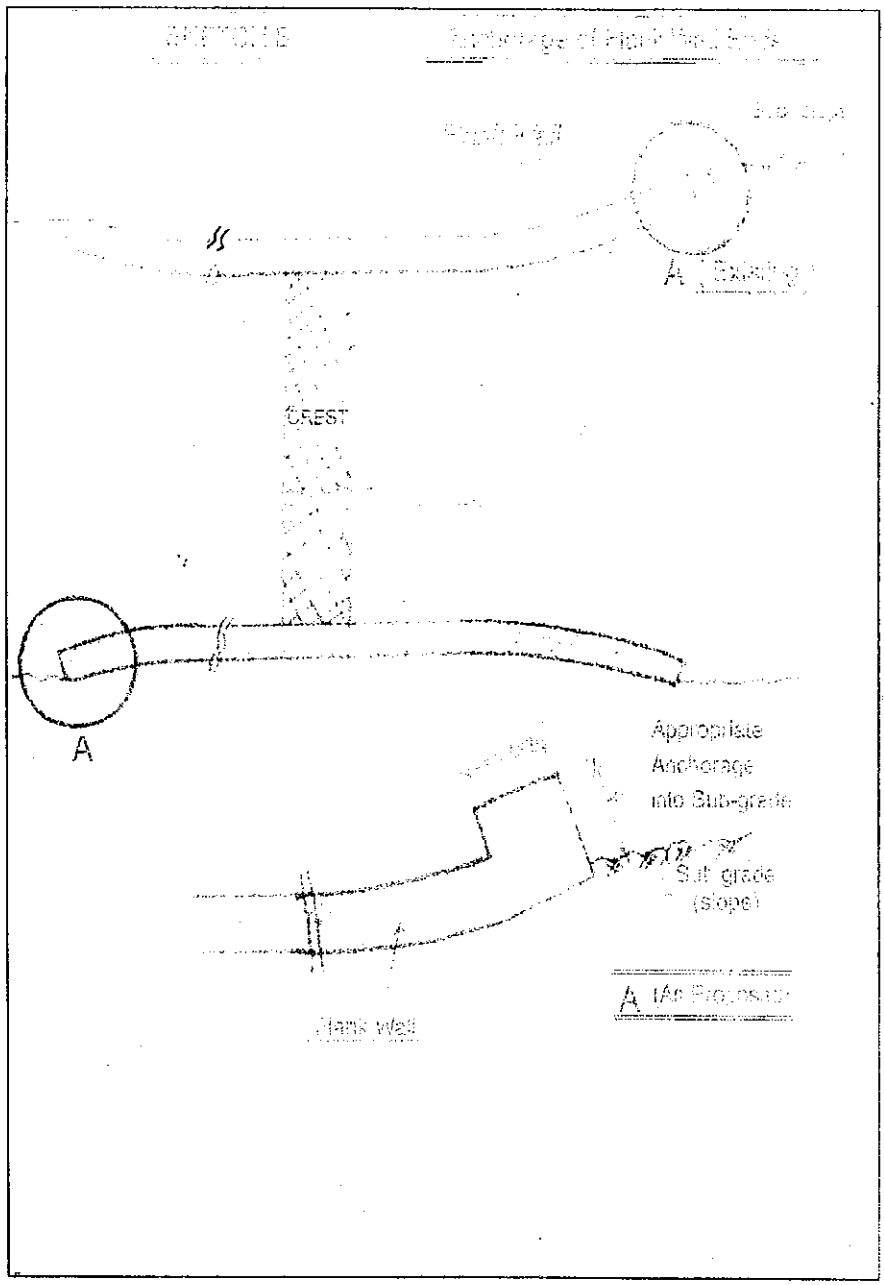


1. DIESEL OPERATED NEEDLE VIBRATOR



2. NEEDLE VIBRATOR CLAMPED ON STEEL PLATE





**Tamil Nadu JAMWAFM Project
Raising & Strengthening of Tank Bunds**

O.K. CARD FOR EARTH FILL PLACEMENT

Name of Contractor: _____
 Reach of bund: _____ Feet. S.S. _____ To _____
 Station for Strengthening: _____
 TBM of Bund: _____

Contract No.: _____
 Name of Work: _____
 Village: _____
 Subpage No: _____

S. No.	Description of Agencies	In Tamil	Contractor	AE/AEE Construction	Date of Signature of		Remarks of Inspecting officers
					AE/AEE Quality Control	Representative of Farmer Organization	
1	In English						
1	1) Layout / Demarcation of work						
2	2) Site clearance / Removal of jungle growth, shrubs, vegetation, roots, stumps etc.						
3	3) Cutting 'benches' on upstream/downstream slopes of Bund						
4	4) Fixing of benches, removal of clods and any dead wood etc.						
5	5) OK for fill placement						
6	6) Suitability of borrow area soil						
7	7) Soil classification report (enclose)						
8	8) OMC: _____ %						
9	9) MPBD (Maximum Dry Bulk Density): _____ %						
10	10) Thickness of loose layer placed & level of _____ cm						
11	11) Removal of clods/ stones of size more than 7.5cm by hand picking from the layer						
12	12) Moisture content of soil in the layer: _____ %						
13	13) Addition of water to OMC % (if needed)						
14	14) OK for commencing compaction						

Sl. No.	Description of Activities	In English	In Hindi	Contractor	Date of Signature of		Remarks of Inspecting Officers
					AE/AEE Construction	AE/AEE Representative of Farmer Organization	
15	Compaction efficiency actually achieved.						
	Layer wise						
	Layer No.	Compaction efficiency	Column 13 (ftip)				
	Layer 1						
	Layer 2						
	Layer 3						
	Layer 4						
	Layer 5						
	Layer 6						
	Layer 7						
	Layer 8						
	Layer 9						
	Layer n (Completion)						
16	Top level of Bund after completion of compaction						
17	Total quantity of earth fill placed & compacted in Bund						
18	Firming & Ramping of upstream and down stream slopes completed.						

Annex III b- The second team visited WRO civil work packages in Varahanadhi, Palar (PAP), Aliyar (PAP), Kottakarayar and Arjunanadhi sub-basins accompanied by the respective Regional Chief Engineers and associated senior staff. The mission interacted with the contractors and farmers as well as the field officers of the WRO.

Varahanadhi (Package visited: Number 6). In general the work was acceptable quality in concrete works. The quality of earthwork on the embankment and supply channel was unsatisfactory. The mission has suggested to the Chief Engineer Chennai Region to send his officers to other States (MP for instance) to get first-hand knowledge of the compaction equipment available as attachment to the procline to compact side slopes. In addition the quality control laboratory at Vellore needs substantial upgradation in both equipment and staff.

The supply channel has been excavated without the installation of bed bars and reference cross-sections to maintain the section and the longitudinal gradient for future maintenance purposes. No survey measurements were available at site. The mission requested the site officers to conduct such surveys and report back. This was done and it indicated the deficiencies in supply channel excavation. The Chief Engineer Chennai has assured the mission that payments would not be made to the Contractor until the defects pointed out by the mission have been rectified. The mission was informed that the MDPU had conducted a number of review missions in this sub-basin and based on their findings as well as his own, the Secretary PWD has suspended the Executive Engineer and associated staff for their poor performance. This is a welcome good governance step. It was agreed that the Chief Engineer Chennai would perform a quality check on all the packages under implementation in this sub-basin and report to the Engineer-in-Chief, MDPU by no later than November 30, 2008. All compaction should be carried out using appropriate Plate Vibrators and the Proctor Density measured at site as well as on core samples and reported.

Aliyar (Package visited Number 2, 3, 4 and 5).

Palar (Packages visited Number 9 and 21)

The concrete lining work is satisfactory in all the packages. In some places pressure relief measures have not been provided. The mission advised and the WRO staff agreed to take corrective action immediately. The mission is surprised that under the same staff, such measures are being implemented in some package and not in another.

There are problems associated with dumping of excavated material from the canal beds. In some places these have been just dumped on the banks without any shaping or consolidation. The mission advised the staff of WRO to remedy this situation through appropriate benching and shaping of the material on top of the banks. In this connection WRO staff mentioned that there is no clear demarcation of the boundary of WRO property in the entire canal system. The mission in its meeting with the District Collector requested the District Administration to provide the necessary assistance to WRO to undertake this exercise and have complete demarcation of the property boundaries along all the canals. This would facilitate the disposal of excavated material in accordance with the Social and Environmental Management Framework (SEMF) referred to in the W-2 documents.

A matter of concern is inadequate maintenance of the canal system. In some places, the lining work carried out under the previous Bank-assisted project has already deteriorated and is in need of replacement. In some other places, overgrown weeds and trees above the lining are beginning to crack the lining. The mission recommends need-based allocation of maintenance

resources, close monitoring of the canal system for signs of deterioration so that they can be fixed early and administrative action against errant officers responsible for maintenance. Otherwise PAP system will be continually rehabilitated!!

Kottakarayar (Packages visited Number K8, K1, K3 and K4) The mission visited K8 in Ramnad District after discussions with the District Collector regarding his support for the PIM activities. The K8 package has been hampered by unexpected rainfall in early part of the year followed by substantial rains in the current month. Concrete-related construction activities have been undertaken. The same contractor is also working in K1 and K4. The shuttering and centering need improvement as the concrete finishes are not good. The contractor is using new shuttering material but the workmanship is not good.

In K8, the soil used for the embankment is not fit for casing material. Here this soil can be used for hearting zone only since the Liquid Limit is about 41% and the Plasticity Index is about 23. Even though the bund height is small, the homogeneous section concept cannot be applied if this otherwise readily available material is to be used. A different material should be used as casing probably for a depth of 35 cm based on a quick slope-stability analysis. The mission has informed the Chief Engineer Madurai Region and Mr. Rashid, Assistant Executive Engineer in the Field to make the necessary changes in the design. In one location farmers wanted repairs to be carried out in a sluice to stop the leakage of water in the buried barrel. The mission has requested the AEE to look into the matter and implement required works to solve the problem.

The staff in K8 had all the requisite documentation with them. The Quality Control staff from Madurai also had good documentation with them.

Machinery was seen in operation in K4. Work quality in the site visited was good. This was the only site where a few machines were found to be operating. However the contractor has not mobilized the requisite machinery for the package as per the agreement and no action has been taken by WRO staff. Unless the required machinery is deployed the works cannot be completed in time. The contractor and WRO staff have been advised by the mission that no time extension would be permitted and the contractor is at risk of being declared delinquent in this regard. The contractor has assured the mission the requisite machinery would be deployed immediately. The AEE will follow up.

Work progress in K3 is poor and the contract has not been supervised adequately. Even instructions given by the Chief Engineer Madurai have not been complied with. No work program has been prepared. The mission saw that a supply channel to a tank had been completely blocked and none of the field officers seem to be aware of the difficulties this would cause for the villagers. At the mission's request, the Chief Engineer instructed the Contractor to remove this obstruction immediately and the Contractor agreed to do so within six hours. Instead of doing things in parallel, the contractor is working in a slow pace. For instance piers in the scour sluice in the river section have been erected but not in the supply channel sluice. Work supervision by WRO staff is less than satisfactory.

Data and record-keeping in K1 was not satisfactory. OK cards have not been kept for work on tank bunds. Quality control staff have not been approached for materials testing. Concrete finishes as well as earthwork are shoddy. Some very agitated villagers spoke to the mission about their unhappiness with the way the contract is being executed. There was an OK card countersigned by a farmer representative in a Xeroxed version which appears to be an afterthought. In summary, work performed under this division is unsatisfactory and the WRO operational staff have been negligent thus far in supervising the works of this package. For

instance among others, in one site, the contractor had blocked the supply channel and the WRO staff had done nothing about it until the mission pointed this out. It appears that the EE had not visited the site routinely and reviewed these situations. The mission requests the Secretary PWD to take appropriate action against errant officers and review the staffing situation to ensure successful implementation of this package.

Arjunanadhi (Packages visited Number ARJ3 and ARJ4): The construction quality of the works visited at ARJ3 was acceptable. This contract has been progressing very slowly with only about 10% financial progress having been made in about 50% of contract time. This is a simple contract with excellent site access conditions. The mission was informed that several meetings have been held by senior management of WRO and the MDPU with the contractor to speed up the work but to no avail. Liquidated damages have been imposed on the contractor but he is not showing any progress even though he is paying about Rs. 10000 per day. The mission held a separate meeting with the contractor and advised him he was facing termination unless his progress is substantially improved. The mission recommends that this contract be monitored closely and termination action initiated if current slow implementation continues.

The construction quality and the pace of work under ARJ4 were good. Due to heavy rain, it was not possible to inspect the works thoroughly but the works visited were of good quality. Embankment compaction on the side slopes is still an issue but proper materials have been used in the strengthening of the embankment. Quality control staff from Madurai are doing a good job.

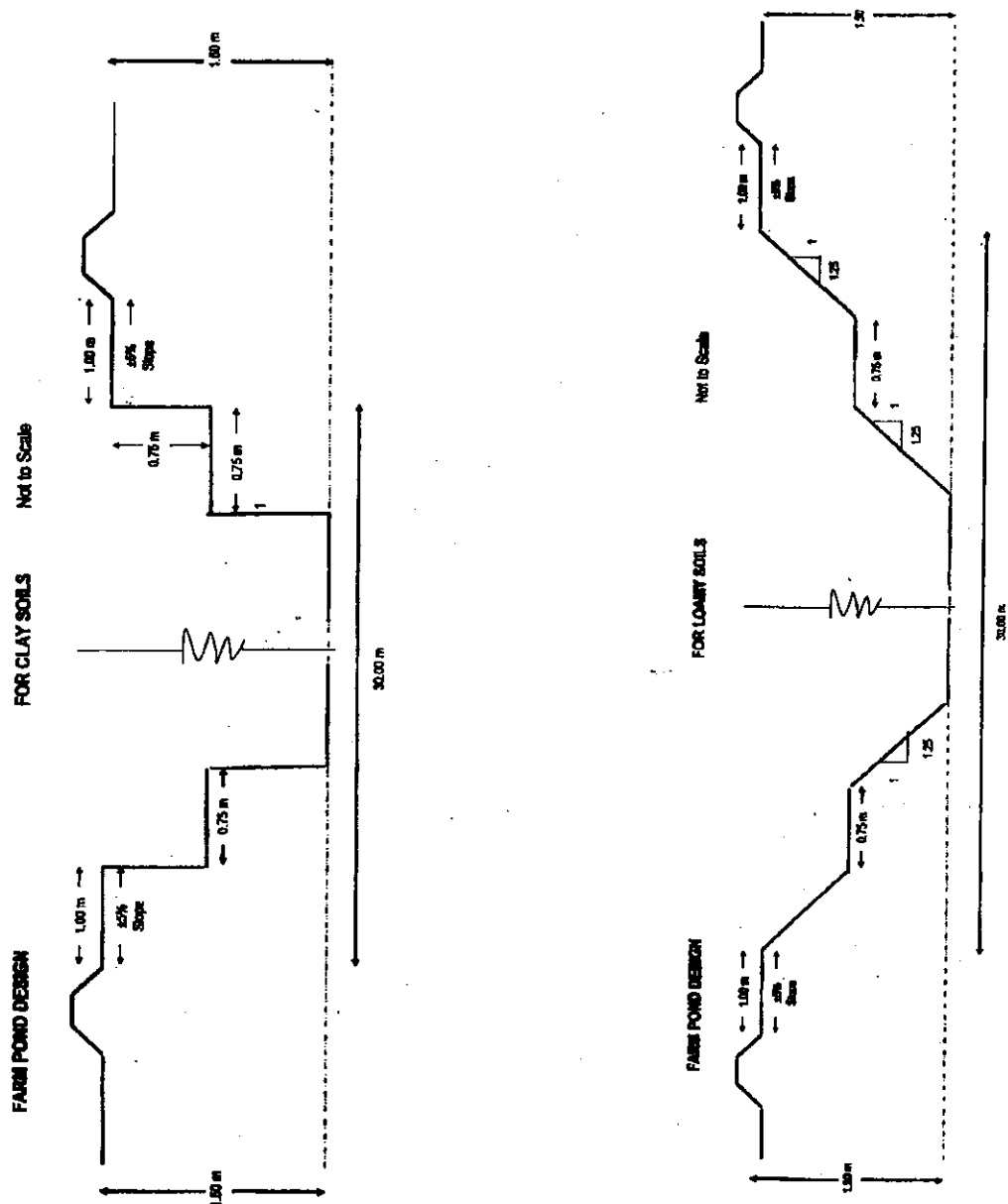
Selection of Construction Materials: Construction materials are being tested properly in most packages. The mission recommends that senior staff such as the SE and the CE review these results and modify the designs accordingly. In K8, the mission reviewed the soil test results and concluded that the material was not suitable for a homogeneous embankment. In this case the WRO standards of using homogeneous embankments for a certain size of embankment cannot be applied since the material available at site can only be used as Hearting zone material. The mission requests the Chief Engineer Madurai to review this and amend the design of K8 appropriately.

Annex IV- Proper Construction of farm ponds

Construction quality of Farm ponds Existing procedure being adopted by the Agriculture Department on the construction of farm ponds was reviewed. It is suggested to modify the procedure on the construction of future farm ponds as broadly outlined below:

- (a) **Clayey Soils:** A berm be provided at mid depth instead of the existing practice of excavating the pond to the full vertical depth without the provision of any berm.
- (b) **Clayey-Loamy Soils:** Excavation be done at 1.25 (H): 1 (V) slope with the provision of a berm at mid depth instead of excavating the pond to the full vertical depth.

The above procedure is illustrated in the Sketch below



Annexure V
Report of Dr. M.C.Nandeesh, Consultant for the Fisheries Sub component

Introduction:

The Fisheries Consultant held series of discussion with the Commissioner of Fisheries, Joint Director of Fisheries and Deputy Director of Fisheries of various regions of the project under operation and the nodal officers responsible for the implementation of the project. The field visits undertaken from 18th October 2008 to 22nd October 2008 covered the various sub basins namely Pennaiyar, Upper Vellar, Swetha Nadhi, South Vellar, Pambar, Kottakariyar, Manimuthar, Varahanadhi falling under the first and second phase of the project. The activities observed included

1. Aquaculture in farm ponds
2. Fish seed rearing in cages
3. Fish seed bank
4. Ornamental fish culture
5. Fish culture in irrigation tanks
6. Fish kiosk
7. Repair to Government fish seed farm
8. Fishing implements supplied

Objectives:

The Fisheries component has the **major objective of increasing fish production and provides higher income and employment opportunity to the fishermen/farming community** through intervention in Inland fisheries activities. To accomplish this main objective, the sub objectives included are

1. To make quality fish seed available throughout the year for stocking in irrigation tanks
2. To demonstrate better methods of marketing fish through model kiosks
3. To popularize ornamental fish production as a commercial crop
4. To increase fishing efficiency by providing suitable crafts and gears for harvesting fish from ponds and reservoirs

Context:

The state of Tamil Nadu is one of the states receiving lower rainfall. However, the state is known historically for scientific interventions in the fisheries sector, particularly in large tanks created mainly for water harvesting and irrigation purposes. The inland fisheries in Tamil Nadu are largely recognized through the activities in the irrigation tanks. The total fish production in the state is 0.553 mmt and the contribution from inland water bodies is only 0.16 mmt. The per capita availability of fish in the state is 8-10 kg. The productivity from the inland water bodies is generally low with less than 100 kg/ha. The farm ponds are created mainly for water conservation purpose, but many of these ponds have not been utilized for aquaculture. The non availability of fish seed has been one of the major constraints hindering inland aquaculture development in the state. Even at present, the state is experiencing serious shortage of fish seed and much of it is imported from other states. As the fish production in the state is not able to meet the existing demand, large amount of fish is also imported from neighboring states.

In view of the above, the interventions made through IAMWARM project is expected to contribute for substantial increase in fish seed availability as well as fish production through various approaches covering large part of the state.

Sub-Basins covered in the first and second year and accomplishments made:

In the first phase, 9 basins were covered during 2007-08 and in the second phase 16 sub-basins have been taken up during 2008-09. The physical and financial accomplishments up to 30.09.08 were examined.

Several of the planned activities have been accomplished in the first year sub-basins. Whereas many of the planned activities are yet to be initiated in the second year sub-basins.

Activity wise remarks based on the observations made and information provided by the Department of Fisheries:

1. **Aquaculture in farm ponds:** Out of the 244 farm ponds allotted in the first phase 9 sub-basins, only 184 have been taken over and among this 37 were stocked in 2007-08 and 88 were stocked in 2008-09. Remaining ponds are yet to be stocked. The main reasons for non stocking of fish seeds were reported to be delayed handing over of farm ponds by Agricultural Engineering Department and non availability of water and fish seeds. The ponds were stocked with Indian major carps mainly catla, rohu and mrigal. In some of the ponds, only two species have been stocked. However, in some farm ponds, the farmers have stocked other species of carps. The growth of Indian major carps was found to be in the range of 200-600 g in a culture period of 9-10 months whereas the growth of other carp was above 500 grams.

For the second year sub-basins, it was reported that the farm ponds are yet to be handed over by the Agricultural Engineering Department in all the basins.

2. **Cage culture of fish seeds:** Good progress has been achieved in rearing of fish seed in cages. Out of 57 cages distributed, seed culture has already been initiated in 53 cages. Among the cages observed, culture of catla, mrigal and common carp were noticed during the field visit. The results obtained in rearing of fish seed from early fry to fingerling or late fry to fingerlings are impressive. The farmers are pleased with the good survival and growth obtained.

For the second year sub-basins, it was reported that the tenders have been floated for procurement of cages.

3. **Fish seed banks:** A total of 10 fish seed banks have been allotted in the first year sub basin. Out of the 10 fish seeds banks, one has been inaugurated on 22nd Oct 2008 by stocking of early fry. Construction of 6 fish seed banks are under progress. Two seed banks retendering are finalized as per the bank's advise and the third bank proposal is planned to be readvertised.

For the second year sub-basins two fish seed bank are allotted and it was reported that sites have been identified and tender floated.

4. **Construction and improvement to Government Fish Seed Farm:** The construction and repair work at one government fish seed farm at Vidur in Villupuram district (Varahanadi basin) was observed and most of work has been completed as planned. In case of Government fish seed farm at Pilavakkal in Virudhunagar district (basin), it has been informed that 85% of the work is completed.

For the second year sub basins, one new construction of Government fish seed farm and one improvement to existing Government fish seed farm has been allotted. It was reported that tenders has been floated for both the works.

5. **Fish Kiosk:** A total of 2 fish kiosk were provided in the first year Varahanadi sub basin. Both the fish kiosk has been established. The fish kiosk established at Vikravandi village, Villupuram district was inaugurated and fish sale started on 22.10.08.

For the second year sub-basins 6 fish kiosk has been allotted. During the field visit, the site selected at Tamampatty selection grade Panchayat in Swetha Basin was observed and suggestions were given to initiate the work at an early date. In rest of basins, it was reported that site has been identified and tenders have been called for through NCB.

6. **Supply of fishing implements:** For the first year sub-basins, the supply of fishing implements has been accomplished.
For the second year sub-basins, it was reported tender has been floated for procurement of fishing implements centrally.

7. **Ornamental fish culture:** A total of 9 units were allotted for the year sub basin and has been accomplished. Observations were made in the ornamental fish culture unit established in Manimuthar sub basin in Sivagangai district and the observations made in this farm highlights the need for ensuring the required level of commitment from the beneficiary and the followup support needed to make the activity successful.

In the second year sub basins, 9 ornamental fish culture units have been allotted. It was reported that site has been identified and tender under W5 civil works has been initiated by the nodal officers.

8. **Aquaculture in irrigation tanks:** This component was included in the second year sub basins and in Swetha Nadi basin, three tanks (total of 53 ha water spread area) have been stocked. It was reported that remaining irrigation tank will be covered once adequate water is received.

9. **Fishing implements distribution :** The nets and coracle have been procured and distributed to the beneficiaries as planed in the first phase sub basins. For the second year sub basins, it was reported that tenders under national shopping has been called for.

10. **Information Education and Capacity Building:** The Department has produced a number of publicity posters and widely distributed. A total of 259 farmers have been trained on aquaculture activities and given exposure visits.

In the second year sub basins, it has been reported that a total of 157 farmers have been trained so far.

Constraints noticed:

1. **Manpower availability in the Fisheries Department:** In all the areas visited, the major issue raised by the Department of Fisheries was the non availability of time to attend to a number of activities. Farmers also expressed the need for adequate follow up support to enable them to be successful in the new activity. Based on the observations made, it is recognized that this is an important issue that needs urgent attention by all concerned.

2. **Delay in excavation and transfer of farm ponds by the Agricultural Engineering Department to Fisheries Department:** The AED department excavates and hands over the farm ponds to Fisheries department generally in the month of December – January and this hampers the initiation of aquaculture in farm ponds.
3. **Poor participation of women in various aquaculture activities initiated:** In most of the basins women involvement in aquaculture activities was not seen excepting in few basins. Aquaculture being a family based backyard activity, globally fish culture, fish seed rearing and aquarium fish production has been recognized as the most suitable activity for the involvement of women
4. **Availability of quality fish seed of different species:** Based on the observations made during the visit, most farmers stock just two or three species of Indian major carps and main reason noticed is the non availability of seed as well as Detailed Project Report focus mainly on Indian Major Carps. It is unlikely to achieve the targeted level of production, with the current level of input and species combination.
5. **Fishing rights in irrigation tanks:** Whenever the minimum dead storage level is not maintained, there is conflict between the fishers and agriculturists. Secondly, there is also competition to obtain fishing rights by the various groups
6. **Lack of exposure of the departmental staff to the technological developments:** The regional offices of the Department do not have adequate literature and internet connectivity. The officers are also not exposed to the recent technological developments.

Recommendations

1. Minimum number of department staff needed to provide the required level of follow up support to the farmers.
2. Use the family approach involving both husband and wife in all the trainings. Special emphasis should be laid to focus on the women for knowledge transmission as well as provision of skills necessary through follow up support.
3. Develop suitable policy measures to consider aquaculture on par with agriculture as in many other states of the country to ensure sustainable aquaculture development
4. Diversify species composition to include fast growing other carps that are available in the country. In addition, improved strain of gift tilapia that is now being permitted by the Government of India should be considered for introduction and propagation in the project
5. Adopt cage culture as a strategy to enhance seed availability in rural areas. The information generated in the phase 1 should be analyzed and used for scaling activity.
6. Cage culture of market size fish in ponds and tanks should also be considered in the project area to increase fish production
7. Improve integration of aquaculture with other farming activities to reduce the cost of fish production and ensure efficient utilization of on farm resources. The focus should be enhancing food production through application of inorganic fertilizers and organic manures with minimal input of feed with a view to ensure best economic returns to farmers. Pond bunds should also be utilized for cultivation of horticultural crops.
8. Produce user friendly technical manuals in the vernacular language to strengthen the farmers knowledge and promote innovations by farmers
9. Develop knowledge based marketing strategy in kiosk. Available information on health benefits of fish should be promoted by using various approaches including display of information in kiosk.

10. Ornamental fish units viability would depend on the follow up technical support and marketing opportunity. As most of the units have already been established in the first phase, there is a need to provide follow up support to prove the economic viability.
11. Capacity building of the staff involved with the activity is most essential. This can be accomplished by exposing the staff to technological advancements that have taken place and implemented in appropriate places. As an immediate step, subscribe to essential aquaculture magazines and provide internet connectivity in the offices to help staff strengthen knowledge on the recent technological developments
12. The nodal officers implementing the project activity should be provided with computer with internet connectivity for access to information and documentation of the project activities.
13. Create local seed nurseries by promoting nursing of fish seed in the farm ponds or cages in the farm ponds. Such farmers with good water resource may be provided additional support to scale up the fish rearing activity.
14. Spread the subsidy support to two years instead of providing all the support at one time

Ensure follow up technical support and documentation of the results for a minimum of three years. Use the information generated to evolve good package of practices for wider utility.

**Annexure VI -WB implementation support / supervision mission IAMWARM Project
TamilNadu, India - Report of Dr B.S.Sathe, Livestock Consultant, on the Livestock
component of the project**

Objectives of the AH component:

The main objective of A.H. component is to improve the production potential of livestock (dairy animals) in the selected sub-basins through:

- (a) Improving delivery of animal breeding and veterinary/animal health services
- (b) Increased availability of green and other fodder by bringing more area under fodder cultivation, since more irrigation facilities will be available from the project.
- (c) Improving awareness, knowledge level and skills of the livestock farmers in the sub-basins. Funding will be provided to achieve above mentioned objectives. This will primarily include infrastructure facilities for on-farm demonstration of fodder production through provision of certified seeds in plots of selected and willing farmers for production of HYV grasses like Co3 (hybrid Napier), Kollukkatai (buffaloe grass) and stylo, in addition to fodder like cultivated green maize/sorghum (Cholam) and hedge Lucerne. At the end of the project, it is expected that 6500 ha area will be brought under improved fodder production.

The project envisages providing inputs such as better quality semen for insemination of cows and buffaloes, improved veterinary and animal health cover through establishment of veterinary units manned by Self Employed Veterinary Graduates (SEVG). Funds will also be provided for extension education of the farmers and field workers to improve their knowledge and skills.

WB implementation support mission 13-24 October 2008:

I visited Chennai from 13-24 October 2008 as a Livestock Expert (TCIP/FAO) to join the WB implementation support mission to review the Livestock sub-component of the project and provide the required support and advice to MDPU and Department of A.H. Government of Tamilnadu. The programs of A.H. component implemented by the MDPU for 2007-08 and 2008-09 for sub-basins included in Phase I and II were reviewed and issues discussed with the concerned technical staff of MDPU and Directorate of Animal Husbandry GOTN.

Field Visits:

Field visits were taken in Varahnadhi, Upper Vellar, Chinnar, South Vellar, Pambar, Therkar, Palar and Aliyar subbasins. District meetings were also attended in Tindivanam (Villupuram district), Pudukottai, SivGangai and Madurai. Field visit also included visit to Government Cattle Breeding Farm Chettinad where programme of development of Green fodder is being taken up under the IAMWARM project. The main purpose of the field visits was to review the field-level progress on the implementation in sub-basins of Phase I and II till 30th September 2008, to know the constraints/problems and provide advice to resolve them as well as to assist MDPU/ GOTN on issues concerning procurement of inputs, so that good progress can be achieved in the remaining project period. I met almost 90% of the Sub-basin SEVG at different places to review the progress and to provide guidance to them and the implementing officers of DOAH so that the work of SEVG and overall AH programme of the project can be improved.

Meetings and discussions:

I had preliminary meetings with Ms Leena Nair, IAS, Principal Secretary on 13th October 2008 and with Mr P.P. Shampath, IAS, Commissioner A.H GOTN. on 14th October 2008, before leaving for the field study. After returning from the field study, I held meetings with Mr T.K. Pillai of TamilNadu Livestock Development Authority (TNLA) and Mr Murli of TamilNadu Medical Services Corporation (TNMC) to discuss procurement issues concerning the supply of inputs (semen straws, LN2 and medicines) for AH programme. I visited Dr. Veerapandi, Professor of Obstetrics and Gynecology and Dr. Vairamuthu, Professor of Clinical Pathology and Medicine in Tamilnadu Veterinary and Animal Sciences University (TANUVAS) at Chennai to see and respectively discuss the work relating to the Base line studies in AH and utility of Semi-Auto Analyzers for the project.

On the basis of above mentioned discussions and field visits, the main points are as under:-

1.0 Farmers' training programs, interactive meetings, Infertility cum healthcare camps etc:

In order to create awareness amongst the dairy farmers about IAMWARM A H. programme, several activities such as farmers' training programs, interactive meetings, distribution of educational material, holding infertility camps for treatment of animals and for supply of mineral mixture, de-worming medicines for calves etc at the camps were taken up by DOAH field officers during 2007-08 and targets were fully achieved. These programs will also be continued in 2008-09. Mission is happy to note that DOAH is confident that the targets of above programs for all sub-basins of Phase I and II, except perhaps the infertility camps, will be completed satisfactorily. During the mission's visits in both the years, it was observed that the selection of target beneficiaries was satisfactory and the response from farmers was very high. Mission appreciates the efforts made by the DOAH in this regard considering the fact that this was a task of carrying an additional load of work by their field officers for the IAMWARM Project.

2.0 Green Fodder Production:

During 2007-08, the work of supply of fodder slips and seeds to the farmers was taken up by the DOAH staff. Mission observed that the response from farmers was very high and the targets for 2007-08 were achieved satisfactorily. DOAH is confident that the targets for 2008-9 for phase I and II sub-basins will also be achieved fully. Mission appreciates the efforts done by the DOAH field officers in this regard. Mission observed that transportation of CO3 fodder slips from the Government farm over a long distance to the farmers' fields located/scattered in distant villages is a problem. Mission observed that there is a good possibility of selecting some progressive farmers in the villages who can be trained and motivated to produce and supply (sell) green fodder slips to the nearby needy farmers. This procedure will also help to spread the green fodder program horizontally with a greater speed and achieve the long-term objective of a sustainable green fodder production program taken by the farmers themselves. The response from progressive farmers and DOAH field officers to this suggestion was very positive. It is urged that DOAH may initiate this activity, on a pilot scale, in a few selected sub-basins, in year 2008-09.

Mission observed that records were being kept on quantity of seed/slips supplied by the DOAH to the farmer and the area available with him for fodder cultivation. However, data on actual quantity of fodder produced by the farmers was not available. It would be desirable to start keeping this data for accurate monitoring and reporting purpose. The DOAH field staff reacted

positively to this suggestion. The methodology of data collection will have to be simple, practical, uniform and adaptable at the farmer's level. It is suggested that DOAH together with MDPU may discuss the issue with the agronomists of TANUVAS and set up a suitable methodology for keeping records from 2008-09.

Mission visit to the fodder plots of Dairy Farm Chettinad indicated that as compared to CO3 fodder, CO4 gave more yield and was more succulent. It is likely that feeding CO4 helps get more milk yield. Mission suggests that DOAH may conduct a small comparative feeding trial using CO3 and CO4 fodder at the farm and record the effect on milk yield. If CO4 feeding is found to give more milk yield, fodder slips of CO4 could be produced at the farm for supply to the farmers in IAMWARM project. DOAH officials in Chettinad farm gave positive response to this suggestion.

3.0 Procurement of Semi-Auto-Analysers (SA).

It is proposed to procure 5 SA to improve the efficiency of diagnosis of nutritional / metabolic disorders in animals. Mission noted with satisfaction that the orders for supply have been placed and SA are likely to be delivered very soon. The mission suggests that the SA may be placed in different regional DI Laboratories of DOAH where large number of samples are regularly received for diagnosis of above mentioned disorders. It may also be ensured that each laboratory has a suitably qualified and experienced officer supported by a laboratory technician. It is further suggested that with a view to improve the efficiency and usage of the machinery/equipment, the concerned officer and technician may be deputed for a hands-down training of 3-4 days duration at the Veterinary Clinical Medicine Department of TANUVAS at Chennai.

4.0 Keeping records on cross-bred calves born from AI coverage, calf mortality and milk production:

Mission was happy to note that few crossbred calves were produced with efforts of AI in the IAMWARM project villages and many more are likely to come up in near future. Mission appreciates the efforts done by the SEVG and the DOAH field staff. Mission feels that now the time has come that farmers and SEVG are motivated to maintain proper records on the performance of these calves in terms of growth, sexual maturity, milk production, mortality etc. These records will help to determine achievement of the project during the impact/ monitoring studies. The methodology to keep these records at the field level needs to be developed. It would be desirable that the DOAH along with MDPU may discuss the issue with TANUVAS to hold a brain-storming session/workshop to determine the methodology to start keeping the field data from year 2008-09.

5.0 Filling up vacancies of Self Employed Veterinary Graduates (SEVG)

In 2007-08, after the issue of payment of honorarium to SEVG was resolved, some progress could be made in recruiting the SEVG. As of 10th October 2008, out of 65 SEVG required for phase I and II sub-basins, 48 are in position, leaving a gap of 17 SEVG. (It will be pertinent to note that additional 72 SEVG will be required when phase III sub-basins are taken up).

DOAH said that despite a few practical problems, it was trying to fill up the vacant positions. While the mission appreciates the steps being taken on this issue, it has urged DOAH to fill up the vacancies of SEVG as early as possible so that the required activities of SEVG can

be taken up in a time-bound manner. Mission has also urged that till the SEVG vacancies are filled, the targets of SEVG may be achieved by deploying the staff of DOAH. The DOAH has responded positively to this suggestion. Mission suggests that out of the 245 Veterinary Officers recently recruited by the DOAH, the required number may be posted on deputation to the project till the project is completed and given the tasks to fulfill the project targets. It is understood that 260 more Veterinary Officers are likely to be recruited by DOAH by December 2008 mission suggests that out of that lot, the required number of SEVG for phase III program could be selected and given the tasks of the IAMWARM project. During discussions of myself and Mr Karaky with Mrs Leena Nair, Secretary DOAH, this point was highlighted and she promised that all care will be taken that adequate staff is made available for the IAMWARM, on a priority basis.

6.0 Likelihood of present SEVG switching over to the GOTN Jobs

Many present SEVG have appeared for the recruitment examination of TN Public Service Commission for Veterinary Officers. The results are likely to be announced very shortly. If selected, they will opt for the Government jobs. This will have further problems in achieving the SEVG targets. It is urged by the mission that if the present SEVG are selected for the Government jobs, they may be retained in their present sub-basins and given the same task of SEVG, till completion of TNIAMWARM Project.

7.0 Achieving targets of Artificial insemination.

In the sub-basin level, there are separate targets fixed by DOAH for AI by SEVG Unit and AI in infertility camps.

(a) AI Target for SEVG:

In case of 9 sub-basins of phase I which were started in year 2007-08, out of the total target of 255000 A.I. for FY 2007 and 2008, the achievement up to 10th October was 25658 AI. In case of Phase II sub-basins which were taken up in year 2008-09, out of the total target of 36000 AI for SEVG, achievement upto 10th October 2008 was 2499 AI. The DOAH informed that the backlog of AI in 2007-08 was filled by deploying the staff of DOAH in the sub-basins to carry out AI using Government resources (semen straws, LN2 etc) and the same help will have to be given in the year 2008-09. Figures given by DOAH HO official associated with the mission showed that total AI done by the Government institutions in 9 sub-basins of Phase I during 2007-08 was 288817. These figures of AI are for all the villages in the sub-basins; separate figures for selected villages covered under SEVG Unit were not available. The mission suggests that for correct assessment of achievements of the SEVG units, the figures of AI done by the SEVG and by the DOAH staff in the selected villages covered under SEVG Unit for years 2007 and 2008 may be assembled for all sub-basins of Phase I and II. The data could be further examined and discussed with DOAH during the next mission.

(b) AI Target for Infertility camps:

Out of the total target of 45000 AI for phase I sub-basins for years 2007 and 2008, achievement till 10th October 2008 was 26399 AI. For the sub-basins, of Phase II, out of the total target of 4500 AI for year 2008-09, the achievement till 10th October 2008 was 868 AI. The DOAH officials said that the target will be completed satisfactorily by the end of the FY 2008-09 by deploying the staff of DOAH. Apparently many infertility camps are being held outside the

selected villages falling under SEVG. Therefore the AI figures can not be exclusively used to assess working of SEVG unit.

During my discussions with the field staff, the implementing officers of DOAH and the SEVG were requested to have monthly meetings between SEVGs and the implementing officers of DOAH and have a greater co-ordination . It was also seen that for the same time-period spent in the same project area, few SEVGs were giving much better performance than others in achieving the targets. I suggested that the SEVG should interact amongst themselves more frequently and learn from each other's experience. This interaction will also help to resolve issues like timely availability of inputs to SEVG, review of performance records and required action to improve the performance etc. I suggested improvement in keeping A.I. data which requires information of date of pregnancy diagnosis, likely date of calving followed by visit of SEVG to the farmer. I also advised them how to keep the track of farmers and the animals served by the SEVG and how to develop and win the confidence of farmers. They agreed with these suggestions and expressed that they will be able to show good progress in the remaining period of FY 2008-09

During the field study, guidance was also given to SEVG on encouraging farmers to chaff the fodder so that fodder intake and digestibility is improved. Advice was also given on how the dung and urine can be properly conserved and used by the farmers

The mission has urged the DOAH that considering the non-availability of SEVG, the given AI targets may be completed by deploying the staff of DOAH wherever there is a shortfall in achieving the target. Mission appreciates the help so far given by the DOAH in this regard. During the mission's discussion with the Secretary DOAH and the Commissioner this point was highlighted. They assured that all required support will be given to fulfill the targets.

8.0 Procurement of semen straws and Liquid Nitrogen (LN2):

At present, semen straws and LN2 for the IAMWARM project are being procured by the respective Regional Joint Directors of DOAH by calling quotations (local shopping). This is being done till such time TNLDA is approved to do this job. The Bank forwarded the procurement assessment capacity questionnaire to MDPU on June 18, 2008. The filled-in questionnaire was submitted to the Bank on October 20, 2008. The same is under review.

There is only one agency namely National Oxygen Limited Pondicherry (NOL) supplying LN2 to TNIAMWARM project and DOAH. The DOAH officials in Villupuram and Coimbatore districts informed that the company has reduced the supply drastically for in last few months, apparently on account of reduction of LN2 output in the factory due to frequent power shortages. If this position continues, it may lead to serious problems of non-availability of LN2 resulting into loss of semen quality. It is urged that DOAH may keep a close watch on the supply of LN2.

During the wrap up meeting, Commissioner AH DOAH said that as per bank NS procurement guidelines, quotations from 3 parties are required. However, in TamilNadu only one party (NOL) was quoting for LN2. The mission informed that since it was a procurement issue, this may be taken up with the Bank's procurement department.

9.0 Difference in price of LN2 supplied to DOAH and the IAMWARM project.

During the field visits, DOAH officials at regional level mentioned that during 2007-08, the rates of LN2 quoted by NOL were same for DOAH and the IAMWARM project. However, during 2008-09, the company was quoting a higher rate (Rs 20 / liter) for supply to IAMWARM project. as compared to the DOAH (Rs 15/liter). The justification given by NOL was that the quantity of LN2 required for IAMWARM was much smaller as compared to the quantity required for the DOAH. During the wrap up, this point was discussed. The mission suggested that since the ultimate user agency (DOAH) for two projects is same, there was no reason why the supplier should charge two different rates. DOAH was requested to discuss the issue with the supplier and ensure that rate of LN2 supply is same for the DOAH and the IAMWARM project.

10.0 Supply of veterinary Medicines/drugs etc by TNMC:

The requirements of DOAH as well as IAMWARM project are being procured by TNMC. Mission observed that there was considerable delay in the supply to TNIAMWARM. Mission appreciates that during the year 2007-08, medicines for IAMWARM project were provided , on a replenishment basis, by DOAH out of its own stocks. Mission observed that even in 2008-09, there is a considerable delay in supply of medicines. For example, the medicines indented for the year 2007-08 were being received now and that too in smaller quantity. This was affecting the programme of Infertility Camps under the IAMWARM project. Furthermore, requirements of 2008-09 may only be supplied by the fag end of the year. This will further hamper the progress of IAMWARM project. *It is suggested that DOAH may take up the matter urgently with TNMC and ensure that regular and timely supply is made by the TNMC.*

Annex VII

Cooum Sub-basin Restoration and Management

Introduction

Under the IAMWARM Project, a water resources management plan is being developed for each of the 63 sub-basins based on multi-agency discussions and stakeholder inputs (e.g. WRO, AED, Horticulture, Fisheries). Given the complex and unique multi-sector issues in the Cooum sub-basin, a special effort is required to guide the development of the Cooum Sub-basin Plan to ensure that these inter-sector issues are appropriately addressed and effectively leverage the financing under IAMWARM and other projects (e.g. Chennai Waterways Improvement Project). Lessons learned from the development of the Cooum Sub-basin Plan will have relevance to other basins in Tamil Nadu and elsewhere in India. Bank Netherlands Water Partnership Program (BNWPP) funds were obtained to provide international guidance and support to the GoTN (and the Cooum Sub-basin Restoration and Management, CSRSM, team) in the development of this plan.

Progress so Far

There has been some progress on the CSRSM activities under the IAMWARM project so far. These include:

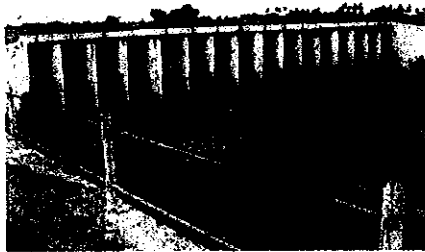
- **Appointment of CSRSM Nodal Officer:** The GoTN has appointed Mr. Phanindar Reddy, IAS as the nodal officer for CSRSM. He is also responsible for work on Chennai Waterways and can also draw upon his work in the urban development front. The WRO staff, led by Mr. Ramaswamy (SE, Chennai Region) and relevant EEs and other staff have also showed considerable enthusiasm during the mission on promoting CSRSM activities.
- **Building a CSRSM Stakeholder Network:** The CSRSM office has also initiated work with other departments (e.g. Metrowater, Corporation, etc.) and stakeholders. Relevant departments have appointed nodal officers responsible for the CSRSM work.
- **Setting up a temporary CSRSM Office:** During the mission, a temporary CSRSM office (refurbished from a building in the PWD complex) was inaugurated. Work is underway to find an appropriate site to locate the final CSRSM office.

Mission Activities

- **Field Visits:** The mission undertook intensive field visits on the Cooum sub-basin, from the start (Kesavaram Anaicut) to the estuary. The issues of environmental flow (negligible except for a few days a year), poor state of infrastructure (e.g. the already abandoned Anunvoil Anaicut and the increasingly dilapidated Korattur Anaicut), severe solid waste and polluted effluent problems, slums along the Cooum banks in urban areas, and the choking of the mouth were all discussed in detail. The mission especially noted the institutionalized disposal of solid wastes in the peri-urban stretched by local bodies that would drastically undermine any water quality gains made through effluent management in the system.
- There are several small tanks in the catchment of the Cooum river. Some of these tanks are used for irrigation and domestic drinking water purposes. In addition there is substantial extraction of groundwater in the upper reaches of the river. Farmers interviewed informed the mission of the extensive drop in groundwater levels in these

reaches. It is possible to recover these levels through crop diversification and adoption of improved irrigation and crop-husbandry technologies. The mission requests that these aspects be incorporated in the preparation of Cooum Sub-Basin Development Plan. The mission continued its visit following the river course to determine if ecological flows can be sent from the upper tanks.

- The mission was informed of the illegal mining in several stretches of the river and in these places the river bed has dropped by about 3 to 4 meters resulting in the destruction of control structures. In addition to this, inadequate maintenance and improperly planned repairs are resulting in deterioration of other regulation structures in the river. Need-based O & M is not being practiced. The mission recommends that WRO and GoTN adopt need-based O & M as other wise the funds are used in an inefficient and ineffective manner. This observation is applicable to all WRO work.
- Nearer the city some tanks are not being used for irrigation and some have been encroached by urban dwellers. These tanks can be used as flood storage mechanisms with pre-determined releases to the river through automated controls. This would ensure ecological flows in the river reach through the city. It was agreed that initial GIS work would commence by no later than November 1, 2008.



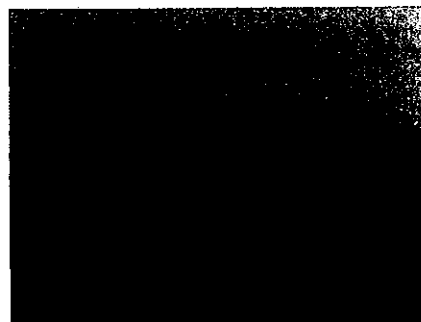
Clean river in upstream areas (photo of Kesavaram Analcut)



Solid waste disposal on Cooum bed starting in peri-urban areas (photo of Vanagaram)



Highly polluted river in the peri-urban and urban areas



Sand deposits from littoral drift choking Cooum Mouth

- **Stakeholder Meetings:** The mission also held meetings with a number of stakeholders (from WRO, Metro Water, C.P. Ramaswamy Foundation, ENVIS, Adyar Poonga Trust, IL&FS, Madras University, representative BDO in peri-urban area, Consultants for Cooum website development, etc.). The meetings reinforced the need for multiple stakeholders to be involved to provide varied perspectives, experience, and skills in designing and implementing an integrated result-oriented Cooum sub-basin plan.

- **Stakeholder Workshop:** The mission participated in and helped facilitate a stakeholder workshop was held on October 16. This workshop was chaired by the head of the CSRSM nodal officer and attended by a broad range of stakeholders from government, civil society, and university communities. The aim of the workshop was to (1) reach a shared understanding of the issues on the Cooum, (2) identify some key indicators of 'health' in



the Cooum', and to (3) identify some key options for improving the Cooum, including selecting demonstration pilots that could eventually be scaled up. The workshop agenda and presentation are attached below. Some illustrative international (e.g. San Antonio River Authority) and national (e.g. Sabarmati Riverfront Development Project, Yamuna Biodiversity Park) were shared with the participants.

Workshop Agenda

- 10-10:15 am: Welcome & Introduction to Workshop Objectives & Agenda
Participant Introductions
- 10:15-10:45am: Overview of Cooum Sub-basin Issues and Options
Summary of CSRSM Office activities
Discussion
- 10:45-11:30am: Lessons from other Global and Indian experiences (focusing on river clean-up and stakeholder awareness)
- International Experiences
- National Experiences: Ganga/Yamuna/Sabarmati
- TN Experiences: Adyar Poonga
- 11:30am-12 pm: Discussion on Issues and Indicators of Cooum Health
- 12-1pm: Discussions on Options
- 1-2pm: *Lunch*
- 2am-4pm: Breakout groups (w. discussion of stakeholder and analytical approaches) on **Potential Options:**
1. Catchment & Estuary: water conservation, environmental flows, sand mining management, tidal gates, potential eco-park approaches
 2. Peri-urban and Urban: Waste Management (prevention and control of dumping of municipal solid waste, hazardous waste, biomedical waste, construction debris)
 3. Peri-urban and Urban: Effluent Management (prevention and control of discharge of municipal sewage and industrial effluents)
- 4-4:30pm: Plenary Reporting of Breakout Groups
Wrap-up & Next Steps

During the breakout sessions in the afternoon, groups were formed according to three broad option areas (a) catchment and estuary – to include options such as water conservation, environmental flows, sand mining management, tidal gates, eco-parks, constructed wetlands, (b) peri-urban and urban waste management – to include control of dumping of municipal solid waste hazardous waste, bio-medical waste, and (c) peri-urban and urban effluent management – to include prevention and control of discharge of municipal sewage and industrial effluents. Groups were asked to brainstorm and discuss the following three questions:

- (1) What are the 2-3 key outcomes sought on the Cooum?
- (2) What are the priority options to achieve these outcomes?
- (3) How can these options be implemented in practice?

There was lively discussion during the workshop, especially in the breakout groups, and the participants felt the need to move quickly to action on restoring the Cooum in a manner that involved all relevant stakeholders. The inputs from the workshop are proposed to be integrated into the issues and options paper being prepared.

Next Steps

- **CSRM Office Operationalization:** The mission stressed the need to appoint a CSRM Nodal EE with appropriate execution powers and budget to immediately undertake a number of activities to set up the temporary and permanent CSRM office. The mission stressed the need to immediately procure computers and software to support activities (e.g. GIS/Remote Sensing). The mission also stressed the need to immediately identify a site and initiate plans for a permanent Cooum Sub-basin office.
- **Work towards a Cooum Sub-basin Plan:** An initial matrix of issues (and relevant indicators) and options was discussed with several of the stakeholders during the mission. Based on these discussions and field visits, an Issues and Options paper is currently being drafted. The mission stressed the need for the CSRM office to be proactive in:
 - Becoming a knowledge hub on the Cooum (including having copies of all key Cooum-related studies, datasets, satellite imagery, GIS, models, etc.). The Bank would facilitate these activities through inputs on GIS and DSS. This will include collation of GIS layers, generation of useful thematic maps and atlases, remote sensing analysis, and augmentation of information/data (e.g. hydrologic, infrastructure, economic, environmental, social) to be incorporated into the DSS model, to update and refine the existing rainfall-runoff model, and to generate schematics and other graphics to facilitate the activities of the CSRM Office.
 - Initiating awareness-building activities (immediate upgradation of the prototype Cooum website; discussions with government agencies, schools/colleges, NGOs, private sector and other stakeholder groups; launching a Cooum design competition, etc.). This will include a new set of targeted stakeholder meetings that moves away from WRO/MDPU to various locations along the Cooum. It was agreed that awareness creation activities will be started by no later than 30 November 2008.
 - Initiating activities to support planning and pilots on the Cooum (including collating and integrating relevant institutional plans on the Cooum Sub-basin -

e.g. WRO, MetroWater, Chennai Corporation; and the engagement of Consultants to undertake targeted studies – e.g. detailed surveys on topography, solid waste and effluent inputs, water quality, benthic sludge quality, slums, etc., as well as targeted pilots. The initial pilots identified by CSRM in consultation with the mission include those on constructed wetlands for effluent management, solid waste management – including bins, vermicomposting, etc., aeration in estuary, targeted fisheries improvement, abandoned tank rehabilitation in Cooum catchment for flood management and flow improvement. The mission agreed to assist the CSRM office in developing TORs for these activities. The CSRM also agreed to initiate activities to stem institutionalized dumping of solid wastes on the Cooum bed, primarily by peri-urban town panchayats, municipalities, etc.

- At the mouth, dredging is to be done on a continuous basis to keep the mouth open and to take advantage of the tides in maintaining acceptable water quality in the last five kilometers. It is essential that detailed mathematical as well as physical model studies be initiated immediately. It was agreed that decision on the modeling of the river flow system with tide regulation through automatic gates would be initiated by no later than November 30, 2008.