The World Bank
INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
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May 10, 2010

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

Dear Mr. Sripathi:

Tamil Nadu Irrigated Agriculture Modernization and Water-Bodies Restoration and Management (IAMWARM) Project- Mid Term Review Mission - February 22-March 5, 2010

Thank you for chairing the wrap-up meeting, following the mid-term review mission for the above project on March 5, 2010. Please find attached the aide memoire. We regret the delay in transmitting this package.

We note that the implementation progress for the irrigation infrastructure rehabilitation works (component A) and the agricultural diversification and intensification activities (component B) is proceeding moderately satisfactorily, with initial reports of improved water and land productivity and success in linking farmers to markets. We are however concerned that a delay in the administrative sanction has meant that many of the planned activities under phase III of the project have not started on time. We kindly request expeditious implementation of these activities to make up for the time lost.

The progress under components C and D, namely institutional modernization and water resources management, has been slower than originally envisaged despite the good efforts in establishing a large number of Water Users Associations (WUAs) which are handicapped in the absence of Support Organizations whose recruitment has been considerably delayed. In light of the above and given a cumulative disbursement rate of only 22% as of end-March 2010 after three years of project implementation, we have rated implementation progress, at mid-term, as Moderately Satisfactory.

Following a close evaluation of implementation progress, a number of key issues are highlighted below for your kind attention:

Agricultural Engineering Department (AED): Given the difficulties faced by AED to implement the micro-irrigation component and the small number of sub basins taken up by AED in phases III and IV of the project, it is unlikely that the targets set originally for AED activities under the project would be realized. We agree with the project's decision to revise the targets downward and to reallocate the savings from AED toward other project components.

Agribusiness Development Facility (ABDF): Given the significant delay in setting up the ABDF, we agree that this activity be dropped from the project and the savings reallocated towards other project components, including targeted second generation investments in value chains development and productive partnerships on a smaller scale.

State Water Resources Management Agency (SWaRMA): It is my understanding that the GoTN will be sending to the Bank the final proposal for establishing SWaRMA following

discussions held with the mission. SWaRMA is an important agency that needs to be established with an independent and multidisciplinary staff body. We kindly request this activity is launched as soon as possible as it constitutes an overdue legal covenant that the GoTN has not yet fully complied with, in any case not later than May 31, 2010.

Monitoring and Evaluation: One of the noticeable weaknesses of the project at mid-term is the lack of proper documentation of project outcomes and impacts. This is mainly due to the long time it took to put the M&E consultancy in place. We are pleased that this has finally been achieved, and that the M&E consulting firm has begun its work. We are also pleased to note that MDPU and all implementing agencies have agreed to fully cooperate with it and facilitate its work. We also reiterate the urgent need for MDPU to recruit a full-time M&E specialist with proper training and background to manage and coordinate this challenging activity under the project with all line departments in collaboration with the external consulting firm, possibly by June 30, 2010.

Project Consultancies: A detailed review of the various pending consultancies has been undertaken. Consultancies, considered essential to the success of project implementation and to the realization of the project development objective should be expedited without further delay. These include: Construction quality management and technical supervision which is essential to adequately supervise the quality of the large number of civil works under implementation; Support organizations for WUAs which is crucial for the implementation of the Participatory Irrigation Management activity with direct implications on the project development objective; consultancy for Basin planning including Decision Support System; and consultancy for Enterprise Information management systems. We have agreed on a timetable to award the above consultancies and request that this be monitored closely to avoid any slippages in order that appropriate benefits accrue to the project.

Project Restructuring Plan: We endorse the agreement reached between the GoTN and the mission on keeping the PDO unchanged at mid-term. I agree with the mission's assessment that the likelihood of achieving the PDO will depend on a balanced and accelerated implementation of all project components. With respect to the new activities being proposed and variations suggested by the various line departments, it is important that well justified proposals are prepared. We look forward to receiving from the GoTN a consolidated proposal which describes the plans for utilization/reallocation of project savings, along the lines discussed with the mission by May 31, 2010.

We are encouraged by the level of commitment and engagement that the IAMWARM project continues to receive from the GoTN. I look forward to an accelerated implementation of project activities in the coming three years. Please get in touch with Mr. Rabih Karaky (TTL), or Ms. Anju Gaur (Co-TTL) for any questions or clarifications regarding this letter or the attached aide memoire.

With regards,

Yours sincerely,

Roberto Zagha
Country Director, India

Attachment: *Aide Memoire*

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

Aide Memoire

Tamil Nadu Irrigated Agriculture Modernization and Water-bodies Restoration and Management Project (TN IAMWARM)-Mid Term Review Mission (February 22- March 5, 2010)

I – Introduction

1. A World Bank team[1] undertook a mid-term review mission for TN IAMWARM project from February 22 until March 5, 2010. The objectives of the mission were to (a) assess whether the project development objective remains valid or changes have to be made and assess the likelihood of achieving the objective, (b) review and evaluate the implementation progress, (c) examine project disbursement projections, procurement issues, and status of compliance with legal covenants, and (d) discuss with the Government of Tamil Nadu (GoTN) project scope/design changes if needed, and proposals to reallocate any savings. The mission would like to thank all senior officers and staff of all implementing agencies and Multidisciplinary Project Unit (MDPU) for their support and full engagement in this joint work, and for facilitating the field visits. The mission undertook extensive sites visits and district level meeting with district officers from all line departments. The wrap-up meeting was held on March 5, 2010 in Chennai and was chaired by Mr. K.S. Sripathi, Chief Secretary, GoTN.

II- Key Project Data

Project Data		Current Ratings and Flag		
		Summary Ratings	*Last*	*Now*
Board Approval Date	*01/23/2007*	*Development Objectives*	*S*	*MS*
Effectiveness Date	*04/09/2007*	*Implementation Progress*	*S*	*MS*
Closing Date	*03/31/2013*	*Project flags*	*None*	*None*
MTR date- Actual	*03/05/2010*			
Original Loan Amount	*US$485 million*			
Amount Disbursed[2]	*US$124.48 million*			

III- Achievement of Project Development Objective (PDO)

2. *The PDO is for selected sub-basins stakeholders to increase irrigated agriculture productivity in a sustainable water resources management framework.* The mission agreed with the project authorities that the PDO remains valid and doesn't require modification at mid-term. It still likely that the PDO will be achieved but this will require a faster and more balanced implementation progress across the various project components over the remaining lifetime of the project with particular attention to the institutional modernization and water resources management components. Overall the achievement of the project development objective at mid-term is rated moderately satisfactory.

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[1] The Team consisted of Rabih Karaky (Task Team Leader), Joop Stoutjesdijk (Lead Irrigation Engineer), Anju Gaur (Water Resources Management Specialist), Shankar Narayanan (Senior Social Development Specialist), Mohan Gopalakrishnan (Senior Financial Management Specialist), Harbans Anеja (Senior Procurement Specialist), Anupam Joshi (Environmental Specialist), Jagdish Anand (IT specialist), Sitaramachandra Machiraju (Agriculture Marketing Specialist), R.K. Malhotra (Construction Quality Specialist), Anil Borwankar (Construction Quality Specialist), Benjamin Obrien (Agricultural Specialist), Balwant Sathe (Livestock Specialist), Mudnakudu Nandeesha (Fisheries Specialist). After the Bank receives the government's proposal for newly proposed activities and reallocation of project funds, based on the MTR discussions and recommendations, a small mission will be fielded to prepare and appraise the proposal and agree with the government on the next steps. The next full review mission is planned for September/October 2010.

[2] See Section V- Financial management for more details on disbursement figures.

3. The mission is pleased to note that the Monitoring and Evaluation (M&E) consulting firm has finally been recruited and has started its work. The mission was also informed that the current officer in charge of Participatory Irrigation Management (PIM) activities at MDPU has been given additional charges for M&E. Though this is a good step, the mission requests that MDPU hires an external full-time M&E specialist with the required skills to manage and coordinate the challenging M&E activity under the project with all line departments in collaboration with the M&E consulting firm. A project of the size and scope of IAMWARM certainly necessitates a dedicated full-time M&E specialist. The mission also requests that MDPU and all implementing agencies facilitate the work of the consulting firm by providing necessary data and information related to the project. It is also critical that payments to the M&E consultant are made on time in order to avoid unnecessary delays with the services.

IV- Current Implementation Status – Overview

4. The implementation of the irrigation infrastructure rehabilitation works (Component A) and of the agricultural diversification and intensification activities (Component B) is proceeding moderately well. It is noted that, at the time of the mission, project activities had not started in phase III sub basins (around 30 sub basins), mainly due to administrative sanctions delays. Particular attention is needed to ensure timely completion of irrigation infrastructure rehabilitation packages by WRO with due attention to quality, and timely and efficient implementation of activities related to agricultural intensification and diversification by the other line departments. There are reports that water and land productivity have improved under the project (e.g. SRI), despite the difficulties faced in bringing more area under micro-irrigation, and the relatively low quantity of fish production achieved. The project has begun to take steps to evaluate the impacts carefully and to derive positive lessons which could possibly be widely applied throughout the state. There is also evidence that the project has been successful in building connections with the private sector, particularly in the areas of agriculture marketing. The project has also brought some degree of coordination and convergence among line departments around water productivity issues. The mission would like to commend the project on its increasing global visibility. The Agriculture and Rural Development unit at the World Bank has selected the project as one of few sites for its global learning exchange program. Around 30 Staff from the World Bank and other international agencies will visit the project around the end of April 2010 to learn about improved ways of increasing irrigated agricultural productivity.

5. There has been less progress in the implementation of the other two project components namely the Institutional Modernization and Water Resources Management. Even though these two components represent a relatively small share of total project outlay, they nonetheless have a crucial and direct role in the realization of the PDO. Activities such as establishing the State Water Resources Management Agency (SWaRMA) and forming and building the capacity of WUAs and integrating them fully in project activities have been significantly delayed. Key consultancies essential for successful project implementation particularly third party technical quality supervision and Support Organizations (SO) for WUA have been delayed. All the aforementioned issues have been discussed with the implementing agencies and with MDPU with the aim of finding ways to move forward. Overall the implementation progress of the project at mid term is rated moderately satisfactory.

V- Key issues in Implementation

Component A: Irrigation Systems Modernization in a Sub-basin Framework

6. It is reported that out of 76 packages under the nine phase I sub basins, 75 have been awarded and 52 have been completed, with the balance under implementation. The physical total completion rate is at 68.4 percent. As for the financial progress for these packages, it is reported that expenditures for phase I packages has reached around 354 crores by January 31, 2010, against a total agreed value of about 450 crores which

relates to a disbursement rate of about 79 percent. Region wise progress for phase I civil works on January 31, 2010, is about 40 percent in Chennai Region, 93 percent in Pollachi Region, 72 percent in Trichy Region, and 83 percent in Madurai Region. Most of the phase I packages should have been completed by project mid-term. The mission requested WRO to identify the reasons for slow progress, particularly in Chennai region, and to take all necessary measures to rectify the situation. These lessons learned can then be used to improve the implementation of the phase II to IV packages.

7. It is reported that out of 43 packages under the 16 phase II sub basins, all have been awarded. One package is reported to be completed. The corresponding financial rate is reported to be around 42 percent and WRO assuring that all packages will be completed within the 18 months of the contracts period.

8. The procurement plan for 99 packages under the 26 phase III sub basins[3], with a value of about 273 crores, has been cleared by the Bank. However the mission learned that due to delay in issuing of the administrative sanction (AS) no work has started on these packages yet. The mission urges that necessary government approval is expedited. It is also noted that all phase III packages are concentrated in Chennai and Madurai Regions. The mission recommends that WRO reassigns necessary staff to these two regions to expedite implementation once approval from the Government is received.

9. *Quality Control/ Quality Assurance*[4] - The mission made field visits to ongoing and completed packages of phase I works in the Pollachi, Madurai, and Trichy regions. Overall the workmanship and construction is of acceptable quality, and quality control tests are being conducted and documented. Some quality control aspects which need to be further be addressed and fine-tuned have been conveyed to the engineers on site and are included in the annex. In one of the packages visited[5], the cement concrete lining placed in a number of panels was observed to be associated with severe honey-combing and, thus, of unacceptable quality. Consequently, the concerned CE (Pollachi region) got 4 lined panels demolished to be laid afresh by the contractor at his own cost. The mission considers this kind of quality control decisions a strong message to all construction agencies about GoTN's commitment to good construction quality. In order to improve the construction supervision and quality assurance, it is important that contractors provide quality work as per technical specifications and that the works are adequately supervised by WRO engineers and quality assurance staff. In addition, it is essential that WRO completes the evaluation of the third-party construction quality supervision so the consultant can be mobilized at the earliest.

10. *Review of WRO DPRs/Bid documents*. During the mission, the civil works components of 4 DPRs for phase III sub basins were reviewed. Final clearance from Bank will be issued once all other aspects of the DPR have been reviewed. A number of model bid documents have also been reviewed and NOC have been issued. The mission would like to bring to WRO's attention that all phase III sub basin packages, which were agreed to be considered prior review during last mission, would need to be forwarded to the Bank for clearance after duly incorporating comments received on the model bid documents.

11. *WRO has proposed a number of variations and new works as part of reallocating project savings* Installation of measuring devices at all sluice outlets that were not considered under phase I packages. The mission agrees that measuring devices are important for WUAs and agrees with the inclusion of such structures The estimated cost is about Rs. 4 Crores. WRO will have to propose and submit to the Bank preferred methods of procurement. Possible options are the inclusion of the construction of the structures as a variation in well performing contracts or procurement for a new contract.

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[3] DPRs for 4 additional sub-basins are under review/clearance.

[4] The mission field visit observations, comments and suggestions are detailed in the enclosed Annex.

[5] Package No. 10 (10-R water course Nattukal Palayam distributory)

12. Lining of at least 30 m – up to 50 m downstream of each sluice. The mission agrees that lining of the initial canal section can be important in order to maintain the canal section immediately downstream of a sluice. However, it requested that the actual length be determined based on needs. It is expected that the length will be less than 50 m in most cases and that not every outlets needs lining. The maximum cost would be around Rs. 30 crores. These additional works should as much as possible be added to on-going contracts after receiving procurement clearance.

13. Rehabilitation & Modernization of the Contour Canal (CC) in PAP. In August 2007, a Bank mission visited the CC which is the sole supply canal for the PAP system (152,000 ha) and found it to be in deteriorated condition and that many of the rehabilitation works carried out in the past (including the previous Bank-assisted Water Resources Consolidation Project -WRCP) have not been durable. As a result the CC can supply never more than 90 percent of the design flow, while almost on an annual basis breaches occur that require closure of the canal for up to one month. WRO set up an expert committee that reviewed and determined the needed rehabilitation and modernization requirements of the canal. The mission learned that the committee proposed new designs that would be strong enough to withstand embankment settlement which is the common reason for the destruction of canal lining. Based on the information provided, it appears that there is a technical case to be made for the proposed works, considering the importance of the CC for 152,000 ha of water short area. In addition, the project has already invested Rs 116 Crores in the rehabilitation of the infrastructure in the Palar command area.

14. The estimate for the complete rehabilitation and modernization of CC is Rs. 127.5 Crores, which the mission considers to be relatively low. The mission is of the opinion that the typical schedule of rates does not apply for these works that have to be carried out under difficult conditions and only during few months per year. From experience in other states, an additional premium of 40-50 percent may be required. WRO was requested to prepare a more realistic estimate.

15. The addition of the CC is considered a major restructuring activity under the project, which would necessitate a thorough review by the task team, and Bank management approval. The CC would require a careful assessment to determine whether it is feasible to complete within the remaining three years of the project lifetime, taking into consideration the difficulties faced in civil works completion to date. The CC project will use up most of the project savings from all other components, and given the expected time needed to process and implement the CC, if approved, careful consideration should be made to the risk of funds sitting unutilized until actual works start. Careful examination should also be made to decide whether the inclusion of the CC would necessitate an extension of project closing date, currently scheduled for March 31, 2013. More importantly, the decision to include the CC in the IAMWARM project should weigh in any association of the CC with rivers that have been subject of past interstate disputes between TN and its neighboring states and the possible ramifications.

16. The DPR for CC should describe the impacts in detail, especially the impact on water deliveries and agricultural outputs, conduct an environmental and social impact assessment (the canal runs through a tiger reserve and many large trees are located along the canal), prepare a detailed economic analysis and a detailed implementation program, including the tasks to be carried out to agree with farmers in case it is proposed to forego an irrigation season. This maybe important to have sufficient time to implement the works. Also, considering the complexity of the works, an independent third party construction supervision and quality assurance consultant would be required and would need to be in place at the start of construction. A final decision about the inclusion of CC can be made when all this requested information has been prepared and an official request has been received from GoTN, through DEA, as part of the overall project restructuring, and after the Bank conducts its own appraisal and management approval is obtained.

17. The project has included Rs. 15 Crores for automation of a section of the PAP canal system. This amount would be sufficient to automate the head regulator, 3 out of 13 regulators on the PMC (up to km 31 of

the 124 km long canal), six branch canal offtakes, four distributary offtakes, and the entire No. 1 distributory (10 regulators and 26 farm sluices). WRO has proposed to utilize Rs 100 Crores for automation of five systems, including the PAP. Until now, the only experience with automation relates to two small gates. The mission recommends that automation remains limited to the PAP canal system, as proposed, so that experience is gained with the automation of a large canal system. This recommendation is also based on the fact that the other four systems have not yet been identified and no investigation and design has taken place.

18. WRO has proposed to drop six sub basins from the project and replace them with three sub basins, bringing the total number of sub basins under the project to 60, but reporting that the total registered ayacut area under the project would remain unchanged (617 000 ha). The mission has no objection to this proposal provided that it is endorsed by all other line departments and that they would be able to undertake their demonstration activities in the alternative sub basins proposed.

Component B: Agriculture Intensification and Diversification

19. *Department of Agriculture (DoA)- Department of Horticulture (DoH) and TNAU-* Amongst them the three line departments report that 58 400 ha (43 860 in previous mission) of demonstrations/expansion area has been achieved to date with more than 200 000 ha of impact area adopting technologies promoted by DoA and TNAU.

20. Outcome indicators, particularly those related to the increase in the value of crop production per unit of irrigation water and the increase in farmers' incomes have not been reported, and this will be a high priority for the recently appointed M & E Consultants. The target increase in the area under high value crops (horticulture) is 9% at the end of year three and 30% by EOP. To date the area covered by the DoH is approximately 3% of the total project area, but it is not clear how much of this area is diversification and how much is with farmers who were horticultural producers before the project. This seems to be a disappointing increase so far, but to be sure a careful evaluation is required

21. The increase in the value of crop production per unit of water has been studied for one crop, rice under SRI. The data have not been extrapolated across the project, but the results are encouraging as significant increase in productivity is reported. Increased production of crops due to the project has been reported at greater than 620 000 MT (PAD target of 1.5 million MT at end of year three). The calculation of the incremental production is suffering from the lack of standardized baseline data for the crops produced.

22. The introduction of a cropping systems approach to SRI, with the combination of green manure/SRI/pulses is a good indicator of INM practices. The expansion of the area under pulses also could be viewed as part of the INM approach as should the organic farming demonstration where vermin-composting is promoted. Taking this into account the area covered by INM could be greater than 30% of the total Ayacut area (as per current DPRs). This however should be verified by assessing the number of project farmers that subsequently continue to conduct soil tests on a regular basis.

23. The increase of area under IPM and organic farming is not well documented and the approaches to pest management are somewhat fragmented. For IPM to be truly effective a community approach needs to be adopted where the community has some isolation or buffer from neighbouring communities (for example the impact of spray drift of chemical insecticides on beneficial insect populations, an important component of IPM, can be devastating). The project needs to reconsider its approach to IPM or organic farming or this target should be revised. The organic farming demonstrations conducted under the project should be renamed as INM, as the provision of vermin-compost alone doesn't constitute organic farming.

24. Expenditure of the three agencies against the original provisions in the project design is variable however all report to be on target against the supplemental DPRs approved (with some exceptions i.e DoH in

Palar, TNAU for precision agriculture). The DoA is realizing significant savings that could amount to Rs. 36 Crores and is able to achieve its targets utilizing less resources than budgeted in DPRs. TNAU report savings that could amount to Rs. 21 Crore as a result of reduction in the costs of demonstrations, in particular SRI.

25. Both DoA and TNAU have provided supplemental activities which they would like to undertake to make use of these savings. The suggested activities by the DoA include demonstrations targeted at sustaining the impact area, pulse, groundnut and green manure seed production, intensification of pulse production, distribution of agricultural equipment including vermicomposting units, crop competitions, and further IEC activities. Additional activities suggested by TNAU include demonstrations targeted at sustaining the impact area, pulse seed production, intensive pulse production, demonstrations on (i) conservation agriculture, (ii) sustainable sugarcane, (iii) direct wet seeding rice, (iii) raised bed rice production and (iv) irrigation scheduling using soil moisture sensing devices. Further activities suggested include automation of micro irrigation systems, DSS for crop production, identification of GHG emission reduction technologies in SRI for carbon trading, up-scaling of agro advisory services and water balance studies. These proposals were discussed with the mission, however they are yet to be fully finalized and final clearance will only be given after due consultations (including with farmers) have been made, sub-basin wise physical program for each item, unit cost, and financial requirements have been submitted. The mission is of the opinion that subsidy provided for repeated activities, which have proven successful in previous years should be significantly reduced/eliminated. Once detailed DPRs are submitted for Bank review, further action will be recommended.

26. DoH has requested additional staff (Technical Input Providers - TIP) for conduction activities in the Phase III sub basins. The original qualification for the provision of these staff was the recognition that the DoH was understaffed and that these TIPS would be gradually phased out as the strength of the department increased. The DoH currently has around 79 Tips on payroll and the mission recommends that this number gets cut in half as the area per TIP will be doubled, as agreed, and the demonstrations activities under phase I sub basins are winding down. Once this exercise has been undertaken, the mission recommends that reallocation of TIPS towards phase III takes place from within the revised number. If more TIPs are still needed, then a proposal may be sent to the Bank for review.

27. Observations in the field were generally that the quality of demonstrations remains satisfactory. It was noted in some pulse demonstrations that the farmer was unwilling or unable to undertake the recommendations of line planting. While this may be an isolated case it is important that if a farmer agrees to a demonstration and inputs are provided that he adopts the full package of practices. If for some reason he/she cannot then a minimum of 10% of the field should be planted using the full practice. Groundnut demonstrations were observed planted on the flat however; TNAU indicates that research conducted shows significant yield advantages from planting groundnuts on beds. This highlights a technology gap between the researchers and the DoA and as such it is recommended that when Phase IV DPRs are produced that TNAU conduct some demonstrations in all major crops of best practices. Preliminary information from a rapid assessment study indicates that much of the technology transfer within a village is provided by the opinion maker, wherever possible these demonstrations should be conducted on his or her fields.

28. The mission noted the high quality of the precision farming demonstrations, namely the cluster of onion, chilli, tomato and beetroot farmers are an excellent "showcase" of project interventions. The E-Vellanmai extension concept was reviewed and some encouraging results were reported, particularly as it is introducing the concept of payments for extension services. The initial pilot received an average of 15 calls per week, 5 of which were problem based and required a field visit, the remainder were decision based and were resolved over the phone. The response time for problem based calls was reported to be no later than the end of the following day. This model is of particular interest and the recommendation made by the university to pass it to the Department of Agriculture should be taken with extra caution, with the very least reviewing the success of similar systems run in other States by the Agricultural Departments.

29. *Department of Agricultural Engineering (AED)* - The activities assigned to AED include installation of 100,000 ha Micro Irrigation System, piped conveyance systems, and water harvesting structures such as farm ponds, all with an ultimate aim of improving irrigation efficiency. In addition, AED provides machinery to WUAs. Overall AED has been able to disburse INR 168 million (US$3.74) against the allocation of INR 3390 million (US $75 million). The progress of AED has been slow, mainly due to poor adoption of MIS. So far AED has achieved only 4643 ha, while applications for 7000 ha are under progress. In order to accelerate the adoption rate by farmers, several revisions (refer Annex I) have been proposed in the approach accommodating for field situations and other schemes in the state, yet it would not be possible to achieve the target of 100,000 ha. Therefore it was proposed to reduce target for MIS to 40,000 ha while scope of other water efficient interventions such as piped water conveyance water harvesting structures will be increased to improve water delivery systems. Further introduction of fuel pumps with farm ponds will ensure the water availability for critical irrigation needs and enhance irrigated areas. The total allocation to the AED component under the project will be revised downward almost by half resulting in significant savings which will be allocated to other project activities.

30. In order to make implementation effective particularly water harvesting and pipe conveyance system, the department requires technical assistance to assess the system and accordingly recommend customized interventions. During past two missions, it has been agreed that a consultant would be engaged by AED to design pipe irrigation system and rectify already installed systems and design R3 distributary system. It has been very disappointing to see that the AED hasn't been proactive in engaging the consultant until now. In order to set a pilot system for piped conveyance, TNAU has agreed to include the installation of R3 distributary as part of their work plan. TNAU will provide on job training to AED how to assess, design and evaluate the piped conveyance system so that they can replicate in other areas. Since the availability of energy is a major constraint, it is advised that the preference is given for gravity piped distribution.

31. Department of Agriculture Marketing: Commendable work has been done by organizing marketing of 27,579 metric tons of agriculture commodities valued at US$ 7.39 million through the commodity groups and last mile productive infrastructure created under the project. It has been reported that 191 structures like Agri-Business Centers (ABCs) drying yards, storage godowns, collection centers, pack house, etc. planned in Phase I sub-basins are fully operational. The remaining infrastructure works planned are under various stages of completion. Phase III works are yet to start due to administrative sanctions delays.

32. *Utilization of resources allocated for Agriculture Marketing at MTR and proposals for additional activities:* Against the allocation of US$ 5.52 million in PAD, the project has committed investments worth US$ 5.41 million. Commissioner for Agriculture Marketing has proposed additional investments for linking farmers to markets. The mission reviewed the proposals to support the following activities by allocating additional resources of US$ 2.92 million for the agriculture marketing sub-component. The project is advised to prepare detailed project reports (along with relevant ToRs) based on these discussions and submit to the Bank for approval as part of overall project restructuring plan. Considering these investments, the mission agreed to drop the Agri-Business Development Facility (ABDF) component resulting in net savings of US $15 million. The newly proposed activities include : (a) *Consolidating commodity groups into producers' organizations (US$ 1.11 million); (b) Value chain development in select commodities (US$ 0.88 million): (c). Development market place for linking farmers with markets (US$ 0.44 million): d. Phase IV sub-basins (US$ 0.25 million); (e) Strengthening of Commissionerate of Agriculture Marketing (US$ 0.24 million).*

33. *Department of Animal Husbandry (DAH)* - It is reported by DAH that the cumulative targets vs achievements for Phase I and II from inception until 31st January 2010 are for A.I, fodder cultivation area, azolla production, infertility treatment camps, farmers' training camps and interactive meetings largely achieved. It is necessary to know why the results of conception/calving rate are low in some sub-basins and what steps can be taken to improve them. The efficiency of achieving AI targets and conception rates, at SEVG units, needs to be improved and monitored by DAH staff.

34. The reported data indicates that so far around 4.88 lakhs AIs have been achieved against a target of 5.51 lakhs, and that the increase in milk production is of the order of 757 liters day in 2007/08 and 2236 liters /day in 2008-09. The data collected by DAH so far indicates a "with" project increase of annual milk production of 52195 M tons only, indicating a need for a bigger effort by DAH to achieve the target under the project. It would be important to evaluate the data above carefully to analyze the impact.

35. Against the financial allocation, as per Administrative Sanction, of Rs 11.80 crores, the utilization till end of January 2010 is reported to be Rs 6.99 crores (59.2%), leaving a gap of Rs 4.81 crores. Further, the utilization as percentage of DPR is only (42.43%). The total outlay of Rs 386.562 lakhs has been approved for A.H. for 20 sub-basins of Phase III. However, the program for FY 2009/10 has not been so far implemented, as the Government orders are yet to be issued.

36. Out of the total DPR allocation for DAH of Rs 39.30 crores, balance amount of Rs 18.59 crores is available. The requirement to utilize this amount has been prepared by DAH under 17 items with a total outlay of Rs 18.77 crores. Mission suggests that only those ongoing items which have shown a high response from the farmers and are directly linked to increasing milk production (e g AI, fodder production, azolla, infertility treatment/follow up camps) may be given the priority and considered. Items related to creating new facility or improving existing infrastructure facility of the Government institutions may not be considered at this stage, considering that half of the project period is already over. Keeping this broad objective in view, mission urges that DAH may re-examine the issue, re-estimate the requirements for inputs that are most essential to implement the remaining AH program and revise the proposal giving the objectives, results achieved so far, impact made by the component selected for expansion, justification to increase the activity, sub-basin wise physical program for each item, unit cost and financial requirement for the selected components of AH program for the remaining project period.

37. Department *of Fisheries* - Good physical progress has been made in most of the interventions excepting in the case of ornamental fish units, cage units and aquaculture in farm ponds. These need to be targeted to achieve the outputs as indicated. The implementation plan for the third phase DPR should be developed based on the lessons learnt in the first and second phase to achieve the targets in the given period of time.

38. Reaching the target of over 22000 tons of fish production (as per PAD) would be possible, if adequate fingerlings are made available through project intervention for stocking in tanks. So far, only over 1200 tons has been accomplished since many of the seed banks are yet to commence seed nursing. Based on the quantity of fingerlings needed to produce nearly 20,000 tons of fish in the remaining life span of the project, plans have been worked out in consultation with the DoF and MDPU (See Annex II). The project should adhere to this target and develop plans to accomplish it within the life span of the project.

39. Stocking of irrigation tanks either with the seed produced from the seed banks established under the project or through procurement of seed from the commercial vendors is continued. However, information related to baseline data on the production and the actual productivity accomplished due to stocking are still based on the estimated values. It is essential to utilize the field monitors to gather baseline information and the actual production information from as many stocked water bodies as possible.

40. Fish seed banks efficiency has begun to show some improvement. There is a need for continued monitoring of these units to reach their optimal production ability. Further, it is time to identify the Water Users Associations that have been proposed to take over the management of these seed banks and enable them to acquire the necessary skills before the actual transfer.

41. One of the beneficiaries, who received support for the establishment of ornamental fish culture unit has expanded his activity further with the support of Marine Products Export Development Authority. While this is good news to see the impact of this intervention, many other beneficiaries are yet to demonstrate the viability of the activity. The modified structure of ornamental fish culture unit require considerable amount of back up support and technical guidance to enable them to be successful. Proper market linkage appears to be one of the key issues confronting the success of these units, besides successful rearing of aquarium fishes.

42. Adequate data is necessary to establish the ability of the fish kiosks to source fish for sale, quantum of fish sold, and type of customers visiting the kiosks, etc., before scaling up this activity.

43. Monitors appointed under the project have not been given adequate training on the tasks they need to carry out. It is necessary to give them complete orientation on the project, operation procedures and the potential impact the interventions expected to make. One of the constraints experienced by these monitors is the reimbursement of actual travel expenses. Appropriate guidance may be issued to the nodal officers to encourage these monitors to travel and seek reimbursement under the provisions.

44. Until now, the suggested training manuals to be developed based on the successful interventions are yet to be prepared by the project. Part of the IEC budget must be used to develop the training manuals.

45. Staffing remains a constraint. It is learnt that new batch of department staff recently recruited have completed training and would be available for posting. Hence, priority may be given to post them to the project area and help in achieving the fish production target. As the seed nursing units need to be established and farmers need close follow up support , it is essential that adequate number of staff become available to provide support to about one hundred fish seed nursing units to be established. This may be treated on priority in view of the huge gap that exists between the target accomplished and the target to be reached.

46. Activities planned for the utilization of the left over funds for DoF have been discussed with the mission. Detailed proposals/DPRs would be forwarded to the Bank for review/clearance.

Component C – Institutional Modernization for Irrigated Agriculture

47. It is reported that 2362 WUAs have been delineated under the project and a total of 2271 WUA presidents have been elected throughout the project subbasins and an initial orientation training for 2063 of these WUA Presidents has been organized by the PIM cell. The mission is however disappointed of the severe delay in the recruitment of the Support Organizations to build the capacity of WUAs, and to help them fully integrate in project activities and ensure sustainability. The mission believes that unless immediate action is taken, the achievement of the PDO may be jeopardized.

48. As per Farmers Management of Irrigation Systems's Act, WUAs are to be empowered to take care of the operation and maintenance of certain infrastructure. For WUAs to be able to do that, they need to have social cohesion and sufficient technical and financial capacity. The project aim is to build this cohesion and capacity. As per project design, SOs are important to support WRO with the capacity building of WUAs. Twenty four SOs are to be recruited but none of the SOs is in place and recruitment of only 10 SOs is ongoing. The recruitment is still at evaluation stage, which is done at district level under the leadership of the District Collector. The Mission was informed that most of the financial proposals exceed the cost estimates, which is to a large extent due to the very low cost estimate made by WRO. The Mission urged that a price comparison is made as soon as possible and if the proposed costs are within range of market rates, contracts should be awarded. The aim is to have all ten contracts concluded latest by the end of May 31, 2010. The procurement of the remaining 14 SOs should start immediately with the advertisement for expressions of interest. The same RFP as for the first ten SOs can be used. It is recommended that the evaluation is done

centrally by WRO, with assistance from the MPDU, rather than decentralized at district level. The timeline should be such that by November 1, 2010 all remaining SOs have been mobilized.

49. The Mission is also disappointed that the PIM cell is left with two staff only, one of whom is on secondment from MPDU. Considering the interest expressed by the EiC that PIM has to focus on all WUAs in the state this lack of support to the PIM cell is not justified. The Mission discussed the vision for PIM in the state and it was agreed that multi-disciplinary teams (WUA development specialist, water management specialist, engineer, social scientist, financial management specialist, etc.) are to be established at state, regional, and divisional level. The state PIM cell will have to provide the overall coordination of WUA development and provide the vision and policy advice to government. The staff of the cell will also support the regional staff. The regional PIM cell will carry out overall monitoring of WUA development and performance in the region and support the divisional staff with training and advice. The divisional staff will carry out monitoring of all WUAs and provide regular support and training to WUAs, with the main focus on the less performing ones. The PIM cell will also coordinate the outsourcing of specialist training to WUAs, e.g. through the IMTI in Trichy. The Mission requested the EiC to prepare a detailed and costed proposal, which, if acceptable to the Bank, can be supported by the project. The estimated support during the next three years is estimated at US$2.5 million, which will set up the foundation for a long-term engagement with WUA support by WRO.

50. The staffing of the IT cell is still inadequate and needs to be augmented. Currently only an EE, an AEE and AE are in this cell; of this the AEE is likely to be transferred after 15 April 2010. Approval exits to recruit people from the industry for this cell and this should be done on priority. The inadequate staffing of the IT cell has been brought to the notice of the EinC who has agreed to personally look into this and augment the team.

51. The project design envisages the construction of one office for a cluster of ten WUAs. WRO and the mission agreed that sharing one office by ten scattered WUAs is logistically very impractical and should not be supported. It was agreed, however, that a small office for each WUA would be important to keep it a sense of formal existence and to keep records and hold meetings. It was agreed that for each WUA that within the next six months fulfills a number of conditions as per Act (conduct meetings, form four sub-committees, maintain records) as well as provide land, a small office of about 4m by 7m will be constructed. In the meantime a cost estimate has to be prepared and construction and procurement arrangements have to be decided.

Component D –Water Resources Management

52. **SWaRMA**: The mission discussed the subject of SWaRMA with GoTN authorities. This has been a long pending issue that has seen little progress to date and happens to be a legal covenant under the project. Government has issued a GO for the establishment of SWaRMA, which is important for Tamil Nadu, being a water-stressed state. The Mission agrees that SWaRMA has a focus on the overall management of water resources in a holistic manner and the efficient allocation of water for various competing uses. The Mission deems it important that a State Water Resources Management Committee is set up with all stakeholders represented to set the policies and provide guidance to the Agency. SWaRMA should be set up with a full complement of staff to quantify water resources; monitor water resources; license use; license wastewater disposal; measure flows; assess environmental requirements; regulate; control; prosecute violators; set water fees (for abstraction, not within a command area), etc. SWaRMA would thus provide a one-stop shop for water management, giving knowledge of resource availability, control, management capability, coordination, etc. The Mission understands that additional proposals have recently been sent to government for the establishment of SWaRMA, but requests that the proposals be shared with the Bank team for review by May 15, 2010. The current GO calls for an executive office, mainly comprised of engineers, which in the opinion

of the mission is not adequate, as other specialtics should be included in the Agency which should be headed by a senior, experienced and qualified officer, having decision-making authority, to be appointed.

53. **Cooum**: The mission met the Cooum Sub-basin Restoration and Management team to discuss the current status with the development of the Cooum river sub-basin plan. It is a positive development that all main stakeholders have been organized to have a say in and participate in the planning, restoration and management of the Cooum sub-basin. The Mission was informed about a longlist of project proposals made by the various stakeholders. The Mission stressed the importance of having a master plan for the integrated development and management of the Cooum River Basin. Such a plan would prioritize the investments subject to safeguards considerations so that maximum benefits can be attained as soon as possible through a series of coordinated developments. CSRM nodal officer informed that GoTN is independently planning a partnership with GoSingapore and a conceptual master plan may come out within the next six months for the basin, with the assistance of a group of agencies from Singapore. The Mission stresses that after the conceptual plan a more detailed plan would be required, as well as a mathematical model that can model the impact of certain investments on the water quality and quantity. The project s=would be able to finance such study, however the project is not party to the partnership with GoSingapore and procurement rules will not allow that the services by the consortium of agencies from Singapore to be financed from the project. Given the multiplicity of government projects that are conducted in the cooum sub basin, it is essential that IAMWARM activities are clearly de-linked from any other projects/activities/schemes in the sub basin to allow targeted monitoring including proper implementation environmental and social safeguards measures as per the ESMF for the project. Based on preliminary discussions, it was informed that there are 71 tanks in the upper zone of the Cooum Basin and five tanks in the middle zone, that are expected to be taken up under the project. It was informed that the DPRs are at an advanced stage of preparation, and both Cooum and Adyar DPRs are expected to be submitted by May 30, 2010.

54. **VI- Environmental & Social Safeguards**: The mission reviewed the status of environmental safeguards and its implementation status. It observed that the monitoring undertaken by the Environment Cell Division (ECD) needs to clearly capture any adverse impacts due to project investments, which at present is not reflected in the reports prepared by the ECD. Although the quality of the reporting has improved considerably and as emphasized in earlier missions, baseline data is now also being collected for various parameters, any direct or indirect impacts due to project investments are still not being captured. This makes it difficult to observe the intensity and extent of the mitigation measures in the field. Mission conducted a half day workshop of the three EEs heading the Environmental Cell in the Chennai, Madurai and Coimbatore Divisions and collectively a draft reporting format was developed to capture project and non-project related impacts in the various sub-basins. The draft reporting format is provided in Annex. The ECD will finalize this format and submit to the Bank for comments by March 30, 2010 (The format has since been submitted to the Bank). During the workshop, a tentative list of parameters was also finalized for collecting baseline data. The mission agreed that the ECD will submit half yearly activity progress report that will include field based observation as recorded in the finalized reporting format. This format will be uniformly followed for all sub-basins.

55. **The mission highlighted that an external environmental audit of compliance with the agreed Environmental and Social Framework (ESMF) is long pending and that it is required to be carried out urgently**: The project will develop and share draft TORs for the external audit with the bank by May 15, 2010 and will initiate the process of contracting this audit.

56. Based on the review of the "Environmental and Social Baseline Data collection" reports for 6 sub-basins, the mission reiterates that it is important that if land acquisition takes place as part of project activities, the record of such land acquisition with specific details of the individual, the extent of land acquired, his or her landholding and other asset details and a record of the process of assessing the impact using the formats provided in (Section 7.9 on Pages 262 and 263 of) the Environmental and Assessment Report for the project

is made available by WRO through MDPU. The mission would like to emphasize strict adherence to this agreed procedure as per the agreed Environmental and Social Management Framework (ESMF) for the project. The data for all land acquisition, if any, should be submitted to the Bank by May 30, 2010.

VII- Financial Management

Financing from	IDA	IBRD	Total
Allocation	152.96	335.00	**487.96**
Disbursed *	66.78	41.80	**108.58**
In pipeline with Bank/CAAA/Project**	11.74	4.26	**15.90**
Total Disbursment	78.52	46.06	**124.48**
% Disb.	51.33 %	13.75 %	**25.51 %**

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

** Claims in pipeline with the project (relating to the quarter ended December 31 2009) which has been submitted to the Bank for approval prior to re-imbursement.

57. The project has been timely in the submission of the quarterly IUFRs and disbursements have been made for expenditures reported till quarter ended September 2009.

58. **Budget & Funds Flow**: The budget proposed for the financial year 2010-11 is Rs 3848 million which adequate and compares favorably with the revised budget estimate of 2009-10 which is Rs 3235 million. This can be increased in the revised estimate for 2010-11 in case the utilization rate is higher. There were no constraints in funds availability with the various implementing departments. However the administrative sanctions (AS) for Phase III sub basins have been considerably delayed resulting in very low expenditure (only approx 9% of the revised budget estimate till December 31, 2009) in case of departments other than WRO. This could result in a rush of expenditure immediately after issue of AS and also drawing of funds at year end to show utilization. **It is suggested that the MDPU send a communication to all the line departments re-iterating that funds should not be drawn and parked in bank accounts/ PD accounts at year end since it will not be reimbursable by the Bank and also invite comments in AG audit. The FM rating for the project remains moderately satisfactory.**

59. **Accounting, Financial Reporting and Internal Control**: the project is obtaining monthly reports from all the line departments and the project expenditures reported by the line departments and the state AG are being reconciled on a periodic basis and adjustments, if any, are being reflected in subsequent quarter's IUFR. Following discussions with the AG (A&E) during the previous mission the project has received the expenditure recorded in the AG's accounts for the quarter ended December 31 2009 and the difference between the expenditure reported by the line departments and the AG is less than 1%The changes agreed in the IUFR formats to reflect component allocation, year to date and cumulative to date expenditure have been incorporated in the IUFR for the quarter ended December 31 2009. Sub basin wise comparison of DPR with cumulative actual expenditure till December 31 2009 was also shared with the mission. The figure of retention money being reported by WRO appears incorrect; this is based on confirmation of the understanding that retention money deducted from running bills is recorded as expenditure only on completion of the contract. While this has not had any impact on the expenditure and re-imbursement since only two to three contracts have been completed till date, it was agreed that MDPU will review and correct the information in the IUFR for the quarter ending March 31 2010.

60. The training on financial management for phase III sub basin has been delayed to April 2010, in view of the delay in receipt of Administrative Sanctions.

61. **Internal & External Audit**: a meeting with the internal auditors was held during the mission. The internal auditors have since the previous mission submitted the final report No 3 and 4 covering 14 sub basins

and are also carrying out physical verification of assets created under the project. The observations mainly relate to (a) need for independent & direct confirmation of bank guarantee's provided by contractors; (b) adequate coverage (amount & period) of insurance taken by contractors; and (c) observations relating to procurement procedures and better documentation in the bid documents. It was agreed that the project would submit its response and action taken on reports 2 to 4 by April 30 2010. The project has submitted the external audit reports for the project for the year 2008-09 (project and TNAU) with some delay and has also provided the response from TNAU. MDPU has taken action on the audit findings by way of adjustment in claims in respect of items identified as either in-eligible or advances reported as expenditure. The response to the Bank would be sent by March 15 2010 (done). It was also agreed that for FY 2009-10, the reconciliation of the expenditure as per IUFR would be segregated between TNAU component and the main project as two audit reports are received.

VIII- Procurement

62. Procurement plans for Phase I and Phase II presented to the mission did not carry actual dates or revised dates in some cases. It was agreed that updated plans indicating revised and actual dates shall be sent to the Bank latest by April 30, 2010. For Phase III, the procurement plans were cleared by the Bank during last quarter of 2009 but these are awaiting administrative approvals of GoTN. Consequently procurement action for these plans is yet to start. Mission emphasized that this issue be taken up with GoTN for expeditious clearance. As soon as GoTN clearance is received, the project should work out the revised dates and send to Bank.

63. **DoA**: All packages have been completed. Project brought up the prices of fertilizers, paddy, pulses/ seeds are fixed by Government and are to be procured from Government outlets and dealers. They land up with the same prices from all bidders. Firstly it is not possible to get competitive rates and secondly all bidders quoting the same rates is problematic to decide on the award. Project was advised to study the Government notification carefully whether the prices fixed were in the nature of MRP or mandatory because the possibility of dealers offering discounts cannot be ruled by sharing their margins. If project wishes to suggest changes on procurement procedures then they should forward the proposal to the Bank for consideration, supported by past purchases.

64. It was also suggested that certain packages need to be further split up as deliveries are required at different stages ranging from two to eight months. Besides, there was problem of storage and also perishable nature of goods. It was suggested that if prices are stable then installment /staggered deliveries may be requested.

65. **DoH**: Mission noted that a large number of packages were still to be awarded. These need to be expedited.

66. **DoF**: Phase 1 2008-2009: 6 packages yet to be initiated due to scarcity of water supply. 2009-2010: 16 packages and 2010-2011; 4 packages. These could not be taken up so far. It was mentioned that these will be initiated based on the water availability and the handing over of farm ponds by AED. This needs constant watch for speedy actions and supplies. Phase 2 Sub basins: 13 Packages will be initiated based on water availability in irrigation tanks and handing over of ponds by AED.

67. **TNAU**: 2007-2008 Phase 1; Execution of contracts is behind schedule and need to be expedited. 2008-2009 Phase 1 and Phase 2; Out of 500, 57 still to be awarded and 24 not operated. 2009-2010 Phase 1 and Phase 2: 324 packages yet to be awarded. Behind schedule needs immediate attention. 2009-2010 Phase III: NCB -1 and NS 353. Awaiting GOTN approval before procurement action can be started.

68. **AHD**: Phase 1 2008-2009: Three packages are yet to be awarded; Phase 1 2009-2010: Total 21 packages. 18 awarded and three awaiting award. Phase 2 2009-2010: Total 50 All NS. 19 awarded. No supplies. Behind schedule - Phase 3: @2009-2010 Total 14: All NS. Awaiting GOTN approval- Special attention is required for timely supplies.

69. **AED**: Phase 1:2007-2008:/2008-2009; For 28 packages contracts are yet to be awarded. Need to expedite. 2009-2010: Only one NS yet to be awarded

70. **AMD**: Phase 1; 2007-2008/2008-2009 All completed but 2009-2010 out of 46 only 18 awarded. behind schedule –

71. **WRD :** Phase 1; lst year : NCB 67. 65 awarded. 45 Completed. One Bank rejected to finance. 20 in progress.Phase 1 2nd year: NCB 10. 10 awarded 7 Completed - Phase 2: NCB 43. All awarded only one completed. During discussions it transpired that response was poor as in most of the cases only one or two bids were received; Phase 1- year 1; 3 bids received for 2 packages, two bids for 54 packages and only one bid for 11 packages; Phase1 2nd year: Two bids for all 10 packages; Phase 2: 39 packages- 2 bids and 4 packages only one bid. There is need to go into causes for inadequate response, investigate the cause and to take remedial steps.

Consultancies

72. **Topographic and Cadastral surveys**: The mission discussed the long delay for this consultancy and the recent complaint received. The Bank has requested and reviewed the proposals of the selected firm and the complaining firm and reverted to WRO with queries. The revised comparative statement about weaknesses and strengths for SF (selected firm) and CF (Complainant Firm) given by WRO, as a result of the queries, was not able to justify the relative differences between the scores given for criteria 1 and 2 for the two proposals. The strengths listed for SF existed in CF too. On the other side, the weaknesses listed for CF were irrelevant. The mission is very concerned about the long delay in this case, particularly that most of the designs/works have already been done based on walk-though survey. In light of the above, the mission recommends that the project submits a proposal on how it would like to proceed forward on this consultancy for Bank review by May 15, 2010.

73. **Construction quality Management and Technical Supervision**: Chief Engineer (DRCS) agreed to furnish a revised technical evaluation report following discussion with the mission that clearly provides the strengths and weaknesses for each proposal, and which should be consistent with the scores given. MDPU to provide guidance.

74. **Basin Planning including knowledge base, Design Support system Development**: The Selection of alternative basins (PAP,Gunder and Vellar) completed in consultation with mission. Draft REOI vetted by mission and recommended for publication as soon as possible. Modified Tors based on selected basins is to be finalized by April 30, 2010.

75. **Enterprise Information Management Systems** : Deadline for submission of proposals extended until April 2, 2010. Discussions and clarifications have been given to EE (IT Cell, EinC Office), MDPU and reps of ELCOT with respect to the queries raised by the bidders in the pre bid meeting on the EIMS Consultancy.

76. **Design Support for Modernization of irrigation Systems**: Project suggested to split this consultancy into tow packages one for consultancy services and the other for procurement of software and scientific equipment. Mission advised that procurement of software and scientific equipment, if needed, can be taken up under component C after submission of proposal/ procurement plan to the Bank.

Support Organizations for WUAs (discussed under component C above) –

77. **Training of Heads of Procurement and MDPU Procurement Officers**: Mission was informed that nine batches of training programs are being organized from March 08, 2010 to May 26, 2010. It is expected this would increase the quality of procurement.

IX- Key Agreed Actions

S.No	Actions	Date by	Responsibility
1	Submit Implementation Progress report and Environmental and Social progress report	April 30, 2010	MDPU
2	10 Support Organizations in place	May 31, 2010	WRO, MDPU
3	Remaining 14 SOs in place	Nov 1, 2010	WRO, MDPU
4	Final SWaRMA incorporating Bank comments sent to Bank	May 15, 2010	WRO, MDPU
5	Develop TOR for External Env & Social audit and submit to World Bank	May 15, 2010	WRO, MDPU
6	Submit Data on any Land aquisition	April 30, 2010	WRO, MDPU
7	Update Procurement plans	April 30, 2010	All line departments, MDPU
8	Finalize Technical evaluation for Third party construction quality supervision and submit to Bank	April 30 , 2010 (Completed)	WRO- MDPU may guide
9	DPRs for phase IV sub basins	September 2010	All line departments
10	Send proposal for proceeding further on Topographic & Cadastral Survey Consultancy	May 15, 2010	WRO, MDPU
11	DPRs for cooum and Adyar sub basins	May 30, 2010	All line departments and CSRM
12	Procurement of 126 core cutters, 60 speedy moisture meters, and 60 weighing balances	May 30,2010	WRO
13	Concerned Assistant Engineers, quality control and construction be given "hands-on training" to make them fully competent to conduct field density tests themselves.	May 15, 2010	WRO
14	OK cards having the work activities both in Tamil and English language be introduced on all works.	March 31, 2010	WRO
15	Engineer-in-Chief, to take requisite actions to commission the 2 " Nuclear Density Testers" (lying packed and unused since the TN-WRCP period) for deployment on the work of raising and strengthening of earthen tank bunds	*Immediately*	WRO
16	Engage consultant for assessment of rainwater harvesting	May 30, 2010	AED
17	Send communication to all line departments that funds should not be drawn and parked in bank accounts at year end as it only results in disallowance by AG.	Immediate	MDPU (FM)
18	Response to AG's audit observations on the audit report for the year 2008-09	March 15, 2010 (Done)	MDPU (FM and procurement)
19	Review and correct the figure of retention money (with-held deposit) on WRO works contracts in the IUFR for q/e March 31 2010.	May 31, 2010	MDPU (FM)
20	Training to Phase III sub basin finance staff	Planned in April 2010	MDPU(FM)
21	Submit response on balance review comments on Ist internal audit report and on reports II, III and IV	by May 15, 2010	MDPU (FM and procurement)
22	Submit IUFR for the quarter ending March 31 2010, with contract details for all contracts under WRO and above Rs 50 lacs for other line department.	May 31, 2010	MDPU (FM & Procurement)

23	Send restructuring plan for project including newly proposed activities and reallocation of project savings	May 31, 2010	MDPU and all line departments

Annex 1: Agricultural Engineering Department

Agricultural Engineering department (AED) is responsible for installation of Micro Irrigation System, MIS (100,000 ha), piped conveyance systems, water harvesting structures such as farm ponds with an ultimate aim of improving irrigation efficiency. Following lists the detail of respective activities:

Micro Irrigation

The adoption of MIS has been incredibly slow with an achievement of 4036 ha against a target of 100,000 ha. In order to accelerate the progress in MIS, following changes have been introduced in the original plan and projected to implement in 40,000 ha in remaining period of the project:

1. With an aim to improve irrigation efficiency at basin scale, the farmers' eligibility criteria has been broadened:
   - It was agreed that the farmers who may not belong to selected ayacut but are part of basin and would contribute to overall water management in the selected basin can be eligible for MIS subsidy.
   - The farmers more than 5 ha are also eligible who would eventually contribute to water saving in ayacut and/or basin and would contribute to reduce the gap area in the ayacut.

2. To promote awareness of MIS, model installations of MIS for one hectare (minimum Size of one acre) will be laid in 1713 WUAs at 100% project cost.

3. To introduce efficient usage of fertilizer and reduce the environmental hazards, AED should promote drip irrigation system with Fertigation in planned installations. The Govt of Tamil Nadu has permitted additional assistance of Rs 11,200 per hectare under NADP for fertigation unit. The same level of assistance of Rs 11,200/hectare will be extended to Drip Irrigation under IAMWARM for future installations.
4. The procurement method will be revised to suit the field situation while ensuring best rates of quality system.
5. In order to promote the activity at local scale, local representative from respective village will be identified who will be paid on the basis of actual installation at a rate of Rs 300/ha. This activity will be covered under IEC section.

Farm Mechanization

It is proposed to distribute following Agricultural Machinery to the WUAs at project cost mainly to help poor farmers and mitigate the labour scarcity during peak agricultural seasons. The Farm Mechanisation Component will be expanded to cover the following machinery and equipment.

1. Power Tiller
2. Paddy Transplanter
3. Rotavator
4. Multi crop Thresher
5. Solar Poly tunnel chilli drier
6. Diesel Pump sets

Improved conveyance system

In order to improve **surface** water delivery system, the pipe conveyance system has been proposed in canal and tank command areas. So far eight systems have been installed. Out of which only one has been observed serving the objective. Majority of installed systems, need to be rectified to make them useful for surface water

delivery system. The efforts should be made to convert existing open channel system into pipes water conveyance system and preferably gravity system using gradient of the command.

It has been proposed to seek technical help (in the form of consultant) to evaluate the system which are already installed and accordingly plan for future. **No progress has been made so far.**

TNAU will setup a pilot and it is advised that AED nominate team to work with TNAU to provide required information and acquire on the job training on how to assess, design and evaluate the system.

Rain Water Harvesting Structures.

A Comprehensive Rain water Harvesting Plan will be prepared and implanted in the sub- basins at a cost of INR 313.6 million. The site specific recommendations will be made by updating spatial database using recent remote sensing imageries, field inspection, database of installed structures and their performance and Recharge study done by Anna Univ for the TWAD. A consultant will be engaged to compile all the information, assess existing system and recommend required structures.

One of the major interventions under water harvesting structures is Farm ponds in the fields. It is advised that farm ponds can be constructed in the field customized to harvest water from respective field and if required pumping arrangement with/without MIS can be provided to poor farmers. The pump size should not exceed 3 HP.

Annex II- Fish production target

As per PAD , a water spread area of 77,880 ha is expected to become available for fish culture. A production of 400 kg /ha is expected to be achieved through quality seed stocking from the estimated level of 100 kg/ha. In addition 150 ha water spread area is expected to be created through farm ponds and a yield of 6 ton /ha is expected to be accomplished. By giving allowance for various factors that might contribute to low production , at the end of project period , project is expected to produce **22500** tons of fish.

Although by mid term period , a production of 10,000 tons is anticipated as per PAD , so far only **1200 tons** has been accomplished. The reason for lower accomplishment has been due to delay in fish seed banks establishment and their successful operation.

A critical assessment of the production targets, particularly in respect of fish production was made. In the project area, altogether 4.38 lakh ha of Ayacut area is available. Assuming 30% of the Ayacut area as water spread area, there is 1.31 lakh ha of tank area available for fish culture. If it is assumed that only 50% of this area is with water, there is **65700** ha of water spread is available. Assuming a production of 300 kg/ha, a production of **19710** tons would be produced from tank fisheries. After completion of project, it is likely that there will be **1000** farm ponds. Assuming an average production of 3500 kg/ha, a production of 350 ton/ha would become available. This would produce **350** ton /ha.

Through cage culture, a moderate production **100** ton is anticipated at a production level of 50 kg m^3 .
All this together would yield a total production of **20160** tons.
This reflects that, if the efforts are made to ensure seed availability of good size seed, water bodies can be stocked to achieve the above production.
To produce the above amount of fish, assuming 300 g weight accomplishment and @ 60% survival, for each ha 1000 quality fingerlings should be stocked.

(a) For stocking 65700 ha water spread area , a total of 6.57 crore seed would be needed
(b) For farm ponds with an area of 100 ha , 0.1 crore seed would be needed
(c) For cages 0.2 crore seed would be needed

Total amount of seed needed would be **6.87** crore fingerlings . After accomplishment of establishing the seed production units under Phase I, Phase II and Phase III of the project, a total of **2.14 crore** seed is expected to be produced.

Facilities for the production of an additional amount of **4.73 crore** fingerlings need to be accomplished through creation of additional earthen fish seed banks , cages , nursing in farm ponds.
To produce the above amount of seed, following seed production units are planned.

(a) Nursing in cages – 100 units to produce 60 lakh fingerlings
(b) 200 farm ponds to produce 10 lakh fingerlings
(c) 100 Earthen ponds to produce each with a capacity of 4 lakh fingerlings /farm of 100 units

Total : 4.70 crore fingerlings

In the PAD, 5 ha intensive seed production units were proposed. However, considering water availability, minimal target of 4 lakh fingerling production has been fixed /farm by establishing earthen seed banks. These 100 seed banks are planned to be established in close proximity to good tanks that have water for long periods. These seed banks would be managed by either water users association, fishers associations, self help groups or individual entrepreneurs.

The seed banks would be established in a staggered manner to accomplish the target and also include lessons learnt to improve seed nursing units from year to year. These seed banks would be assigned to monitors to

provide close follow up support and ensure production of quality fingerlings. Excess seed produced by these banks can be sold for stocking in other tanks. The above production figures have been computed based on the discussion held with the project management team including the MDPU person responsible for fisheries.

[redacted] Progress upto the month of January 2010

Abstract

(Rs. In Lakhs)

Name of Region / Phase	Number of Sub Basins	Number of Packages	Agreement Value	No. of Tanks proposed for Rehabilitation			No. of Anicut proposed for Rehabilitation			Supply channel Proposed for Rehabilitation in KM			As per Agreement Value								Liabilities	Total Expenditure including Liabilities
													Expenditure upto previous month		Expenditure During the month		Cum Exp upto the month		Total Expenditure up to the month	Percentage of Expenditure		
				Total	In progress	Completed	Total	In progress	Completed	Total	In progress	Completed	Tank	Non Tank	Tank	Non Tank	Tank	Non Tank				
ennai ase I	1	12	2584.126	236	58	113	37	10	14	440.44	51.13	287.51	807.05	172.64	29.13	18.77	836.18	191.41	1027.59	39.77	50.66	1078
ennai ase II	3	9	3918.200	181	81	3	10	8	0	426.94	179.65	0.00	838.09	258.38	0.00	26.59	838.09	284.97	1123.06	28.66	240.00	1363
idurai ase I	3+ 1 part	23	16061.52	834	96	725	74	6	49	376.61	2.50	294.03	11997.54	357.30	992.09	0.00	12989.63	357.30	13346.93	83.10	353.86	13700.7
durai ase II	8	17	6371.80	227	78	111	74	19	36	87.69	4.50	24.12	2569.49	561.24	123.90	53.36	2693.39	614.60	3307.99	51.92	310.50	3618.4
ollachi nase I	2	16	7587.00	0	0	0	0	0	0	770.44	21.45	740.80	0.00	6958.06	0.00	115.92	0.00	7073.98	7073.98	93.24	195.59	7269.5
ollachi eftout ckages	0	10	4922.50	0	0	0	0	0	0	758.80	160.61	598.19	0.00	3740.70	0.00	148.23	0.00	3888.93	3888.93	79.00	185.26	4074.1
hy se I	2+ 1 part	15	13873.35	566	378	171	141	16	125	745.51	100.89	644.62	6209.92	3396.72	261.42	186.67	6471.34	3583.39	10054.73	72.48	40.00	10094.7
hy se II	5	17	8611.83	357	248	5	80	48	4	504.10	203.60	69.93	2942.84	170.95	90.71	7.27	3033.55	178.22	3211.77	37.29	148.00	3359.7
otal ase I	9	76	45028.50	1636	532	1009	252	32	188	3091.79	336.58	2565.14	19014.51	14625.42	1282.64	469.59	20297.15	15095.01	35392.16	78.60	825.37	36217.53
otal ase II	16	43	18901.83	765	407	119	164	75	40	1018.7	387.75	94.05	6350.42	990.57	214.61	87.22	6565.03	1077.79	7642.82	40.43	698.5	8341.32
and otal	25	119	63930.33	2401	939	1128	416	107	228	4110.52	724.33	2659.19	25364.93	15615.99	1497.25	556.81	26862.18	16172.80	43034.98	67.32	1523.87	44558.85

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Annex III- a - Component A: Irrigation Infrastructure Rehabilitation Works

1. **Quality Control (QC) / Quality Assurance:**

The mission made field visits to the following works during the period, February 24-25, 2010. Mission observations / comments and suggestions, packagewise, are outlined below:

(i) Package No: 14 / IAMWARM / PALAR / WRO / PKM / NCB / 2006-07
9(L) Water Course of Senguttupalayam Branch Canal.

This water course is proposed to be lined in 800 m length. Preparation of subgrade and placement of cast-in-situ 65 mm thick cement concrete lining are in progress.

(a) Mission Observations: *The mission observed that, by & large, correct construction procedures, as had been suggested by the March 24-April, 2009 mission were being implemented on the execution of this package.* These procedures include: preparation of smooth subgrade; consolidation of subgrade with a simple device comprising the fuel – operated needle vibrator clamped on to a steel plate; gentle moistening of subgrade through fine spray from gardener cans; addition of air-entraining agent (AEA) in the concrete mix produced by mechanical concrete mixer; effective consolidation of concrete lining through deployment of fuel-operated needle vibrator fixed on to a steel plate; making contraction joint grooves of proper shape at specified spacing; and making effective curing arrangement of lining through placement of hessian cloth rolls on the slope lining duly sprinkled with water and ponding of water on bed lining. *Implementation of these procedures has helped in achieving an overall satisfactory workmanship and construction quality on works in this package.*

However, some shortcomings were noticed which should be appropriately addressed promptly by implementing the under mentioned suggestions:

(b) Mission Suggestions:

- Quality control test on sand in respect of the presence of impurities (silt / clay) should be periodically conducted which, presently, is not being done.

- Bulkage test on moist sand is being conducted but the test result is not being incorporated in the volumetric mix proportioning being adopted at site.

- Quality control quick colour test on sand in respect of the presence of organic impurities with 3% caustic soda solution is not being done. The QC Laboratory at Pollachi has bottles containing 3% caustic soda solution and there should not be any problem in conducting the quick "colour test"

- Sieve analysis of sand and coarse aggregate samples have not been documented. This should be meticulously done.

- The concrete mix design got done from the local engineering institution has not incorporated addition of air-entraining agent (AEA) in the mix. Revised mix design be got done duly incorporating the addition of AEA.

- The concrete mix design by the local engineering institution is based on proportioning the concrete mix ingredients by weight. However, volumetric proportioning of ingredients is being done at site. This, also is not being correctly done. Volumetric proportioning based on accurate bulk densities of materials should be worked out and then adopted and not simply adopting the weight proportioning as volumetric proportioning. The local engineering institution may be approached to give the mix design based on

"proportioning of mix ingredients by weight" as well as on "volumetric proportioning". The contractor should be asked to mobilize a suitable weight batcher which would help in proportioning the design mix ingredients by weigh and also help in establishing correct mass – volume relationship for adopting volumetric batching, wherever needed.

(ii) Package No: 10 / IAMWARM / PALAR / WRO / PKM / NCB / 2006-07
10(R) Water Course of Nattukal Palayam Distributory
This water course is proposed to be lined in 730 m length. Preparation of subgrade and placement of cast-in-situ 65 mm thick cement concrete lining are in progress.

(a) Mission Observations: *The mission observed the cement concrete lining placed in several panels to be associated with severe "honey-combing" in almost the entire surface area of respective panels. Honey-combing of such magnitude cannot be appropriately rectified. The concrete lining of such a poor workmanship is liable to pre-mature disintegration.*

Convinced with the visual assessment of this work to be of poor workmanship & poor quality of construction and realizing the adverse implications of accepting such a work, the Chief Engineer, Pollachi Region got 4 numbers of severely honey-combed concrete panels completely demolished to be placed afresh at by the contractor at his cost.

The mission considers this to be a step in the right direction. Acceptance of such a poor quality work would have been violative of the Specifications "acceptance criteria requirements". This actual demolition of defective work would help in sending strong message not only to the concerned contractor but also to all construction agencies that GoTN is firmly committed to good construction quality and that there would be no compromise on this count.

(b) Mission Suggestions:
The mission suggestions listed at (b) above for the Package No. 14 hold good for the Package No. 10 also and should be meticulously implemented.

(iii) Package No: 15 / IAMWARM / PALAR / WRO / PKM / NCB / 2006-07 2(R) Water course of 6L of sinthiluppu Distributory
This water course is proposed to be lined in 1600 m length. Lining has been placed in about 75 m reach. On the day of mission visit, lining operations including subgrade preparation were in progress in about 50 m reach.

(a) Mission Observations: *The mission observed that, by & large, correct construction procedures were being implemented on the execution of this package in conformity with those suggested by the March 24-April 10,*
2009, mission (Para (a) above of package No: 14 be referred for details of construction procedures being implemented). Accordingly, an overall satisfactory workmanship and acceptable construction quality is being achieved on the work in this package. However, some short comings (of the same type as in Package No. 14 above) were noticed which need to be addressed.

(b) Mission Suggestions:
The sieve analysis of sand and coarse aggregate being used in the concrete mix have been conducted and documented. However, the other suggestions listed at (b) above for the Package No: 14 hold good for this package also, for addressing the short comings by implementing these suggestions.

(iv) Package No: 04 / IAMWARM / PALAR / WRO / NCB / 2006-07
Ponnapuram Branch Canal, Km 9-15.

The work in this package comprising 75 mm thick cast-in-situ cement concrete bed lining and plain cement concrete slab lining (60 cmx45cmx5cm slabs in M15 concrete) on sides has been recently completed.

Mission Observations:

i) *Visually, the construction quality and workmanship was observed to be of acceptable standard.*

ii) *It was also satisfying to note that the quality of bed concrete lining was determined by testing 65mm dia concrete cores extracted from the lining. The coring and compressive strength testing of cores was got done from Nachimuthu Polytechnic College, Pollachi - 3. The test results, duly documented and furnished by the Polytechnic, indicate that concrete cores conformed to the acceptance criteria as per Clause 17-4.3 of Indian Standard IS 456: 2000. This is appreciated.*

iii) Not withstanding the workmanship to be of acceptable quality standard and testing the quality of lining, as actually placed and cured, through random coring to fulfill the requirements of technical specifications, the lining suffers from a major deficiency in respect of the "under-drainage" aspect. Instead of providing "porous concrete slabs" at 6.0 m spacing (one slab on slope lining on either side over graded filter as specified in the bid document technical specifications), 30cm x 30cm nitches have been cut and filled with ± 20mm size aggregate. One such nitch on either side of slope at 15m spacing has been provided throughout the lined reach. *Provision of such under-drainage arrangement is defective and does not conform to the one specified in the specifications. The mission also observed that the 20mm stone aggregate had come out of almost all the nitches, leaving the so called under-drainage nitches mostly hollow. Such open windows could allow unrestricted ingress of water to the subgrade behind lining during the running of canal which, in course of time, would pose potential threat to be safety and stability of slab lining. There could be large scale collapse of slabs.*

Mission Suggestions

i) It is very essential to rectify the existing deficiency to the optimum possible extent. Accordingly, porous concrete slabs 30cmx30cm (viz of the size of existing nitches) should be properly cast (1 cement : 4 coarse aggregate of
20 mm MSA without any sand and with just enough water to enable formation of cement paste for reasonable bonding of aggregate particles) and water-cured for atleast 14 days. Meanwhile, all the nitches be cleared and properly graded filter placed inside at the back. There-after, the pre-cast porous concrete slabs should be laid in the nitches and the sides pointed with 1:2 or 1:3 mortar as per the mortar pointing specifications.

ii) All the hollow core holes in the bed lining (consequent to the extraction of cores) should be appropriately filled with "dry-pack mortar" the soonest to avoid these holes getting filled with soil / muck etc if left un filled.

(v) Package No. 11 Rehabilitation of left out reaches in Poolankinar Branch Canal offtaking at LS 8.750 Km of PMC and Gomangalam Distributory at LS 21-120 Km of Parambikulam Main Canal.

The reach, Km 7.710 to Km 11.160 of Poolankinar Branch Canal, taken up for rehabilitation under IAMWARM Project has been completed and water was flowing in this canal on the day of mission visit. Being associated with swelling black cotton soil, 100 cm thick CNS soil was reportedly placed in layers (and compacted to 98% PD) in between the subgrade and lining prior to placement of lining. The bed lining comprised cast-in-situ cement concrete lining of 75 mm thickness and the pre-cast concrete slabs, 60 cmx45cmx5cm in M15 grade concrete laid on base plaster constituted side lining.

Mission Observation / Suggestion: Since the canal was running it could not be ascertained / verified whether the specified proper "under-drainage" arrangement in the lining was provided or whether it was on the pattern of that provided and observed in the Ponnapuram Branch Canal, Km 9 -15, Package No. 04.

It is suggested that the concerned Executive Engineer/ Superintending Engineer should personally inspect the Poolaninar Branch Canal when it is closed with particular reference to the "under-drainage arrangement" provided in the lining. In case it is in the form of open nitches filled with aggregate (viz on the same pattern as has been provided in the Ponnapuram Branch Canal – Package No. 04), such a drainage arrangement is defective and should be replaced with properly cast "porous concrete slabs", as has been outlined above in our suggestion for Package No. 04.

2. Quality Control Laboratory at Pollachi

i) The mission visited the main quality control laboratory at Pollachi and inter-acted with the quality control staff. 2 new lab technicians (diploma holders) have been recently inducted on short-term basis. Consequent to inter-action with the new and old lab technicians, it was noted that they needed "hands-on-training" to enable them to conduct the routine quality control tests themselves. They are enthusiastic to learn. Some of the Assistant Engineers, quality control, also need training on conducting the quality control tests on sand such as sieve analysis, quick colour test to determine the presence of silt / clay impurities in sand; and bulkage test to determine the extent of bulkage in moist sand and the methodology of accounting for this bulkage in volumetric proportioning. *It is suggested that Chief Engineer, Pollachi / Engineer-in-Chief should arrange to provide the needed "hands-on-training" to the lab technicians and Assistant Engineers, the soonest to make them fully conversant to conduct the quality control tests themselves.*

ii) The mission during visit of the Quality Control Laboratory complex at Pollachi found that one "Nuclear Density Tester" procured during the Tamil Nadu Water Resources Consolidation Project period was lying packed in the box and reportedly not un packed and, thus, not used at all. It was also learnt that one such new Density Tester was lying packed and un used in the Quality Control Laboratory at Madurai as well.

The Nuclear Density Tester is a very useful instrument for compaction control testing of earthfill. It provides a very rapid on-site determination of compaction parameters such as moisture content, wet density, dry density, and percent compaction in terms of Procter density of compacted layers.

It is suggested that Engineer-in-Chief should, through dynamic initiative, take requisite steps to use these Density Testers on the works relating to the raising and strengthening of earthen tank bunds. A batch of 6 enthusiastic engineers should also be trained at the Bhaba Atomic Research Station on the use and upkeep of these instruments.

3. Procurement of Quality Control Equipment

It was agreed with the October 21-30, 2009 Bank Mission that, by November 30, 2009, the needed quality control equipment for conducting field density tests on earthfill layers (on raising and strengthening of tank bunds) would be procured. This equipment included 126 core cutlers, 60 speedy moisture meters, and 60 weighing balances. The current mission was apprised that the entire quality control equipment would be procured latest by March 31, 2010. *Procurement has been abnormally delayed. It should be ensured that it does not get delayed beyond March 31, 2010.*

Annex III b- Observations on the quality control and quality assurance of some of the packages of IAMWARM works in the Madurai and Trichhi region.

- In Madurai region there are 23 packages in phase I, distributed in four sub basins, within the jurisdiction of CE Madurai Region. The sub basin wise status of these packages are as follows:-

1. Kottakaraiyar: there are total 9 packages, the packages in which the work is completed are 8, and the work is to be completed in one package.
2. Manimuthar: there are total 8 packages, the work is complete in 6 packages and the work to be completed in 2 packages.
3. Pambar: the total packages are 2 and work is completed in both the packages.
4. Arjun nadi: the total packages are 4 and work is complete in 2 packages and is in progress in 2 packages.

- **The tanks which were inspected in Madurai region are**:-
- Manimuthar sub basin are Sitha tank and Eriyur tank in package M-8, Thirunarayanmangalam tank and Perumi tank in package M-7,
- Thirumanavayal tank and Pavanakottai tank in package M-5,
- In Pambar Basin Kundra kudi tank and Sankarapuram tanks of package P-7.
- In Kottakariar sub basin, Melavaniankudi tank of package K-3,
- Nendukulam tank and Sembanur tank of package K-2.
- Mavilangai Anicut of package K-1,
- The base quality control laboratory at Madurai.
- In CE Trichhi region:-
- Indanur Dividing Dam of Pambar package -5 Pambar
- Kadappanendal tank of Pambar package 2
- Ayinkudi Periyakulam tank of SVB package 2
- Nirinjikudi Anicut of SVB package 3

The Status of packages visited is as follows:-

Package M-5 Pavankottai, Thirumanavayal and 61 other tanks:

Name of Contractor	**:**	**M/s NSK Builders Trichy.**			
Date of Start	**:**	**20.03.08**	**Date of Completion**	**:**	**19.09.2009/ 19.03.10**
Time Elapsed	**:**	**24 Months**	**Time Remaining**	**:**	**1/2 Month**

The rehabilitation work of this project is in progress under package M-5. The work costing Rs. 1588.65 lakh is awarded to one M/S NSK Builders of Trichy. The work was started on 20.03.08, and was to be completed by 19.09.09. The work was inspected by Bank consultant on 02.03.10, and the work was still incomplete. It was informed that so far Rs 1432.96 lakh has been incurred. Obviously the work is not well organized, the contractor has prepared the work plan and plan is approved by the department but it could not be implemented. Only 90% of work could be completed in 133% of the time. It is obvious that the contractor has not deployed sufficient resources of men, machines and material. The position of the measures taken for not achieving the mile stones was not readily available. The OK Card system is being followed but the site order book is not opened and therefore the entries of remarks of senior officers inspecting work, could not be made. The drawings of the work being executed were available at site. The quality of raw material collected at site for concrete and the quality of the finished concrete was good and acceptable. However the quality of earth work executed is not to the mark as clod breaking was not done effectively especially on slopes. The department has managed the quality control activities of the works with their limited resources and by resorting to the out sourcing, the testing of the construction material. The WUA people are involved in construction activities by getting their signature in the OK Card.

Package M-7 Perumi, Thirunarayanmangalam and 93 other tanks:

Name of Contractor	:	**M/s Thiru R.Ramu of Madurai.**			
Date of Start	:	**13.03.08**	**Date of Completion**	:	**25.09.2009/ 19.03.10**
Time Elapsed	:	**24 Months**	**Time Remaining**	:	**1/2 Month**

The rehabilitation work of this project is in progress under package M-7. The work costing Rs. 1011.66 lakhs is awarded to one M/S Thiru R. Ramu of Madurai. The work was started on 13.03.08, and was to be completed by 25.09.09. The work was inspected by Bank consultant on 02.03.10, and the work was still incomplete. It was informed that so far Rs 997.45 lakh has been incurred. Obviously the work is not well organized, the contractor has prepared the work plan and plan is approved by the department but it could not be implemented. Only 98% of work could be completed in 133% of the time. It is obvious that the contractor has not deployed sufficient resources of men, machines and material. The position of the measures taken for not achieving the last mile stone was not readily available. It was not readily known as to whether the extension is issued by the department. The OK Card system is being followed but the site order book is not opened and therefore the entries of remarks of senior officers inspecting the work, could not be made. The drawings of the work being executed were available at site. The quality of the finished concrete was good and acceptable. However the quality of earth work executed is not to the mark as embankment had developed some longitudinal cracks on top surface probably due to earth used was not suitable. On slopes the rain cuts were developed. The Chief Engineer has immediately ordered remedial measures to be taken during the inspection. The department has managed the quality control activities of the works with their limited resources and by resorting to the out sourcing, the testing of the construction material. The WUA people are involved in construction activities by getting their signature in the OK Card.

Package M-8 Sitha, Eriyur and 40 other tanks:

Name of Contractor	:	**M/s Vijayamani Contractors of Madurai.**			
Date of Start	:	**23.01.08**	**Date of Completion**	:	**20.08.2009/ 31.03.10**
Time Elapsed	:	**25 Months**	**Time Remaining**	:	**1/2 Month**

The rehabilitation work of this project is in progress under package M-8. The work costing Rs. 555.00 lakhs is awarded to one M/S Vijayamani Contractors of Madurai. The work was started on 23.01.08, and was to be completed by 20.08.09. The work was inspected by Bank consultant on 02.03.10, and the work was still incomplete. It was informed that so far Rs 474.21 lakhs has been spent on this work. Obviously the work is not well organized, the contractor has prepared the work plan and plan is approved by the department but it could not be implemented. Only 85% of work could be completed in @ 130% of the time. It is obvious that the contractor has not deployed sufficient resources of men, machines and material. The position of the measures taken for not achieving the mile stones was not readily available. It was not readily known as to whether the extension is issued by the department. The OK Card system is being followed but the site order book is not opened and therefore the entries of remarks of senior officers inspecting the works, are not available. The drawings of the work being executed were available at site. The quality of the finished concrete was good and acceptable. The preparation for concreting the field channel was in progress on the day of inspection. However the quality of earth work executed is not to the mark as embankment had not been finished. On slopes the rain cuts were developed vegetation have grown. The Chief Engineer has immediately ordered to take up finishing work. The department has managed the quality control activities of the works with their limited resources and by resorting to the out sourcing, the testing of the construction material. The WUA people are involved in construction activities by getting their signature in the OK Card.

Package P-7 Kundrakudi, Sankarpkaram and 55 other tanks:

Name of Contractor	:	**M/s P & C Constrution of Erode.**			
Date of Start	:	**10.03.08**	**Date of Completion**	:	**23.11.2009**
Time Elapsed	:	**24 Months**	**Time Remaining**	:	**Nil**

The rehabilitation work of this project is in progress under package P-8. The work costing Rs. 1091.95 lakhs is awarded to one M/S P & C Constructions of Erode. The work was started on 10.03.08, and was to be completed by 23.11.09. The work was inspected by Bank consultant on 02.03.10, and the work was still incomplete. It was informed that so far Rs 915.32 lakhs has been spent on this work. Obviously the work is not well organized, the contractor has prepared the work plan and plan is approved by the department but it could not be implemented. Only 83% of work could be completed in @ 111% of the time. It is obvious that the contractor has not deployed sufficient resources of men, machines and material. The position of the measures taken for not achieving the mile stones was not readily available. It was not readily known as to whether the extension is issued by the department. The OK Card system is being followed but the site order book is not opened and therefore the entries of remarks of senior officers inspecting the works, are not available. The drawings of the work being executed were available at site. The quality of the finished concrete was good and acceptable. The preparation for concreting the field channel was in progress on the day of inspection. However the quality of earth work executed is not to the mark as embankment was good in initial reach but has developed some longitudinal cracks on top surface. On slopes the rain cuts were developed vegetation have grown. The Chief Engineer has immediately ordered to take up rectification of the work. The department has managed the quality control activities of the works with their limited resources and by resorting to the out sourcing, the testing of the construction material. The WUA people are involved in construction activities by getting their signature in the OK Card.

Package K-1 Mavilangi, and 22 other tanks:

Name of Contractor	:	**M/s Thiru Manickam.**			
Date of Start	:	**21.01.08**	**Date of Completion**	:	**13.01.2010**
Time Elapsed	:	**26 Months**	**Time Remaining**	:	**Nil**

The rehabilitation work of this project is in progress under package K-1. The work costing Rs. 537.61 lakhs is awarded to one M/S K. Manickam. The work was started on 21.01.08, and was to be completed by 13.01.10. The work was inspected by Bank consultant on 03.03.10, and the work was still incomplete. It was informed that so far Rs 450.42 lakhs has been spent on this work. Obviously the work is not well organized, the contractor has prepared the work plan and plan is approved by the department but it could not be implemented. Only 83% of work could be completed in @ 130% of the time. It is obvious that the contractor has not deployed sufficient resources of men, machines and material. The position of the measures taken for not achieving the mile stones was not readily available. It was not readily known as to whether the extension is issued by the department. The OK Card system is being followed but the site order book is not opened and therefore the entries of remarks of senior officers inspecting the works, are not available. The drawings of the work being executed were available at site. The quality of the finished concrete was good and acceptable. The department has managed the quality control activities of the works with their limited resources and by resorting to the out sourcing, the testing of the construction material. The WUA people are involved in construction activities by getting their signature in the OK Card.

Package K-2 Nedukulam, Sembanur and 46 other tanks:

Name of Contractor	:	**M/s Thiru V. Manoharan.**			
Date of Start	:	**23.01.08**	**Date of Completion**	:	**05.08.2009/ 31.03.10**
Time Elapsed	:	**25 Months**	**Time Remaining**	:	**1/2 Month**

The rehabilitation work of this project is in progress under package K-2. The work costing Rs. 548.11 lakhs is awarded to one M/S Thiru V. Manoharan. The work was started on 23.01.08, and was to be completed by 05.08.09. The work was inspected by Bank consultant on 03.03.10, and the work was still incomplete and extension has been granted up to 31.03.10. It was informed that so far Rs 427.77 lakhs has been spent on this work. Obviously the work is not well organized, the contractor has prepared the work plan and plan is approved by the department but it could not be implemented. Only 78% of work could be completed in @ 145% of the time. It is obvious that the contractor has not deployed sufficient resources of men, machines and

material. The position of the measures taken for not achieving the last mile stone was not readily available. The OK Card system is being followed but the site order book is not opened and therefore the entries of remarks of senior officers inspecting the works, are not available. The drawings of the work being executed were available at site. The quality of the finished concrete was good and acceptable. The preparation for concreting the field channel was in progress on the day of inspection. However the quality of earth work executed at Sambanur tank was not to the mark as earthwork on embankment was showing that the roots etc are not separated from the earth placed on the dam. On slopes the unbroken clods were visible. The Chief Engineer immediately ordered to take up rectification work. The department has managed the quality control activities of the works with their limited resources and by resorting to the out sourcing, the testing of the construction material. The WUA people are involved in construction activities by getting their signature in the OK Card.

Package K-3 Melavaniankudi, Achapuli and 52 other tanks:

Name of Contractor	:	**M/s Thiru Manickam.**			
Date of Start	:	**21.01.08**	**Date of Completion**	:	**21.01.2010**
Time Elapsed	:	**26 Months**	**Time Remaining**	:	**Nil**

The rehabilitation work of this project is in progress under package K-1. The work costing Rs. 548.97 lakhs is awarded to one M/S K. Manickam. The work was started on 21.01.08, and was to be completed by 21.01.10. The work was inspected by Bank consultant on 03.03.10, and the work was still incomplete. It was informed that so far Rs 434.12 lakhs has been spent on this work. Obviously the work is not well organized, the contractor has prepared the work plan and plan is approved by the department but it could not be implemented. Only 80% of work could be completed in @ 130% of the time. It is obvious that the contractor has not deployed sufficient resources of men, machines and material. The position of the measures taken for not achieving the mile stones, was not readily available. It was not readily known as to whether the extension is issued by the department. The OK Card system is being followed but the site order book is not opened and therefore the entries of remarks of senior officers inspecting the works, are not available. The drawings of the work being executed were available at site. The quality of the finished concrete was good and acceptable. The repair work of rain cuts on the slope was in progress. The department has managed the quality control activities of the works with their limited resources and by resorting to the out sourcing, the testing of the construction material. The WUA people are involved in construction activities by getting their signature in the OK Card.

Package P-V Indanur Dividing Dam and 41 other tanks:

Name of Contractor	:	**M/s Siva Swathi Construction.**			
Date of Start	:	**17.03.08**	**Date of Completion**	:	**16.09.2009/ 30.06.10**
Time Elapsed	:	**24 Months**	**Time Remaining**	:	**3 Months**

The rehabilitation work of this project is in progress under package P-V. The work costing Rs. 1102.26 lakhs is awarded to one M/S Siva Swathi construction. The work was started on 17.03.08, and was to be completed by 16.09.09. The work was inspected by Bank consultant on 04.03.10, and the work was still incomplete and extension has been granted up to 30.06.10. It was informed that so far Rs 774.48 lakhs has been spent on this work. Obviously the work is not well organized, the contractor has prepared the work plan and plan is approved by the department but it could not be implemented. Only 77% of work could be completed in @ 133% of the time. It is obvious that the contractor has not deployed sufficient resources of men, machines and material. The position of the measures taken for not achieving the last mile stone was not readily available. The OK Card system is being followed but the site order book is not opened and therefore the entries of remarks of senior officers inspecting the works, are not available. The drawings of the work being executed were available at site. The quality of the finished concrete was good and acceptable. Some earth work executed is balance in this package at Indanur site. The earthwork of embankment was appearing to be insufficient and it is felt it should be checked for its stability and strength especially at the junction of the

diversion channel and main anicut. The Chief Engineer immediately ordered to take up checking work with the design wing. The department has managed the quality control activities of the works with their limited resources and by resorting to the out sourcing, the testing of the construction material. The WUA people are involved in construction activities by getting their signature in the OK Card.

Package P-II Kadappanendal and 87 other tanks:

Name of Contractor	:	**M/s AMR Construction of Hydrabad.**			
Date of Start	:	**26.02.08**	**Date of Completion**	:	**11.09.09 /30.06.10**
Time Elapsed	:	**24 Months**	**Time Remaining**	:	**3 Months**

The rehabilitation work of this project is in progress under package P-II. The work costing Rs. 1093.38 lakhs is awarded to one M/S AMR Construction. The work was started on 26.02.08, and was to be completed by 11.09.09. The work was inspected by Bank consultant on 04.03.10, and the work was still incomplete and extension to the work has been granted up to 30.06.10. It was informed that so far Rs 814.44 lakhs has been spent on this work. Obviously the work is not well organized, the contractor has prepared the work plan and plan is approved by the department but it could not be implemented. Only 74% of work could be completed in @ 133% of the time. It is obvious that the contractor has not deployed sufficient resources of men, machines and material. It is also reported that he has not followed the instructions of the EE regarding clause 27, 16.1 and 23.1 of GCCof the contract. The position of the measures taken for not achieving the mile stones was not readily available. The OK Card system is being followed but the site order book is not opened and therefore the entries of remarks of senior officers inspecting the works, are not available. The drawings of the work being executed were available at site. The quality of the finished concrete was good and acceptable. The department has managed the quality control activities of the works with their limited resources and by resorting to the out sourcing, the testing of the construction material. The WUA people are involved in construction activities by getting their signature in the OK Card.Due to inordinate delay and non compliance of contract conditions by the contractor.

Package SVB-III Nerinjikudi and 57 other tanks:

Name of Contractor	:	**M/s AMR Construction of Hydrabad.**			
Date of Start	:	**26.02.08**	**Date of Completion**	:	**09.09.09 /30.06.10**
Time Elapsed	:	**24 Months**	**Time Remaining**	:	**3 Months**

The rehabilitation work of this project is in progress under package SVB-III. The work costing Rs. 1086.80 lakhs is awarded to one M/S AMR Construction. The work was started on 26.02.08, and was to be completed by 09.09.09. The work was inspected by Bank consultant on 04.03.10, and the work was still incomplete and extension to the work has been granted up to 30.06.10. It was informed that so far about Rs 600.00 lakhs has been spent on this work. Obviously the work is not well organized, the contractor has prepared the work plan and plan is approved by the department but it could not be implemented. Only 58.93% of work could be completed in @ 155% of the time. It is obvious that the contractor has not deployed sufficient resources of men, machines and material.. The position of the measures taken for not achieving the mile stones was not readily available. The OK Card system is being followed but the site order book is not opened and therefore the entries of remarks of senior officers inspecting the works, are not available. The drawings of the work being executed were available at site. The quality of the finished concrete was good and acceptable. Although the structure has to negotiate the high flood the Energy Dissipation Arrangement is not provided this could be looked into. The department has managed the quality control activities of the works with their limited resources and by resorting to the out sourcing, the testing of the construction material. The WUA people are involved in construction activities by getting their signature in the OK Card. Due to inordinate delay and non compliance of contract conditions by the contractor.

Package SVB-II Ayinkudi Periyakulam and 31 other tanks:

Name of Contractor : M/s AMR Construction of Hydrabad.

Date of Start	:	**26.02.08**	**Date of Completion**	:	**11.09.09 /30.06.10**
Time Elapsed	:	**24 Months**	**Time Remaining**	:	**3 Months**

The rehabilitation work of this project is in progress under package SVB-III. The work costing Rs. 1086.80 lakhs is awarded to one M/S AMR Construction. The work was started on 26.02.08, and was to be completed by 09.09.09. The work was inspected by Bank consultant on 04.03.10, and the work was still incomplete and extension to the work has been granted up to 30.06.10. It was informed that so far about Rs 792.17 lakhs has been spent on this work. Obviously the work is not well organized, the contractor has prepared the work plan and plan is approved by the department but it could not be implemented. Only 74.49% of work could be completed in @ 130% of the time. It is obvious that the contractor has not deployed sufficient resources of men, machines and material.. The position of the measures taken for not achieving the mile stones was not readily available. The OK Card system is being followed but the site order book is not opened and therefore the entries of remarks of senior officers inspecting the works, are not available. The drawings of the work being executed were available at site. The quality of the finished concrete was good and acceptable. The department has managed the quality control activities of the works with their limited resources and by resorting to the out sourcing, the testing of the construction material. This was reported to be the biggest WUA and the WUA people are involved in construction activities by getting their signature in the OK Card. Due to inordinate delay and non compliance of contract conditions by the contractor.

Observations on the quality control activities in the packages inspected are:-

Field Quality Control: To carry out the work systematically the departmental field engineers have followed the OK Card system and OK cards are maintained separately by field staff and quality control staff for their parts of the duties. The signature of WUA presidents are obtained before starting the work. The remarks added by the field staff and QC staff needs to be consolidated. In the OK cards maintained by the quality control staff in one of the OK Card (Pavankotti Tank concrete shuttering), there are some remarks and it was not clear whether the remarks were complied or not by the field engineers. It is therefore essential at this stage, when the preparation of the final bills are under progress, the quality control staff look into all their reports and communicate to field executive engineers and superintending sngineers, the adverse remarks given by them in their OK cards, to verify whether their remarks are properly attended.

The Site Order Book which is to be essentially opened and kept at site for entering the remarks / comments, of senior officers during their inspection were not opened and maintained.

At present there is no third party agency for technical examination of works. The work fronts are many, in one package there eighty five tanks and quality control work was handled by the departmental quality control unit which have limited resources. The QC lab at Madurai has limited equipment and the quality testing of construction material was outsourced. Even if the testing is outsourced it requires continuous monitoring by the departmental staff. In one of the tank Thirunarayanmangallam, it was observed that the earth from tank bed was used for re sectioning apparently the results were OK but the embankment had developed the cracks on top. Obviously the soil testing result obtained from out sourcing were not in conformity with the soil used on the embankment. This clearly demands more effective quality control implementation and this can be done by third party. In the above case where the cracks were observed, the CE immediately ordered for making good the defective reach.

The testing of the concrete cubes and cement cubes was witnessed in the laboratory. The test results for 28 days cubes of M-10 concrete was @ 13 N/mm^2 which were OK.

At site in Madurai region the PPC is being used. The contract requires that the OPC should be used but if the OPC is not available in the market the Executive Engineer has to issue a permission letter for using the PPC in place of OPC. Technically there is no difference in the both the cements, except the generation of heat of hydration is less in PPC, but cost wise the PPC is cheaper than OPC and difference in the cost is accountable. In Trechhi region the OPC is being used.

In field the casting of concrete was seen at two places. In package M-5 at Pavankotti tank, the material being used was OK, the OK cards were duly filled and the quality of the concrete was good. The shuttering plates fixed were having gaps which were then got repaired immediately.
In one package at Kadappanendal tank site, the quality of aggregate and sand was good the quality of concrete was also good but the concrete was being prepared by using mixer without the hopper. The mixer with the hopper was also at site but was reported to be just gone out of order and mixer without hopper was deployed. Normally the mixers without hopper should not be used or brought to the site, as the quality control is difficult where such mixers are deployed.

At most of the sites the newly placed earth work have developed / developing the rain cuts on the slopes. This gives a bad look and requires regular maintenance. To overcome to much extent the boulder edging could be provided on top edge with the arrangement of chutes at regular intervals. In Sembanur tank the contractor has used a soil which is having large number of roots and will have to be replaced.
At Nirinjikudi Anicut the weir is big and has to negotiate high flood but the there is no provision of the Energy Dissipation Arrangements. The anicut is located on S –curve and water after fall of anicut will hit the left guide bund downstream of anicut, Looking to high value of flood, it would be good if the hydraulic model testing is done to assure that the outgoing flood is guided smoothly without damaging the guide bunds.
The works of the Phase I are almost complete and the department has to prepare the final bills and PCR. The steps required to prepare the PCR are as follows:-

1. Take the final level of works and prepare the completion drawings.
2. Handover all the completion drawings to WUA.
3. Consolidate the quality control and action taken reports.
4. Work out final quantities rates and prepare the comparative statements.
5. **Superintending Engineer has to give the completion certificate of all the works in the packages.**
6. Pay final bill and
7. Prepare PCR.

During field visits it was informed that, in this process unless the Superintending Engineer issues the completion certificate, the Executive Engineer cannot make the payment of the final bill. In every package there are large number of tanks and number of tanks varying from 45 to even 85 tanks. Each dam is about 1.5 Km. to 1.75 Km. in length. Unless complete walk through of the embankment is made the SE cannot issue the completion certificate. This was evident during the inspection of one of the tanks that, in the beginning of the earth dam, the quality of the earth used and workmanship was very good but after walking about half a kilometer on dam it was found that the quality of earth dam was not acceptable unless the unsuitable earth is replaced by suitable earth. Therefore the progress of preparation depends on the issue of the completion certificate by SE and will have to be monitored.