

**IRRIGATED AGRICULTURE MODERNISATION &
WATER-BODIES RESTORATION AND MANAGEMENT PROJECT
(IAMWARM)**

Project Operation Manual



நீர்வள நிலவளக் திட்டம்

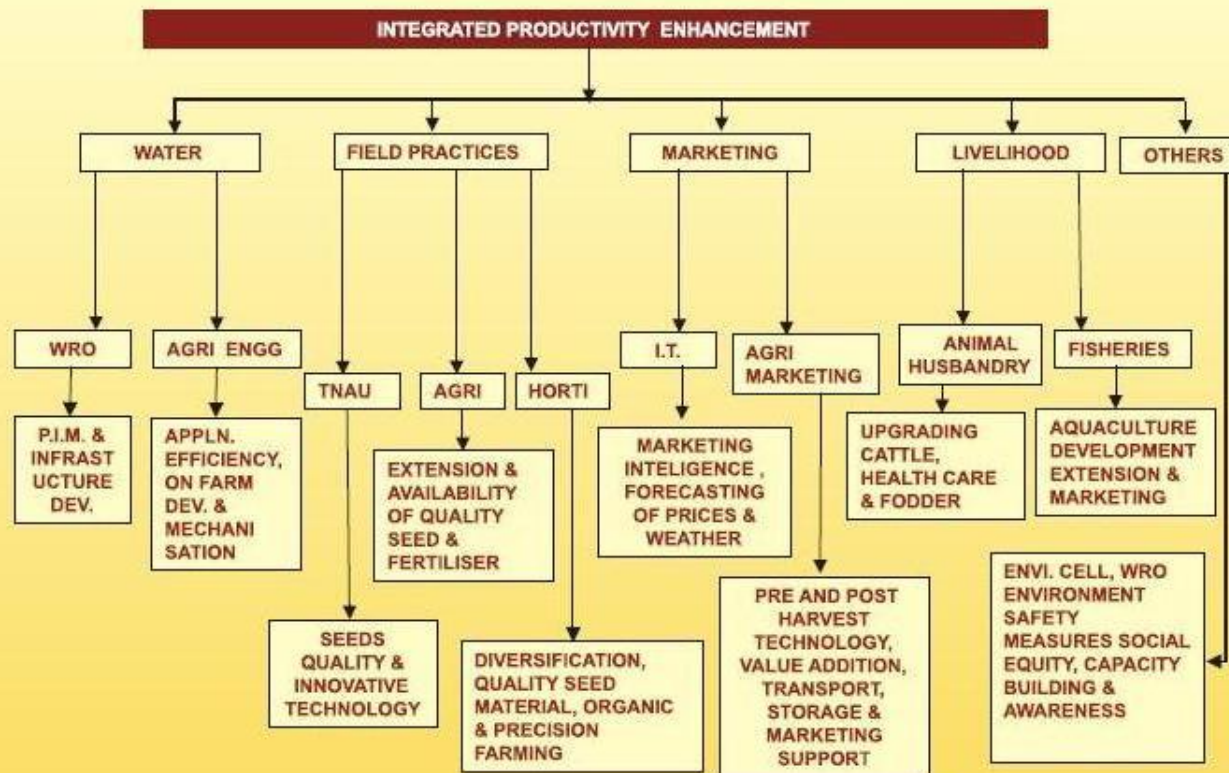


TamilNadu



More Income per Drop of Water

**Multi Disciplinary Project Unit
Water Resources Organisation
Public Works Department
Chennai-5**





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PROJECT OPERATION MANUAL
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Project Operation Manual

Brief Project Note

1. Back ground

In a predominantly Agricultural State like Tamil Nadu, there is need for intensifying efforts to improve productivity, and sustainable farm income. Long-term growth in agriculture depends in large part on **increasing the efficiency and productivity of use of water**. A concomitant need in this area is the strengthening and integrating of institutional structures which can help small and marginal farmers' access responsive irrigation management and improved agriculture practices.

Faster growth in agriculture is central to sustainable development and poverty reduction in Tamil Nadu. Although agriculture accounts for only 15.7 percent of total GSDP, farm income accounts for about half of household income for 35 million people (56 percent of the state's population) who live in rural areas. Much of this rural population is poor, with estimates ranging from 20.6% to 31% of rural population. For the poorest rural quintile (approximately 1.5 million households, or 7.5 million people), more than three-quarters of income is derived from agriculture, with agricultural wage labour alone accounting for half of household income. Given the importance of agriculture in the incomes of the poor in Tamil Nadu, growth in agriculture could further reduce rural poverty through higher yields to agricultural producers, higher real wages to agricultural labourers, and increased income and employment opportunities with forward and backward links to the rural non-farm sector.

Tamil Nadu is one of the driest states in India, averaging only 925 millimeters of rainfall a year. Per capita availability of water resources in Tamil Nadu (population about 62 million) is only 900 cubic meters a year, compared with 2,200 cubic meters for all of India. The state's dry season lasts five months (January through May) even in good years, and severe droughts occur in 3 of 10 years, severely limiting cultivation of crops between June and September. A recent series of droughts and water shortages has highlighted the importance of good water resources and irrigation management. Tamil Nadu's geographic area can be grouped into 17 river basins (127 Sub Basins), a majority of which are water-stressed. There are 61 major reservoirs, about 40,000 tanks (traditional water harvesting structures) and about 3 million wells, that heavily utilize the available surface water (24.2 BCM) and groundwater (22.4 BCM). Agriculture is the single largest consumer of water in the state, using 75% of the state's water. Irrigation through a combination of canals, wells, and tanks increases the reliability and availability of water for farming and is essential for cultivating crops in much of state. Approximately 30% of the net irrigated area of 30 lakh hectares is watered by canals and 21% by tanks, while 49% is fed by wells. The remaining area is irrigated by other sources such as streams and springs.

The Tamil Nadu has been engaged with this critical challenge evolving various responses over time.

An Expert Committee on "Development and Management of Water Resources" constituted as per G.O. Ms. No. 332PW(R1) Dept. dated 6.7.2000 observed that bringing additional area into cultivation is remote but the challenge is how best to bridge the gap in cultivation by reducing demand, by effective water management and by adoption of modern agricultural techniques (Micro Irrigation etc.) The

Committee recommended Integrated Water Resources Management & convergence of various Departments for development and management of water resources in Tamil Nadu.

With Agriculture sector facing major constraints due to dilapidated irrigation infrastructure, coupled with water scarcity (both quantity and quality) and growing demands from industry and domestic users, long term growth in agriculture and rural income depends in large part on increasing efficiency and effectiveness in the use of water. Concomitantly increased agricultural diversification and private investments in higher value processing are likely to generate new rural non-farm employment opportunities and raise rural incomes. Increased availability of water and greater efficiency of water use through widespread adoption of drip and sprinkler irrigation could enable cultivation of crops over larger area, year round, providing employment in agricultural production and processing, benefiting the rural poor.

It is important to ensure that the ultimate outcome of irrigated agriculture is food security and improved farm incomes.

The four major areas of focus present themselves:

1. Improved infrastructure
2. Crop diversification
3. New technologies for productivity
4. Market participation

It is, with this back ground, the Irrigated Agriculture Modernisation and Water-Bodies Restoration and Management (IAMWARM) project is prepared converging all Line Departments.

2. Project Objective

The IAMWARM project aims to improve the service delivery and productivity of irrigated agriculture with effective integrated water resources management in a River basin / Sub-Basin framework in Tamil Nadu with the following broad objectives.

- i. Improving irrigation service delivery including adaptation of modern water-saving irrigation technologies and agricultural practices,
- ii. Agricultural intensification and diversification,
- iii. Enhancing market access and agri-business opportunities; and
- iv. Strengthening institutions and instruments dealing with water resources management.

The project's development objective includes:

Increase in area (Hectares) served by irrigation system in 63 selected Sub-Basins which are to be rehabilitated and modernized. (vide Annexure -8 for Phase wise details)

- Increase in agricultural productivity (**net benefits per unit of water delivered in Rs/m³**) in the modernized systems
- Increase in fisheries production in targeted water bodies (Tons/year) and improved livestock health.
- Increase in targeted stakeholders' incomes
- Establishment of the State Water Resources Management Agency (SWARMA) and three Sub-Basin and one Basin Development and Management Boards by the end of the project
- Development of good-practice Decision support systems for sustainable water resources management which is piloted in three Sub-Basins and Basin

3. Project Components

The specific components of the project include

3.1. Component A: Irrigation systems modernisation in a Sub-Basin framework (Base cost Rs.1273 Crores)

This component seeks to improve bulk water delivery to irrigation system through modernization of irrigation systems, service delivery and management in schemes in about 63 selected project Sub-Basins. Activities will be carried out under two sub-components:

3.1.1. Sub-component A1: Tank System Modernisation

This sub-component will focus on reviving traditional water bodies (tanks) that are an integral part of most irrigation systems networks in the state. Special effort will be made to consider tanks in a multi-disciplinary, holistic framework to yield sustainable benefits to the farmers of such systems.

3.1.2. Sub-component A2: Other Irrigation Systems Modernisation

This sub-component will focus on the irrigation infrastructure like canals automation in the few Sub-Basins where tanks are not part of the larger canal irrigated systems. These irrigation systems will also be modernized with a shared-vision in a Sub-Basin perspective

3.2. Component B: Agricultural Intensification and Diversification

(Base cost Rs. 748 Crores)

This component seeks to build on the improved bulk water delivery of component A to increase the productivity of agriculture-related activities through improved agricultural intensification and diversification in about 63 selected Sub-Basins. This component will also be implemented as two sub-components:

3.2.1. Sub-component B1: Tank Systems

This sub component will focus on intensification and diversification of tank-dependent ayacuts. The system will look to encourage diversification from paddy, SRI, shift to high value horticulture crops and to establish marketing linkages for the proposed diversification as well as existing cropping pattern. The project would also examine improving the productivity of water use efficiency through micro irrigation, mechanization. Allied activities in animal husbandry and fisheries will also be taken up.

3.2.2. Sub-component B2: Other Systems

This sub-component will focus on the intensification and diversification of tank the larger canal-irrigated systems.

3.3. Component C: Institutional Modernisation for Irrigated Agriculture

(Base cost Rs. 237 Crores)

This component seeks to improve the institutional capacity for modern, efficient, and accountable irrigation service delivery. The scope of this activity is state-wide.

These activities will be implemented through the WRO and the WUAs. The activities are expected to substantially scale-up the institutional capacity at the WRO to design, monitor, maintain and modernize their assets in an environmentally and socially sustainable manner using appropriate state-of-art techniques, and to more effectively interact with much stronger WUAs.

3.4. Component D: Water Resources Management (Base cost Rs. 22.50 Crores)

The objective of this component is to improve the institutional arrangements and capacity for sustainable water resources management in the State. This will include the creation of a State Water Resources Management Agency (SWaRMA), amalgamating the existing Institute for Water Studies and the State Ground and Surface Water Resources Data Centre.

These activities are to be implemented by the SWaRMA (and its predecessor institutions till this is formed), the WRO, and Basin Boards. These investments should make Tamil Nadu one of the best examples of operationalising modern sustainable Water Resources Planning and Management concept in a basin framework in India.

3.5. Component E: Project Management Support (Base cost Rs. 37.50 Crores)

This component will support the management and coordination efforts related to this project.

This component will be implemented by the Multi-Disciplinary Project Unit (MDPU). It is expected that the project activities would help MDPU improve its challenging institutional coordination function, remain on top of the status of project activities, and undertake corrective measures as required.

4. Implementation

The Project will be implemented over a period of 6 years. The main implementing agencies will be the Water Resources Organization (WRO), Agricultural Engineering, Agriculture, Horticulture, Tamil Nadu Agricultural University, Agricultural Marketing, Animal Husbandry and Fisheries Departments with management support and co-ordination provided by the Multi Disciplinary Project Unit (MDPU). It is proposed to commence implementation from financial year 2007-2008 onwards. The total project cost including physical and price contingencies is assessed as Rs. 2547 crore (US\$ 566m). Against this the World Bank has agreed to reimburse Rs 2183 crore (US\$ 485m) including a Government Of India grant of US\$ 150m.

The following pages deal with the operational process for the implementation of the project serving as a guideline for all the officers involved in the project. It has been so prepared that each department's activities are described in separate chapters along with the common activities and institutional arrangements that are needed for the successful implementation of the project in convergence by all the line agencies. This is supported with detailed annexures as model schedule to be followed for future planning. The main objective of this exercise is to ensure that the implementing officers are to carry out their respective roles

- With due diligence and efficiency
- In conformity with appropriate administrative, technical, financial, economic, environmental and social standards and practices
- In accordance with the provisions of the Legal Agreements and General conditions as agreed to with the World Bank



Basin Map

| Sl. No. | Major River Basins | Minor River Basins |
|---------|--------------------|---|
| 1 | Chennai | 1. Araniyar 2. Kosasthalaiar, 3. Cooum 4. Adyar |
| 2 | Palar | 5. Palar |
| 3 | Varahanadhi | 6. Ongur, 7. Varahanadhi |
| 4 | Ponnaiyar | 8. Malattar, 9. Ponnaiyar, 10. Gadilam |
| 5 | Vellar | 11. Vellar |
| 6 | Paravanar | Paravanar |
| 7 | Cauvery | 12. Cauvery |
| 8 | Agniari | 13. Agniar, 14. Ambuliyar, 15. Vellar(S) |
| 9 | PAP | 16. Parambikulam Basin Complex |
| 10 | Pambar Kottakariar | 17. Koluvarar, 18. Pambar, 19. Manimuthar, 20. Kottakariar |
| 11 | Vaigai | 21. Vaigai |
| 12 | Gundar | 22. Uttarakosamangaiyar, 23. Gundar, 24. Vembar |
| 13 | Vaippar | 25. Vaippar |
| 14 | Kallar | 26. Kallar, 27. Korampallamar |
| 15 | Tambaraparani | 28. Tambaraparani |
| 16 | Nambiyar | 29. Nambiyar, 30. Karumeniar, 31. Hanumanadhi |
| 17 | Kodayar | 32. Palayaru, 33. Valliyar, 34. Kodayar |

Framework for Project Operation Manual

| Sub-Basin Plan Stage | Implementing Agency | | | | | | | | |
|---|---|--|--|-------|---|---|---|--|---|
| | WRO | AED | Agri | Horti | Marketing | TNAU | Fisheries | Animal Husbandry | MDPU |
| I. Pre-Planning | <ul style="list-style-type: none"> Collate maps, data on Sub-Basin irrigation and drainage infrastructure, extent of irrigation, water potential, quality (incl. data from IWS and SGSWRDC) Topo Survey completed | <ul style="list-style-type: none"> Extent of drip, sprinkler use by crop in Sub-Basin Assess potential to expand drip, sprinkler use and farm ponds, and other OFD | <ul style="list-style-type: none"> Collate maps, data on current cropping pattern, soil maps, suitability for other crops, crop water requirements, pesticide, quality seeds and fertilizer use by type, adequacy of extension service, | | <ul style="list-style-type: none"> Locate and assess existing markets for key inputs and agri/horti outputs, agro processing facilities associated with this Sub-Basin Assess markets for current and potential crops (in consultation with WUAs, traders, Factories, businesses and other line agencies) | <ul style="list-style-type: none"> Extent of SRI use in paddy, and precision farming in Sub-Basin Focus Crops and their productivity issues | <ul style="list-style-type: none"> Current and past production of various species of fish Assess current and potential market potential | <ul style="list-style-type: none"> Assess population and health status and services of livestock and current milk yields Status of fodder production Current and potential markets for milk and animal products | <ul style="list-style-type: none"> Frequent interaction with all line agencies |
| TOOLS <ul style="list-style-type: none"> Sub-basin Atlas first draft Monitoring Arrangements Stakeholder Meetings (incl. with WUAs or farmer groups) Joint Walkthrough | | | | | | | | | |

Frame Work

| | | | | | | | | | |
|---|--|---|---|---|---|--|---|--|--|
| <p>II. Planning</p> | <ul style="list-style-type: none"> Assess irrigation and drainage infrastructure (incl. canal and tank systems) condition and modernization requirements and costs Water balance studies for supply (surface and gw) and demands (under various cropping patterns and other uses) PIM and Env/Social Cells formulate Plans Designs and costing & vetting by WRO Regional CE, DRCS, PF & IAMWARM Cell | <ul style="list-style-type: none"> Identification of farmers and field for new technologies Collect tank wise details Prepare Ayacut map Prepare models for drip/sprinkler systems and in line with the existing incentive systems with MOU Examine the possibility for water harvesting structures like farm ponds Establishing quality control measures | <ul style="list-style-type: none"> Assess the soil quality Quantify the number of demonstrations on INM, IPM, Quantify the required inputs like seeds, bio-fertilizer, and timely supply Promoting organic farming Possibility of utilizing the services of Agri-clinics and NGOs Strengthening the extension service | <ul style="list-style-type: none"> Assess soil nutrient status Availability of quality seeds for hybrid varieties Promoting Micro irrigation with fertigation Identification of farmers field for demonstrations Suggesting cropping pattern and the extent of diversification | <ul style="list-style-type: none"> Propose correct market linkages with reference to the market intelligence data Propose suitable infrastructure for better marketability and value addition measures Promote contract farming avoiding third party interference in marketing Develop skill for Agri business entrepreneurship by farmers/WUAs | <ul style="list-style-type: none"> Consult with sister departments on the profitable and suitable crops that ill suit the agro-climatic condition Propose adequate large scale demonstrations for SRI in Paddy Propose farmers friendly TOT from lab to farm Propose suitable farm implements and machinery for drudgery reduction to achieve increased productivity | <ul style="list-style-type: none"> Propose aquaculture development in adequate number of tanks in the Sub-Basin in consultation with the WUAs Different species for different Sub-Basin depending on the period of storage in the tanks The infrastructure improvements needed for rearing fingerlings are to be suggested | <ul style="list-style-type: none"> Design for expansion/new fodder cultivation Identify the farmers willing to take fodder cultivation Ensuring quality seeds for fodder Suggest suitable quality veterinary service improvements needed in consultation with the WUAs | <ul style="list-style-type: none"> Frequent interaction with all line agencies Consolidation and appraisal (technical, economic, environmental, social) of each Sub-Basin plan Liaise with Steering Committee and World Bank for plan clearance |
| <ul style="list-style-type: none"> Detailed Sub-basin Atlas (for planning) Stakeholder Meetings Monitoring arrangements finalize Sub-basin Baseline Training, including IAMWARM Field Day, study tour/awareness visits Sub-basin Committee Meetings to finalize Sub-Basin Plans in consultation with HODs and District Coordination Committee and sent to MDPU Steering Committee approves Sub-basin Plan MOU agreed (incl. farmer/WUA contribution to their O&M fund) | | | | | | | | | |

| | | | | | | | | | |
|--|---|---|--|---|--|---|---|--|--|
| <p>III. Implementation</p> | <ul style="list-style-type: none"> • Procurement process for Sub-Basin plan implementation initiated (e.g. bid documents prepared,... evaluation, empowered committee clearance, agency selected, work initiated...) | <ul style="list-style-type: none"> • Procurement process for formation of farm ponds with necessary MOU arrangements | <ul style="list-style-type: none"> • Demonstration fields identified and timely supply of inputs to be ensured • Procurement process to be followed • IPM and INM demonstrations to be arranged • Replication of demonstrations to be enlarged through media campaigns and publicity materials | <ul style="list-style-type: none"> • Arrange field days at critical stages of crops and on important field operations • Arrange exposure visits and workshops for promoting diversification • Procurement process to correctly followed for input supply | <ul style="list-style-type: none"> • Procurement process for construction of godowns, kiosks, threshing floors, weighing scales • Tie up with CII and DEMIC, TNAU for promoting Agri-business entrepreneurship with WUAs • Product specific and commercial specific grading, collection centers pack houses to be made ready adhering to quality control measures | <ul style="list-style-type: none"> • Layout of demonstrations and supply of inputs to be made available at all plots • Number of demonstration on SRI technique should be more with adequate awareness creation • Drip and sprinkler arrangements with fertigation etc should also form part of demonstrations • Adoption of mechanized system to be effectively demonstrated | <ul style="list-style-type: none"> • Procurement of cages, gratings, nets and fish feeds to be done promptly • Correct quantity of fingerlings to be made available for aquaculture in farm ponds and tanks from fish rearing centers to be ensured • Adequate trainings to farmers/WUAs to be arranged • Kiosks at suitable locations to be provided in consultation with the WUAs | <ul style="list-style-type: none"> • Initiate procurement proce | |
| <ul style="list-style-type: none"> • Supervision and Quality Management • Strengthening institutions with computer and IT net work connectivity • Monitoring progress by all HODs and District level and Sub-Basin committees • Training, including IAMWARM Field Day(s), study tour/awareness visits • Financial Management (incl. reimbursement) • Completion Report by Agency | | | | | | | | | |

Frame Work

Frame Work

| | | | | | | | | | |
|--|---|--|--|--|--|--|---|--|--|
| <p>IV. Post-Implementation</p> | <ul style="list-style-type: none"> Discuss additional activities required with WUA for sustainability Develop detailed WRO&WUA O&M plan for Sub-Basin | <ul style="list-style-type: none"> Develop O&M plans for maintenance of Drip and Sprinkler systems with WUAs Ensure that farm ponds formed are sustainable for aquaculture | <ul style="list-style-type: none"> The impact of demonstration to be documented effectively for the farmers group to keep it as model for future adoption Field day meetings to continue | <ul style="list-style-type: none"> The spread of latest technology on raising horticultural crops in line with the NHM to be ensured The effect of exposure visit for increasing productivity to be made dynamic by the WUAs | <ul style="list-style-type: none"> The benefits of improved marketability of agri- produce to be documented and the WUAs to be trained to keep this process continuing Maintenance of the infrastructure by the WUAs to be made mandatory through MOUs Lending Institutions to tie up with WUAs in agri business activity | <ul style="list-style-type: none"> The yield increase due to adoption of SRI to be quantified and remedial action to be suggested wherever there is shortages The tested technology for Maize, Groundnut, and vegetables to be expanded by WUAs The adoption of more machinery in agriculture to be encouraged through tie up with lending institutions | <ul style="list-style-type: none"> The sustainability of improved cattle health to be ensured through effective awareness campaigns The veterinarians outsourced during the project should become the employees of the WUAs | <ul style="list-style-type: none"> The farmers themselves should take aquaculture Kiosks to be run by the WUAs | <ul style="list-style-type: none"> Frequent interaction with all line agencies Prepare Sub-basin ICR with assistance of M&E Consultants Discuss Sub-basin ICRs in groups with PSC |
| <ul style="list-style-type: none"> Develop a Sub-basin ICR and contribute to project Monitoring & Evaluation Revision for Sub-basin Atlas and inputs to next year's Sub-Basin Plan Adequate trainings on O&M for all WUAs and agencies to be ensured at last for some periods beyond the completion of packages | | | | | | | | | |

Chapter - 1

Common Activities of All Departments

1. Pre Planning

The following list of activities needs to be carried out for initiating planning.

- a. Official communication for appropriate institutional arrangements at Sub-Basin level.
- b. Acquaintance with inter departmental officers.
- c. Analyse Sub-basin Atlas & take up Data collection.
- d. Preliminary Stakeholders meeting.
 - Identify the key stakeholders
 - Prepare materials on the project for information of the stakeholders
 - Arrange joint walkthrough

2. Planning

- a. Improve stakeholder awareness of the project
- b. Merge technical analysis and stakeholder views
- c. Consult the Sub-basin committee
- d. Develop sub-basin plan consistent with the project objectives, design and responsive to the field consultations.
- e. Prepare the DPR and the cost estimate
- f. Present to the District co-ordination committee
- g. Presentation to MDPU followed by approval by Steering Committee
- h. Draft of Memorandum of Understanding with the stakeholders
- i. Prepare the Procurement Plan, Annual plan and the training plan
- j. Procurement and Financial Accounting systems should be familiarized with
- k. Partnership with other institutions

3. Implementation

- a. Implementation as per agreed plan and designs
- b. Quality management
- c. Monitoring
- d. Documentation
- e. Establishing and maintaining Information System
- f. Preparation of ICR

4. Post Implementation

- a. Revision of Sub-Basin Atlas
- b. Adequate trainings on O&M for all WUAs
- c. Ensure sustainability of project activities

Frame work for Project Implementation

| Stage | Activity Type | Purpose | Key Activities | Key Outputs | Responsibility |
|-----------------|---------------------------|---|--|--|--|
| I. Pre-Planning | 1. Official Communication | Ensure appropriate institutional arrangements to initiate activities at Sub-Basin level | Communication to initiate activities in Sub-Basin, fill posts, appoint nodal officers, setup Sub-Basin committee | <ul style="list-style-type: none"> Official Communication | MDPU, Line Agencies HODs |
| | 2. Information Collection | Develop initial knowledge base for stakeholder consultation and analysis; develop shared inter-agency vision of Sub-Basin characteristics | <ul style="list-style-type: none"> Collect relevant reports, data, maps to assist with Sub-Basin planning, develop Sub-Basin baseline Initiate surveys Document information | <ul style="list-style-type: none"> <u>Sub-basin Atlas</u> drafted (description of different aspects of Sub-Basin and baseline information with illustrative maps, charts, photographs, tables), including description of physical setting/ topography, climate, hydrology, schematics of water network, agriculture/ irrigation/ tank systems status, cropping patterns, livestock, key markets, economy, institutions, potential partnerships <u>Presentation on Sub-basin</u> (with relevant maps, data, and Google Earth or equivalent fly-through of Sub-Basin showing key features) | Sub-basin Committee (with Sub-basin Atlas, presentation, and fly-through finally collated by MDPU) |

| Stage | Activity Type | Purpose | Key Activities | Key Outputs | Responsibility |
|--------------|---|--|---|---|--|
| | 3. Preliminary Stakeholder Consultation | Obtain stakeholder perspectives on key issues in improving irrigated agriculture and water productivity to help guide Sub-Basin planning | <ul style="list-style-type: none"> Identify key stakeholders (incl. formal and informal WUAs, progressive farmers, women, SC/ST, fisher folk, livestock owners, local agri-entrepreneurs) and initiate stakeholder consultation Prepare communication materials on project (basic project information objectives, types of activities envisaged, activities initiated/ completed elsewhere under project, environmental and social management framework summary) Communicate project information to local stakeholders and obtain initial feedback Undertake joint walkthrough(s) to determine key issues and options in consultation with local stakeholders (formal or informal WUAs and other stakeholders) and using Sub-Basin atlas (taking photographs, videos) | <ul style="list-style-type: none"> IAMWARM Awareness Day(s) held Joint Walkthrough Report (integrated across agencies and indicating a few strategic problems/issues to be addressed in Sub-Basin and a brief discussion of possible options represented on a map wherever possible and with illustrative photographs and video footage) Document list of stakeholders consulted | Sub-basin Committee with Line Dept & MDPU assistance |
| II. Planning | 1. Training | Improve stakeholder awareness of project activities (e.g. modern approaches to irrigated agriculture) to build capacity to be partners in developing Sub-Basin plans | <ul style="list-style-type: none"> Identify immediate capacity-building needs (technical, administrative, other) Identify appropriate sites for awareness visits Identify appropriate stakeholders (in an open and transparent manner) for awareness visits and training activities Identify stakeholders who could be good trainers in future | <ul style="list-style-type: none"> Training/Capacity-building plan developed for planning stage Awareness visits undertaken (coordinated across line agencies wherever possible) | Sub-basin Committee with Line Dept and MDPU assistance |

| Stage | Activity Type | Purpose | Key Activities | Key Outputs | Responsibility |
|-------|---------------------------------------|--|--|--|--|
| | 2. Stakeholder Discussions & Analysis | Merge technical analysis and stakeholder views on hardware (e.g. construction) and software (e.g. capacity-building) options to included in the Sub-Basin plan | <ul style="list-style-type: none"> Identification of hardware and software options (all key options should be considered including a no-activity option) Preliminary identification of sites for project activities in consultation with stakeholders | <ul style="list-style-type: none"> Maps with identified sites, options Preliminary analysis of options (including cost estimates, operation & maintenance implications, successful demonstrations elsewhere, etc.) | Sub-basin Committee with Line Dept and MDPU assistance |
| | 3. Sub-basin Plan | Develop appropriate Sub-Basin plan to be supported under the project consistent with project objectives and design | <ul style="list-style-type: none"> Develop Sub-basin Plan and discuss plan with stakeholders, line agencies and MDPU Appraise Sub-basin Plan from technical, environmental, social, and economic perspectives Ensure plan is approved at all levels | <p>Sub-Basin Plan consisting of:</p> <ul style="list-style-type: none"> Finalized Sub-basin Atlas Summary of Consultations Summary of Technical Analysis Proposed Hardware and Software activities as part of Sub-Basin plan with costing, farmer contribution, and implementation arrangements Economic Analysis (overall costs, benefits, net benefit stream/IRR) using standard spreadsheets Environment and Social Management Plans (including for resettlement and rehabilitation, dam/tank safety, silt disposal, IPM/INM/organic activities, water saving, gender and vulnerable group activities, grievance redressal, etc.) Proposed Schedule of Activities (developed with Microsoft Project or equivalent) <p>Presentation and Discussion of Sub-Basin Plan (to stakeholders, district collectors, line agencies, MDPU and Project Steering Committee)</p> | <p>Development:</p> <p>Sub-basin Committee with Line Dept and MDPU assistance</p> <p>Appraisal: MDPU</p> <p>Approval: Stakeholders, Sub-basin Committee, line agencies, MDPU, Project Steering Committee, World Bank</p> |


| Stage | Activity Type | Purpose | Key Activities | Key Outputs | Responsibility |
|---------------------|---|---|---|---|---|
| | 4. Memorandum of Understanding | Line departments and project stakeholders agree on what is to be implemented, and where, how and when | <ul style="list-style-type: none"> • Develop draft MOU • Discuss and agree with stakeholders | <ul style="list-style-type: none"> • Memorandum of Understanding signed by all line departments and stakeholders (e.g. relevant WUAs) at Sub-basin Plan Signing Ceremony to officially launch implementation | Sub-basin Committee with Line Dept and MDPU support |
| III. Implementation | 1. Procurement and Financial Management | Effective and transparent procurement and financial management undertaken | <ul style="list-style-type: none"> • Procurement initiated (with appropriate approvals) • Works: bid documents prepared • Goods: specifications developed • Contract staff/consultancy: terms of reference/RFP • Bank procurement processes followed as outlined in project documents • Financial Management (incl. reimbursement) undertaken | <ul style="list-style-type: none"> • Procurement implemented (e.g. contracts signed, goods procured, contract staff in place) • Regular accounting/ audits/ reimbursement | Line Departments, MDPU |
| | 2. Training / Capacity-Building | Capacity-building of stakeholders to help become partners in project activity implementation and quality management | <ul style="list-style-type: none"> • Training • Explore partnerships with other institutions to strengthen implementation and sustainability | <ul style="list-style-type: none"> • IAWARM Field Days (across departments) • Study Tours/Awareness Visits • Training activities • Partnerships with other institutions | Sub-basin Committee, Line Depts. and MDPU |

| Stage | Activity Type | Purpose | Key Activities | Key Outputs | Responsibility |
|-------------------------|--------------------------------|---|--|--|--|
| | 3. Implementation Management | Project activities implemented as designed and any changed agreed upon by all parties | <ul style="list-style-type: none"> Continuous and close monitoring of project implementation (Project Monitoring Information System continuously updated) Quality Management procedures applied (through stakeholder/WUA social audits, Sub-Basin committee, line agency, MDPU and quality management and monitoring consultants; OK-card system developed to document sign-offs at each stage of implementation by department and stakeholders) Documentation of implementation status and issues for resolution | <ul style="list-style-type: none"> Updated Project Monitoring Information System Monthly Sub-basin Project Status Summary by Line Agency Quality Management and Monitoring Reports Monthly & Quarterly Progress Report (collated by MDPU) Final Completion Report by implementing agency (line dept.) | Sub-basin committee, Line Depts., MDPU |
| IV. Post-Implementation | 1. Documentation & Evaluation | Ensure that activities conducted as part of the project are well-documented and lessons learned are captured and used | <ul style="list-style-type: none"> Develop a Sub-basin ICR (integrated across all line dept. activities) and contribute to project Monitoring & Evaluation Revision for Sub-basin Atlas and inputs to next year's Sub-Basin Plan Adequate trainings on O&M for all WUAs and agencies to be ensured at least for some periods beyond the completion of packages | <ul style="list-style-type: none"> Sub-Basin ICR & Workshop Final Sub-basin Atlas | Sub-basin committee, Line Depts., MDPU |
| | 2. Sustainability & Scaling-Up | Ensure sustainability of project activities | <ul style="list-style-type: none"> Develop any further Sub-basin Partnerships Continue post-implementation monitoring Determine approaches to address any identified gaps in ensuring sustainability of project investments Determine approaches for up-scaling activities (including any follow-up project activities) | <ul style="list-style-type: none"> O&M Plan for Project Revised Sub-Basin Plan & Workshop (indicating partnerships, critical areas for follow-up, ways to enhance sustainability and scale-up adoption of modern water management/ irrigation/ cropping/ livestock/ fisheries/ marketing approaches) | Sub-basin committee, Line Depts., MDPU |

Chapter - 2.1

Operational Manual for Sub-basin Activities

Water Resources Organization - Framework of Activities

| Stage | Activity Type | Key Activities | Timing |
|--------------|--------------------------------------|---|--|
| Pre-Planning | Official Communication | <ul style="list-style-type: none"> EIC to identify the Executive Engineers for 63 Sub-basins who will be the Nodal Officer of the Sub-basin to facilitate and monitor the project related activities of all the line departments in the Sub-Basin. The EE will fix a date for Meeting of the Sub-basin Committee formed across line Departments. | 1 st week of April |
| | Information Collection | <ul style="list-style-type: none"> EE will coordinate the collection of data regarding the current state of the irrigation and drainage systems in the Sub-Basin and furnish the same (in electronic form where possible) to MDPU for collation into an initial Sub-basin Atlas. The EE will work with MDPU to prepare a power point presentation on the Sub-basin (including initial identification of key issues and options) | Completed by April end |
| | Preliminary Stakeholder Consultation | <ul style="list-style-type: none"> EE will convene a Sub-basin Committee meeting with these officers, and agencies like "ATMA" EE will, in consultation with other departments, convene an "IAMWARM Day" in appropriate locations in the Sub-Basin to initiate discussions with Sub-Basin stakeholder on what are the major Sub-Basin constraints and opportunities and how the IAMWARM project could help in this regard Fix date(s) and location(s) for Joint Walkthrough(s) of the Sub-Basin based on discussions held Develop a Sub-Basin Joint Walkthrough Report in consultation with other line agencies to give the preliminary impressions of the Sub-Basin and its needs. Planning/Training  | <p>Sub-basin Committee meeting in 2nd week of June</p> <p>Joint Walkthrough Report by 1st week of July</p> |
| Planning | Training | <ul style="list-style-type: none"> The EE will identify immediate capacity-building needs (technical, administrative, other) in the Sub-Basin and organize such training. | |
| | Stakeholder Discussions & Analysis | <ul style="list-style-type: none"> Based on sound technical analysis as well as effective stakeholder communication, identify key hardware (construction) and software (capacity-building/training) options (all key options should be considered including a no-activity option). CE, IWS shall also arrange to furnish to the regional Executive Engineer thematic maps pertaining to the Sub-basin /basin The Regional Executive Engineer will also discuss with the Chief Engineer SGSWRDC on the possible recharge structures to be constructed in the Sub basin on scientific basis | 2 nd week of July |

CHAPTER - 2.1

| Stage | Activity Type | Key Activities | Timing |
|-----------------------|--------------------------------------|---|--------------------------------|
| | Sub-basin Plan | <ul style="list-style-type: none"> Develop Draft Sub-basin Plan and discuss plan with stakeholders, line agencies and MDPU: The Draft Sub-basin Plan will then be placed before the Sub-basin sub committee constituted as per G.O. Ms No.212 PW (WR 1) dated 1-11-2006 (vide Chapter on Sub-committee for the role of sub-committee) for the professional judgment and their formal clearance considering all multi-sectoral aspects. The minutes of the said meeting will have to be sent to the Collector, Superintending Engineer WRO, the HODs of Line Departments and the Project Director, MDPU. The draft Sub-Basin plan will be discussed at a Sub-basin Stakeholder workshop. With the vetting by MDPU exhaustive reports and estimates will be prepared jointly by MDPU and the Nodal officers of WRO and Line Departments. HODs forward to MDPU which after finishing touches will place before the steering committee for clearance and to forward to World Bank for their clearance The Final Sub-basin Plan shall be agreed with the stakeholders, line department HODs, MDPU and forwarded for clearance by the Project Steering Committee (through MDPU). After clearance by PSC and the World Bank, the concerned regional Chief Engineer WRO shall arrange for any required modifications (if any) as part of clearance. | 1 st week of August |
| | Memorandum of Understanding | <ul style="list-style-type: none"> EE will develop draft MOU (based on model to be supplied by MDPU) Discuss and agree with stakeholders The EE will organize a Signing Ceremony to initiate project implementation in the Sub-basin. | 1 st week of Oct. |
| Implementation | Procurement and Financial Management | <ul style="list-style-type: none"> The Regional CE will initiate procurement activities with appropriate packaging and cost estimation following Bank procurement processes followed as outlined in project documents <p>IAMWARM Cell and Procurement cell</p> <ul style="list-style-type: none"> This cell shall scrutinize the Sub-basin development plans and the hydrology aspects, design of structures, cost estimates with due clarifications obtained from the Chief Engineers Concerned, Procurement plans prepared by the Regional Chief Engineer, and annual work plan before forwarding the sub basin plan to the MDPU The cell shall arrange to get the performance data on the indicators as in the PAD from the regional Chief Engineers and forward to MDPU <p>Participatory Irrigation Management cell (PIM)</p> <ul style="list-style-type: none"> This cell through the Regional Chief Engineers shall arrange for the elections to WUAs in the project area The cell shall arrange setting up of suitable buildings for WUA or a cluster of WUAs, IT kiosks to educate the farmers on the market intelligence to enable them for growing diversified crops To design the capacity building for the WUAs and all officers of the departments engaged in the implementation of the project <p>Information technology cell :</p> <ul style="list-style-type: none"> The IT Cell will advise on any IT related activities to be undertaken to support project implementation in the Sub-Basin (e.g. IT networking, information flow, etc. | April to October |

| Stage | Activity Type | Key Activities | Timing |
|----------------------------|--------------------------------------|--|------------------|
| | Procurement and Financial Management | <p>Environment/Social Cells</p> <ul style="list-style-type: none"> This cell will facilitate the examination of environmental and social development opportunities in the Sub-Basin that can be enhanced by project activities and ensure adequate mitigation and management of environmental and social risks associated with project activities The WRO (and all the cells) will assist with monitoring project activities and feeding information into and utilizing results from the Project Monitoring Information System being developed. | April to October |
| | Training Capacity-Building | <p>TRAINING CELL :</p> <ul style="list-style-type: none"> It shall develop suitable modules for training (CAPACITY BUILDING) of officers of WRO and line departments and arrange for these through various training centers in and outside states International training will also be identified and suitable nominations for the year programme will be finalised at least 3 months in advance, | |
| | Implementation Management | <ul style="list-style-type: none"> Continuous and close monitoring of project implementation (Project Monitoring Information System continuously updated) Quality Management procedures applied (through stakeholder/WUA social audits, Sub-Basin committee, WRO supervision, MDPU agency (line dept.)) | |
| Post Implementation | Documentation & Evaluation | <ul style="list-style-type: none"> The Regional EE (WRO) as nodal officer of the Sub-Basin committee, will, with the support of the other line departments and the Monitoring and Evaluation Consultant, help develop a Sub-basin ICR (integrated across all line dept. activities) and contribute to project Monitoring & Evaluation. | |
| | Sustainability & Scaling-Up | <ul style="list-style-type: none"> The EE shall Develop an O&M plan for sustainability of project activities in the Sub-Basin The EE shall determine approaches for up-scaling activities (including any follow-up project activities) | |

Chapter - 2.2

Water Resources Organization

Detailed Mapping of Activities

1. Objectives

- Improving irrigation water delivery flexibly and response to farmers need
- Improving the efficiency of conveyance and storage
- Providing irrigation to the gap area of original ayacut
- Involving farmers in Participatory Irrigation Management through Water Users Associations

2. Structure

2.1. Sub Basin Planning

- Engineer - In - Chief will identify the Executive Engineers for 63 Sub-basins at one for each sub basin
- Executive Engineer (Regional) is the Nodal Officer of the Sub-basin, to coordinate the project related activities of all the line departments in the Sub-Basin.
- He will identify the field level nodal officers of the line departments, acquaint with them and will establish close rapport with all of them (to ensure convergence-in such a way that they will respond to his call for meetings at short notice)



3. Baseline Assessment

- He will convene a series of meetings with these officers, the stakeholders and agencies like "ATMA " in the Sub-basin & IAMWARM field days
- The stakeholders include farmers, traders and reputed and responsible NGOs civil society /community in the Sub-basin

- The farmers will be represented by their WUAs if already formed in the Sub-basin or by the progressive farmers in the Sub-basin
- EE WRO shall update the register of Irrigation Assets in the Sub-Basin
- Consultations with the farmers on the irrigation system deficiencies and improvements for the needs of modernization of the irrigation leading to possible solutions like
 - Modernisation of anicuts and Improving supply channels
 - Desilting of tanks based on previous hydrological performance
 - Strengthening and upgradation of tank bunds
 - Repairs, renovation of sluices
 - Improving surplus course
 - Lining of channels
 - Construction of modern flow measuring devices
 - Provision of real time data acquisition system and canal operation mechanisms
 - Provision of equipment needed for automated canal operation to improve performance efficiency
 - If possible the data on average cultivation, gap and reasons for gap etc are to be collected and verified with correct statistics from the VAOs later
 - The existing cropping patterns will be ascertained

[This will facilitate the Agriculture and Horticulture Department Officers to explore the scope for crop diversification and the willingness of the farmers to adopt diversified cropping].

4. Consultations

- In order to have better co-ordination in planning and implementation of the project in line with the above indicators, the following cycle of consultations are proposed
 - Every **5th day of the month** line department meeting at WRO office for updating Sub-basin plans and to assess physical and financial Implementation progress and report to HODs and MDPU on the same day
 - Every **20th day of the month** walk through survey & sub committee meeting
 - Every first Monday of the month district level committee meeting
 - **During June , July September and October from 11th onwards** MDPU will review the Sub basin plans with Line Departments (dates will be intimated separately)

5. Important data to be collected

- The Executive Engineer WRO shall then discuss with the Chief Engineer institute for water studies and work out the crop water requirement for the existing and proposed cropping pattern and with reference to water balance studies made by IWS in that basin //Sub-basin
- CE, IWS shall also arrange to furnish to the regional Executive Engineer thematic maps pertaining to the Sub-basin /basin for preparing the initial sub basin atlas
- The Regional Executive Engineer will also discuss with the Chief Engineer SGSWRDC on the categorization of the Sub-basin with reference to the ground water exploitation and the recommendation the CE, SGSWRDC makes on the possible recharge structures to be constructed in the Sub basin on scientific basis
- CE SGSWRDC shall also furnish the Sub-Basin map showing the categorization of the Sub-Basin and the well details
- The Superintending Engineer WRO of the basin shall also associate in these activities of consultations and guide the Nodal officer in preparing the Sub-Basin development plans and liaising with other departments' officials
- With the data obtained from other WRO units and the line departments' officers the Executive Engineer WRO will appraise the MDPU, through power point presentation, the initial key issues identified in the Sub-Basin, where the specialists shall interact and offer their professional suggestions on modernization of irrigation infrastructure, suitable crop diversification and possibility of the Livestock improvements and fisheries developments in the water-bodies
- Data on livestock status and the productivity of inland fish in the water-bodies will also be collected and the possible interventions will be gathered from the respective line department officers
- **Thus a macro-level Sub-basin development plan will be arrived at.**
- The macro-level Sub-basin development plan will be projected to the multiple stakeholders during joint walk through survey and the inventory of the assets will also be carried out and an economical infrastructure improvements needed will also be mutually decided
- The iterative process will be continued and final components for improving the irrigation infrastructure and the strengthening measures required for the tank systems will also be agreed upon.
- EE will identify the capacity building needs, appropriate awareness visits and locations for motivating the farmers for formation of WUAs and adoption of modern irrigation technologies and water management practices

6. Sub Basin Plan

- The Executive Engineer shall appraise the Superintending Engineer on the demands of the stakeholders and prepare an approximate estimate cost for improving /adding infrastructure Tank /Anicut wise for improved irrigation efficiency and water management
- These plans will then be placed before the Sub-basin sub committee constituted as per G.O. Ms No.212 PW (WR I) dated 1-11-2006 (vide Chapter on Sub committee for the role of sub-committee)for the professional inputs minutes of the said meeting will have to be sent to the Collector, Superintending Engineer WRO, the HODs of Line Departments and the Project Director
- Each department will then start preparing detailed estimates
- The Executive Engineer will also discuss with the Environmental unit in the Sub-Basin and identify the Environmental issues to be addressed and the environmental unit shall prepare the estimate for the required interventions
- The possible social and environmental issues as in the framework for SEMF developed by M/s EPTRI, Hyderabad in the Sub-basin will also be addressed by inclusion of suitable components in the cost estimates
- WRO will jointly share the field works with the WRO plan formulation wing and prepare the cost estimates in consultation with the design wing of WRO, IWS and ground water wing with the Regional Chief Engineer concerned convening a meeting of Chief Engineers IWS, SGWRDC, PLAN FORMULATION and DRCS
- The regional Executive Engineer shall collect the development plans and the cost estimates for the interventions proposed by the Line Departments .
- Detailed reports and plans will be prepared by the Nodal officers of WRO and Line Departments with inputs from the MDPU.
- If any modifications are made by the MDPU specialist in the Sub-basin development plans the same will be responded to by the sub basin team and EE. The finalized report and estimates will be sent by the regional Executive Engineer to the District Level Co-ordination Committee for ensuring convergence in planning and to facilitate easy monitoring during implementation and to the HODs for forwarding to MDPU and to forward to world bank for their clearance
- As soon as the clearance is received from the bank the concerned Chief Engineer WRO shall arrange for the modifications if any and submit to the empowered committee for administrative clearance

7. Implementation

- Once the empowered committee clears, Chief Engineer WRO with the support of the project cells in their offices shall take appropriate action
 - for finalizing the annual work plan
 - proper allocation of budget
 - for the preparation of bid documents
 - getting cleared by the bank as per norms fixed and agreed in the project and finance agreements for prior review contracts and
 - appropriate action to settle contracts as per procurement guidelines of the bank
- In the case of post review contracts according to the powers delegated to the officers bid documents will be prepared
- and bids will be called for following the procurement guidelines of the bank and
- contracts concluded in line with the procurement plans approved
- After signing of the Agreement by the Contractor, within a Fortnight **PERT Chart** for the Physical and Financial Progress of the Contract with the work plan and the methodologies of executing the package as mutually agreed upon between the WRO Implementing Officer and the Contractor (by taking into account the working seasons and upper and lower reaches programme of work for enabling to monitor the Progress of work effectively and to achieve the objectives of the Project ----(See also Annexure 2 for details of various objectives)
- At this stage the District Collectors should be informed to monitor the implementation through the District Level Co-ordination Committee
- MDPU will examine the Annual work plans received from the WRO and line agencies on the ongoing sub plan and for the next years budget requirements and forward the budget demands to the finance department for inclusion in the state annual budget
- The CE through the EE of the sub basin of WRO will simultaneously through the PIM cell in the office of the engineer-in- chief establish WUAs in the project areas before march 2010 in the phased manner as indicated in the Chapter in Participatory Irrigation Management (PIM) cell

8. Scheme cycle

- The scheme cycle framework for the above activities can be summarized as below

8.1.Planning

| | | |
|------------|----------------------|--|
| April- May | 1 st week | line department meeting |
| June | 2 nd week | stakeholders and line department meeting |
| July | 1 st week | meeting with MDPU with field level officers for preparation of Sub-basin plans |
| July | 2 nd week | modifications suggested in MDPU to be attended to by all departments |
| August | 1 st week | consultations with project cells of line department for review and comments |
| August | 3 rd week | attending to comments of cells and again consulting stakeholders |
| September | 1 st week | Plans and designs to be sent to HODs with approved plan to the MDPU |
| October | 1 st week | MDPU will finalize the converged Sub-basin plans and the line department to prepare cost estimates |
| October | 4 th week | Sub-basin plans and cost estimates and annual work plan including budget will be placed before the appropriate authority |
| November | 1 st week | annual Sub-basin work plan and budget estimates to be sent to world bank and finance department |

8.2. Procurement

- The Regional Chief Engineer will initiate procurement activities through the concerned Superintending Engineer for appropriate packaging and cost estimates for due clearance by the Empowered committee
- Once the Empowered Committee clears the estimate the Chief Engineer shall accord Technical sanction
- The Superintending Engineer shall prepare the Bid documents and call for the Bids if it is within the threshold limits and a post review case or get it cleared by the World Bank if it is a prior review case through the IAMWARM project cell in Engineer-in Chief Office and MDPU and then call for bids
- Following the Procurement Procedure of the World Bank and as indicated in the Bid documents, the Evaluation will be carried out by the Superintending Engineer and according to the delegation of powers will take appropriate action to award the contract by himself or getting cleared by the Tender Award Committee through the IAMWARM Project cell Prior review cases should be sent directly to the Bank for approval.

- Once the World bank clears the contract or for cases cleared by himself, the Superintending Engineer shall conclude an agreement with the successful contractor with due PERT charts from the contractor and forward to World Bank through EIC, for getting WBR numbers and send copies of the Agreement with PERT charts to the Executive Engineer concerned and start close monitoring of the implementation right from the beginning followed by frequent field visit and quality assurance
- The Executive Engineer concerned shall carefully go through the Contract conditions, and Milestones fixed in the agreement and work out an action plan for implementation in consultation with the contractor such that the activities of other departments can be converged without any hindrance keeping up the schedule of implementation as planned and agreed to.
- He should convene the Contract Management meetings as and when necessary as per field day visits with other departments and take appropriate remedial actions for completing those components requiring high priority and special attention
- O.K cards as indicated in the Quality Control Manual and the specifications as in the contract documents will be ensured with relevant records made available at the site for inspection by the Superior Officers
- The Executive Engineer, the Superintending Engineer and the Chief Engineer shall adhere to the reporting systems both for Physical and Financial aspects as stipulated by the IAMWARM project Cell in the Engineer-in-Chief and MDPU office
- The Chief Engineer shall periodically review the progress of the works and shall prepare an annual work plan for the ongoing works and for the works proposed for the next year with physical and financial targets. The annual plan should be forwarded to MDPU through Engineer-in-Chief at any cost not later than the first week of November every year enabling MDPU to consolidate and forward to Finance Department for allocation of Sufficient revised funds for the current year and budget allocation for the following year.
- The Executive Engineer shall take appropriate action to get the accounts reconciled by Accountant General and prepare reimbursement claims to World Bank and forward to IAMWARM project cell in Engineer-in Chief office for onward transmission to World Bank under intimation to MDPU
- The Executive Engineer shall closely follow this till the reimbursements are made fully.

(Please vide Chapter 13 & 14 for more details)

9. Cells to be formed in EngineerinChief Office



9.1 IAMWARM Cell and Procurement cell

- This cell will function as a technical secretariat to Engineer-in-Chief
- One Superintending Engineer will head this cell supported by one Executive Engineer, two Assistant Executive Engineers, four Assistant / Junior engineers, four Draughting Officers, two budget Assistants, two Junior Assistants and one Superintendent
- The budget unit will consult the technical unit in the cell and arrange to get suitable head of accounts, sub-heads, minor heads from the Finance Department for seeking funds for various components to be implemented with the assistance of the Financial Management Specialist in MDPU who will liaise with the Finance Department
- This cell shall scrutinize the Sub-basin development plans and the hydrology aspects, design of structures, cost estimates with due clarifications obtained from the Chief Engineers Concerned
- Procurement plans prepared by the Regional Chief Engineer will be vetted
- The draft bid documents for prior review contracts will be scrutinized before sending to bank for getting NOC
- The contract documents and evaluation reports from the Regional and Functional Chief Engineers will be scrutinized before sending to Tender Award Committee
- After approval bid document and evaluation reports with the minutes of the tender award committee will be forwarded to world bank for their clearance
- Once the NOC is received from the bank ,the regional Chief Engineer will arrange to conclude necessary agreements and commence the works sticking to the procurement plans which will be monitored by this cell

- The budget unit in the cell shall take timely action to place requisite funds under LOC system to the concerned Executive Engineers
- The cell will also frame suitable modalities for the operation of the Irrigation Research Fund and monitor it
- The PERT Chart of the works to be obtained from Regions and the progress to be monitored ensuring that milestones and completion targets to avoid levying of any penal service / commitment charges by the World Bank on the unutilized Budget provisions
- The cell shall monitor the entire expenditure of the WRO components
- To obtain monthly physical and financial progress report and physical and consolidate and send to MDPU for forwarding to world bank and Government
- The budget unit shall get the accounts reconciled periodically with accountant general and arrange to file reimbursement claims promptly and follow it up till reimbursement communication from the world bank as well as from the Government of India is received.
- This cell will also associate with various consultants (such as baseline, Monitoring and Evaluation, I.T consultant to be employed and share/arrange supply of data)
- Annual budget plans will be discussed among the regional and field level officers and prompt reports on budget allocation needed as re for current year/be for the next year will be compiled and sent to the Project Director enabling him to, send to finance department by November middle of every year
- The cell shall arrange to get the data on the performance indicators as in the pad from the regional Chief Engineers and forward to MDPU(se also reporting in Annexure 8)

9.2 Participatory Irrigation Management cell (PIM)

- It shall be headed by a Superintending Engineer supported by one Executive Engineer, two Assistant Executive Engineers, four Assistant / junior engineers four Draughting officers, one superintendent, two junior Assistants at State Level
- The deputy chief engineer in each region is the nodal officer of the PIM cell of the Region concerned to monitor and report
- The cell through the Regional Chief Engineers shall arrange for the elections to WUAs in the project area before march 2010
- It shall assess the existing WUAs whether formal /informal

- The cell shall also strengthen the existing WUAs
- The cell shall design the capacity building arrangements for all WUAs and the WRO and line department officers on roles and responsibilities of the farmers and the department in maintaining the irrigation system efficiently and also the benefits of diversification of crops to save water
- The cell shall arrange for the notification of the TNFMIS act to be operable in the project areas & suggest for modifications / amendments for any improvement
- Identify the required number of WUAs to be newly formed in the project areas
- It shall arrange through the regional chief engineers for the documentation of the WUAs hydraulic boundary maps, members list, voters' list, election rules etc
- It shall arrange for completing the election process for formation of WUAs in the entire project areas before march 2010
- The cell shall develop a mechanism through NGOs, ATMAS Regional WRO engineers and field officers of Line Departments to motivate the farmers to undertake Agri business activities
- It shall design suitable methodologies for change management enabling environment for all officers itself acting as a facilitator
- The cell shall arrange setting up of suitable buildings for WUA or a cluster of WUAs it kiosks to educate the farmers on the market intelligence to enable them for growing diversified crops
- To design the capacity building for the WUAs and all officers of the departments engaged in the implementation of the project

9.3 Information technology cell

- It shall also function under the Superintending Engineer (PIM) with the support of the same staff
- WRO shall engage a I.T consultant for advising on the modalities for installation and testing of computers and communication infrastructure in all offices upto section level including the kiosks arrangement in the WUAs and in the line departments and creation of web-based information management system
- Estimates for the same will be prepared by the I.T cell in Engineerin-Chief and procurement process will completed before September 2007

- Agency fixed shall have to complete the execution before December 2008


9.4 Training Cell

- It shall be headed by Joint Chief Engineer (General) with the existing support staff in co-ordination with IMTI
- It shall develop suitable modules for training (CAPACITY BUILDING) of officers of WRO and line departments and arrange for these through various training centers in and outside states
- International training will also be identified and suitable nominations for the year programme will be finalized at least 3 months in advance, in consultation with the JCE(General) in respect of WRO and in consultation with the heads of Line departments should be and arranged through IMTI
- Annual work plans and budget requirements will be worked out and forwarded to the MDPU for consolidation and sending to Finance Department for inclusion in the State Budget promptly every first week of November
- Once the budget allocations are made it is the responsibility of the EIC in respect of WRO and the HODs of line departments to comply with the schedules of trainings approved in the budget and periodical reports (Monthly and Quarterly) to the Training Cell in EIC office and to MDPU to facilitate easy monitoring and take corrective actions
- The common budget unit in the IAMWARM PROJECT cell formed in the EIC office will attend to budget and reimbursement aspects

10 Outcome Indicators

- Physical modernization of canal irrigation systems
- Physical modernization of Tank irrigation systems (In both cases number of Kilometers of Channel improved and the number of tanks improved and the extent of command area benefited)
- Percentage increase in area irrigated
- % of staff trained
- Number of Water Users' Associations set up, trained and effective
- Irrigation information management system set up and functional
- Cells created functional
- State Water Resources created and strengthened Management Agency
- Basin Boards set up and strengthened
- Effective project management reporting, financial management, procurement

Chapter - 3.1
Operational Manual for Sub-basin Activities
Agricultural Engineering Department Framework of Activities

| Stage | Activity Type | Key Activities | Timing |
|--------------|--------------------------------------|--|--|
| Pre-Planning | Official Communication | <ul style="list-style-type: none"> Chief Engineer (Agrl. Engg.) to identify the Executive Engineers for 63 Sub-basins who will be the Nodal Officers of the Sub-basins. | 1 st week of April |
| | Information Collection | <ul style="list-style-type: none"> EE, AED Shall collect data on the prevailing status of OFD and micro irrigation | Completed by April |
| | Preliminary Stakeholder Consultation | <ul style="list-style-type: none"> EE, AED will attend the Sub-basin Committee meeting convened by EE, WRO which will also be attended by the Line Department officers EE, AED will attend the "IAMWARM Day" convened by EE, WRO in appropriate locations in the Sub-Basin to initiate discussions with Sub-Basin stakeholder The EE, AED will attend the Joint Walkthrough surveys organized by EE, WRO to identify key issues and options by making suitable notations on the Sub-Basin atlas  | Sub-basin Committee meeting in 3 rd week of April Joint Walkthrough Report by 1 st week of May (Vide WRO chapter) |
| Planning | Training | <ul style="list-style-type: none"> The EE, AED will identify immediate capacity-building needs (technical, administrative, other) in the Sub-Basin and organize such training. | April - May |
| | Stakeholder Discussions & Analysis | <ul style="list-style-type: none"> Based on sound technical analysis as well as effective communication with Line Departments, identify key hardware (Drip, Sprinkler, Precision Farming, Farm Machinery, Farm Pond) and software (capacity-building/training) options (all key options should be considered including a no-activity option). | 2 nd week of May |
| | Sub-basin Plan | <ul style="list-style-type: none"> Develop Draft Sub-basin Plan and discuss plan with stakeholders, line agencies (Horti, Agri & Fisheries). The draft Sub-Basin plan will be discussed at a Sub-basin Stakeholder workshop and suggestions considered while finalizing the Sub-Basin plan, Detailed technical designs and cost estimates for the components proposed may be prepared. or equivalent) The Sub-basin plan will be presented at MDPU through a well-designed PowerPoint presentation (with assistance of maps, Google Earth, etc.) and comments solicited. The Final Sub-basin Plan shall be agreed with the stakeholders, line department HODs, MDPU and forwarded for clearance by the Project Steering Committee (through MDPU). | June |

CHAPTER - 3.1

| Stage | Activity Type | Key Activities | Timing |
|---------------------|--------------------------------------|--|------------------------------|
| Implementation | Memorandum of Understanding | <ul style="list-style-type: none"> EE, AED will develop draft MOU (based on model to be supplied by MDPU) The EE, AED will organize a Signing Ceremony to initiate project implementation in the Sub-basin. | 1 st week of July |
| | Procurement and Financial Management | <ul style="list-style-type: none"> The EE, AED will initiate procurement activities with appropriate packaging and cost estimation following Bank procurement processes followed as outlined in project documents EE, AED will submit the procurement documents and cost estimates to the Empowered Committee for clearance. At this stage, the District Collectors will be informed to monitor the implementation through the District Level Co-ordination Committee EE AED shall forward to MDPU the work plans requiring modifications on the ongoing packages and for the next years budget requirements facilitating MDPU to forward the budget demands to the finance department for inclusion in the state annual budget The Project Cell established at the Office of the CE (E), will facilitate smooth project implementation This cell shall scrutinize the Sub-basin development plans, design of structures, cost estimates with due clarifications obtained from the EEs, (AED) Concerned before forwarding to the MDPU for finalization Procurement plans prepared by the Executive Engineer will be vetted The draft bid documents for prior review contracts will be scrutinized before sending to MDPU which will forward to bank for getting NOC Once the NOC is received from the bank through MDPU and CE, AED, the Executive Engineers AED will arrange to conclude necessary agreements and commence the works adhering to the procurement plans which will be monitored by this cell The cell shall monitor the entire expenditure of the AED components The cell shall arrange to get the data on the performance indicators as in the PAD | July to January |
| | Implementation Management | <ul style="list-style-type: none"> Quality Management procedures applied (through stakeholder/WUA social audits, Sub-Basin committee, AED supervision, MDPU) will be promptly followed | July to February |
| Post-Implementation | Documentation & Evaluation | <ul style="list-style-type: none"> The Regional EE (WRO) as nodal officer of the Sub-Basin committee, will, with the support of the other line departments and the Monitoring and Evaluation Consultant, help develop a Sub-basin ICR (Implementation Completion Report) (integrated across all line dept. activities) and contribute to project Monitoring & Evaluation. | March |
| | Sustainability Scaling-Up | <ul style="list-style-type: none"> The EE, AED shall submit to the CE (AE) (who will forward to MDPU) suggestions to develop an O&M plan for sustainability of project activities in the Sub-Basin EE AED shall determine approaches (including any follow-up project activities) | March |

Chapter 3.2

Agricultural Engineering Department

Detailed Mapping of Activities

1. Objectives

- **Improving the conveyance efficiency at farm level**
- **Increasing application efficiency of Irrigation Water**
- **Improving Ground water recharge through construction of water harvesting structures**
- **Popularization of Agricultural Machinery to improve productivity and reduce drudgery of agricultural labourers**

2. Sub Basin Level

2.1. Planning

a. Structure

- The Chief Engineer (AED) shall identify the officers for the Project Cell and the Procurement cell in his office
- At District level, Executive Engineer (AED) shall be the Nodal officer for preparation and implementation of the project in the Sub-Basin

b. Baseline Assessment

- The Nodal officer identified to associate with the Executive Engineer WRO of the Sub-Basin who is the Principal Nodal officer in the first week of April every year and collect data on
 - The Sub-Basin details on Hydrology, cropping Pattern, Crop Water Requirement
 - Tank wise ayacut details
 - Water availability,
 - Macro level status of water distribution practiced,
 - total irrigation command area in the Sub-Basin, average irrigated area, and the gap area with reasons for the gap area,
 - water potential to cater to the needs of the command area in the Sub-Basin
 - **The extent of micro irrigation adopted in the Sub-Basin**
 - Number of irrigation wells in the command and their status crop wise

- Number of Rain water Harvesting Structures in the sub basin
- **Number and type of Agricultural Machinery used by the farmers and the scope for increasing it**
- Demands and issues raised by the farmers



c. Consultations

- EE (AED) will then consult the Agriculture and Horticulture officers who propose new cropping pattern suitable to the agro-climatic zone in which the Sub-Basin falls and will request WRO EE to work out the crop water requirement
- He will participate in the multiple stakeholders meeting convened by the Executive Engineer WRO in the month of April-May and share the views of the stakeholders on the



- prevailing conditions in the Sub-Basin on irrigation infrastructure,
- extent of Micro irrigation practiced crop wise and future possibilities
- on the support they receive from the Agriculture Engineering officers on the adoption of technologies and the cropping pattern, the bottlenecks and support requested
- On the possibility of increasing the

Agricultural Machinery for various farm activities

- the inputs recommended by the Agri- Engineering and Extension officers
 - And their experience in following their recommendations.
- He will appraise the forum the macro level details he had worked out and interact with them and add their response to his suggestions for diversification, On Farm Development activities, Micro irrigation technology to be expanded or to be introduced
 - In the meeting, dates for Joint walk through survey will be decided (preferably in the first week of June) to assess the status of irrigation





infrastructure and allied agriculture practices adopted and the possible interventions as required by the stakeholders.

- He will participate in the joint walk through and assess the true picture, Tank wise Ayacut details, interact with the stakeholders which consists of the formal/in-formal WUAS and get the feed back on their needs from the Agriculture Engineering Department to design the support

to be given to On Farm Development and Micro irrigation activities, Agricultural Machineries requirement, Farm Ponds, Water Harvesting Structures etc.

3. Sub Basin Plan

- In the office, based on the field visit and the needs expressed by the stakeholders and on the basis of water potential in the Sub-Basin as discussed with the Executive Engineer WRO designs on the introduction of new technologies for saving of water viz. increasing the area under Micro irrigation, creating farm ponds in WUAs fields to serve as water harvesting structure and to promote inland fisheries, increasing crop area due to saving of water, enhancing productivity and the possible diversification of crops of less water intensive, assessment of Agricultural Machineries required, can be prepared.
- To facilitate decision making process, he is to prepare the Ayacut map depicting the components proposed
- Consultation with the Agriculture, Agri-Marketing, TNAU and Horticulture officers in the Sub-basin in the last week of June, who propose suitable marketable crops that will be agreeable to the farmers in the Sub-Basin so that the extent of micro irrigation to be covered in this project could be approximately estimated
- **The location** of Micro irrigation to be adopted, farm ponds to be formed are to be identified and consultations with the Executive Engineer WRO and the concerned WUAs on the prospects of assured delivery of regulated water to the proposed area
- The draft MOUs to be executed by the beneficiaries are to be made ready and mutually agreed
- It should also be ensured that there is no overlapping of this component with that proposed by TNAU. AED & TNAU should mark out the areas of focus through mutual discussion.



- The above Sub-Basin plan developed will then be sent to the CE(AED) by Second week of September for perusal and suggestions and also to the District Co-ordination Committee and the agreed plans to be sent to the MDPU for scrutiny and modification
- This iterative process will go on till a finalized and acceptable Sub-Basin development plan along with the required training needs both for officers and WUAs is developed with estimated cost and sent to the MDPU for clearance by the Steering Committee by last week of September
- The field level officers will prepare the final cost estimates and send to CE(AED) with a copy to Executive Engineer WRO in the basin and to MDPU by first week of October
- The Sub-Basin development plan and the cost estimate will then be forwarded to the World Bank and clearance obtained by MDPU by the Second week of October
- The CE (AED) will place before the empowered committee the estimates through MDPU before the last week of October and obtain Administrative Sanction and
- draw an annual work plan with details of budget provision needed for the ongoing packages and the budget provision for the new packages to be taken up in the following year and send to MDPU which will forward to Finance Department by the second week of November

4. Pre Implementation

- Once the estimates receive Administrative Sanction, the field nodal officer will prepare the detailed estimates with drawings showing the field numbers where the Water harvesting Structures, Farm Ponds are proposed, crop wise micro irrigation system is proposed, No. of Agricultural Machineries required etc.
- According to the delegation of powers the district Nodal officer shall arrange for Technical sanction of the estimate
- The Technically sanctioned estimate will then be perused by the Procurement officer designated in the Sub-Basin, who will be trained either at the Sub-Basin or at Chennai, and initiate the procurement process for settling the agency for the execution by NCB or Shopping Procedure as the case may be in consultation with the State level Procurement officer in the Head office (vide Procurement chapter for more details)
- The Nodal officer in the Sub-Basin shall identify the personnel to be trained on extension and procurement activities and arrange imparting trainings to them through recognized Training Institutes as approved by the Empowered Committee
- Necessary agencies for supply and installation of the Micro Irrigation system, supply of Agricultural Machineries, formation of farm ponds will then be finalized according to the powers delegated to the procurement officers

- The District Procurement officer will issue the required work order after concluding agreement with the contractors for formation of farm ponds, orders for the supply and installation of Drip and Sprinkler irrigation system so that the implementing officer shall carry out the work without any disruption

5. Implementation

5.1. Convergence

- EE, AED to discuss with TNAU Officials and delineate the area of operation to avoid the duplication of similar components in the Sub basin.
- Segregate the villages / WUA among AED & TNAU
- Sit together and finalize the Action Plan with TNAU Officials
- EE, AED to consult with Agri / Horti Officials regarding the Cropping Pattern, Crop Diversification proposed and implementation of Drip / Sprinkler Irrigation, Precision Farming.
- The convergence of activities should be ensured in consultation with the Fisheries Department for construction of Farm Pond.
- A weekday, say, Wednesday may be fixed for discussion with the Line Departments to facilitate smooth implementation. (IAMWARM proposed may be adhered to)
- The Implementing Officer shall attend the zonal workshop and Field days arranged by Agriculture Department and ensure convergence of activities and advise midcourse corrections to be made by the farmers in the implementation of the project.
- The nodal officer from AED shall have a joint walk through with the Fisheries officials to identify the farm ponds where fish culture can be possible

5.2. Creating Awareness

- Wide publicity may be given at the Sub basin level to create awareness among the farmers about AED components proposed for this sub basin through
 - Village level meetings,
 - Awareness Campaigns,
 - Local cable TV network, Radio etc
 - Handouts, banners etc.
- Joint Walk Through campaign with the Line Department officials for promoting the relevant

component should be ensured.

- handbills, posters highlighting the profit / income due to implementation of the components, may be brought out.
- Opinion makers such as Thalaiyaries, Village Presidents, influential personalities at the village level etc may be appraised for quick spread of activities.

5.3 Farmers Identification

- Get the assistance of WUA in identifying the willing farmers and maintain Priority register which should be followed.
- A database on the list of farmers who have success stories / best practices with respect to activities such as Drip Irrigation, improved crop variety, cross breeding, crop diversification etc. may be prepared and maintained.

5.4 Demo & Exposure

- Attend the Iamwarm Field Days, Exposure visits, demonstrations etc. arranged by WRO / Line Departments.
- Arrange Exposure visits Demonstrations on Micro Irrigation System, Farm Implements @ one for each village in the farmers' field
- Demonstrations should have multiplier effect to the neighboring areas

5.5 Changing mindset

- The motto of IAMWARM *“More Money per Litre of Water”* should be engraved in the mindset of the implementing officers.
- Implementation Officers may be oriented on the IAMWARM concept so as to ensure effective implementation.
- **Focus on how Micro irrigation improves productivity of the plant-higher yield and therefore higher income**
- Invite the Farmer Interest Groups to see live Demo and interaction with the experts on the components / activities.
- Farmer to farmer Interaction may be arranged with the successful farmers for convincing the Farmers Interest Group so as to have quick spread of the technologies.

- Farmers who need Bank loans for purchasing the components may be guided, if necessary.
- The WUAs may be motivated to create a corpus fund to meet the maintenance expenses of the machinery and the micro irrigation system
- Assess the irrigation water potential of the fields of the individual farmer and suggest Micro Irrigation System coupled with suitable cropping pattern.

5.6 Responsibility

- The implementing officer shall, with reference to the sanctioned estimate, arrange WUA wise and tank wise programmes and pert charts in consultation with the contractors
- The AEE/ AE/JEs and Assistant Soil Conservation officers are responsible for qualitative work and correct quantity as per estimates.
- Sub Basin Plan should be scrupulously implemented.

6. Reporting Mechanism

- The implementing officer will report to the CE (AED), Executive Engineer, WRO, District Level Co-ordination Committee and to MDPU on the Physical and Financial progress periodically as prescribed (Monthly, Quarterly, Semester) and shall inform the bottlenecks experienced during implementation
- The District Collector shall try to solve the problems by convening Monthly / Emergent Meetings and resolve the issues
- The implementing officer should ensure that the works are completed as per time schedule agreed in the contract with the suppliers as well as in the approved procurement plan Joint campaign with the Line Department officials for promoting the relevant component should be ensured.
- Simultaneously the implementing officer shall take up a macro level impact caused by these interventions with frequent WUAs meetings and workshops and document them for perusal by the Monitoring and Evaluation Consultant to be employed by the MDPU

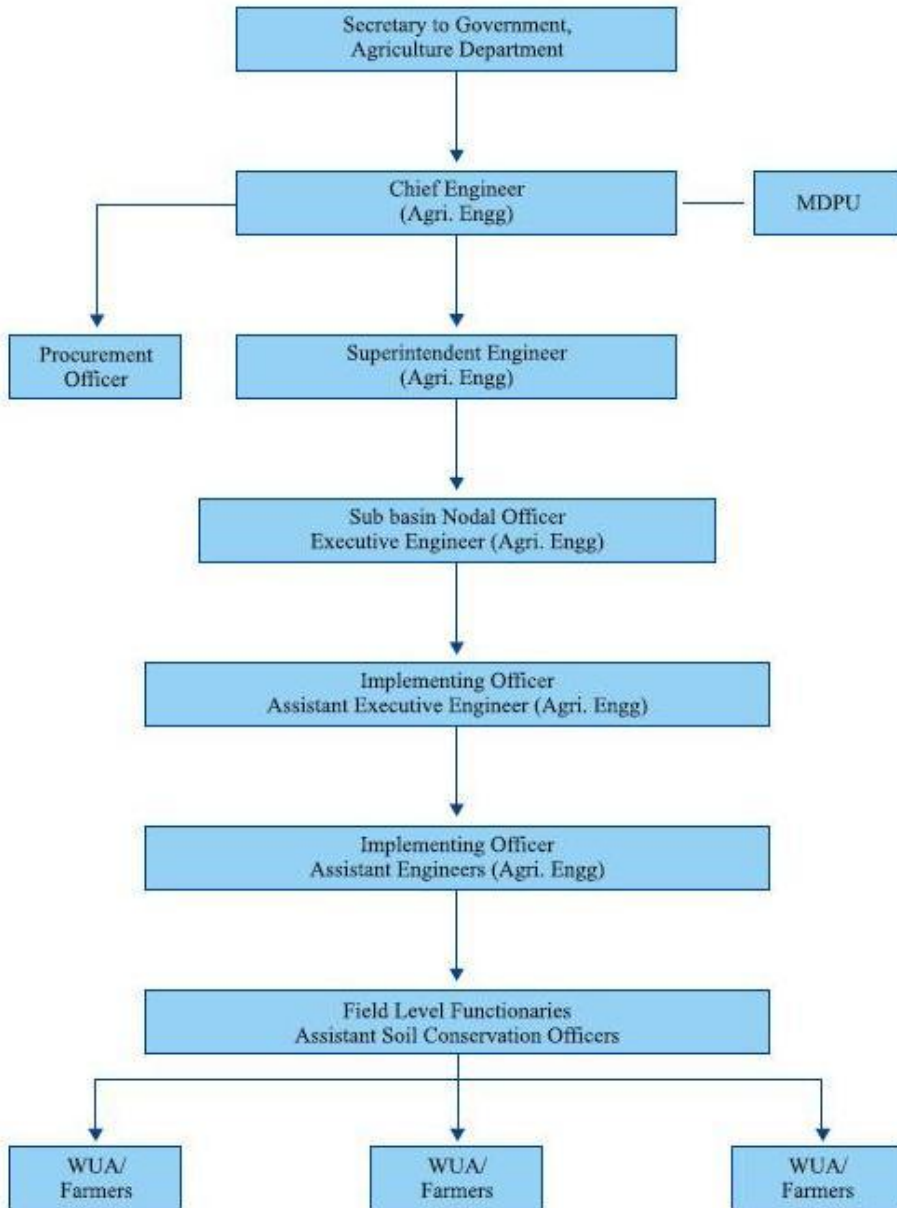
7. Outcome Indicators

- The extent of increase in the Micro irrigation
- The extent of adoption of drip with Fertigation
- The number of wells improved with rise in water table
- The increase in productivity of the crops and the consequent additional agriculture income in

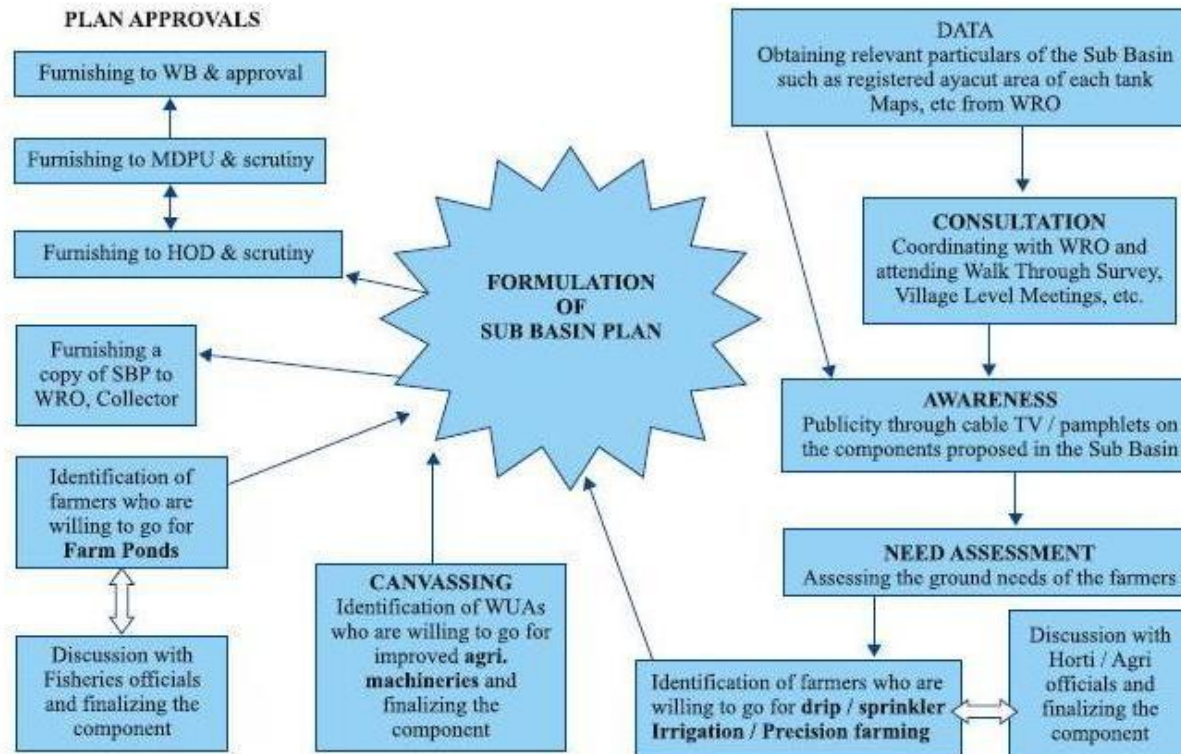
the Sub-Basin

- The number of farm ponds effectively used for fish production
- The consequence additional income due to aquaculture to the basins and in consultation with the Monitoring and Evaluation Consultant shall forward to Government and to World Bank
- The IAMWARM project cell in the CE's Office is responsible for monitoring the implementation of the Project.

Annexure - 1
AED - ORGANOGRAM



**Annexure - II
IAMWARM - AED
CONVERGENCE OF PROJECT ACTIVITIES DIAGRAM**



Chapter - 4.1
Operational Manual for Sub-basin Activities
Agriculture Department - Framework of Activities

| Stage | Activity Type | Key Activities | Timing |
|--------------------------------------|-----------------------------------|--|--|
| | Official Communication | <ul style="list-style-type: none"> The Director of Agriculture to identify District JDAs for 63 Sub-basins who will be the District level Nodal Officer for the Project / Procurement Officer for the Sub-basin concerned. | 1 st week |
| Pre-Planning | Information Collection | <ul style="list-style-type: none"> The JDA / District Nodal Officer will co ordinate the collection of data on current agriculture scenario by the Sub-basin Nodal Officers / implementing Officers and furnish the same (in electronic form also). | Complete by 1 st month |
| Preliminary stakeholder consultation | | <ul style="list-style-type: none"> The Sub-basin Nodal Officer / implementing officer should participate in the multiple stakeholder meeting at Sub-basin, village and tank levels convened by the EE WRO In the meeting a date for joint walk survey will be decided The Sub-basin Nodal Officer / implementing officer should participate in the joint walk through and get the feed back on their needs / expectation of the WUAs, | Sub-basin committee meeting in 3 rd week Join walk through by 5 th week |
| Planning | Training | <ul style="list-style-type: none"> The Sub-basin Nodal Officer should identify immediate capacity - building needs (technical, administrative and others) in the Sub-basin and should organize such trainings / demonstrations. The Sub-basin Nodal Officer should document this in a brief training / capacity building plan. | Completed by 2 nd month |
| Implementation | Stakeholder discussion & Analysis | <ul style="list-style-type: none"> The Sub-basin Nodal Officer should identify key countermeasures / solutions to address the issues / constraints taken into account. The Sub-basin Nodal Officer and implementing staff to do preliminary identification of fields & farmers tank wise and development components of activities wise in consultation with stakeholders & line department officers concerned if necessary. | 2 nd month |
| | Sub-basin plan | <ul style="list-style-type: none"> Based on the field visit and the needs expressed by the stakeholders and on the basis of water potential in the Sub-basin as assessed by WRO, designs on the introduction of new technologies for increasing crop area, productivity and the possible diversification of crops to less water intensive can be prepared. The above draft plan should be iterated based on consultation with the Agricultural Marketing Department, AED, Tamil Nadu Agricultural University, WRO, Horticulture Department officials of the Sub-basin and also with Multi Disciplinary Project Unit. | Completed by 3 rd month |

CHAPTER - 4.1

| Stage | Activity Type | Key Activities | Timelog |
|-------|--------------------------------------|---|-----------------------|
| | | <ul style="list-style-type: none"> The location of demonstration plots to be identified and consultations with the EE, WRO and the concerned WUAs on the prospects of assured delivery of water to the proposed area are to be ascertained. The Sub-Basin development plan and the cost estimate will then be forwarded to the World Bank and clearance obtained by MDPU. Agriculture Department has to prepare detailed technical designs and cost estimates. The Sub-basin plan will be presented at MDPU through a well designed power point presentation (with assistants of maps, Google Earth, etc) and comments solicited. The final Sub-basin plan shall be agreed with the stakeholders, line department HODs, MDPU and forwarded for clearance by the project steering committee (through MDPU). After clearance by PSC and the World Bank, the concerned District JDA shall arrange for any required modifications (if any) as part of clearance. | |
| | Memorandum of Understanding | <ul style="list-style-type: none"> In connection with laying of Demonstrations, the JDA shall discuss in details with WUAs and fix the fields and type of Demonstrations. | 4 th month |
| | Procurement and financial management | <ul style="list-style-type: none"> The District JDA will initiate procurement activities with appropriate packaging and cost estimates following Bank Procurement Processes followed as outlined in project documents. The District JDA will submit the procurement documents and cost estimates to the Empowered Committee through DOA for clearance. Once the empowered committee clears, the DOA with the support of the project cell in his office shall take appropriate action for preparation of bid documents as per procurement guidelines of the bank and contracts concluded in line with the procurement plans approved. After signing of the Agreement by the contractor, the District Collector will be informed to monitor the implementation through the District Level Coordination Committee. MDPU will examine the work / supply plans received of line agencies on the ongoing packages and for the next years budget requirements and forward the budget demands to the finance department for inclusion in the state annual budget. | 2 nd month |
| | | <ul style="list-style-type: none"> The JDA will report to the HODs, District level Coordination Committee and to MDPU on the physical and financial progress periodically. The District Collector shall review implementation convening meeting often and resolve the issues. The JDA should ensure that the works are completed as per time schedule agreed in the contract with the suppliers as well as in the approved procurement plan. Simultaneously the JDA shall take up macro level impact caused by these demonstrations with frequent WUAs meetings and document them for perusal by the monitoring and evaluation consultant to be employed by the Multi Disciplinary Project Unit. The accounts section of the DOA office should get the accounts reconciled periodically with AG and arrange to file reimbursement of claims promptly and follow it up till reimbursement communication from the World Bank as well as from the Government of India is received. | |

| Stage | Activity Type | Key Activities | Timing |
|---------------------|-----------------------------|--|---|
| | Implementation Management | <ul style="list-style-type: none"> Quality Management procedures applied (of implementation by department and stakeholders) Final completion report. | 1 st to 12 th month |
| Post Implementation | Documentation & Evaluation | <ul style="list-style-type: none"> The District JDA as Nodal Officer of the Sub-Basin committee, with the support of Monitoring and Evaluation Consultant, helps develop a Sub-Basin ICR (integrated across all line department activities) and contribute to project monitoring and evaluation. The District JDA should note that the Sub-Basin atlas and Sub-Basin plans are to be revised every year. | 1 st to 12 th month |
| | Sustainability & Scaling-UP | <ul style="list-style-type: none"> The JDA shall submit to the Director of Agriculture (who will forward to MDPU) suggestions to develop suitable plan for sustainability of project activities in the Sub-Basin. | 1 st to 12 th month |

Chapter - 4.2

Agricultural Department

Detailed Mapping of Activities

1. Objectives

- Diversification to high value and water efficient crops
- Transfer of technology from lab to farm
- Popularization and distribution of critical inputs in time for increased productivity and eco development
- Increased efficiency in farm operations and drudgery reduction
- Sustainable development of Agriculture

2. Sub-basin level

2.1. Planning

a. Structure

- The HOD to identify the Nodal officer and Implementing Officer for preparation and implementation of the Project.
- In the District level, the Joint Director of Agriculture is the Nodal officer / Procurement officer of the Project in the Sub-Basin

b. Baseline Assessment

- Identified Nodal officer has to associate with the Executive Engineer WRO / principal coordinator of the Sub-Basin in the first week of April every year and collect the following data of the Sub-Basin.
 - Water availability,
 - Existing irrigation potential
 - Macro level status of water distribution practiced,
 - Total irrigation command area in the Sub-Basin
 - Average irrigated area,
 - The gap area with reasons for the gap area and
 - The date for a meeting with the stakeholders etc

- Meanwhile he will also collect the data on rainfall, existing agriculture practices, technologies adopted, varieties grown, yield, productivity, cost of cultivation, market potential, rate of produces, **current cropping pattern**, Practices, Issues, paddy and prospects of diversification and the crop water requirement for the Sub-basin in consultation with the CEIWS
- He will then propose **new cropping pattern suitable to the agro-climatic** zone in which the Sub-Basin falls and request WRO EE to work out the crop water requirement

c. Preliminary stakeholders' consultations

- He will participate in the **multiple stakeholders meetings** at Sub-Basin, village and tank levels convened by the Executive Engineer WRO in the month of April- May-June and share the views of the stakeholders on
 - the prevailing conditions in the Sub-Basin on irrigation infrastructure,
 - Rainfall pattern, seasons.
 - the support they receive from the Agriculture Department for adoption of technologies
 - The cropping pattern (and the reasons for it), availability of inputs in time especially seeds, soil types, labour availability, farm implements, machineries and sprayers availability.
 - the inputs recommended by the Extension officers and
 - Their experience in following their recommendations.
 - Important issues
 - Counter measure expected
 - Technologies adopted crops and varieties grown, duration of the crops, yield details, cost of cultivation, marketing details, cost of produces etc.
- He will also appraise the WUA meetings the macro level details he had worked out and interact with them and assess their needs / counter measures for the issues discussed etc.
- In the multiple stakeholders meeting a date for Joint walk through survey will be decided (preferably completed by the first week of June) to assess the status of irrigation infrastructure and allied agriculture practices/ technologies adopted, issues discussed and the possible interventions as required by the stakeholders. (the joint walk through and meetings as a random sample should cover at least 30% of the Sub-Basin spread out equally)
- He will participate in the joint walk through and assess the true picture, of all points, issues and outcomes of the earlier meetings and again interact with the stakeholders which consists of the formal/in-formal WUAS and get the feed back on issues, their needs that the agriculture department to design on the supports to be given on extension activities

- Based on the field visit, issues and the needs / counter measures expressed by the stakeholders and on the basis of water potential in the sub-Basin [as discussed with the Executive Engineer WRO] strategy on the introduction of new technologies for increasing crop area, productivity and the possible diversification to high profit less water intensive crops and crops suited to gap areas can be prepared.
- Such Sub-basin plan will be iterated based on Consultation with the Agri-Marketing, AED, TNAU and Horticulture officers in the Sub-basin in the last week of June to propose suitable marketable crops that will be agreeable to the farmers in the Sub-Basin.
- The above Sub-Basin plan developed will then be sent to the HODs by Second week of September for their perusal and suggestions and also to the **District Co-ordination Committee** (see vide the chapter under District co-ordination committee for more details on its role) and the agreed plans to be sent to the MDPU by HOD for scrutiny and modification
- The HODs will place the development plans with cost estimates before Project Steering Committee through MDPU before the last week of October and obtain Administrative Sanction
- This iterative process will go on till a finalised acceptable Sub-Basin Development plan along with the required training needs both for officers and WUAs is developed with cost estimates and sent to the MDPU for clearance by the Steering Committee by last week of September
- Once the steering committee approves the plan, the JDA and the field level officers of line departments will recheck the estimates prepared by them already for any final refinements and send to **Sub-Basin committee**
- Once the **Sub-Basin committee** clears the proposal the JDA shall send the plans to HODs with a copy to Executive Engineer WRO in the basin and
- The HODs after scrutiny shall forward to MDPU by first week of October
- The Sub-Basin development plan and the cost estimate will then be forwarded to the World Bank and clearance obtained by MDPU by the Second week of October

3. Sub Basin Development Plan

3.1. Capacity Building

- Based on the designs, the Sub-Basin nodal officer shall identify the immediate capacity building needs and organize such small trainings/awareness campaigns. The training shall include
 - The identification of appropriate cropping pattern and inputs requirements.
 - Technologies

- Identification of Farmers for awareness visits
- Formation of Farmers Interest Group
- Identification of trainer from stakeholders
- The requirement of IPM/TNM applications
- Organic farming
- Large scale demonstrations

3.2. Zone of Influence

- Demonstration and beyond -to ensure achievement of the above proposed cropping pattern Tank/Anicut wise number of demonstrations and the input needed are to be worked out.
- The location of demonstration plots are to be identified in consultation with the WUAs on the prospects of assured delivery of water to the proposed area are to be ascertained
- The District JDA should lead these activities and consultations and guide the Sub-Basin nodal officers in the preparation and implementation of Sub-Basin development plans

4. Suggested Components

- The nature, type & crop diversification and alternate cropping strategies
 - Integrated management of soil, water, pest and diseases
 - Enhancing the technical skill and decision making capacity of officers and farmers.
 - Educating the farmers on the usefulness of Agricultural Information System Net Work
 - Exposure visit : Inter-state and inter- districts to farmers and officers
- The Sub-Basin plan shall consist of
- Finalized Sub-Basin atlas
 - Summary of consultations
 - Summary of Technical Analysis
 - Proposed Hardware and software activities as part of Sub-basin plan with costing, farmers participation and sharing and implementation arrangements
 - Economic analysis
 - Environmental and social management plans specifically to be addressed in the Sub-Basin
 - Proposed schedule of activities etc

- Draw an annual work plan with details of budget provision needed and send to MDPU which will forward to Finance Department by the second week of November

5. Pre Implementation

5.1. Communication from HOD

- The Directorate has to get necessary Government Orders / Administrative Sanction for the following and communicated to the Districts.
 - a. The proposed sub basin activities under the project should be in tune with the State or Centrally sponsored scheme norms. The Head quarters IAMWARM Project Cell has to scrutinize the sub basin proposals in consultation with the Director of Agriculture and give clearance to the districts. For the development components of activities which are not in tune with the State or centrally sponsored scheme norms, the Directorate should get necessary Government orders for the same and communicate to the districts for implementation.
 - b. Budget and work plan for IAMWARM Project for the year.
 - c. Government order for IAMWARM Project.
 - d. Administrative sanction for IAMWARM Project.
 - e. Project Operation Manual.
 - f. Government Order for the outsourcing of staff required for district and sub basin.
 - g. Government Order for the additional infrastructure for district and sub basin.
 - h. Sub Basinwise approved procurement plan for the year.
- Positioning of additional staff if required in different levels (Head quarters, District, Sub basin) by HOD

5.2. Orientation

- One day State level interactive work shop and orientation to the field staff, WUA, traders, Manufactures / processors, concerned with all Line departments by HOD.
- HODs meeting with district JDAs / Nodal officers regarding implementation of the project for the year.
- District JDA/ Nodal officers meeting with the District Collector for appraisal about the project.
- District Joint Directors of Agriculture meeting with the sub basin Nodal officers and WUA about the project plan and implementation.

5.3. Need assessment and organizing the inputs

- Check with the sub basin procurement plan and assess once again the correct inputs - Physical and financial requirements, component wise by detailed discussion with the Sub Basin Nodal officers and the ADAs concerned.

5.4. Publicity

- District Joint Directors of Agriculture to finalize the type of publicity activities needed for successful implementation of the project, in discussion with the sub basin implementation officers and WUA.
- Doing publicity activities as finalized - by the sub basin Nodal officers and other implementing officers of the sub basin.

5.5. Training

- District Joint Directors of Agriculture to finalize the training needs including the specialized trainings of the implementation officers and WUA by detailed discussion with the implementation officers and WUA.
- One day training of sub basin Nodal officers and other implementing officers on various technologies, procurement procedures etc. as finalized earlier by Joint Directors of Agriculture.
- One day training to sub basin WUA / Farmers on varies components of activities, transfer of technology etc. as planned by sub basin Nodal officers and other implementing officers. The training may be organized in the demonstration field itself covering both skilled and unskilled practices.
- One day State Level interactive Workshop and orientation to the field staff, WUA, traders, manufacturers / Processors concerned with all Line Departments by HOD.
- One day Sub basin Level interactive Workshop and orientation to the field staff, WUA, traders, manufacturers / Processors concerned with all Line Departments by District Joint Director of Agriculture.

6. Procurement of Inputs and Equipments

- Sub basinwise, packagewise finalization of items, cost and supply points including AECs, etc. based on the procurement plan.
- Preparation of bid documents for ICB, NCB, Force Account etc. as the case may be, clearly indicating the date of invitation of bid with time, bid opening date with time, evaluation, finalization, issue of supply order, commencement of supply, delivery points etc.

- Ensure that the full World Bank norms have been followed in each step of preparation of bid document.
- Ensure that the items, date of supply to the destination and the firms by which the items have to be supplied etc. have been informed to the AECs, or WUA etc. by duly marking the supply order copy to the concerned.
- For quality, quantity and date of supply, necessary certificate with stock book entry details from the concerned AEC or WUA has to be obtained by the JDA before making payment to the firms concerned.
- For the item of inputs which are to be procured as per the Force Account procedure, it is to be ensured, that the items are actually produced, manufactured, cultivated by the Agriculture Department.
- For the inputs to be procured as per Force Account procedure from the Agriculture Department (AEC production unit, State Seeds farms etc.) such units or centers or SSFs, to be strengthened well in advance by providing additional funds and staff etc. anticipating the additional production for the project over and above the normal production each year.
- Assess the full production capacity of such departmental units, so that other procurement methods/ procedures could also be adopted for the additional quantity required over and above the capacity of such units, so that timely inputs supply could be ensured for the successful implementation of project.
- While preparing the bid document, the full quantity of inputs required for the whole year covering all the seasons / requirement of the sub basin may be indicated with clear supply date well before the commencement of each season. So that quality inputs / seeds to be supplied to the farmers well in time.
- HOD to review often the progress of procurement work done by the District JDA/Nodal officers.

7. Implementation

7.1. Execution

- Once the estimates receive Administrative Sanction, The field implementing officer will prepare the detailed drawings showing the field numbers where the demonstrations are proposed and the type of demonstrations planned
- Identification of sub basinwise, tankwise farmers, clustering of farmers based on activities, size of holding and fields in which componentwise project activities to be implemented by sub basin Nodal Officers and other implementing officers of the sub basin.

- According to the delegation of powers, the district Nodal officer shall arrange for Technical sanction of the estimate
- The technically sanctioned estimate will then be perused by the Procurement officer designated in the Sub-Basin, who will be trained either at the Sub-Basin or at Chennai, and initiate the procurement process (For details Refer Procurement Chapter)
- The Nodal officer in the Sub-Basin shall identify the personnel to be trained on extension and procurement activities and arrange imparting trainings to them through recognized Training Institutes as approved by the HODs
- Necessary agencies for supply of inputs will then be finalised according to the powers delegated to the procurement officers

7.2 The mobilization of inputs may be organized as per the model given below:

| <i>Season</i> | <i>Period in which inputs to be mobilized</i> | <i>Remarks</i> |
|--|---|---|
| 1 st season (Samba) June July | April May | Discuss with the WRO regarding the exact date of water release and mobilize inputs accordingly. |
| 2 nd season (Navarai) January February | November-December | Discuss with the WRO regarding the exact date of water released and mobilize inputs accordingly |
| 3 rd season (Sornawary) April May | February March | Discuss with the WRO regarding the exact date of water released and mobilize inputs accordingly |

- The JDA/ district Procurement officer will issue supply orders for the supply of Inputs (seeds, MN Mixture, Bio-fertilizers, Bio- pesticides, farm implements and machineries etc) required to the implementing officer to carry out the identified demonstration in the selected field at the right season (vide Annexure - for more details)

7.3. Important Steps for successful diversification of crops

- As a first step, the issue may be discussed in detail by the JDA with the concerned Sub Basin field staff during the **monthly zonal workshop** and fix a suitable date for village campaign(Jamwarm Day), villages to be covered, crops to be diverted, new varieties to be introduced etc.
- Accordingly inform farmers, local Line Department officials, WRO, Local TNAU scientists, local traders etc. about the village campaigns.
- Distribute pamphlets, handouts, and booklets about the potentiality of the crops. Display photos, live specimens of the crop, use all possible publicity activities in the campaign to educate the participants.
- Explain about the potentiality of the new crop to be introduced - such as higher yield, lesser cost of cultivation, lesser water requirement, duration of the crop, market potentials, number of by products to be made, probable extra income etc.
- Ensure that only less water more profit crops are introduced in the place of more water less profit crops as finalized early.
- Request the innovative farmers who have already grown such crops to share their experience with the fellow farmers, so that the participating farmers could easily convinced about the potentiality of the crop and income.
- Involve the local TNAU scientists to share their technical knowledge on cultivation of the crop with the farmers, so that all steps of package of practices or cultivation methods could be well understood by the farmers.
- Similarly create an opportunity to the local traders and produces / manufactures concerned to explain about the market potential, price that they could be offered for the produce etc., so that the farmers could convince themselves in cultivation of the desired crops.
- Let the WRO explain about the time of water release, quantity and duration of water release etc., so that farmers get confidence about the assured water for the entire crop period.
- Let the local engineers of the AED explain about the services that could be offered to this crop (for eg. Drip, drip and fertigation depends upon the nature of crop) so that farmers will be getting additional interest to take up the crop in the current season itself using lesser water.
- The representatives of the Agriculture Marketing and Agribusiness Department may also explain about the market potential for the crops at local markets, out side the districts, procurement facilities offered, transport, drying and storage facilities available, value addition possibilities, E kiosk services etc., so that the potentiality of the crop including the extra income could deeply

registered in the minds of the farmers, which will ultimately reflect in easy coverage of the crops in larger areas, besides having multiplier effect in the nearby area.



- Keep the seeds and other inputs required readily in the AECs for distribution. If possible arrange distribution in the concerned village itself to the farmers or through WUA.
- Sub basin nodal officer and other implementing staff of the sub basin should ensure the coverage of gap area in as per the cropping pattern and as discussed with WRO and finalized early.

7.4. Important steps for successful gap area coverage (Likely to be in the end of First or Second year in the Sub-Basin)

- Similar to the issue of the diversification and completely linked with it, the issue of gap area coverage in the Ayacut area also to be discussed by the JDA in the monthly zonal meeting as a first step.
- Discuss with WRO in detail about the date of release of water, period of release of water, number of days in which the water will reach in tail end approximate period of continuous availability of water to the tail end in the sub basin etc.
- Depends up on the length of availability of water to the tail end and the total area that could be covered, the crop / variety may be suggested for gap area sowing / coverage. If the water availability is shorter period only, **irrigated pulses of 70 -75 days duration** may be suggested for the gap area. If water availability is for about 3 months, **irrigated groundnut or irrigated millets** may be recommended for the gap area. If the water availability is more than 90 days in the gap area, **maize, millets, etc** may be recommended based on WUA choice. These crops could be supplemented by well irrigation if available, depending on necessity. In the case of non availability of water for the tail end in the sub basin, **rainfed millets; groundnut** could be recommended in anticipating rain, instead of keeping the area fallow.
- As per the availability of water to the gap area, desired seeds and other inputs may be mobilized and stocked in the AEC for timely distribution to the farmers.
- The existing gap area in which wells are there, the **medium duration irrigated Groundnut** could be recommended with confidence, so that last one or two irrigation could be given through wells.
- If the WRO expresses inability to supply water for the tail end of the sub basin for a particular season / period, **short duration rainfed millets, rainfed groundnut** may be recommended.

- Farmers may be educated through publicity, village meeting, village campaigns, WUA meetings etc. about the irrigated crops to be taken up in the gap area depends upon the water availability or rainfed crops to be taken up in the case of non availability of water.
- Farmers must be educated and convinced that the gap area of the ayacut should not be left as fallow without any crop. Some crops whether fully irrigated or partially irrigated or partially substituted with well water or / pure rainfed crops including fodder crops could be taken up .
- Frequent interaction with the WRO by the JDA and other implementing officers of the sub basin is a must to decide the suitable crop for the gap area. Because for most seasons, the availability of water to the gap area could be predicted only in the last movement by the WRO. Accordingly, the crop seeds to be mobilized quickly.
- The sub basin Nodal officers and other implementing staff of the sub basin should ensure that the full package of practices is adopted step by step for all the developmental components of activities proposed for the sub basins.

7.5. The Developmental Component Activities

- The sub basin Nodal officers and other implementing staff of the sub basin should interact at least once in a week possibly in the respective demo site itself with the WUA/ farmers and see that the execution of all activities carried out with out any deviation.
- The sub basin Nodal officers and other implementing staff of the sub basin should co-ordinate with other Line Department field officers and see that their inputs and services are best utilized to carry out each and every operation. (e.g.) Installation of drip and fertigation equipments for sugarcane and coconut by AED Department.
- Demonstrations should be in large scale (i.e.) at least 10 ha, in contiguous areas with some in road sides for easy mobilization of inputs and arranging field days and exposure visits

7.6. Important steps for arranging Field Days / Farmers Meet (IAMWARM DAY)

7.6.1.Common Farmers Meet / Field Days

- Preferably, common date for Farmers Meet / Field Days may be fixed by the sub basin implementing officers, after consulting all the line Department officers, WRO etc., so that all officers concerned could meet on the **same date** in the sub basin which may be called as **IAMWARM DAY** so that the respective issues, points, services, technologies, practices could be discussed with the sub basin farmers in the **same day** instead of each line department fixing

different date for the same purpose and inviting other line departments to participate which may not workout and serve the purpose.

- Involve WUA/ farmers, Officers, including Line Department Officers, TNAU Scientist, WRO, Traders, District Collector, and Local People's Representative like MP, MLA, Panchayat Presidents, Community Leaders, Local School Children, Teachers and Other VIP in the Sub basin.
- The Sub Basin Nodal officer should create an opportunity to exchange views, sharing the experience, clarifying doubt, interaction with the stakeholder / farmer by the participants. Nodal officer should also explain the technologies adopted, reasons for the better performance of crops etc., so that participants could be convinced and adopt in their fields, besides convincing the other fellow farmers. This will reflect in multiplier effect. The sub basin Nodal officers should arrange at least 4 to 5 such field meetings so that rapid TOT could be made easy.
- The date and time for Field Days to be informed well in advance to all the targeted group of participants.
- Record the stage of crop, outcome of the particular technology, views of the participants etc. in the presence of the participants. This could be printed and issued for educating other farmers for adoption. If possible, the Field Day activities may be covered with photos and video.
- Maintain register of participants in each Field Day for different field operation of the same field.

7.6.2. The tentative model activity chart for the major crops to conduct Farmers Meet and Field Days:

At least 3 - 4 Farmers Meet (FM) may be arranged for each major crop depends up on the duration of the crop, during critical stages of the crops or field operations. The date, time and location of the Farmers Meet may be fixed in consultation with WRO, Line departments and communicate the same to the concerned well in advance for effective participation.

➤ 1st Farmers Meet

It should be just before the commencement of each season, to decide the crop / variety to be taken up based on season, cropping pattern, water availability, agro climatic suitability, market potential, productivity, profitability and income etc.

➤ 2nd Farmers Meet

This meet may be during the sowing / planting periods, or on important agronomic / cultural practices, field operation periods or during application of critical inputs etc

➤ **3rd Farmers Meet**

This meet may be one month before the harvest or during the important cultural or agronomic practices or application of critical inputs or during adoption of any important technologies or operations.

➤ **4th Farmers Meet**

➤ This meet may be conducted preferably near harvest day, so that the performance of crop (yield) and the effects of technologies adopted could be well understood by the farmers. Market potential, rate of the produce, value addition possibility, probable income etc. could be discussed and explained to the farmers and other participants by the Line Department staff, scientists, traders, manufactures and produces etc. so that it may induce the participant farmers to take up the crop again and again. In this meet, next season crops and practices could also be discussed to create interest and confidence among the farmers to take up the next season crop.

8. Model activity chart for the major crops of the sub basin (for 1st season crops)

| Stage of the crop | Paddy | Sugarcane | Maize | Pulses | Remarks |
|---|-------------------|-------------------|-------------------|-------------------|---|
| Before sowing / planting | FM- 1 May/June | FM- 1 Nov-Dec | FM- 1 May/June | FM- 1 July-Aug | Sub basin implementing officers should fix the correct date based on ground reality in consultation with line departments and WRO |
| Sowing / growing / critical operations / adoption of important technologies | FM- 2 June Aug | FM- 2 Dec/Jan | FM- 2 Jun/July | - | |
| Growing / critical operations / adoption of important technologies | FM-3 Aug Sept | FM-3 Mar - Aug | FM-3 July- Aug | FM-2 Aug-Sept | |
| Maturing / harvest stage | FM-4 Oct- Dec | FM-4 Sept- Oct | FM-4 Aug-Sept | FM-3 Sept | |

FM- Farmers Meet

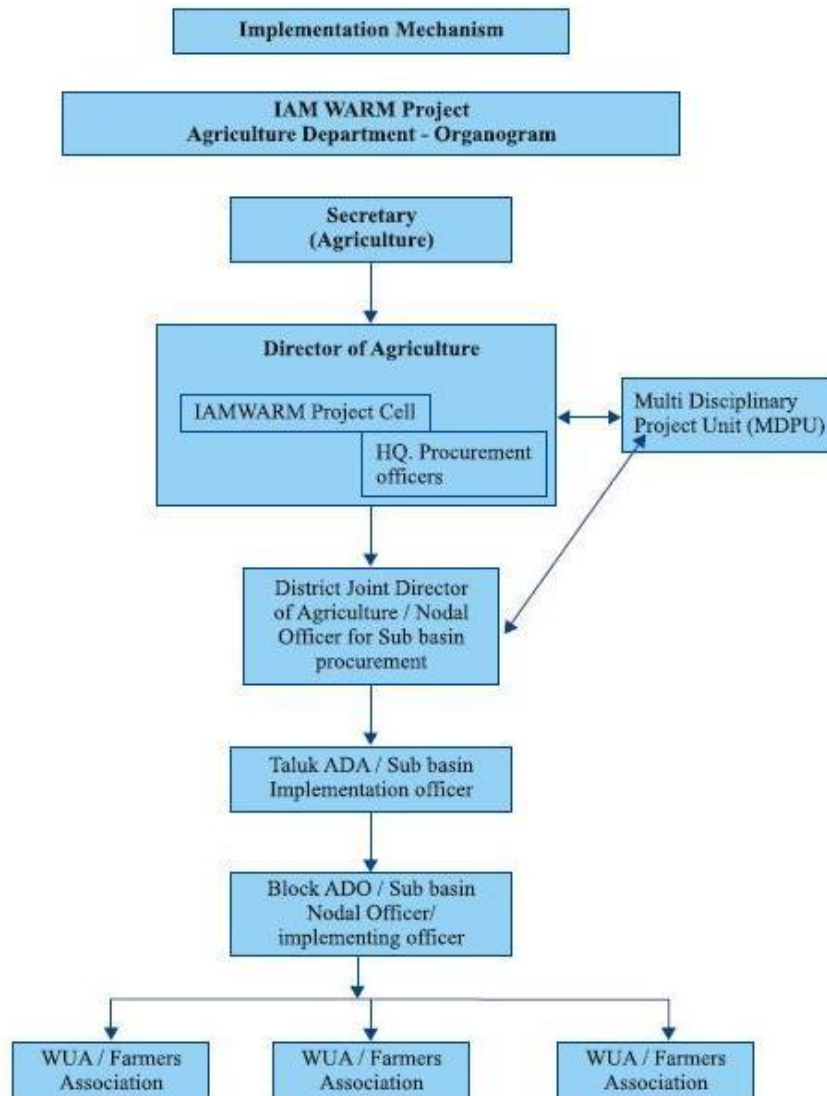
Note: For the 2 & 3 season crops, similar activity charts may be prepared by the respective sub basin implementation staff based on ground realities for easy adoption and necessary follow up

9. Feedback and Reporting

- After each Farmers Meet / Field Days, necessary feedback about the outcome of the meet, cropwise, activitywise is a must to the HOD and MDPU for perusal and guidance. Hence it is the responsibility of the JDA concerned to give timely feed back.
- The implementing officer, with reference to the sanctioned estimate, shall arrange demonstration in the selected field, preferably near road sides WUAs wise and tankwise by mobilizing the neighboring farmers to join the demonstrations and reap the benefits of such demonstrations to help replications in their fields
- The implementing officer will report to the HODs, Executive Engineer WRO, District Level Co-ordination Committee and to MDPU on the Physical and Financial progress periodically as prescribed (Monthly, Quarterly, Semester) and shall inform the bottlenecks experienced during implementation
- The District Collector shall review implementation convening monthly/ Emergent Meetings and resolve the issues
- The implementing officer should ensure that the works are completed as per time schedule agreed in the contract with the suppliers as well as in the approved procurement plan
- The implementing officer shall arrange monthly zonal workshops and field days to ensure that the farmers follow the extension advices promptly and to advise any mid course corrections along with the EE WRO and other departments' field officers
- Simultaneously, the implementing officer shall take up a macro level impact caused by these demonstrations with frequent WUAs meetings and document them for perusal by the Monitoring and Evaluation Consultant to be employed by the MDPU as given below.
 - The area shifted to diversified crop
 - The extent of adoption of INM, IPM, and organic farming practices
 - The increase in productivity of the crops and the consequent additional agriculture income to the farmers in the Sub-Basin
 - The notable change in the Lifestyle of the farmers due to the developmental activities in the Sub-Basin
- With the reports received from the field officers the Project cell in the HODs office shall prepare a comprehensive report and send to MDPU which will consolidate all such reports from all the Sub-Basins and in consultation with the Monitoring and Evaluation Consultant shall forward to Government and to World Bank

10. Expected Outcome Indicators

- 10 to 20 % shift from paddy to other commercial crops.
- 30 to 40% adoption of INM and IPM practices.
- 10 to 20 % increase in productivity.
- 10 to 20 % increase in farm income.



Chapter - 5.1

Operational Manual for Sub-basin Activities

Horticulture and Plantation Crops Department - Framework of Activities

| Stage | Activity Type | Key Activities | Timelog |
|--------------|--------------------------------------|---|----------------------|
| | Official Communication | <ul style="list-style-type: none"> Commissioner of Horticulture & Plantation Crops to identify the Assistant Directors of Horticulture for 63 Sub-basins as Nodal Officer to facilitate, monitor the project with line departments | 1 st week |
| Pre-Planning | Information Collection | <ul style="list-style-type: none"> ADH will collect data on cropping pattern and cultivation packages in the Sub-Basin in electronic form where possible to MDPU for collation into an initial Sub-basin Atlas. | |
| | Preliminary stakeholder consultation | <ul style="list-style-type: none"> ADH to participate in the Sub-basin Committee meetings by EE, WRO with line depts., "ATMA" in the Sub-basin, PIM, Training and environment/Social Cells of Water Resources Organisation ADH will join an "IAMWARM Day" in the Sub-Basin to initiate discussions with Sub-Basin stakeholder | |



TRAINING ON HITECH CULTIVATION



CHAPTER - 5.1

| Stage | Activity Type | Key Activities | Timing |
|---------------------|---|---|--------|
| Planning | Training | <ul style="list-style-type: none"> The ADH to identify capacity-building needs (technical, administrative, other) in the Sub-Basin and organize such training. | |
| | Stakeholder Discussions & Analysis | <ul style="list-style-type: none"> Based on technical analysis & effective stakeholder communication, identify key hardware (construction) and software (capacity-building/training) options (all key options should be considered including a no-activity option). | |
| | Sub-basin plan | <ul style="list-style-type: none"> Develop Draft Sub-basin Plan, discuss with stakeholders, line agencies and MDPU of cultivation packages, suitable crop diversification and possibility of the mechanization of farming in the Sub-Basin areas and demonstration on new crop technologies | |
| | Memorandum of Understanding | <ul style="list-style-type: none"> ADH will develop draft MOU (based on model to be supplied by MDPU) | |
| Implementation | Procurement and Financial Management | <ul style="list-style-type: none"> The Regional JDH/DDH will initiate procurement activities with appropriate packaging and cost estimate as per Bank procurement processes followed as outlined in project documents <p>IAMWARM Cell and Procurement cell</p> <ul style="list-style-type: none"> To scrutinize contract documents and evaluation reports from JDH/DDHs before sending to Tender Award Committee After approval of bid document/evaluation - reports with minutes of tender award committee to be sent to MDPU for onward transmission to world bank for their clearance Once the NOC is received from the bank through MDPU, JDH/DDHs with ADH will finalize agreements and commence the works according to the procurement plans which will be monitored by this cell Budget unit of cell shall arrange necessary funds to be issued to concerned ADHs through JDH/DDHs. Annual budget plans on budget allocation needed as RE for current year and BE for the next year will be compiled and sent to the Project Director. PD will send them to finance department by November middle of every year | |
| | Training/ Capacity-Building Implementation Management | <p>TRAINING CELL :</p> <ul style="list-style-type: none"> To develop suitable modules for training in & outside of state (CAPACITY BUILDING) for officers of DOHPC, stakeholders. Also, frequent field-days involving stake-holders & line depts. will be devised & conducted. | |
| Post-Implementation | Documentation & Evaluation | <ul style="list-style-type: none"> JDH/DDH is the nodal officer of the Sub-Basin committee He will develop a Sub-Basin (Implementation Completion Report) ICR with the help of Monitoring and Evaluation Consultant & line depts. and contribute to project M & Evaluation. | |
| | Sustainability & Scaling-Up | <ul style="list-style-type: none"> The ADH shall submit suggestions to develop an O&M Plan through JDH/DDH to MDPU for sustainability in the Sub-Basin Development activities. | |

ADH: Assistant Director of Horticulture DDH: Deputy Director of Horticulture JDH: Joint Director of Horticulture CHPC: Commissioner of Horticulture & Plantation Crops DOHPC: Depts. of Horticulture & Plantation Crops

Chapter - 5.2

Horticulture and Plantation Crops Department Detailed Mapping of Activities

1. Objectives

- Diversification to high yielding and water efficient crops adopting new technologies by farmers
- Facilitating production of market driven crops through diversification
- Popularizing the hybrid varieties in vegetables, fruit crops, spices etc. for better returns
- Sustaining soil health by promotion of INM/IPM
- Promoting organic farming

2. Sub Basin Level

2.1. Planning

a. Structure

- The HOD to identify the Nodal officer and Implementing Officer for preparation and implementation of the Project in the 63 Sub-Basins.
- In the District Assistant Director of Horticulture is the Nodal officer and Procurement officer of the Project for a Sub-Basin or a cluster of sub basins
- The Nodal officer shall then identify the implementing officers of each Sub-Basin (Horticulture officer or the Assistant Agriculture officer of the concerned Block in the Sub-Basin)

b. Baseline Assessment

- The identified implementing officer to associate with the Executive Engineer WRO of the Sub-Basin who is the Principal Co-coordinator in the month of April-May every year and collect data on the:
 - Existing area of different horticulture crops
 - Soil maps, fertilizers and pesticides used by farmers
 - Sub-basin details on Hydrology,
 - Water availability,

- Macro level status of water distribution practiced,
 - Total irrigation command area in the Sub-Basin, average irrigated area, and the gap area with reasons for the gap area
 - The meteorological data
 - and the date for a meeting with the stakeholders etc
- Meanwhile he will also collate the data on current cropping pattern available in his department and the crop water requirement for the Sub-basin in consultation with the CE IWS WRO
- He will work with MDPU to prepare a power point presentation on the Sub-Basin status including initial identification of key issues
- He will then propose new horticultural cropping pattern suitable to the agro-climatic zone in which the Sub-Basin falls and in line with the National Horticultural Mission targets and norms and request Executive Engineer WRO to work out the crop water requirement



Hybrid Tomato



Hybrid Chilli

- Focus crops specific to the Sub-basin are to be decided at macro level by the Agriculture, Horticulture, TNAU and Agri-Marketing officers in the meeting and a date for joint walk through survey will be fixed



Banana

3. Consultations

- ADH will participate in the multiple stakeholders meetings at Sub-Basin level, village and tank levels convened by the Executive Engineer WRO in the month of April-May and share the views of the stakeholders on
 - the prevailing conditions in the Sub-Basin on irrigation infrastructure,
 - on the support they receive from the Agriculture and Horticulture extension officers on the adoption of technologies
 - the cropping pattern and the horticultural crops raised in the sub basin and its extent
 - the inputs recommended by the Extension officers
 - And their experience in following their recommendations.
- ADH will assess in the forum the macro level details of demands of the stakeholders for introducing/increasing the extent for diversification to Horticulture crops
- In the meeting a date for Joint walk through survey will be decided (preferably completed by the first week of June) to assess the status of irrigation infrastructure and allied Horticultural practices adopted and the conditions of horticulture crop diversification and the possible interventions as required by the stakeholders. (the joint walk through and meetings as a random sample should cover at least 30% of the Sub-Basin spread out equally)
- ADH will participate in the joint walk through and assess the true picture, interact with the stakeholders which consists of the formal/in-formal WUAs and get the feed back on their needs that the Horticulture department to design on the supports to be given on extension activities such as
 - Possibility of revised cropping pattern
 - Addressing problems in cultivation packages
 - Ensuring better seeds, plants and
 - Immediate training needs /awareness campaigns / capacity building etc

4. Sub Basin Development Plan

- The ADH will identify the immediate trainings and capacity building and organize such trainings
- In the office, based on the field visit and the needs expressed by the stakeholders and on the basis of water potential in the Sub-Basin as discussed with the Executive Engineer WRO designs on the introduction of new technologies for increasing the horticultural crop area, introduction of Hybrid varieties of horticulture crops. Calendar of operations for increased productivity and the possible diversification to crops of less water intensive can be prepared.
- The above draft plan will be iterated based on Consultation with the Agri-Marketing and TNAU officers in the Sub-basin in the last week of June to propose suitable marketable crops that will be agreeable to the farmers in the Sub-Basin is to be made

5. Zone of Influence

- To ensure the above proposed cropping pattern tank/anicut wise is successful the number of demonstrations and the input needed are to be worked out in a similar manner and how the command area is going to be influenced to take up this diversified crops.
- The location of demonstration plots are to be identified and consultations with the EE, WRO and the concerned WUAs on the prospects of assured delivery of water to the proposed area are to be ascertained.
- The above sub basin plan developed will then be discussed in the Sub-Basin committee and sent to the HODs by 2nd week of September for their perusal and suggestions and also to the District Co-ordination Committee (vide for more details on the role of this committee in the Chapter on District Co-ordination Committee) and the agreed plans to be sent to the MDPU for scrutiny and modification.
- This iterative process will go on till a finalized acceptable Sub-Basin development plan along with the required training needs both for officers and WUAs is developed together with the approximate cost estimate and sent to the MDPU for clearance by the Steering Committee by last week of September.

- Once the steering committee approves the plan, the field level officers will prepare the final cost estimates and send to HODs with a copy to EE, WRO in the basin and to MDPU by 1st week of October
- The Sub-Basin development plan and the cost estimate will then be forwarded to the World Bank and clearance obtained by MDPU by the 2nd week of October .The Sub-Basin development plan will consist of
 - Finalized Sub-Basin atlas
 - Summary of consultations
 - Summary of Technical Analysis
 - Proposed Hardware and Software activities with costing and participation and sharing by farmers
 - Economic analysis
 - Draft MOU
- The HOD will place the plans before the Project Steering Committee, the estimates through MDPU before the last week of October and obtain Administrative Sanction and
- Draw an annual work plan with details of budget provision needed and send to MDPU which will be forwarded to Finance Department by the second week of November

6. Implementation

- Once the estimates received, to get Administrative Sanction the Sub-Basin nodal officer will prepare the detailed estimates with drawings showing the field numbers where the demonstrations are proposed and the type of demonstrations planned
- According to the delegation of powers the district Nodal Officer (ADH) shall arrange for Technical sanction of the estimate through Regional Officer (JDH/DDH)
- The Technically sanctioned estimate will then be perused by the Procurement officer designated in the Sub-Basin, who will be trained either at the Sub-Basin or at

Chennai, and initiate the procurement process for settling the agency for the execution by NCB or Shopping Procedure as the case may be in consultation with the State level Procurement officer in the Head office (vide chapter on Procurement for more details)

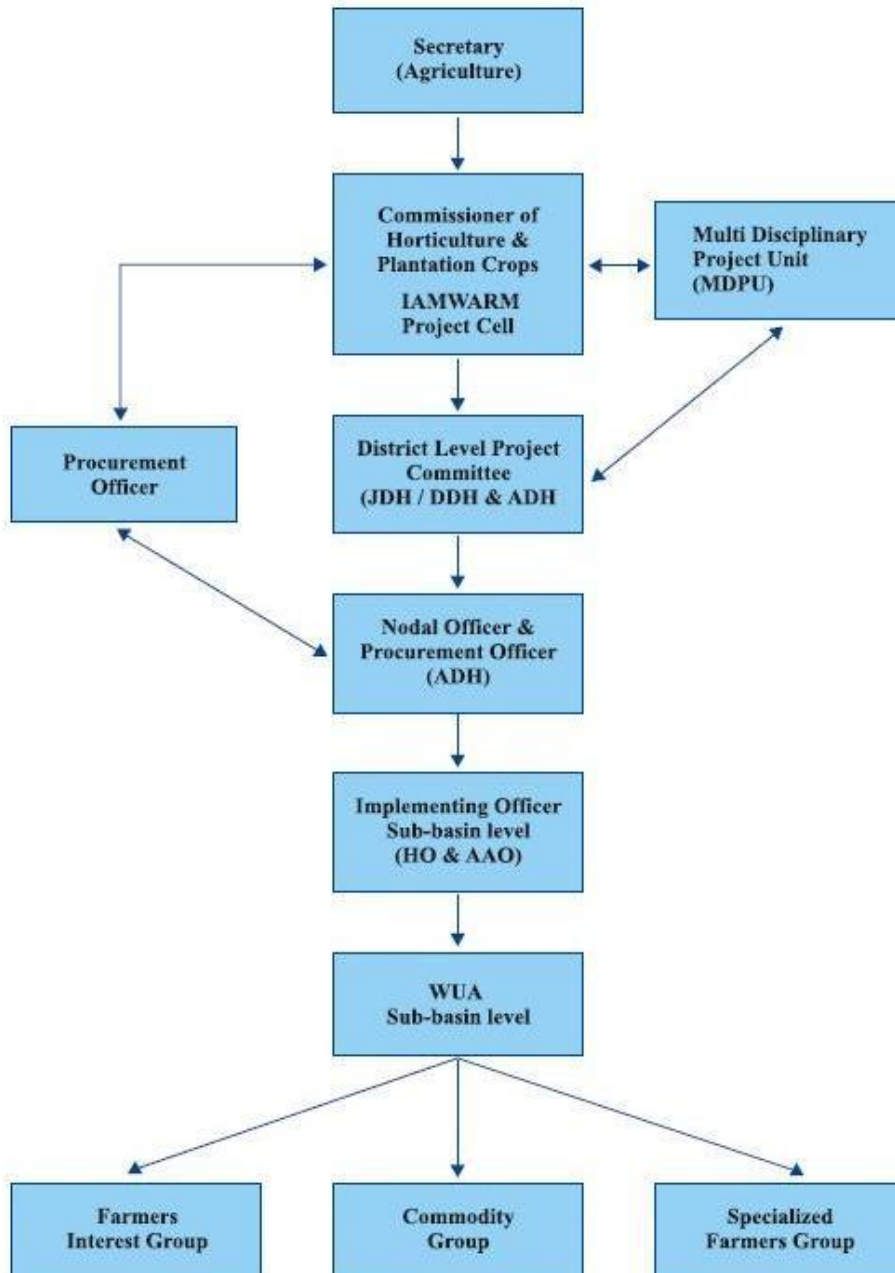
- The Nodal officer in the Sub-Basin shall identify the personnel to be trained on extension and procurement activities and arrange imparting trainings to them through recognized Training Institutes as approved by the HOD
- Necessary agencies for supply of inputs will then be finalized according to the powers delegated to the procurement officers
- The district Procurement officer will issue supply orders for the supply of Inputs (seeds, Hybrid seeds, Plants, MN Mixture, Bio-fertilizers, Bio- pesticides etc) required to the implementing officer to carry out the identified demonstration in the selected field at the right season
- District Assistant Directors of Horticulture to finalize the type of publicity activities needed for successful implementation of the project, in discussion with the sub basin implementation officers and WUA.
- Doing publicity activities as finalized - by the sub basin Nodal officers and other implementing officers of the sub basin. .
- One day sub basin level interactive workshop and orientation to the field staff, WUA, local traders, manufactures, producers concerned with all Line department by District Assistant Directors of Horticulture
- The ADH shall organize a Signing Ceremony to initiate project implementation by inviting Regional Officer(JDH/DDH) of DOHPC & Senior officers in the line departments and the District Collector
- The implementing officer shall with reference to the sanctioned estimate shall arrange demonstration in the selected field, preferably near road sides WUAs wise and tank wise by mobilizing the neighboring farmers to join the demonstrations and reap the benefits of such demonstrations to help replications in their fields

- The implementing officer will report to the HODs, Executive Engineer WRO, District Level Co-ordination Committee and to MDPU on the Physical and Financial progress periodically as prescribed (Monthly, Quarterly, Semester) and shall inform the bottlenecks experienced during implementation
- The District Collector shall review implementation convening Monthly/ Emergent Meetings and resolve the issues
- The implementing officer should ensure that the works are completed as per time schedule agreed in the contract with the suppliers as well as in the approved procurement plan
- Simultaneously the implementing officer shall take up a macro level impact caused by these demonstrations with frequent WUAs meetings and document them for perusal by the Monitoring and Evaluation Consultant to be employed by the MDPU

7. Outcome Indicators

- The extent of increase in the Horticulture crops
 - The area shifted to diversified crop
 - The extent of adoption of INM and IPM practices
 - The area in which the soil fertility has improved
 - The extent increased in Bio- fertilizer application
 - The increase in productivity of the crops and the consequent additional agriculture income in the Sub-Basin
 - The notable change in the Lifestyle of the farmers due to the developmental activities in the Sub-Basin
- With the reports received from the Nodal officers, the Project cell in the HODs office shall prepare a comprehensive report and send to MDPU which will consolidate all such reports from all the Sub-Basins and in consultation with the Monitoring and Evaluation Consultant shall forward to Government and to World Bank (see Annexure - 6 for general methods to be followed in reporting)

ORGANOGRAM IAMWARM (HORTICULTURE)



Chapter - 6.1 Operational Manual for Sub Basin Activities

Tamil Nadu Agricultural University - Framework of Activities

| Stage | Activity Type | Key Activities | Timing |
|--------------|--------------------------------------|---|---|
| Pre-Planning | Official Communication | <ul style="list-style-type: none"> The Vice Chancellor, Tamil Nadu Agricultural University has to identify the Nodal Officer at Head Quarters and the sub basin nodal officers to facilitate and monitor the project related activities in the Sub-Basin. The nodal officer will fix date for meeting with the sub basin nodal officer to highlight the priorities Sub basin nodal officers will attend the meeting of the sub basin committee formed across the line departments and take stock of priorities for the sub basin development | 1 st week |
| | Information Collection | <ul style="list-style-type: none"> The Scientists at sub basin level will coordinate with EE, WRO regarding collection of data on the current state of irrigation to MDPU for collation into an initial Sub-basin Atlas. The Nodal Officer, TNAU will work with MDPU to prepare a power point presentation on the Sub-basin (including initial identification of key issues and options) issues along with the sub basin nodal officer to have right feedback | Completed by 1 st month |
| | Preliminary stakeholder consultation | <ul style="list-style-type: none"> Scientists at sub basin level will attend the meeting convened by the EE, WRO (Sub-basin Committee meeting) with the officers of line departments and agencies like "ATMA" in the Sub-basin The Scientists will attend the "IAMWARM Day" convened by the Executive Engineer, WRO in appropriate locations in the Sub-Basin to initiate discussions with Sub-Basin stakeholder (including farmers, traders and reputed and responsible civil society /community in the Sub-basin. Fix the date and location for Joint Walkthrough(s) of the Sub-Basin based on discussions held The Scientist at the sub basin will attend the Joint Walkthrough surveys organized by the Executive Engineer, WRO along with other line departments and the local stakeholders to identify key issues and options by making suitable notations on the Sub-Basin atlas and other maps Develop a Sub-Basin Joint Walkthrough Report in consultation with other line agencies to give the preliminary impressions of the Sub-Basin and its needs. | Sub-basin committee meeting in 3 rd week Join Walk through Report by 5 th week |
| Planning | Training | <ul style="list-style-type: none"> The Nodal Officer (the Specialist for training) of TNAU in liaison with the Scientists of sub basin will identify immediate capacity-building needs (technical, administrative, other) among the Sub-Basin officials and organize such training. This training will include the identification of appropriate location for awareness creation / exposure visits The Scientists concerned will document this in a brief Training / Capacity Building Plan. For the line department personnel it is the single agency for capacity building on various agricultural technologies and its allied sciences and the Training specialist is to pool up the data in this regard. TNAU is the single and appropriate agency for imparting training to the line department personnel on agriculture and allied sectors and hence its services can be best utilised | |

| Stage | Activity Type | Key Activities | Timing |
|------------------------------------|------------------------------------|--|--------|
| | Stakeholder Discussions & Analysis | <ul style="list-style-type: none"> Based on sound technical analysis as well as effective stakeholder communication, identify key hardware (Adoption of new technology like Drip, Sprinkler, Farm machineries, Precision farming) and software (capacity-building/training) options (all key options should be considered including a no-activity option). Preliminary identification of sites for large scale demonstrations in consultation with stakeholders The Nodal Officer TNAU shall also associate in these activities of consultations and guide the Nodal officers / Scientists of the sub basin in preparing the Sub-Basin development plans and liaising with other departments' officials especially in selection of crops, input, and introduction technologies etc | |
| | Sub-basin Plan | <ul style="list-style-type: none"> Develop Draft Sub-basin Plan and discuss with stakeholders, line agencies (Department of agriculture, horticulture, agricultural engineering etc.) and MDPU The Draft Sub-basin Plan will then be placed before the Sub-basin sub committee constituted as per G.O. Ms No.212 PW (WR I) dated 1-11-2006 (vide Chapter on Sub-committee for the role of sub-committee) for the professional judgment and their formal clearance considering all multi-sectoral aspects. The minutes of the said meeting will have to be sent to the Collector, the HODs of Line Departments and the Project Director, MDPU. The draft Sub-Basin plan will be discussed at a Sub-basin Stakeholder workshop Submit the Sub-basin Plan to MDPU for appraisal from technical, environmental, social, and economic perspectives and modify as requested) The Sub-basin plan will be presented at MDPU through a well-designed power point presentation (with assistance of maps, Google Earth, etc.) and comments solicited. The Final Sub-basin Plan shall be agreed with the stakeholders, line department HODs, MDPU and forwarded for clearance by the Project Steering Committee (through MDPU). After clearance by PSC and the World Bank, the Nodal Officer at head quarters shall arrange for any required modifications (if any) as part of clearance. | |
| | Memorandum of Understanding | <ul style="list-style-type: none"> The Nodal Officer and Director WTC will develop draft MOU (based on model to be supplied by MDPU) for the project and mission mode activities. Separate MOU may be drawn for Paddy transplanter and the Agribusiness and Farm Advisory Cell The Nodal Officer, TNAU will organize a Signing Ceremony to initiate project implementation in the Sub-basin. | |
| Mechanism of Implementation | Establishment of Cells | <ul style="list-style-type: none"> Project implementation could be achieved through the following cells established with Tamil Nadu Agricultural University. They are Project Cell at Head Quarter of Tamil Nadu Agricultural University, Coimbatore with Director, Water Technology Centre as the Nodal Officer Project Cell at sub basin level headed by Professor and Head of Research Stations / KVKs Procurement Cell at Nodal Office of TNAU Agribusiness and Farm Advisory Cell will be functioning under the leadership of Vice Chancellor, TNAU which will give periodic information on Market Intelligence | |

| Stage | Activity Type | Key Activities | Timing |
|-----------------------|--------------------------------------|---|--------|
| | | <ul style="list-style-type: none"> Technical Advisory Committees (TAC) for imparting latest technologies in the areas of Agribusiness Management, SRI, Precision Farming, Farm Mechanization and Seed Production Coordination Committees at Head Quarters with the chairmanship of Vice Chancellor and the Regional Coordination Committees for different regions for easy monitoring and follow up | |
| Implementation | Procurement and Financial Management | <ul style="list-style-type: none"> The Nodal Officer, TNAU will initiate procurement activities with appropriate packaging and cost estimation following Bank procurement processes followed as outlined in project documents <ul style="list-style-type: none"> ✓ Works: bid documents prepared ✓ Goods: specifications developed ✓ Consultancy : if any required in respect of Agri- Business Development activity The Nodal Officer, TNAU will submit the procurement documents and cost estimates to the Empowered Committee for clearance. Once the empowered committee clears, The Nodal Officer, TNAU with the support of the staff of project cells in their offices shall take appropriate action In the case of post review contracts according to the powers delegated to the officers bid documents will be prepared and bids will be called for following the procurement guidelines of the bank and contracts concluded in line with the procurement plans approved At this stage the District Collectors will be informed to monitor the implementation through the District Level Co-ordination Committee, Regional Coordination Committee established in TNAU regional centers for that purpose MDPU will examine the work plans received from the TNAU and line agencies on the modifications required in the ongoing packages and for the next years budget requirements and forward the budget demands to the finance department for inclusion in the state annual budget <p>In addition, each of the cells mentioned below will facilitate smooth project implementation as indicated below:</p> <p>IAMWARM Project Cell and Procurement cell</p> <ul style="list-style-type: none"> This cell shall scrutinize the Sub-basin development plans, cost estimates with due clarifications obtained from the Technical Committees Concerned before forwarding to the MDPU for finalization The cell shall arrange to get the data on the performance indicators as in the PAD from the regional Chief Engineers and forward to MDPU <p>Agribusiness and Farm Advisory Cell</p> <ul style="list-style-type: none"> This cell through the Vice Chancellor, and Director, CARDS, TNAU shall predict the prices and demanding markets for the farm produce and communicate with the user groups for getting fair price The cell shall have possible convergence with Department of Agricultural Marketing The cell shall arrange for the publication of market information through dailies and television network | |

CHAPTER - 6.1

| Stage | Activity Type | Key Activities | Timing |
|-------------------------|--------------------------------|---|--------|
| | Training/ Capacity-Building | <ul style="list-style-type: none"> It shall develop suitable modules for training (CAPACITY BUILDING) of officers of line departments and arrange for these through various Research Stations / KVKs / Agricultural / Horticultural Colleges which are spread over in 35 locations across the state International training will also be identified and suitable nominations for the year programme will be finalised at least 3 months in advance, in consultation with the Project Director, IAM WARM and the heads of Line departments | |
| | Implementation Management | <ul style="list-style-type: none"> Continuous and close monitoring of project implementation (Project Monitoring Information System continuously updated) Quality Management procedures applied (through stakeholder/WUA social audits, Sub-Basin committee, MDPU and quality management and monitoring consultants) Documentation of implementation status and issues for resolution for example, any contract variation, performance of contractors, etc. should be well supervised and documented and appropriate approvals sought. The Nodal Officer shall be responsible for: <ul style="list-style-type: none"> Updating Project Monitoring Information System Monthly Sub-basin Project Status Summary by Line Agency Quality Management and Monitoring Reports Monthly & Quarterly Progress Report (collated by MDPU) Final Completion Report by implementing agency (line dept.) | |
| Post- Implementation | Documentation & Evaluation | <ul style="list-style-type: none"> The Nodal Officer at Head Quarters as nodal officer of the Sub-Basin committee, will, with the support of the other line departments and the Monitoring and Evaluation Consultant, help develop a Sub-basin ICR (integrated across all line dept. activities) and contribute to project Monitoring & Evaluation. | |
| | Sustainability & Scaling-Up | <p>The Nodal Officer, TNAU will forward suggestions to MDPU to:</p> <ul style="list-style-type: none"> Develop an O&M plan for sustainability of project activities in the Sub-Basin Develop any further Sub-basin Partnerships Continue post-implementation monitoring Determine approaches to address any identified gaps in ensuring sustainability of project investments Determine approaches for up-scaling activities (including any follow-up project activities) | |

Chapter - 6.2**Tamil Nadu Agricultural University
Detailed Mapping of Activities**

Tamil Nadu Agricultural University is one of the line agency involved in the implementation of IAM WARM Project with the motto of facilitating the farmers to earn higher income per unit of water by promoting frontier technologies in the sub basin commands.

1. Objectives

- Working towards large scale adoption of specific technologies such as SRI in Paddy, improved production technologies in oilseeds, pulses and cotton to increase the productivity
- Large scale adoption of Drip Fertigation / Precision Farming and Sprinkler irrigation technologies in field crops, Commercial crops and horticultural crops to impart application efficiency
- Popularization of crop diversification options in select crops such as maize, fruits and vegetables in the sub basin commands
- Popularization of labour saving implements in rice, groundnut, cotton and maize to reduce the cost of production
- Testing and large scale adoption of technologies developed on-station to farm conditions
- Promotion of Seed Village Concept (SVC) to produce and supply quality seed and seedlings for diversified agricultural practices
- Provide information on Price Forecasting and Market Intelligence to Water Users Association to develop more market access
- Provide necessary trainings through various centre / research stations of Tamil Nadu Agricultural University to the farmers and other stakeholders for capacity building

2. Role of Tamil Nadu Agricultural University (TNAU)

To accomplish the objectives enshrined above, the following components of activities are proposed in the sub basin commands

- Precision Farming Techniques in Agricultural and Horticultural crops
- Crop Diversification with high value crops
- Demo and up scaling of SRI in Paddy growing areas

- Drip Fertigation techniques in commercial crops like sugarcane, banana and coconut
- Agribusiness and Farm Advisory Cell for Price Forecasting and Market Intelligence information
- Model Seed Village Concept to generate good quality and hybrid seeds
- Organic Farming to promote Organic Agriculture
- Promotion of Farm Mechanization
- Capacity Building to the stakeholders

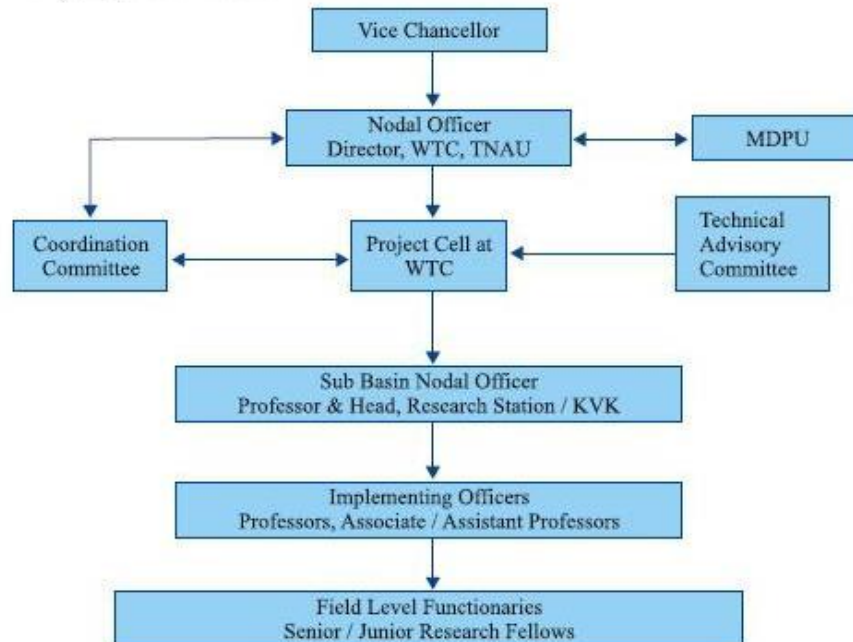
3. Structure

- ◀ The Vice Chancellor will be the Chief Executive Officer for the purpose of the project, to guide, advice and supervise its successful implementation.
- ◀ Director, Water Technology Center (WTC) shall be the Nodal officer at State level for both planning and implementation of IAM WARM Project
- ◀ Director WTC in consultation with the Vice Chancellor shall designate the Project Cell Scientists and a Procurement officer in the Project cell
- ◀ The Project Cell of TNAU consists of the following members.

| Sl. No | Members of Project Cell | Capacity | Role of the Member |
|---|--|----------------------------|---|
| 1. | Director, Water Technology Centre | Nodal Officer/ Chairman | Monitoring and Supervision of IAM WARM activities |
| 2. | Professor in Soil Science | Member | Over all Procurement Supervision & Coordination |
| 3. | Professor in Agronomy | Member | Overall Coordination and Supervision, Demo and Up scaling of SRI, Drip Fertigation |
| 4. | Professor in Horticulture | Member | Area Expansion, Varietals diversification, Precision Farming Technologies and its Up scaling |
| 5. | Professor in Soil and Water Conservation | Member | Supervisory & Coordination Quality Management in Drip Fertigation Systems |
| 6. | Professor in Agricultural Economics | Member | Marketing Tie Ups, Market Potential Assessment, Monitoring and transformation of Market Intelligence Information and Agribusiness Development |
| 7. | Professor in Farm Power and Machinery | Member | Research and Development of SRI Transplanter, Farm Mechanization in sub basins |
| Project Cell at Sub Basin Level: | | | |
| 1. | Professor & Head of Research Station / KVK / Departments | Sub Basin Nodal Officer | M & S of Implementation of Plans |
| 2. | Professors, Associate Professors / Assistant Professors | Implementing Officers | Implementation of activities as per Detailed Project Report of sub basins |
| 3. | Senior Research Fellows / Data Entry Operators | Field level Functionaries | Assisting in Implementation of sub basin components and documentation |

- Project Cell at Sub Basin level is headed by the Professor and Head of the Agricultural Research Station / Krishi Vigyan Kendra and he is assisted by the Professors, Associate / Assistant Professors attached with the centre
 - For implementation, the assistance of outsourced technical staff in the disciplines of agriculture, horticulture, agricultural engineering, agricultural economics will be utilized
 - During the main cropping season the services of the outsourced staff will be utilized for implementing the action plan and to achieve the physical and financial targets
 - During the off season, the staff will be utilized for the following services
 - Publicity and awareness creation activities to beneficiary and non beneficiary farmers
 - Discussion with Water Users Association to assess their crop needs
 - Surveying and identification of beneficiaries
 - Collection of Soil samples and analysis of soil and water samples
 - Arranging exposure visit to the farmers to realize higher productivity
 - Mobilizing of inputs for the ensuring cropping season
 - Skill development to the farmers
 - Post harvest soil sample analysis
 - Campaign for next season crops for replication of technologies
 - Statistical Analysis of crop yield data
 - Assessing the yield gap
 - The Vice Chancellor, Director (WTC) and Nodal Officer, Director of Research and Director of Extension Education and Dean shall function as a task force and review the IAMWARM Project in all the sub basins at least once in three months.
- 4. Strategies for Replication of Technologies**
- Delineation of Zone of Influence from the first year
 - Organizing Campaign for motivation of farmers
 - Arranging Exposure Visit to the locations of Good Agricultural Practices
 - Conducting IAMWARM day periodically to redress the grievances at farm
 - Training to Beneficiary and Non Beneficiary farmers
 - Creation of linkages between beneficiary and non beneficiary farmers

5. Organogram of TNAU



6. Baseline Assessment

- The Professors along with the scientists nominated by the Head of Research Stations / KVKs shall associate in the joint walk through surveys with multiple stakeholders arranged by the Executive Engineers of the various sub-basins to assess the field conditions
- During the survey, the Scientists should examine the conditions of irrigation systems / livelihood status, Potentials of crop / livestock enterprise etc.
- To develop Action Plan of more precise in nature, the Sub basin nodal officer shall collect the following details during the month of April May to support the requirements of stakeholders and the farmers.
 - Water potential of the sub basin
 - Availability of water for the ensuring cropping season
 - The existing cropping pattern ,
 - Potential markets and market prices

- Proposed cropping pattern
- The possibility of field testing of research findings
- Promoting the water saving technologies in field
- Introduction of innovative technologies viz. SRI, Drip and Sprinkler irrigation in consultation with the WUAs or with the prospective farmers in the sub-basin
- Popularization of labour saving implements for rice, maize and groundnut
- Scope for establishing seed village for supply of quality seed and seedlings for more diversified agriculture
- Document major issues that are confronting development / technology transfer

7. Consultations

- Nodal Officer TNAU will participate in the multiple stakeholders meeting convened by the Executive Engineer WRO in the month of April / May and share the views of stakeholders on the
 - Prevailing conditions of irrigation infrastructure in the sub basin
 - Extent of micro irrigation practiced in the sub basin
 - Scope for expansion of Micro Irrigation in areas of agricultural and horticultural crops
 - Possibilities for crop diversification and on farm development activities etc.,
- Dates for Joint Walk Through will be decided to assess the status of irrigation infrastructure, agricultural practices adopted and the possible interventions as required by the stakeholders
- A meeting with all the sub-basin representatives from TNAU shall be arranged to form a framework on the frontier technologies to be transferred in each sub-basin and strategize an annual work plan by identifying large scale demonstrations for converged action of WRO and line departments
- Consult Agriculture, Horticulture, Agricultural Engineering Departments to assess the details of area expansion / crop diversification so as to decide the technology needs in the sub basins
- Consult with the Agricultural Engineering Department officials regarding their requirement of Machineries for farm mechanization and communicate to the Agricultural Machinery Research Centre.
- Consult with Agricultural Marketing and Agribusiness Department officials regarding transfer of market intelligence information generated by the Agribusiness and Farm Advisory Cell and get the feedback of marketing officials which will be an input to the cell.

8. Draft Sub Basin Plan

- Prepare sub basin plan based on the field visit and the needs expressed by the stakeholders and on the basis of water potential available in the sub basin, diversification of high water demanding crops to low water demanding crops, its technological and climatological parameters coupled with the issues on marketing tie ups
- The sub basin plan will be iterated based on consultation with the line departments like agricultural engineering, horticulture, agricultural marketing and agriculture to propose suitable high value crops that will be agreeable to farmers of the sub basin
- The location of demonstration plots are to be identified (tankwise) and consultations with Department of Agriculture/Horticulture and the WUAs should be made
- The above sub basin plan developed will then be sent to the HODs (Nodal Officer, Tamil Nadu Agricultural University) by second week of September for their perusal and suggestions and also to the District Coordination Committee and the agreed plans to be sent to the MDPU for scrutiny and modification
- This iterative process will go on till a finalized acceptable sub basin development plan for clearance by the Project Steering Committee (PSC) by last week of September
- Once the steering committee approves the plan, the sub basin Nodal Officer will prepare the final cost estimates and send to Nodal Officer and Director, TNAU with a copy to the Executive Engineer of sub basin and copy to MDPU by first week of October
- The sub basin development plan and the cost estimate will then be forwarded to the World Bank and clearance obtained by MDPU by the Second Week of October
- The HODs will place the plans before the Project Steering Committee (Empowered Committee) the estimates through the MDPU before the last week of October
- Draw an annual work plan with details of budget provision needed for the current and new packages to be taken up in the following year and send to MDPU which will forward to finance department by second week of November
- Prepare Draft Memorandum of Understanding (MOU) and avail discussion with MDPU for its validation for approval.
- Prepare separate MOU for Project Activities, SRI transplanter and Agribusiness and Farm Advisory Cell and get the clearance from MDPU for necessary further action
- Highlight the number of outsourcing staff, their working season, job contents and their performance evaluation etc., in the MOU and get the approval of MDPU

9. Pre Implementation

- Once the estimates receive Administrative Sanction, the Sub Basin Nodal Officer will prepare the detailed estimates with drawings showing the field numbers where the demonstrations are proposed and the type of demonstrations / activities aimed
- The technically sanctioned estimate will then be perused by the Procurement committee / Procurement Officer with the Project Cell at Nodal Office of TNAU who will either be trained at Administrative Staff College of India (ASCI) Hyderabad or at Chennai and initiate procurement process
- Nodal officer, TNAU shall identify the person to be trained on technological advancement, extension and procurement methods and arrange trainings to them.
- Identify the agencies who are competent input providers for the task outlined in the plan

10. Implementation

- Six Technical Advisory Committees have been established in Tamil Nadu Agricultural University for Coordination and monitoring of Major activities of sub basin plan. They are
 - Technical Committee on Agribusiness Management
 - Technical Committee on System of Rice Intensification
 - Technical Committee on Precision Farming
 - Technical Committee on Organic Farming
 - Technical Committee on Farm Mechanization and
 - Technical Committee on Seed Production
 - Besides, a coordination committee hence by the Vice Chancellor also formed to monitor and review the progress of the plan.
- a. Convergence**
- The Nodal Officer TNAU to discuss with Agricultural Engineering Department officials and delineate the area of operation with regard to Micro Irrigation to avoid the duplication of similar components in the sub basin
- Segregate the villages among TNAU, AED, Agriculture and Horticulture for need based intervention
- Finalize the action plan for the season after availing discussion with line departments
- Encourage / Guide Animal Husbandry officials on establishment of green fodder

- Give tips to them on technological aspects for establishing fodder as intercrops wherever feasible
- Nodal Officer to consult with Agriculture / Horticulture officials regarding the cropping pattern, crop diversification proposed and implementation of drip / sprinkler irrigation, precision farming
- In a month, a day may be identified to celebrate IAM WARM day to redress the issues that arose in the sub basin commands and to plan for the next month programs which is amenable to line department
- The Sub Basin Nodal Officer / implementing officer shall attend the zonal workshop and field days arranged by Agriculture department and ensure convergence of activities and advise midcourse corrections to be made by the farmers in the implementation of the project

b. Creating Awareness

- Wide publicity may be given at the sub basin level to create awareness among the farmers about TNAU components proposed for the sub basin through
 - Discussion meetings at village level
 - Awareness campaigns,
 - Television, Cable networks
 - Handouts, Banners,
 - Screening movies on Best Agricultural Practices
- Joint Walk Through Campaign should be performed with the line department officials for promoting the relevant components
- Handouts, posters depicting the profitability of crop / livestock enterprise so as to make the farmers convinced
- Village leaders who are popular among the public shall be approached for appraising the IAM WARM activities and their services may be best utilized for popularizing the project activities among the public to gain quick spread of technologies / social development activities.
- Identify prospective womenfolk who excels in microfinance / social development activities may be utilized for awareness creation under IAM WARM Project at village level

C. Farmer Identification

- Get the assistance of WUA in identifying the willing farmers (tankwise) and maintain priority register
- Select the area contiguously.

- Change the demo area/ locations every year to extend the benefit of technology to different user
- Encourage small, marginal and women farmers also in to the beneficiary fold
- A database on the list of farmers who have success stories / Best Agricultural Practices with respect to activities such as drip irrigation, improved crop variety, cross breeding, crop diversification etc., may be prepared and maintained

D. Demonstration and Exposure Visits

- The implementing officers at sub basin level with reference to the sanctioned estimate shall arrange demonstration in the selected field, preferably along the road side to have accessibility
- Mobilization of neighboring farmers also to join the demonstrations so as to have timely replications in their fields
- While conducting demonstrations, see that the line department personnel, farmers of adjacent fields and the critical inputs are available in the spot
- Critical inputs may sufficiently be pooled in the demo plot so as to feed the requirement of farmers of adjacent fields for large scale adoption of the technology with in the time frame
- Attend the IAM WARM field days, exposure visits, demonstrations etc arranged by the WRO / Line departments

Example of Conducting Field Days - SRI in Rice (Seasonal Crop)

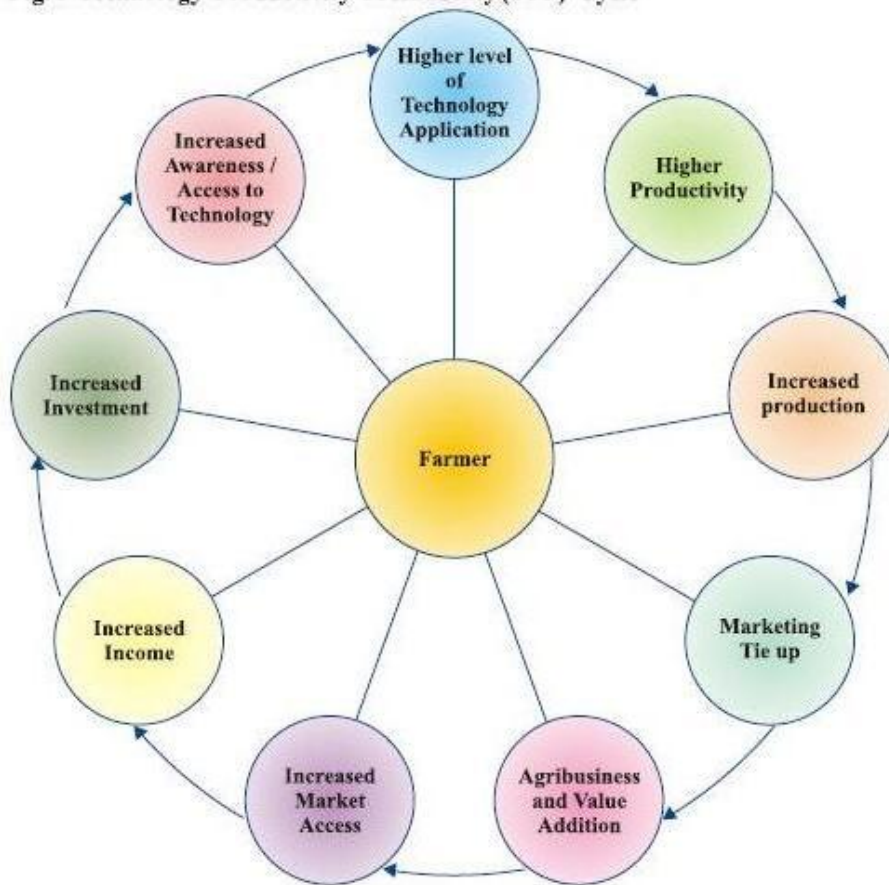
| | |
|-------------|--|
| Field Day 1 | Preparation of Mat Nursery |
| Field Day 2 | Transplanting of single seedling through Paddy transplanter / existing SRI method |
| Field Day 3 | Giving an exposure on Wet & dry method of irrigation and manuring |
| Field Day 4 | Exposure on Weeding methods using rotary weeder, tillering of crop and manuring procedures |
| Field Day 5 | Mechanized Harvesting, Processing, Packaging and Post Harvest Operations |

- Arrange Exposure Visits on Best Agricultural Practices and conduct demonstrations on improved technologies, precision farming, Micro irrigation etc.

E. Changing the Mindset

- The Motto of IAMWARM PROJECT“ is *More Money per Litre of Water*” should be engrained in the mindset of the implementing officers.
- Implementation Officers may be given orientation training on the IAMWARM concept so as to ensure effective implementation.
- Focus on how precision farming and improved production technologies enhance the productivity of the plant, increased production and therefore higher income (Fig.1)

Fig.1 Technology Productivity Profitability (TPP) Cycle

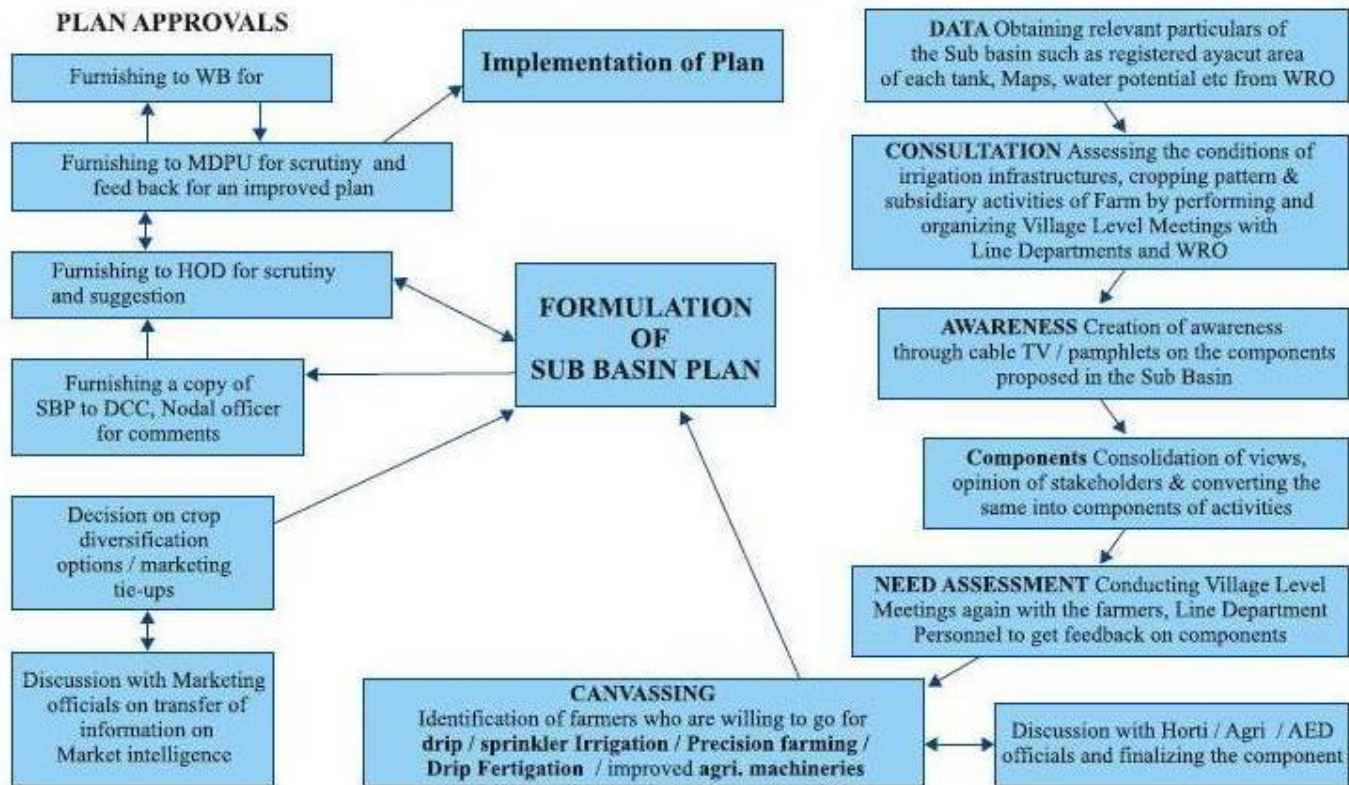


- Invite the Farmer Interest Groups to see live Demo and interaction with the experts on the components / activities.
- Farmer to farmer interaction may be arranged with the successful farmers for convincing the Farmers Interest Group so as to have quick spread of the technologies.
- Farmers who need Bank loans for purchasing the components may be guided to have quick spread of technologies.
- The WUAs may be motivated to create a corpus fund to meet the maintenance expenses of the machinery and the micro irrigation system
- Assess the irrigation water potential of the fields of the individual farmer and suggest Micro Irrigation System coupled with suitable cropping pattern and if possible inter cropping arrangements.

11. Authority, Responsibility, Accountability Issues (ARAI)

- Delineation of powers / Decentralization of powers to sub basin Nodal Officers may be examined to accomplish the project goals
- The Nodal Officers and Professors at sub basin level are responsible for qualitative and quantitative aspects of the components enunciated in the sub basin plan
- The report of monitoring and evaluation consultant in respect of each Sub basin may be examined for imparting quality aspects.
- Action plans may be prepared to fulfill the goals of IAM WARM Project to phase the works with in the stipulated time
- Ensure / Inculcate self auditing to revisit / recheck the quality aspects of work executed
- Motivation Programs like Workshops, Trainings, Exposure Visits, performance incentives may be arranged to the Implementation Officers at sub basin level

IAMWARM - TNAU
CONVERGENCE OF project activities DIAGRAM



Chapter- 7.1 Operational Manual for Sub Basin Activities

Agricultural Marketing - Framework of Activities

| Stage | Activity Type | Key Activities | Timing |
|--------------|--|---|---|
| Pre-Planning | 1. Official Communication | DAM & AB to identify the Marketing Nodal officers for all the 63 Sub basins | 1 st week |
| | 2. Information Collection | The Nodal officer will collect the data on current scenario of the marketing activities to prepare a sub basin atlas / details and furnish the same to MDPU. | Completed by 1 st month |
| | 3. Preliminary stakeholder consultation | At sub basin level, a Sub basin Committee will be constituted by Executive Engineer with all Nodal officers as members and agencies like ATMA will be coordinated. | Sub-basin committee meeting in 3 rd week |
| | 4. Project Day | The Sub basin committee will convene an "IAMWARM Day" in the sub basin to initiate discussion with sub basin stakeholders, traders, agro processors, agro- entrepreneurs and other civil society associations. | |
| | 5. Interactions | <p>The interactions at Sub Basin level would include the following.</p> <ul style="list-style-type: none"> ▪ Presentation of IAMWARM Project objective and marketing information. Discussions with stakeholders on what are the major sub basin constraints and opportunities ▪ A date for joint walk through survey will be decided . ▪ Document the list of stakeholders met and minutes of these meetings. ▪ Zone of influence: ▪ The location of marketing infrastructure sites are to be identified . ▪ To develop a sub basin Joint walk through report in consultation with other line agencies. ▪ From the marketing perspective the walk through report should include the existing scenario (Vide 4:2:2:2 of Part B) | Join Walk through Report by 5 th week |
| II. Planning | 6. Training | <ul style="list-style-type: none"> ▪ The Nodal officer will identify immediate capacity-building needs in the sub basin and organize such training. | 6 th week |
| | 7. Stakeholder Discussions & Analysis | <ul style="list-style-type: none"> ▪ Based on sound technical analysis as well as effective stakeholder communication, identify key hardware (construction) and software (capacity-building / training) options including a no activity option. | 8 th week |
| | 8. Sub basin plan (Vide 4:2:2:4 of Part B) | <ul style="list-style-type: none"> ▪ Marketing Nodal officer to develop a draft Sub basin plan and discuss the plan with stakeholders, other line agencies and MDPU ▪ The final Sub basin plan shall be agreed with the stakeholders, Line Department HODs, MDPU and forwarded, for clearance by the Project Steering Committee. | |
| | 9. Memorandum of understanding | <ul style="list-style-type: none"> ▪ The Executive Engineer, WRO will develop a draft MOU inclusive of all Departments concerned | 9 th week |

| Stage | Activity Type | Key Activities | Timing |
|---------------------|---|--|--------|
| III. Implementation | 10. Procurement and financial management Vide Annexure | <ul style="list-style-type: none"> The Directorate of Marketing and Agribusiness will initiate procurement activities with appropriate packaging and cost estimation following Bank procurement processes as outlined in project documents. | |
| | 11. Implementation Management | <ul style="list-style-type: none"> Continuous and close monitoring of project implementation (Project Monitoring Information System continuously updated) Quality management procedures applied. Conduct of Farmers Meets at different stages of crop cultivation and harvest, involving farmers, traders, agro processors and other marketing personnel. | |
| | 12. Documentation & Evaluation | <ul style="list-style-type: none"> Nodal officer to help the sub basin Executive Engineer to develop a sub basin ICR and contribute to project monitoring and evaluation. Sub basin Atlas and sub basin Plans are to be revised every year. | |
| | 13. Sustainability & Scaling-Up | <ul style="list-style-type: none"> The Nodal officer shall submit proposals to Develop an O&M plan for. Further sub basin partnerships Continue post implementation monitoring. Approaches for up scaling activities. | |

Chapter 7.2

Agricultural Marketing Department Detailed Mapping of Activities

1. Objectives

- To ensure market driven and profitable crops are grown by the farmers
- To facilitate value addition to the produce
- To improve transport arrangements for marketing and preservation of perishable items by providing cold storages and godowns
- To provide market intelligence to WUAs

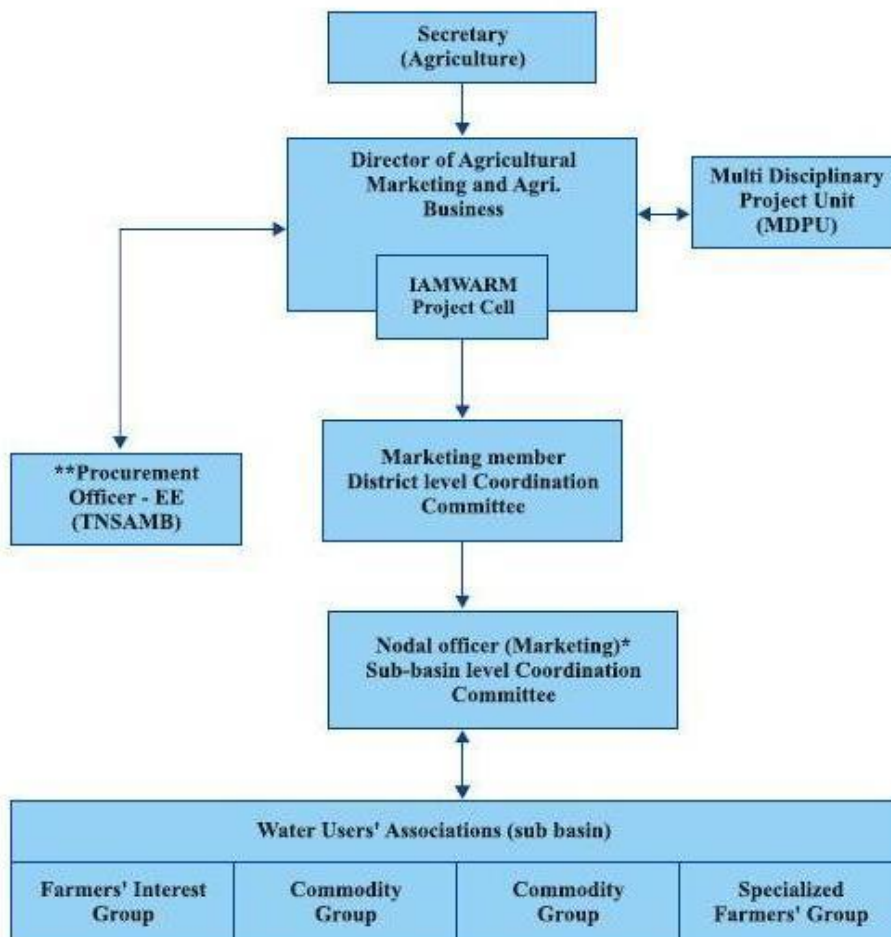
2. Sub-basin level

2.1. Planning

Structure

- A special IAMWARM Project cell at the Directorate of Agricultural Marketing and Agri Business with the existing staff will be formed for planning, implementation, co-ordination and monitoring purposes. An external Marketing Specialist well versed in rural marketing activities will be employed on contract basis to assist this cell and the implementing officers at Sub-Basin level. Necessary computer and other accessories will be provided.
- The HOD to identify the Sub Basin Nodal officer and Implementing Officer for preparation and implementation of the Project. Nodal Officer will be the designated officer to carry out the task of integration among various Sub-Basin Line Department officers with an overall responsibility in Project planning, implementation and monitoring activities.
- At the District level the Assistant Secretary (Market Committee)/ Assistant Director (Marketing) is the Nodal officer of the Project who will be assisted by a consulting Marketing Specialist to be appointed by the Government on contract basis in the Head office
- Wherever a Sub-Basin falls in more than one District, the District officer whose area is more than the other, will be designated as Nodal Officer for that Sub-Basin
- The HODs shall also take appropriate action to position the in service staff in the vacancies and to recruit Marketing Specialist / Facilitators.
- The Sub-Basin Nodal Officer shall identify the innovative Farmers for formation of Farmers Interest Group (FIG) / Commodity Groups (CG) for specific crops
- The flow chart below explains the structure of Marketing Department functioning, under this project.

Flow chart IAMWARM (Marketing)



- Nodal officer: will be the designated officer nominated by the Department to carryout the preplanning, planning, implementation and monitoring activities of the project for the entire Sub Basin through integration among various Implementing Officers of the Department and also among similar Nodal Officers of other Line Departments.
- **Procurement officer: EE (TNSAMB) Chennai is the designated Procurement officer for Agricultural Marketing Department, who will handle procurement works pertaining to infrastructure, office equipment, net working etc. Selected Nodal Officers at Sub Basin level will be imported training in procurement procedures so that they will act as Procurement Officers at Sub Basin level.

2.2. Baseline Assessment

- The Nodal officer identified to associate with the Executive Engineer WRO of the Sub-Basin who is the Principal Nodal officer and collect data in the month of April every year on the

2.2.1. Agriculture

- Cropping pattern
- Area under different crops
- Productivity / Production of crops

2.2.2. Infrastructure

- Storage facilities, threshing floors, pack houses, collection centres, weighing scales, cold storages etc.
- Processing facilities such as decorticators, oil extraction (private/ public)
- Agro based enterprises i.e. sago, resins etc.
- Market Intelligence systems with IT network facilities etc
- Regulated markets (VIDE ANNEXURE-4)
- Agri-Export zone ie Mango, cashew
- Transport facilities and market access.
- Adoption of Pre and Post harvest technologies.

2.2.3. Marketing

- Current Marketing Facilities
 - Marketable Surplus of produces.
 - Glut/shortage of produce
 - Price fluctuation of commodities
 - Quality control measures
- Sub Basin Nodal Officer (SBNO) will also collect the data on the scope for improved marketability of the existing crops and the possible better opportunities for diversified crops, value addition required to attract profitable marketability (such as threshing floor, improvement to existing storage godowns, solar drier and cold storages) and transport facilities etc

3. Consultations

- Sub Basin Nodal Officer (SBNO) will participate in WUA meetings, walk through survey and

other preliminary consultative session, in consultation with Executive Engineer (WRO) and stakeholders

- SBNO will participate in the multiple stakeholders meetings at Sub-Basin, village and tank levels convened by the Executive Engineer WRO in the month of April-May and share the views of the stakeholders on the
 - Prevailing conditions in the Sub-Basin on irrigation infrastructure.

Support they receive from the Agricultural Marketing Officers on the transfer of marketing technologies maintenance of the Godown.



- The hardware & software facilities afforded by the Marketing Committees / Regulated Markets for the sale of their produce.
- And the marketing technologies recommended by the Marketing Officers and their experience in following their recommendations.
- SBNO will appraise to the forum the macro level details he had worked out and interact with them and share their responses to his suggestions for diversification, and improved marketing facilities and value addition to the crops for increased profitability
- In the meeting a date for Joint walk through survey will be decided (preferably completed by the first week of June) to assess the status of cropping pattern and other marketing practices adopted and the possible interventions in respect of Marketing Department as required by the stakeholders. (the joint walk thru and meetings as a random sample should cover at least 30% of the Sub-Basin spread out equally)
- The existing and future scenario on marketing of the produce specific to the Sub-Basin will be tabulated as below:

| Existing Marketing practices followed | Problems / Constraints experienced encountered | Remedial measures suggested |
|---------------------------------------|--|-----------------------------|
|---------------------------------------|--|-----------------------------|

- He will participate in the joint walk through and assess the true picture, interact with the stakeholders who consist of the formal/in-formal WUA members and get the feed back on their needs that the Agricultural Marketing Department to design on the supports to be given on improving the marketability of the produce in the above suggested table.

4. Sub Basin Development Plan

In the office, based on the field visit and the needs expressed by the stakeholders and on the basis of marketing potential in the Sub-Basin and on the introduction of new technologies for increasing value addition methods to meet the increased productivity and the possible increased profitability to the growers can be prepared as in the following model table

| Sl. No. | Few of the common Problems / Constraints | Suggested Remedial measures | |
|---------|---|--|---|
| | | Software components | Hardware components |
| 1 | Production glut or shortage of produce. | i. Linkages with manufacturers / traders. ii. Contract farming, MOU. iii. Accurate market forecasting. | Storage godowns and produce pledge loans. |
| 2 | Lack of assured market. | Diversification of Crops. Agro processing. | Agro Processing Units |
| 3 | No action for collective bargaining. | Formation of Commodity groups and Farmers Interest Groups. | Collection Centers with grading of produce, transport facility etc. |
| 4 | Lack of dependable, quick and accurate market information | Market Survey | IT KIOSK with linkages to DEMIC, marketing centers etc. |
| 5 | Non utilization of existing markets | i. Publicity and propaganda. ii. Linkage with private trading community. | More infrastructural facilities i.e. storage Godown, threshing floors weighing scales, moisture meters etc. |
| 6 | Lack of Agro processing and Agro based industries. | Interface workshop between producers and entrepreneurs by CII. | Increased finance and business development services like machinery and storages. |
| 7 | No quality control through grading, testing etc. | Capacity building, IEC. | Agmark Laboratories. Private Testing Laboratories |
| 8 | Pre and post harvest practices not adopted fully. | IEC. | More storage Godown and threshing floors pack houses, specialized storages. |

- Interactions will be made independently with the WUAs, Farmers Interest Groups for introducing Contract farming etc and to develop and strengthen the small and medium size Agro-entrepreneurs and to establish agri-business development facilities
- The sub basin plan will be iterated based on consultation with the Agri-culture, TNAU and Horticulture officers in the Sub-basin in the last week of June to propose suitable marketable

crops and the intervention proposed by the Marketing Department that will be finally agreeable to the farmers in the Sub-Basin is to be made

- This iterative process will go on till a finalised acceptable draft Sub-Basin development plan along with the required training needs both for officers and WUAs is developed and sent to the MDPU for final clearance by the Steering Committee by last week of September

5. Zone of Influence

- The location of new threshing floors, storage godowns other infrastructures proposed such as kiosks for market knowledge base and market intelligence information on the scope of marketability and the profitability of the diversified crop are to be identified and consultations with the Executive Engineer WRO and the concerned WUAs on the prospects of assured delivery of water and their participation are to be ascertained
- The above Sub-Basin plan developed with approximate cost estimate will then be sent to the HODs by Second week of September for their perusal and suggestions and also to the District Co-ordination Committee (Vide the chapter on District Co-ordination Committee for more details) and the agreed plans to be sent to the MDPU for scrutiny and modification of location, size, plan, cost etc., if any..

6. Implementation

- Once the Steering Committee approves the plan the field level officers will prepare the Detailed Project Report (DPR)with final cost estimates, get the clearance of the District CO-Ordination committee and send to Executive Engineer WRO in the basin and to MDPU by first week of October
- The Sub-Basin development plan and the cost estimate will then be forwarded to the World Bank and clearance obtained by MDPU by the Second week of October
- The HOD, based on Steering Committee approval, will send proposals for Administrative Sanction and obtain Government Orders. HOD will also ensure issue of Technical Sanction by Competent Authorities.
- Based on Steering Committee approval, World Bank clearance and Administrative Sanction, the Budget Provision will be requested by HOD with Government.
- An integrated Implementation Plan to be prepared at sub basin level with WRO and Line Departments for smooth implementation and review purposes.

7. Componentwise timeframe

| Sl. No. | Items | From | To |
|---------------------------------|--|----------|----------|
| 7.1. Pre implementation | | | |
| I | Approval orders from Government & communication to field staff | 01/04/07 | 31/11/07 |
| II | Positioning of field / outsourced staff and orientation | 01/12/07 | 31/12/07 |
| III | Identification, selection, need assessment and training to WUA farmers | 01/04/07 | 01/05/07 |
| 7.2. Implementation | | | |
| IV | Procurement and Execution | 15/06/07 | 30/04/08 |
| V | Farmers meet & Exposure visit | 15/06/07 | 30/04/08 |
| VI | Monitoring & follow up | 15/07/07 | 15/05/08 |
| 7.3. Post Implementation | | | |
| VII | Feed back & Evaluation | 01/05/08 | 30/05/09 |
| VIII | Documentation and Status review report | 01/05/08 | 30/05/09 |

NB: The dates mentioned above are indicative for the first year of project implementation. This needs to be repeated for subsequent years with suitable modifications if found necessary based on first year implementation experience.

- Once the estimates receive Administrative Sanction, the field Implementing officer will prepare the detailed estimates with drawings showing the field numbers where the additional infrastructures are proposed and the existing are to be improved. Simultaneously, Technical Sanction by the Competent Authority will be issued.
- The estimate will then be perused by the designated Procurement officer in the Sub-Basin, who will be trained either at the Sub-Basin or at Chennai, and initiate the procurement process for settling the agency for the execution by NCB or Shopping Procedure as the case may be in

consultation with the State level Procurement officer in the Head office (for more details vide chapter on Procurement)

- The Nodal officer in the Sub-Basin shall identify the personnel to be trained on marketing business, sharing market information through kiosks and procurement activities and arrange imparting trainings to them through recognized Training Institutes as approved by the HODs and in co-ordination with the recognized Nodal officer for Training
- The Engineering cell attached to Tamil Nadu State Agricultural Marketing Board will be entrusted with the task of civil works components for procurement and implementation
- The Department will procure goods pertaining to marketing infrastructure, kiosks, IT, Office equipment, networking equipment and Consultancy services pertaining to marketing intelligence / market information systems, assistance to setting up small and medium scale agribusiness enterprises and training. (Vide for more details Procurement chapter)
- Necessary agencies for construction of threshing floors, Godown supply and installation of cold storage facilities will then be finalised according to the powers delegated to the procurement officers
- The designated Procurement officer will issue necessary work orders for construction activities by concluding agreements for the contract and issue orders for the supply and installation of the infrastructure facilities required to be implemented to the implementing officer to carry out the works in the selected field at the right season
- The implementing officer shall with reference to the sanctioned estimate and the agreements entered into with the contactors shall coordinate in the execution of works, WUAs wise and tank wise
- The implementing officer will report to the HODs, Executive Engineer WRO, District Level Co-ordination Committee and to MDPU on the Physical and Financial progress periodically as prescribed (Monthly, Quarterly, Semester) and along with these reports, shall inform the bottlenecks experienced during implementation
- Implementing officer should ensure that the works are completed as per time schedule agreed in the contract with the suppliers as well as in the approved procurement plan
- Simultaneously the implementing officer shall take up a study on macro level impact caused by

these infrastructure created and marketing facilities with frequent WUAs meetings, workshops and document them for perusal by the Monitoring and Evaluation Consultant to be employed by the MDPU

- The District Collector shall review implementation of the project by convening Monthly/ special Meetings and resolve the issues

8. Outcome Indicators

- Percentage of reduction between farm gate and wholesale prices i.e. 10% reduction
 - The increase in targeted farmers' income compared to those without any Project interventions i.e. 10% increase
 - The number of marketing information kiosks functioning and the utilization by the farmers i.e. 10-15% stakeholders per year.
 - Number of additional agricultural enterprises /value chains developed in the basin i.e. 5% increase.
- With the reports received from the field officers the Project cell in the HODs office shall prepare a comprehensive report and send to MDPU which will consolidate all such reports from all the Sub-Basins and in consultation with the Monitoring and Evaluation Monitoring and Evaluation Consultant shall forward to Government and to World Bank.

FLOW CHART ON PLANNING

Chart II

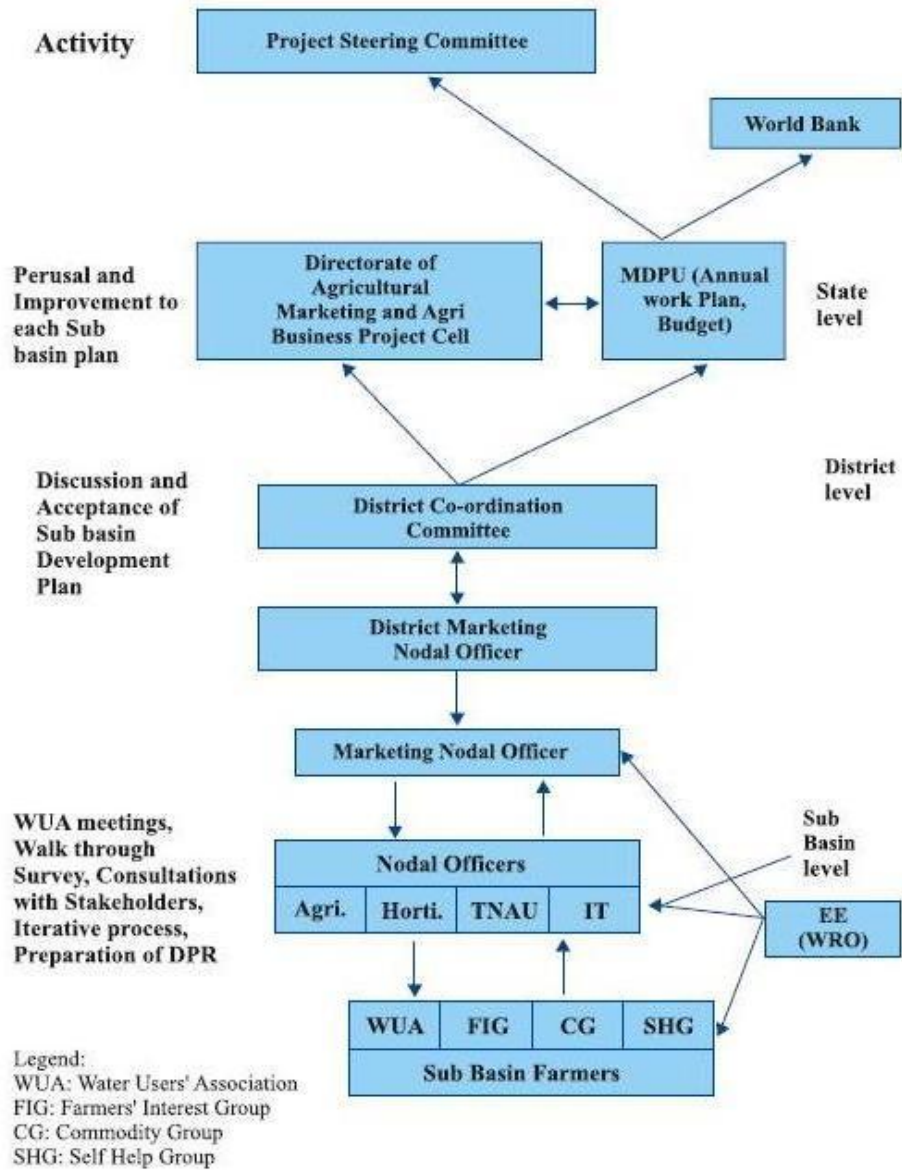


Table II
Activity chart for Major Crops of 9 Sub basins

| Name of Sub basin | Crop I | Crop II | Crop III | Remarks |
|-------------------|---|--|--|---|
| | Pulses | Maize | Banana | |
| Aliyar | FM I - 15th Aug; FM II - 15 Sep; FM III - 1st Nov; FM IV - 15 th Dec. (Sep-Jan) | FM I - 15th Aug; FM II - 15 Sep; FM III - 15th Oct; FM IV - 1st Jan. (Sep-Jan) | FM I - 15th Dec; FM II - 30th Jan; FM III - 15th Feb; FM IV - 15th Nov. (Jan-Dec) | Actual location of the farmers meets participants and trainers to be specified by the Sub-Basin personnel. The other line departments to be involved & invited. |
| Palar | FM I - 15th Dec; FM II - 15th Jan; FM III - 1st Mar; FM IV - 15th April. (Jan-May) | FM I - 15th July; FM II - 15th Aug; FM III - 15th Sep; FM IV - 1st Dec. (Aug-Dec) | FM I - 15th Dec; FM II - 30th Jan; FM III - 15th Feb; FM IV - 15th Nov. (Jan-Dec) | |
| Varahanadhi | FM I - 15th Nov; FM II - 15th Dec; FM III - 1st Jan; FM IV - 15th Feb. (Dec-Mar) | FM I - 15th Nov; FM II - 15th Dec; FM III - 15th Jan; FM IV - 1st Mar. (Dec-Mar) | FM I - 15th Dec; FM II - 30th Jan; FM III - 15th Feb; FM IV - 15th Nov. (Jan-Dec) | |
| Pambar | FM I - 15th May; FM II - 15th Jun; FM III - 15th July; FM IV - 1st Aug. (Jan-Aug) | FM I - 15th Aug; FM II - 15th Sep; FM III - 15th Oct; FM IV - 1st Jan. (Sep-Jan) | FM I - 15th Dec; FM II - 30th Jan; FM III - 15th Feb; FM IV - 15th Nov. (Jan-Dec) | |

| | | | |
|---------------|---|---|---|
| Arjunanadhi | FM I - 15th Aug; FM II - 15 Sep; FM - III 2st Nov; FM IV -15 th Dec. (Sep-Jan) | FM I - 15th Aug; FM II - 15 Sep; FM III 15th Oct; FM IV - 1st Jan. (Sep-Jan) | FM I - 15th Dec; FM II - 30th Jan; FM III - 15th Feb; FM IV - 15th Nov. (Jan-Dec) |
| South Vellar | FM I -15th May; FM II -15th Jun; FM III -15th July; FM IV - 1st Aug. (Jan-Aug) | FM I -15th May; FM II -15th June; FM III -15th July; FM IV - 1st Sep. (Jan-Sep) | FM I - 15th Dec; FM II - 30th Jan; FM III - 15th Feb; FM IV - 15th Nov.(Jan-Dec) |
| Upper Vellar | FM I -15th Nov; FM II -15th Dec; FM III -1st Jan; FM IV - 15th Feb. (Dec-Mar) | FM I -15th July; FM II -15th Aug; FM III -15th Sep; FM IV - 1st Dec. (Aug-Dec) | FM I - 15th Dec; FM II - 30th Jan; FM III - 15th Feb; FM IV-15th Nov. (Jan-Dec) |
| Kottakaraiyar | FM I -15th Jun; FM II -15th July; FM III -1st Sep; FM IV - 15th Oct. (July-Oct) | FM I -15th June; FM II -15th July; FM III -15th Aug; FM IV - 1st Oct. (July-Oct) | FM I - 15th Dec; FM II - 30th Jan; FM III - 15th Feb; FM IV - 15th Nov. (Jan-Dec) |
| Manimuthar | FM I -15th Jun; FM II -15th July; FM III -1st Sep; FM IV - 15th Oct. (July-Oct) | FM I -15th June; FM II -15th July; FM III -15th Aug; FM IV - 1st Oct. (July-Oct) | FM I - 15th Dec; FM II - 30th Jan; FM III - 15th Feb; FM IV - 15th Nov. (Jan-Dec) |

Farmers meet (FM): Farmers Meets are arranged at every stage of crop cultivation for disseminating improved crop technologies and marketing strategies.

FM I - Selection of suitable marketable crops based on profitability.

Purpose of the meet is to facilitate in taking a decision by the farmers on cropping pattern based on profitability. The Farmers will be presented with the agro-climatic suitability of different crops, Marketing facilities available and the productivity / profitability of different crops. This should be followed up by discussions with Departments of Agriculture and Horticulture for TOT, input arrangements, credit, etc.

FM II - Visit to marketing / quality control facilities connected with crop grown.

The farmers (of WUA) will be exposed to the various marketing and quality control facilities available within the reach of the stakeholders by actually visiting them. Even though for the existing crops, Marketing facilities will be adequate some extent, the needed arrangements for the diversified crops should be explored by visiting adjoining similar areas. Likewise quality control measures, need to be ensured within easy reach of the farmers.

FM III - On software side, tie up arrangements, contract farming, MOU etc.

An interface workshop between producers and entrepreneurs will also be included in the agenda so that the requirements of traders including price will be known and negotiated before hand. This will be followed up with tie up arrangements contract farming arrangements and MOU wherever necessary. The interface workshop will help to forge agreements based on quantity, quality, time and place of supply of the produce by the farmers to the traders / entrepreneurs. Fixation of price based on these parameters before hand will be helpful both to producers and purchasers.

FM IV - Exposure visit to processing facilities, terminal markets, cold / specialized storages etc.

The purpose of this meet is to gain first hand practical knowledge about the processing facilities, working of terminal markets, other marketing facilities like cold / storage facilities available, market intelligence arrangements etc Since the crop is almost nearing harvest at this stage, adoption of pre and post harvest technologies will be vital to farmers. Further, the farmers will be enthused to visit nearby marketing / quality control facilities so that immediately after harvest they may be utilised without loss of time.

Chapter - 8.1 Operational Manual for Sub-basin Activities

Fisheries Department - Framework of activities

| Stage | Activity Type | Key Activities | Timlog |
|--------------|--------------------------------------|--|---|
| Pre-Planning | Official Communication | <ul style="list-style-type: none"> Director of Fisheries (DOF) to identify the Regional Assistant Director for Fisheries (ADF) for 63 Sub-basins who will be the Nodal Officer of the Sub-basin to facilitate and monitor the project related activities in the Sub-Basin | 1 st week |
| | Information Collection | <ul style="list-style-type: none"> ADF will collect data regarding the current state of aquaculture and fish marketing in the Sub-Basin so as to forward to MDPU for collation into an initial Sub-basin Atlas. | Completed by 1 st month |
| | Preliminary stakeholder consultation | <ul style="list-style-type: none"> The ADF will attend the Sub-basin Committee meeting convened by EE, WRO ADF will attend the "IAMWARM Day" convened by EE, WRO in appropriate locations in the Sub-Basin to initiate discussions with Sub-Basin stakeholder from WRO for reference. The ADF will attend the Joint Walkthrough surveys organized by EE, WRO to identify key issues and options by making suitable notations on the Sub-Basin atlas and other maps of the area and by taking photographs and video clips of key locations to illustrate these. | Sub-basin committee meeting in 3 rd week Join Walk through Report by 5 th week |
| Planning | Training | <ul style="list-style-type: none"> The ADF will identify immediate capacity-building needs (technical, administrative, other) in the Sub-Basin and organize such training | |
| | Stakeholder Discussions & Analysis | <ul style="list-style-type: none"> Based on sound technical analysis as well as effective communication with Line Departments, identify key hardware (Fish seed Nursery for increasing fingerlings etc.) and software (capacity-building/training) options (all key options should be considered including a no-activity option). | |
| | Sub-basin Plan | <ul style="list-style-type: none"> Develop Draft Sub-basin Plan and discuss plan with stakeholders, line agencies and MDPU; then ADF along with the Executive Engineer WRO, will appraise the MDPU. The draft Sub-Basin plan will be discussed at a Sub-basin Stakeholder workshop and the minutes and participant list of this workshop documented and suggestions considered while finalizing the Sub-Basin plan available with WRO may be obtained and kept for reference. | |

| Stage | Activity Type | Key Activities | Timing |
|---------------------|--------------------------------------|---|--------|
| | Sub-basin Plan | <ul style="list-style-type: none"> ADF will then start preparing detailed technical designs and cost estimates. The ADF will prepare the estimate for the required interventions. The Sub-basin plan will be presented at MDPU through a well-designed PowerPoint presentation (with assistance of maps, Google Earth, etc.) by the ADF and comments solicited. | |
| | Memorandum of understanding | <ul style="list-style-type: none"> ADF will develop draft MOU (based on model to be supplied by MDPU) | |
| Implementation | Procurement and Financial Management | <ul style="list-style-type: none"> The Director of Fisheries and the district Nodal Officers will initiate procurement activities with appropriate packaging and cost estimation following Bank procurement processes followed as outlined in project documents MDPU will examine the work plans received from the HODs of line agencies on the ongoing packages and for the next years budget requirements and forward the budget demands to the Finance Department for inclusion in the state annual budget The Project Cell established at the Directorate of Fisheries will facilitate smooth project implementation | |
| | Implementation Management | <ul style="list-style-type: none"> Continuous and close monitoring of project implementation (Project Monitoring Information System continuously updated) | |
| Post-Implementation | Documentation & Evaluation | <ul style="list-style-type: none"> The ADF jointly with the Regional EE (WRO) as nodal officer of the Sub-Basin committee, and the Monitoring and Evaluation Consultant, help develop a Sub-basin ICR (Implementation Completion Report) (integrated across all line dept. activities) and contribute to project Monitoring & Evaluation. | |
| | Sustainability & Scaling-Up | <ul style="list-style-type: none"> The ADF shall submit to the Director of Fisheries (who will forward to MDPU) suggestions to: Develop an O&M plan for sustainability of project activities in the Sub-Basin | |

Chapter - 8.2**Fisheries Department
Detailed Mapping of Activities****1. Objectives**


- Promoting sustainable aquaculture in irrigation tanks
- Promote Quality Fish Seed Production
- Promoting small ornamental fish culture units
- Promote additional income generation through fish culture
- Develop hygienic fish marketing

2. Sub Basin Level**2.1. Planning****a. Structure**

- Director of Fisheries will be overall in charge of planning and implementation of the Project. He will nominate the Joint Director of Fisheries (Inland), Deputy Director (Inland) Inspector of Fisheries in the IAMWARM PROJECT CELL in his office to assist him in planning, implementation and Monitoring and Evaluation of the Project
- Assistant Director of Fisheries shall be the Nodal officer in charge at the Sub-Basin level for planning, implementation and monitoring and Evaluation of the project

b. Baseline Assessment

- During the first week of April every year, the Nodal officer identified to associate with the Executive Engineer WRO of the Sub-Basin shall collect data on the Sub-Basin details on Hydrology, Water availability, number of tanks in the Sub-Basin, water spread area, period of availability of water in the tanks, Macro level status of water distribution practiced, total irrigation command area in the Sub-Basin.
- He will also collect data on current fisheries activities and the scope for improved inland fisheries, ornamental fish production and the current marketing status etc
- He will then propose suitable aquaculture technology for fishery development in the Sub-Basin tanks and measures for availability of quality carp seeds in the sub basin itself.

- He will participate in the stakeholders meeting convened by the Executive Engineer WRO in the month of April- May and share the views of the stakeholders including WUAs on the prevailing conditions in the Sub-Basin on the fishery in the tanks in the basin and the scope for aquaculture in Farm Ponds in consultation with the officers from the Agricultural Engineering Department.
 - The Fish Seed availability in the sub basin and measures to bridge the gap, if any, shall be suggested
 - He will appraise the forum the macro level details he had worked out and interact with them and share their response to his suggestions for aquaculture in the water bodies and their needs for promoting Fish production.
- 
- In the meeting, a date for Joint walk through survey will be decided (preferably in the first week of June) to assess the status of water bodies and the scope for increased water spread area after rehabilitations and, their willingness to take up the fish culture and the marketing facilities needed
 - He will participate in the joint walk through and assess the true picture, interact with the stakeholders which consists of the formal/in-formal WUAs and get the feed back on their needs so that the Fisheries Department shall design on the supports to be given on Fresh Water aquaculture in the tanks in the Sub-Basin and marketing facilities to be provided
 - In the office, based on the field visit and the needs expressed by the stakeholders and on the basis of water potential in the Sub-Basin as discussed with the Executive Engineer WRO, Fisheries Components to augment Fish Seed production, sustainable aquaculture, Ornamental Fish culture, better Marketing Facilities & Training Programmes will be worked out.
 - In Consultation with the WUAs in the Sub-basin and the Executive Engineer WRO in the last week of June to propose suitable Aquaculture Techniques to promote sustainable aquaculture by identifying suitable location for fish seed production and culture.
 - He shall identify the target groups viz WUAs, progressive SHG, Fishermen co-operative societies for providing Fishery Development Components
 - Comprehensive Sub-Basin plan shall be developed to target the overall increase in Fish production and income to farmers through aquaculture will then be sent to the HODs by Second week of September for their perusal and suggestions and also to the District Co-ordination Committee and the agreed plans to be sent to the MDPU for scrutiny and modification

- This iterative process will go on till a finalised acceptable Sub-Basin development plan is developed and sent to the MDPU for clearance by the Steering Committee by last week of September
- Once the steering committee approves the plan the field level officers will prepare the cost estimates and send to HODs with a copy to Executive Engineer WRO in the sub basin and to MDPU by first week of October
- The Sub-Basin development plan and the cost estimate will then be forwarded to the World Bank and clearance obtained by MDPU by the Second week of October
- The HODs will place before the empowered committee the estimates through MDPU before the last week of October and obtain Administrative Sanction and draw an annual work plan with details of budget provision needed and send to MDPU which will forward to Finance Department by the second week of November

3. Implementation

- Once the estimates receive Administrative Sanction the field nodal officer will prepare the detailed estimates with drawings showing the field numbers where the farm ponds are proposed, fish rearing localities and the number of tanks to be improved with fish culture and the marketing facilities such as Kiosks and cold storages and the name of the WUAs who will be benefited.
- According to the delegation of powers the district Nodal officer shall arrange for Technical sanction of the estimate
- The Technically sanctioned estimate will then be perused by the Procurement officer designated in the Sub-Basin, who will be trained either at the Sub-Basin or at Chennai and initiate the procurement process for settling the agency for the execution by NCB or Shopping Procedure as the case may be in consultation with the State level Procurement officer in the Head office
- The sub basin Nodal Officer / implementing Officer (AD) are responsible for printing the IEC materials, for selection of theme and place of erection of hoarding and wall paintings, and conducting the quarterly night meetings in consultation with the WUAs
- Necessary agencies for procuring fisheries units and allied equipments to the fisheries units will then be finalised and according to the powers delegated officer will issue work and supply orders for the establishment of units and supply of inputs (fish seeds fish feeds and other equipments such as cages, kiosks, nets etc) to the implementing officer to carry out the works in the Sub-Basin
- The implementing officer shall with reference to the sanctioned estimate and agreements drawn with the contractors and suppliers shall arrange completion of the works and the supplies as per completion period agreed


- The implementing officer will report to the HODs, Executive Engineer WRO, District Level Co-ordination Committee and to MDPU on the Physical and Financial progress periodically as prescribed (Monthly, Quarterly, Semester) and shall inform the bottlenecks experienced during implementation
- The District Collector shall try to solve the problems by convening Emergent Meetings and resolve the issues
- In the event or failure to resolve the issue by the District Collector the HODs shall take remedial measure to achieve the objectives with out any constraint to the agreed annual development plan and if any policy level amendments are required in consultation with the Steering committee, appropriate timely actions may be initiated so that there will be any serious violations in the Contract Agreements concluded with the suppliers.
- Simultaneously the implementing officer shall take up a macro level impact Caused by these interventions with frequent WUAs meetings, workshops and document them for perusal by the Monitoring and Evaluation Consultant to be employed by the MDPU as per guidelines evolved in implementing the following activities

4. Outcome Indicators

- The increase in fish production
- Additional income to the farmers due to aquaculture in the Sub-Basin
- Rural employment through Ornamental Fish culture.
- With the reports received from the field officers the Project cell in the HODs office shall prepare a comprehensive report and send to MDPU which will consolidate all such reports from all the Sub-Basins and in consultation with the Monitoring and Evaluation Consultant shall forward to Government and to World Bank.

Chapter - 9.1 Operational Manual for Sub-basin Activities

Animal Husbandry Department - Framework of Activities

| Stage | Activity Type | Key Activities | Timing |
|--------------|--------------------------------------|--|--|
| Pre-Planning | Official Communication | <ul style="list-style-type: none"> Commissioner & Director of Animal Husbandry & Veterinary services (CAHD) to identify the Regional Joint Director (AH) for 63 Sub-basins who will be the Nodal Officer of the Sub-basin to facilitate and monitor the project related activities in the Sub-Basin. | 1 st week of April |
| | Information Collection | <ul style="list-style-type: none"> RJD will coordinate with EE, WRO for collection of data regarding the current state of the irrigation and drainage systems in the Sub-Basin so as to forward to MDPU for collation into an initial Sub-basin Atlas. | Completed by April |
| | Preliminary stakeholder consultation | <ul style="list-style-type: none"> RJD will attend the Sub-basin Committee meeting convened by EE, WRO which will also be attended by other Line Department officers. RJD will attend the "IAMWARM Day" convened by EE, WRO in appropriate locations in the Sub-Basin to initiate discussions with Sub-Basin stakeholder. The RJD will attend the Joint Walkthrough surveys organized by EE, WRO to identify key issues and options by making suitable notations on the Sub-Basin atlas.  | <p>Sub-basin committee meeting in 3rd week of April</p> <p>Joint Walkthrough Report by ^{1st} week of May (Vide WRO chapter)</p> |
| Planning | Training | <ul style="list-style-type: none"> The RJD will identify immediate capacity-building needs (technical, administrative, other) in the Sub-Basin and organize such training. | April - February |
| | Stakeholder Discussions & Analysis | <ul style="list-style-type: none"> Based on sound technical analysis as well as effective communication with Line Departments, identify key hardware (Improving the quality in delivery of Veterinary services and increasing the availability of green fodder etc.) and software (capacity-building/training) options (all key options should be considered including a no-activity option). | 2 nd week of May |
| | Sub-basin Plan | <ul style="list-style-type: none"> Develop Draft Sub-basin Plan and discuss plan with stakeholders, line agencies and MDPU. RJD along with the Executive Engineer WRO, will appraise the MDPU where the specialists shall interact and offer their professional suggestions on modernization of irrigation infrastructure for fodder cultivation, and possibility of the Livestock improvements. An iterative process of plan development will follow and a Sub-Basin plan and an approximate estimate will be evolved with the agreement of the stakeholders and reflecting views of all line departments for improved fodder cultivation and delivery of veterinary services. The Draft Sub-basin Plan will then be placed before the Sub-basin sub committee. | June |

CHAPTER - 9.1

| Stage | Activity Type | Key Activities | Timing |
|---------------------|--------------------------------------|---|------------------------------|
| | Sub-basin Plan | <ul style="list-style-type: none"> The Sub-basin plan will be presented at MDPU through a well-designed PowerPoint presentation (with assistance of maps, Google Earth, etc.) by the RJD and comments solicited. The Final Sub-basin Plan shall be agreed with the stakeholders, CAHD, MDPU and forwarded for clearance by the Project Steering Committee (through MDPU). | |
| | Memorandum of understanding | <ul style="list-style-type: none"> RJD will develop draft MOU (based on model to be supplied by MDPU) The RJD will organize a Signing Ceremony to initiate project implementation in the Sub-basin. | 1 st week of July |
| Implementation | Procurement and Financial Management | <ul style="list-style-type: none"> The RJD (AH) will initiate procurement activities with appropriate packaging and cost estimation following Bank procurement processes followed as outlined in project documents Regional Joint Director (AH) will submit the procurement documents and cost estimates to the Empowered Committee for clearance. At this stage the District Collectors will be informed to monitor the implementation through the District Level Co-ordination Committee MDPU will examine the work plans received from the CAHD on the ongoing packages and for the next years budget requirements and forward the budget demands to the Finance department for inclusion in the state annual budget The Project Cell established at the Commissionerate of Animal Husbandry will facilitate smooth project implementation This cell shall scrutinize the Sub-basin development plans and the hydrology aspects, design of structures, cost estimates with due clarifications obtained from the RJD concerned before forwarding to the MDPU for finalization Procurement plans prepared by the Regional Joint Director will be vetted. The draft bid documents for prior review contracts will be scrutinized before sending to MDPU which will forward to bank for getting NOC Once the NOC is received from the bank through MDPU, the Commissioner and Director of Animal Husbandry & Veterinary service will arrange to conclude necessary agreements and commence the works sticking to the procurement plans which will be monitored by this cell The IAMWARM cell shall monitor the entire expenditure of the AHD components The IAMWARM cell shall arrange to get the data on the performance indicators as in the PAD from the Regional Joint Director of Animal Husbandry and forward to MDPU | July to January |
| | Implementation Management | <ul style="list-style-type: none"> Quality Management procedures applied (through stakeholder/WUA social audits, Sub-Basin committee, AHD supervision, MDPU) | July to February |
| Post-Implementation | Documentation & Evaluation | <ul style="list-style-type: none"> The RJD, as nodal officer of the Sub-Basin committee, with EE (WRO), and the Monitoring and Evaluation Consultant, helps develop a Sub-basin ICR (Implementation Completion Report) (integrated across all line dept. activities) and contribute to project Monitoring & Evaluation. | March |
| | Sustainability & Scaling-Up | <ul style="list-style-type: none"> The RJD, AHD shall submit to the Commissioner of Animal Husbandry (who will forward to MDPU) suggestions to develop an O&M plan for sustainability of project activities in the Sub-Basin The RJD, AHD shall determine approaches for up-scaling activities (including any follow-up project activities) | March |

Chapter - 9.2

Animal Husbandry Department Detailed Mapping of Activities

1. Objectives

- Up gradation of the existing local cattle population
- Improving the health care of the Livestock
- Enhancing Nutrient Management to animals
- Development of entrepreneurship in Livestock sector through training unemployed veterinary graduates

2. Sub Basin Level

2.1. Planning

a. Structure

- The HOD to identify the Nodal officer for preparation and implementation of the Project
- At the District level, the Regional Joint Director is the Nodal officer of the Project

b. Baseline Assessment

- The Sub Basin Nodal officer identified to associate with the Executive Engineer WRO of the Sub-Basin who is the Principal Nodal officer and collect data on the Sub-Basin details on Water availability, Macro level status of water distribution practiced, total irrigation command area in the Sub-Basin, average irrigated area, and the gap area with reasons for the gap area.
- Sub Basin Nodal officer will also collect the data on current cattle population in the Sub-Basin, identify the village where the female cattle breedable population is more than 2000 in the unserved area, availability of the local unemployed veterinary graduates having two wheeler with driving license and the availability of green fodder

3. Consultations

- He will participate in the stakeholders meeting convened by the Executive Engineer WRO and share the views of the stakeholders on the prevailing conditions in the Sub-Basin on irrigated fodder area and the support they receive from the veterinary units in the Sub-Basin on the maintenance of the cattle health

- He will appraise to the forum the macro level details he had worked out and interact with them and share their response to his suggestions for availability of green fodder by bringing more area under fodder cultivation in the gap areas and the improvements to cattle health by strengthening the existing veterinary units, or proposing additional veterinary units and their locations
- In the meeting a date for Joint walk through survey will be decided to assess the status of lands proposed for fodder cultivation and their willingness to cultivate fodder. The disease position of cattle and their prevention, cross breeding in local cattle by artificial insemination will also be studied in this meeting to increase the milk production.
- He will then propose new area for fodder development in the gap areas available in the Sub-Basin command and the number of new veterinary units required to meet the needs of cattle breeding and health coverage,
- He will participate in the joint walk through and assess the true picture, interact with the stakeholders which consists of the formal/in-formal WUAS and get the feed back on their needs that the Animal Husbandry department to design on the supports to be given on veterinary extension activities including the Artificial Insemination and improved conception rate, conducting health care camps and awareness creation meetings with the farmers including market intelligence and tie-ups



4. Sub Basin Development Plan

- In the office, based on the field visit and the needs expressed by the stakeholders and on the basis of water potential in the Sub-Basin as discussed with the Executive Engineer WRO designs on the expansion or introduction of new areas for green fodder cultivation and the number of new veterinary units to be opened, the infrastructure needed to run and maintain these units, the training required for the veterinary graduates to be employed on contract arrangements the number of on-farm demonstrations of fodder production through certified seeds etc,
- Consultation with the WUAs in the Sub-basin and the Executive Engineer WRO in the last week of June to propose suitable fodder area, assured delivery of water and the establishment of veterinary units and allied infrastructure facilities that will be agreeable to the farmers in the Sub-Basin is to be made on the following general principles
 - Productivity enhancement by improving the delivery of quality veterinary services at the door steps of farmers or nearby.

- Strengthening of graduate institutions by supply of equipments like mouth gag, Dentist auto clave etc.
 - Supply of equipments like castrator, scissors, etc. to the sub centers.
 - Supply of Semi Auto Analyzer to the Referral institutions to strengthen the diagnostic facilities.
 - Increasing the availability of green fodder by supply of inputs like quality fodder seeds and slips and bringing more area under fodder cultivation.
 - Identification of interested farmers for the cultivation of fodder.
 - Procurement of demo fodder seeds and slips.
 - Supply of demo fodder inputs like seeds and fodder slips to the farmers.
 - Conducting various outreach programmes to enhance the livestock productivity.
 - Enhancing the knowledge level of human resource in the project area.
- The above Sub-Basin plan developed will then be sent to the HOD by Second week of September for their perusal and suggestions and also to the District Co-ordination Committee and the agreed plans to be sent to the MDPU for scrutiny and modification
- This iterative process will go on till a finalised acceptable Sub-Basin development plan along with the required training needs both for officers and WUAs is developed and sent to the MDPU for clearance by the Steering Committee by last week of September
- Once the steering committee approves the plan the field level officers will prepare the cost estimates and send to HOD with a copy to Executive Engineer WRO in the basin and to MDPU by first week of October
- The Sub-Basin development plan and the cost estimate will then be forwarded to the World Bank and clearance obtained by MDPU by the Second week of October
- The HODs will place before the empowered committee the estimates through MDPU before the last week of October and obtain Administrative Sanction and draw an annual work plan with details of budget provision needed and send to MDPU which will forward to Finance Department by the second week of November

5. Implementation

5.1. Procurement & Execution

- Once the estimates receive Administrative Sanction the field nodal officer will prepare the detailed estimates showing the field numbers where the fodder crops are to be proposed, the cluster WUA veterinary units are to be established and located in the rent free buildings with

improvements or in the WUAs buildings.

- According to the delegation of powers the district Nodal officer shall arrange for Technical sanction of the estimate
- The Technically sanctioned estimate will then be perused by the Procurement officer designated in the Sub-Basin, who will be trained either at the Sub-Basin or at Chennai as per following principles, and initiate the procurement process for settling the agency for the execution by NCB or Shopping Procedure as the case may be in consultation with the State level Procurement officer in the Head office
- The Nodal officer in the Sub-Basin shall identify the unemployed veterinary graduates to be employed on contract basis with correct Terms of Reference already approved by the HOD and get appropriate orders from the HODs and arrange training and procurement of works as approved by the HODs
- Necessary agencies for setting up cluster WUA veterinary units and supply of medicines, frozen semen for artificial insemination and allied equipments to the veterinary units will then be finalised according to the powers delegated to the procurement officers and in line with the procurement guidelines of the World Bank
- The services of Tamil Nadu Medical Services Corporation (TNMSC) will be utilized for the procurement of Medicines for Veterinary health
- The Procurement officer will issue work and supply orders for the establishment of cluster WUA veterinary units and supply of inputs (medicines and equipments required) to the implementing officer to carry out the works in the Sub-Basin
- The implementing officer shall with reference to the sanctioned estimate and agreements drawn with the contractors and suppliers shall arrange completion of the works and the supplies as per completion period agreed

5.2. Publicity

- The sub basin Nodal Officer (RJD) / implementation Officer (AD) are responsible for printing the IEC materials, for selection of theme and place of erection of hoarding and wall paintings, and conducting the quarterly night meetings in consultation with the WUAs

5.3. Convergence

- The services of the Tamil Nadu Veterinary and Animal Sciences University will be utilized where ever necessary

- Updating the knowledge and skills of the veterinarians and Para-veterinarians by various capacity building programmes. Services of Tamil Nadu veterinary and Animal Sciences University and Tamil Nadu Milk Producers Cooperatives Union will be utilized.

5.4. Imparting Training

- Elite farmers interested in animal husbandry activities for training in consultation with Water Users Association (WUA).
- Three day training will be given at the sub basin level @ 400 farmers per year in 25 farmers per batch. 2000 farmers will be trained in five years.
- In service training will be given to the veterinarians in the sub basin at Madras veterinary college / Namakkal veterinary college or any renowned training institute in India.

5.5. Reporting

- The implementing officer will report to the HOD through RJD, Executive Engineer WRO, District Level Co-ordination Committee and to MDPU on the Physical and Financial progress periodically as prescribed (Monthly, Quarterly, Semester) and shall inform the bottlenecks experienced during implementation
- With the reports received from the field officers the Project cell in the HODs office shall prepare a comprehensive report and send to MDPU which will consolidate all such reports from all the Sub-Basins and in consultation with the Monitoring and Evaluation Consultant shall forward to Government and to World Bank

5.6. Resolving Disputes

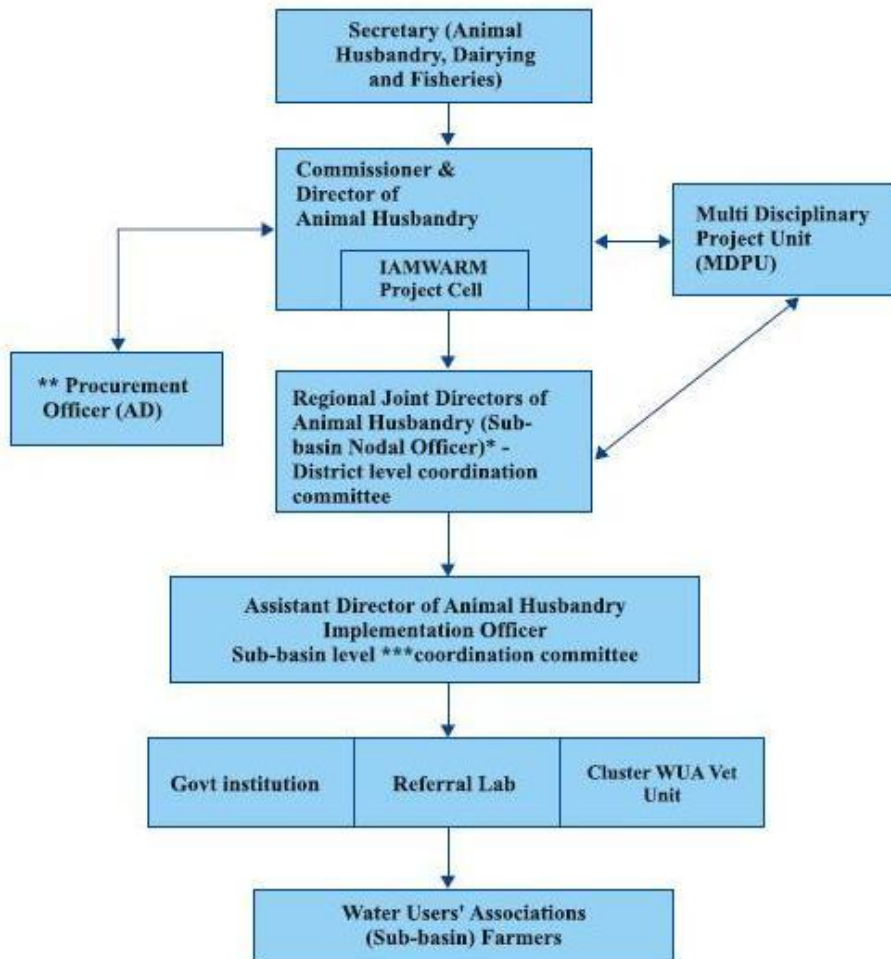
- The District Collector shall try to solve the problems by convening Emergent Meetings and resolve the issues
- In the event of failure to resolve the issue by the District Collector the HODs shall take remedial measure to achieve the objectives with out any constraint to the agreed annual development plan and if any policy level amendments are required in consultation with the Steering Committee appropriate timely actions may be initiated so that there will not be any serious violations in the Contract agreements concluded with the suppliers.
- Simultaneously the implementing officer shall take up a macro level impact Caused by these interventions with frequent WUAs meetings, workshops and document them for perusal by the Monitoring and Evaluation Consultant to be employed by the MDPU as per guidelines evolved in implementing the following activities

- Provision of Revolving Fund of Rs. 10000/- in the first year of the project to purchase of medicines to the cluster WUA veterinary units
- Provision of Incentive for Artificial insemination @ Rs. 20/- first year, Rs. 15/- for second year, Rs. 10/- from third year to fifth year to the cluster WUA veterinarian.
- Provision of performance linked incentives for calf born @ Rs. 50/- first year, Rs. 40/- for second year, Rs. 30/- third year, and Rs. 20/- for fourth and fifth year to the cluster WUA veterinarian.
- In addition the sub basin veterinary extension Officer can collect fee of Rs. 50/- for minor treatments, Rs. 100/- for major treatments and Rs. 50/- for Artificial insemination from the farmers as professional charges.
- The sub basin Nodal Officer (RJD) and implementation Officer (AD), are responsible for selection of sub basin veterinary extension Officer, training, procurement and other implementation.

6. Outcome Indicators

- The extent of farmers received the veterinary services at their doorsteps
- The area shifted to fodder crops
- The number of Artificial Insemination done in the Sub-Basin and the extent of increase in the conception rate
- The increase in the milk yield per animal
- Additional agriculture income in the Sub-Basin
- The notable change in the Lifestyle of the farmers due to the developmental activities in the Sub-Basin

ORGANOGRAM IAMWARM (Animal Husbandry)



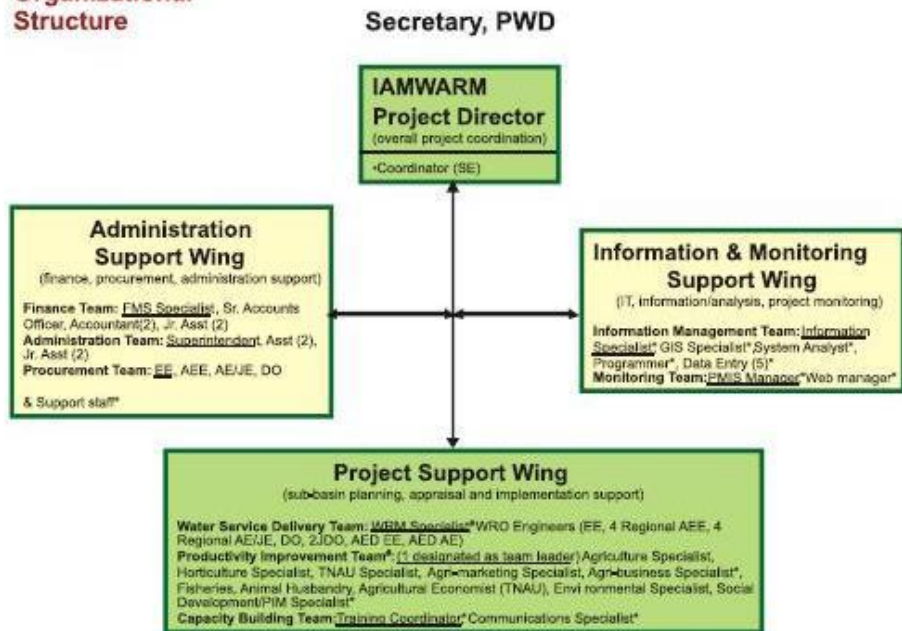
* **Nodal officer:** will be the designated officer nominated by the Department to carryout the pre planning, planning, implementation and monitoring activities of the project.

** **Procurement officer:** AD (IAMWARM Cell) Chennai is the designated as Procurement officer for Animal Husbandry Department, who will handle procurement works pertaining to infrastructure, office equipment, net working equipment etc.

*** **Implementation officer:** will be the designated officer nominated by Department to carryout the implementation of the project at sub basin level.

Chapter - 10
Project Steering Committee

MDPU
Organizational
Structure



* To be deployed from active/retired staff of GoTN
* To be recruited from market

Chapter - 11

District Coordination Committee

1. Objective

To ensure effective co-ordination amongst the Line Departments through involvement of the District Administration both in planning and implementation of the project of unique nature

As per G.O. Ms. No 212 PW (WR1) Dated 1 -11-06 District Coordination Committee and Sub committee were constituted with the following members and Terms of Reference

2. Terms of reference

| | | | |
|----|--|------------------|--|
| 1 | District Collector | Chairman | 1.Meets at least once in 3 months 2. Reviews, Finalize and forward to Regional CE's with copies to Secretary PWD and MDPU |
| 2 | Executive Engineer WRO (Regional) | Member Secretary | |
| 3 | Executive Engineer WRO Plan Formulation | Member | |
| 4 | Executive Engineer WRO Ground water WRO | Member | |
| 5 | Executive Engineer Agri Engineering Department | Member | |
| 6 | Joint Director Agriculture | Member | |
| 7 | Deputy Director Horticulture | Member | |
| 8 | Deputy Director Fisheries | Member | |
| 9 | Deputy Director Animal Husbandry | Member | |
| 10 | Distributory committee President | Member | |

3. Sub committee

| | | | |
|----|---|----------|---|
| 1 | Executive Engineer WRO (Regional) | Convener | 1.Meets as frequently both in preparation phase and implementation phase 2. Assess the stakeholders' needs 3. Use the professional judgment for economic development plan 4 to send Minutes of the meeting to District co-ordination committee |
| 2 | Executive Engineer WRO Plan Formulation | Member | |
| 3 | Executive Engineer WRO Ground water WRO | Member | |
| 4 | Assistant Executive Engineer AED | Member | |
| 5 | Secretary Agri-mktg committee | Member | |
| 6 | Assistant Director Agriculture | Member | |
| 7 | Assistant Director Horticulture | Member | |
| 8 | Assistant Director Animal Husbandry | Member | |
| 9 | Assistant Director Fisheries | Member | |
| 10 | WUA s President | Member | |

- It should be made sure through effective monitoring by MDPU that these committees are made functional

Chapter - 12

Capacity Building Activities

1. Target Group

- i) Senior, Middle and Junior Level Officials and field functionaries of WRO as well as all line departments including TNAU
- ii) President and Members of the Managing Committee of all the 1566 Water Users' Associations formed under WRCP. Similar office bearers of Distributory and Project Committees to be formed
- iii) President and Members of the Managing Committee of about 2530 Water Users' Associations and office bearers of the Distributory and Project Committees, wherever required to cover Major or Medium irrigation systems.
- iv) Farmers, who are involved in the crop diversification and other allied activities, identified from each one of the 63 sub basins.

2. Design and Preparation of Training Modules

i) It is proposed to appoint a Training institution or institutions either from within the State or outside the State, depending upon the potential available and adopting the norms of the World Bank. The process for calling for Expression of Interest (EOI) as per the World Bank norms will commence in the month of January 2007. The areas to be covered for building the capacities of both the farmers and the officials will include the aspects of "Irrigation Water requirement and management", agriculture diversification, On-farm technologies and other related aspects like marketing, information technology.

- ii) The services of the selected institutions will be utilised to not only to identify the total training needs for building the capacities of various actors but also to develop appropriate training modules.

3. Implementation of Training Programmes

- i) Considering the number of officials and farmers to be trained for building their capacities under this project, it is proposed to arrange for identifying regional level training institutions to organize the training activities planned for covering the 12 sub basins proposed to cover during the first year of the project.
- ii) Similar process will be undertaken to cover the training activities due for covering the personnel involved in the second year sub basins. The same thing will be repeated for the third year sub basins. As suggested in the Project Appraisal Document of the World Bank, the training institutions both within and outside the State including institutions such as "Irrigation

Management Training Institute (IMTI), Tiruchy and other experienced Training Institutions, would be involved.

- iii) This proposed phased implementation of capacity building activities will also enable us to modify the strategies and approaches in the second and third year of the project, based on the experience gained during implementation in the first year.
- iv) The project also proposed to arrange for the organizing of study tours for the farmers and officials, both within and outside the state, as well as other countries. This programme for farmers and officials will commence from the “year-two” and be continued till the last year of the project.

4. Implementation Schedule for Capacity Building Activities:

- i) The capacity building activities will also synchronize with the year wise programme for modernization and rehabilitation of the irrigation systems, in selected sub basins, each year.
- ii) This would facilitate effective capacity building activities with concentrated efforts, each year.
- iii) Detailed “action plans” will be prepared as part of the “annual work plans” every year before last week of October in consultation with the HODs of the line departments and forwarded to MDPU which will consolidate and forward to Finance Department and to World Bank.
- iv) By the “end of the Third year” all the farmer groups and officials would have been covered by the capacity building activities.
- v) From the “third year” onwards, “Refresher Courses” will be organized to both the officials and farmers in the areas identified as an outcome of the project implementation and organizing of capacity building activities.
- vi) The proposed “Training Cell” in the Engineer-In-Chief Office and the MDPU Cell will monitor the progress of implementation of capacity building activities and present periodical reports to the Governments, World Bank and others.

5. Probable Areas of Training

5.1. Water Users Association

- Awareness on TNFMIS Act and relevant Rules- Election Rules
- Integrated farming
- Agri-business and Agro processing activity
- Adoption of new Irrigation and Agriculture Technology
- Social Auditing
- Application of I.T.

- Participation in River Basin Boards
- General Responsibilities of the WUAs in the maintenance of the Irrigation Systems

5.2. Water Resources Organisation

- Basin wise approach in planning and implementation
- Formation and functioning of River Basin Boards
- Water Management Practices for sustainable Agriculture
- Volumetric supply of water and installation of measuring devices
- Basics of TNFMIS act and Formation of WUAs and preparation of relevant documents
- Exposure of New Irrigation and Agriculture practices and Technologies
- National Framework on Revival, Restoration and Rehabilitation of Water- bodies in a Sub-Basin
- Agro farming activities such as promoting Inland fishing and livestock developments
- GIS application
- Decision Support System for different scenarios in Basin water management
- New Institutional arrangements and the role to be played by the WRO officers for effective functioning
- The support for the Converged activity in the Irrigated Agriculture
- Community involvement in maintenance and development of Irrigation assets
- Preparation of Thematic Maps for the selected Sub-Basin
- Research activities (IRF, WRRF, ABDF)
- Utilization of Modern Survey Equipments for Topographic and Cadastral Survey
- Modern designs on Irrigation Structures and costal structures
- Budgeting Accounting and financial management including fund-flow arrangement
- Periodical reporting formats
- Environmental assessment and redressal mechanisms in the SOCIAL ENVIRONMENTAL ASSESSMENT framework already prepared
- Maintaining Information Management System and
- R&R policies in respect of Project Affected Persons
- O&M of the Irrigation assets and the allocation of adequate funds

5.3. Other Departments

- Integrated Farming
- Adoption of Micro-irrigation technology
- Promoting Hybrid vegetable and Horticulture crops
- Promoting Fodder cultivation
- Seed production and seed certification

- Agro climatic zones and Agronomy
- Community involvement in contracting and management
- Pest Management
- On farm activities in fodder production
- Encouraging entrepreneurship among unemployed veterinarians
- Transfer of Technology and state-of art in agriculture
- Adoption of farm implements
- Agro farm activities (aquaculture and livestock improvements)
- Agro processing
- Market linkages and market intelligence
- Diversification of crops
- Targeting for increased productivity

5.4 Common to all departments

- Procurement
- Financial management
- Budgeting
- Annual work plan
- Convergence in all activities
- Reimbursement
- Monitoring and Evaluation
- Change Management

Development Indicators (Annexure) corresponding to the project objectives at Para 5 have been chosen to help track the project's impact on the project objectives. Annexure provides a matrix of monitorable indicators against each project objective and comments on how such indicators may be monitored. Indicators include physical indicators for the field components and qualitative and progress indicators for other components. The indicators include:

- implementation of the institutional restructuring and strengthening and its effectiveness,
- agricultural growth, productivity and crop diversification,
- increased delivery of water and improved services,
- Implementation and effectiveness of the farmer participation and turnover programme and improved planning, programming and budgeting.

CHAPTER - 13

FINANCIAL MANAGEMENT

1. Objectives

- To align budget for the project activities by components and Sub-Basin which will help accounting for and generating a financial report/statement facilitating the AG to provide an audit opinion
- To ensure that the funds are made available in the project in a timely manner to all implementing agencies
- To strengthen Internal audit process

2. Project Financing Data

- Project cost Ultimate = \$ 566 m (Rs 2547 Cr)

| Details | In \$ million | In Rs. Crores | Period |
|--|---------------|---------------|--|
| IBRD Loan | 335 | 1507.50 | 5 years Grace period 1 st Repayment 15.10.2012 Last Repayment 15.04.2027 |
| IDA Credit (99.8 m SDR) 1 SDR = \$ 1.5030 | 150* | 675.00 | 10 years Grace period 1 st Repayment 15.07.2017 Last Repayment 15.01.2042 |
| Govt & Stake Holders contribution | 81 | 364.50 | |

*this includes GOI Grant of \$ 75 m towards Restoration of tanks

3. Implementation

- The MDPU shall obtain the annual work plan from all the implementing agencies in the first week of November every year and the consolidated
- annual work plan with Revised budget demands for that fiscal year for the ongoing works and the budget demand for the following year will be sent to Finance Department and World Bank
- Funds from the World Bank to GOTN will be through GOI; The Bank will provide an initial advance which will be transferred by GOI to GOTN and this will be enhanced subsequently if need arises on the support of the financial reports from the AG
- WUAs will have a role in the project planning and supervision of construction at appropriate levels and no funds flow to WUAs except subsidies for Agri-finance and Agri-business and in kind support for farm equipments and infrastructure support and training

- Based on the budget demand sent by MDPU the Finance Department shall allocate funds under the respective demand for grants of line departments involved in the Project
- The budget will be incorporated in the State Budget by Sub-Basin using the minor head/sub head in the GOTN budget code for which the MDPU in consultation with the Financial Advisors of the line departments frame a proposal for opening of detailed budget minor and sub heads for this project before 31-01-07 and take necessary follow up action to operationalize the budget heads before 31-03-07. The Treasury officer diverted from Treasury shall consult the Finance Department and arrange for this system to be established
- To avail the grant funding from the GOI for Tank Restoration sub component, a separate sub head will have to be opened to budget and account for expenditure on Tank Restoration
- For TNAU the budget provision will be made as Grant-in-aid in the demands for grants for the Agriculture Department
- Funds to TNAU will be provided by the Director of Agriculture as an advance on a quarterly basis and only the actual expenditure reported by TNAU will be considered as expenditure in the Project
- TNAU will open separate bank accounts for the Project fund for each Sub-Basin. TNAU will obtain the monthly expenditure accounts from the field units and consolidate and send to MDPU through the Director of Agriculture
- Books of accounts by the WRO, Line Departments will be maintained under the standard Government Accounting systems and monthly accounts will be rendered to the AG by the WRO directly and by other departments through the treasury and reconciled with the AG on a monthly basis
- The staffing pattern in the MDPU for the Finance and Administrative wing will be as outlined under the MDPU chapter
- It has been agreed that Internal Audit and Statutory Board department in the Finance Department, will carry out internal audit. **It is suggested that the Deputy Secretary Finance will head this unit and in association with the MDPU shall carry out this Internal Audit process with necessary provision for this establishment charges to be included in the operating costs of the MDPU which will be reimbursed by the Bank under this Project**. The Treasury officer on diversion duty shall frame suitable proposal in this regard in consultation with the Finance Department early so that this can be operationalised at the earliest EIC WRO shall seek funds for the operation of the Irrigation Research Fund based on the recommendations of the Research Advisory Committee and the Empowered Committee by including his demand in the annual work plan to MDPU

- Chief Engineer IWS shall seek funds for the operation of the Water Resources Research Fund base on the recommendations of the Research Advisory Committee and the Empowered Committee by including his demand in the annual work plan to MDPU
- This Financial Management wing will furnish to the Bank not later than 60 days after the end of each calendar quarter, interim unaudited financial reports for the Project in form and substance satisfactory to the Bank
- This Financial Management wing shall also be responsible for the furnishing of the annual audited Financial statements not later than 6 months after the end of the financial year (i.e. before 30th September of each year)
- This wing is also responsible to monitor the reimbursement of the Project fund from the World Bank through the Controller of Aid Accounts and Audit New Delhi by standard Application forms (For more details see the information in the Box)
- 90% of the expenses incurred for asset maintenance such as office equipment, IT networking charges, Vehicle rentals, office supplies, salaries and allowances of incremental staff in the participating agencies and all staff in the MDPU will be treated as operating cost and will be funded by the Bank
- **A sum of \$1,500,000 equivalent to Rs 6.75 Crores is available as Retro-active fund for the payments made after 1-03-2006 for the components of the project implemented following the Bank's procurement procedures**
- **The expected effectiveness date of the Loan and Credit agreements is 01-03-2007 and the closing date is 31-03-2013**

CHAPTER - 14

PROCUREMENT

1. Objective

- Procurement will be carried out in accordance with the World Bank's Guidelines under IBRD Loans and IDA Credits
- All goods, works and services financed under the project shall be procured using the Bank's Standard Bidding Documents and Standard Request for Proposals as agreed with GOI taqsk force

2. Procurement Methods

2.1. For Works and Goods

- International Competitive Bidding (ICB)
- National Competitive Bidding (NCB)
- Shopping (S)
- Direct Contracting (DC)
- Force Accounts (FA)

2.2. For consultant's Services

Quality and cost based selection (QCBS)

- Quality-based Selection (QBS)
- Selection under a Fixed Budget (SFB)
- Least Cost Selection (LCS)
- Selection based on Consultant's Qualification (CQ)
- Single Source Selection (SS)
- Individual selection by comparison of qualification of at least 3 candidates

3. Procurements involved

3.1. Procurement of works

3.1.1. To be procured by WRO

- Restoration, revival and modernization of selected existing Irrigation Infrastructure such as
 - Rehabilitation of Anicuts
 - Improvements to main canal
 - Improvements to supply channel
 - Improvements to tanks

- Construction of check dams
- Replacement/provision of cross regulators, head works, cross masonry works
- Improvements to service roads
- Lining the channels
- Civil works for construction of office building for MDPU, Basin Boards, WUA buildings, kiosks, modification to existing building to accommodate the proposed SWARMA institute

3.1.2. To be procured by the concerned departments

- On-farm development works, livestock productivity and fisheries productivity improvement demonstration works, Agri marketing and Agri- processing related civil works etc
- All these packages will be procured through NCB

3.2. Procurement of Goods and Equipment

- This will include
 - Office and IT/MIS equipment (desktop and laptop computers, printers, servers, GIS packages, scanners, UPS, photocopiers, fax machines, LAN, VAN etc) (By the IAMWARM cell in EIC office)
 - Training and communications equipment (multimedia Projectors (Training Cell in EIC office)
 - Soil survey equipment (Agri)
 - GPS, digital cameras (MDPU)
 - Office furniture (MDPU)
 - Audio/ Video equipments (MDPU)
 - Modern Survey equipments (CE PF)
 - Pump sets (AED)
 - Satellite imagery maps (CE IWS)
 - Laboratory equipments (Agri, TNAU)
 - Vehicles (MDPU)
 - Seeds, plants, saplings, fertilizers, bio fertilizers etc (Agri, Horticulture, TNAU)
 - Farm implements (Agri, AED)
 - Medicines for animal husbandry (Animal Husbandry)
 - Cages, fish seeds, (Fisheries)
 - Weighing scales, (Agri- Marketing)
- These will be procured under ICB, NCB, Shopping and Direct contracting according to the value of packages through decentralized processing each Sub-Basin and according to the delegation of powers of the respective identified procurement officers of the line department

3.3. Selection of Consultants

- The key consultancies to be procured under this project include :
 - Monitoring and Evaluation (MDPU)
 - Topographic survey of all irrigation systems covered under this project (CE PF)
 - Information management System (IT cell in EIC office)
 - Design support for Modernization of Irrigation System (CE DRCS)
 - Construction Quality Management and Technical Supervision (CE DRCS)
 - Basin planning including Decision Support System development for selected Basins (CE IWS)
 - Internal Audit Capacity Building (Finance department)
 - Other small consultancies (Concerned officers)
- The services of Government Training Institutes, TNAU, IMTI will be utilized for Trainings
- For Training in these institutes only the cost of per-diem to be paid to the participants, their travel boarding, training materials to be made available to them and to the faculty hired specifically for the training and paid will be reimbursed by the Bank
- However for the training institute /organization selected on competitive basis the contractual price payable to it will be funded by the Bank

| Category | Threshold limit |
|---|---|
| International Competitive Bidding (ICB) | Goods > US \$ 300,000 (Rs.1.35 Crores) Works > US \$ 10,000,000 (Rs. 45 Crores) |
| National Competitive Bidding (NCB) | Goods > US \$ 30,000 (Rs 13.5 Lakhs) to 300,000 Works > US \$ 30,000 to 10,000,000 |
| Shopping | Goods < US \$ 30,000 Works < US \$ 30,000 |
| Direct Contracting | Goods and Works < US \$ 1,000 (Rs. 45,000/=) (Limited to Aggregate value to US \$ 2 Million - Rs. 9 Cr.) |
| Force Account | Upto \$ 30,000 with specific Prior approval of World Bank |
| Category | Threshold limit |
| Works | WRO - Prior Review >\$ 1.5m (Rs. 6.75 Cr) Other Depts - Prior Review >\$)0.5m (Rs. 2.25 Cr) |
| Goods | All contracts Prior review > \$ 30,000 (Rs. 13.5 Lakhs) |
| Consultancy | Firm > US \$ 100,000 (Rs.45 Lakhs) with Prior Review by World Bank |
| | Individual > US \$ 50,000 (Rs.22.5 Lakhs) after Prior Review by World Bank |
| | Sole Source > US \$ 50,000 after Prior Review by World Bank |

- The following are the activities involved in the procurement process
 - Appointment of Procurement Officer
 - Preparation of procurement plan as per World Bank Guideline
 - Preparation of Bid document
 - Bank's NOC in case of prior review cases or the clearance from the State level procurement cell in the HOD office
 - Bid invitation
 - Bid opening date
 - Bid evaluation and award' recommendation to the Procurement cell in HOD office
 - Approval of the award by the competent authority after review by the said procurement cell in case it is not a prior review package
 - In the case of prior review package the HOD shall get the approval through the Project Steering Committee
 - Via MDPU which will after approval by the PSC shall forward to the Bank for its clearance
 - Upon receipt of a NOC from Bank necessary Agreement will be concluded and the work orders will be communicated
 - The copy of the concluded agreement will then be sent to the Bank which will allot a WBR number which will be quoted in all application for Reimbursement claims
- MDPU procurement cell to be strengthened
- MDPU shall obtain procurement plans from the WRO and Line departments each year along with the annual work plan, review and consolidate and send to Finance department and Bank not later than 15th November of each year
- The Nodal Procurement Officers of the Line Departments and the Procurement staffing in the IAMWARM cell to be trained at ASCI, Hyderabad
- MDPU to give orientation training to all field officers identified as Procurement officers in the line departments
- Procurements Workshops will be held at Chennai and other WRO Regions Headquarters with Bank's procurement Consultant with the approval of the task leader World Bank
- Frequent orientation trainings to be imparted to new officers as and when they take position
- Internal Auditors and staff of Finance Departments also to be trained at ASCI, Hyderabad and in Workshops conducted by World Bank Procurement Consultant

- MDPU Procurement cell to be strengthened
- The Bank will also carry out Post review contracts through separate consultants engaged by it
- The supervision mission from World Bank shall also review the procurement activities and suggest corrective measures

4. Training

MDPU shall arrange for the following:

1. Training to all Nodal procurement officers of all line departments and the WRO procurement cell will be at ASCI, Hyderabad or similar institute NIFM
2. Procurement workshops will be held in Tamil Nadu for all SEs and EEs of Sub-Basins and Nodal officers of the line department and new substitute posted in their positions
3. Annual refresher courses will be held to train any new entrant to the Project
4. The bank will also organize workshops one in each region where officials of all departments involved in the project may participate.

Chapter - 15

A. State Water Resources Management Agency (SWaRMA)

1. Objective

- To improve Institutional arrangements for sustainable water resources management in the State
- To create a platform of experts in the water sector to jointly advise the WRCRC and the Government with innovative and scientifically based inputs and policy reforms for the efficient and economic sustainability of the water resources
- To establish a structured stakeholders forums
- To function as Apex River Basin Board of the individual River Basins to be formed in the State similar to piloted Palar and Tamiraparani River Basin Board
- Awareness raising and encouraging applied research on key water issues and carry out research projects pertaining to water resource management and dissemination of such reports to public
- This will be headed by an experienced and qualified Technical officer with adequate field experience assisted by competent staff inadequate numbers and resources
- The establishment and operation of the SWaRMA will be by amalgamating the IWS and the DATA center in CE, SGSWRDC
- Awareness raising and applied research on key water issues The Water Resources Research fund will also be operated by this Agency through the recommendations of a Research Advisory Committee and as approved by the Empowered committee

B. Water Resources Research Fund

1. Objective

- To advise the Government on all policy reforms required any legislation concerning environment
 - To promote the culture of applied research among water and irrigation professionals
 - To identify and support applied and problem solving research
 - To promote research on social issues like participation of farmers and women in field activities
- WRRF shall be initially administered by the Chief Engineer IWS and later it will be manned by SWaRMA in which a separate committee will be constituted with Chief Engineer IWS as Member secretary

- The funds for this will be on the same terms and conditions similar to the earlier WRCP where one third of the fund reimbursed had been deposited as an interest bearing deposit and as a corpus fund to conduct on competitive Grant basis by all sections of the society
- The RAC will comprise of Senior Experts with experience in
 - Water Resources Engineering
 - Agriculture
 - Environmental Science
 - Economics
 - Social sciences
 - Urban and Industrial Sector
 - Engineer-in- Chief or his delegate as Member -Secretary

2. Responsibilities of the RAC

- Organize publication of thrust areas of research inviting expression of interest from Research Institutes within the State as well as from other States
- Identify problem areas based on experience and needs expressed on various forums and on the observations of the Chief Engineer, Plan Formulation during his field visits, IHII during model studies conducted by it and by the IWS with its experience in data collection and IMTI on its experience during trainings etc
- From the proposals received from Research Institutes short listing will be made and after ensuring their responsiveness for the qualification criteria the preferable Institute and the subject matter will be recommended to SWaRMA which will after satisfying itself forward to the Empowered Committee for approval and inclusion in the annual work plan to be sent by MDPU to Finance Department and to Bank for its clearance
- As soon as the clearance is received from the Bank necessary agreement will be concluded and work will be commenced as per agreed action in the agreement
- RAC will monitor the Research progress and suggest Midcourse corrections and obtain the final conclusions and its recommendation
- The acceptance of the reports of the institutions and their recommendation will be communicated by SWaRMA to the Government for follow up action with an action plan drawn and the policy reforms required etc

Chapter - 16**Irrigation Research Fund****1. Objective**

- To foster research in irrigation development and management.
 - To give an exposure to the officers of the WRO on the advances and state-of art in irrigation and drainage operations.
 - To blend the computer technology in canal automation and to train officers and the farmers for efficient and effective utilization of these systems
 - To streamline the systems and processes for more efficient Business Process Improvement and Change Management programme.
 - To encourage WUAs and the stakeholders on innovative programmes of their participation in small agro-enterprises to compete with the growing market opportunities with the available limited water resource.
- These will involve selection of right persons /organization/Research Institutes. To enable processing and fixing right agencies the IAMWARM cell in Engineer-in-Chief office shall function as the nodal office guided by an Irrigation Research Committee and follow the procurement and monitoring activities with a corpus fund to tune of Rs 13.5 Crores under this project. The procedure for securing this fund will be on similar lines for WRRF but will be operated by the Joint Chief Engineer of the IAMWARM Project Cell in Engineer-in-Chief office based on the recommendations of the Irrigation Research Advisory committee to be constituted by the Government in consultation with the Engineer-in-Chief.

Annexure - 1

Social and Environmental Management Framework

| Component: A Irrigated Agricultural Modernization | | | | | |
|---|---|--|---|--|--|
| Project Interventions | Environmental | | Social | | |
| | Potential Negative Environmental Impacts | Mitigatory Measures | Potential Negative Social Impacts | Mitigatory Measures | Responsible Agency |
| 1 | 2 | 3 | 4 | 5 | 6 |
| 1. Modernization of Irrigation Infrastructure (system/non-system/ rain fed tanks, distribution system, pump set efficiency) | <ul style="list-style-type: none"> • Accumulation of debris due to desiltation. • Flooding during periods of heavy rains • Water scarcity during periods of drought. • Induced impact of increased pesticide and fertilizer use • Increase in over all use of water resources • Likelihood of breaches to dams and tanks, | <ul style="list-style-type: none"> • Spreading the debris and leveling the banks of water bodies. • Inter connectivity of canals, feeder channels, tanks etc in the basin • Monitoring and maintenance of water distribution mechanisms • Promoting organic farming with improved training. • Awareness campaigns in water conservation • Making inventories of geological and physiographical features using GIS. | <ul style="list-style-type: none"> • Decrease in drinking water quality due to accumulation of minerals • Possibility of water borne diseases • Social hierarchy in harnessing water sources causing disturbed social relations. | <ul style="list-style-type: none"> • Establishment of Mini water treatment units. • Creating awareness for hygiene and community participation in common property resource management. • Ensuring equitable distribution of water through WUAs. | <ul style="list-style-type: none"> • WRO/MDPU • WRO/MDPU/ Dam Safety Department etc. |

ANNEXURE - 1

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| <p>2. Institutional modernization for irrigation agriculture (asset inventory; management plans for dams, tanks and irrigation infrastructure; agricultural, horticultural, livestock and fisheries data; and modernization of documentation, computerization, LAN and WAN, Information management and sharing, public interaction, coordination of line departments)</p> | <ul style="list-style-type: none"> • Dilapidated dams pose a hazard through breaching and over flows. • Risk of crop failure and low yield of horticultural produce. • Infestation by pests. • Depletion in fish resources. | <ul style="list-style-type: none"> • Dam safety through rehabilitation and maintenance is required. • Proper designing and maintenance of dams and tanks, and quality control. • Selection of suitable crops for both mono-crop and poly-crop irrigated agriculture and promoting organic farming. • Effective measures as per the Pest Management Plan • Treatment of industrial effluents and pollutants to prevent contamination of the water bodies in the drainage system. | <ul style="list-style-type: none"> • Lapses in coordinating and strategizing the irrigation infrastructure may cause periods of food systems failure. • Lack of full-fledged data on geographical, ecological and traditional knowledge systems and lack of sharing and coordination will be an impediment to the effective implementation of the project. | <ul style="list-style-type: none"> • As a safe guard alternative sources of livelihood management in non-farm activities like tailoring, leaf plates, candle making, and computers need to be taken care of. • Collection, compilation, up gradation. Computerization and sharing of data relating to census of human population and livestock, forests, agriculture, horticulture and fisheries would help in developing right strategies for sustainability of the project. | |
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| | | | <ul style="list-style-type: none">• Cultural Property: Tanks have played an important role in the culture of a community and several cultural and religious customs and rituals are intertwined with the scarcity of the tank. The project interventions may affect some such cultural properties located on or next to the 'tank structure' (e.g. on the tank bund, in the tank bed). However,• Measures taken to improve the tank system will be taken favorably by the village community, if the scarcity of cultural landscapes is not disturbed. | <ul style="list-style-type: none">• Care should be taken in not disturbing the scarcity and emotional bondage to burial grounds, shrines of folk deities on tank bed, small places of worship on tank embankment, temples close to the waste weir and sacred trees/groves due to project interventions. | |
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ANNEXURE - 1

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| <p>3. Agricultural Diversification Fisheries, Horticulture, Livestock.</p> | <ul style="list-style-type: none"> • Pesticide & fertilizer use: Although the project will not finance fertilizers and pesticides, induced impacts of increased fertilizer and pesticide use (mainly because of diversification of cropping patterns and increased cropping intensity) will probably take place in the project area - in both the command and catchments areas -- due to agricultural extension activities. | <p>It is proposed to strengthen awareness and training activities for integrated pest management on use of organic manure, etc for both the command and catchments farmers. (Pest Management Plan may be referred, Annex-)</p> | <p>Although the proposed project activities may not cause or induce any significant adverse impacts on the public health front, contaminated drinking water source may create health problems.</p> | <p>The proposed project provides an opportunity to enhance the management of preexisting public health concerns in the basin.</p> | <p>WRO/TNAU WRO/TNAU/Dept. of Fisheries, Agriculture</p> |
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| <p>4. Sustainable Agriculture Modernization (cropping systems diversification and management, integrated pest and nutrient management, public private partnerships,</p> | <ul style="list-style-type: none"> • Risk of crop failure due to non adoptability of certain crops to different soils and agro-climatic zones. | <ul style="list-style-type: none"> • Diversification of cropping system needs to be undertaken using the expertise and knowledge of the local farmers and agricultural extension workers. • Nutrient management and pest control using indigenous knowledge base and organic farming combined with modern pest management techniques needs to be adopted. | <ul style="list-style-type: none"> • Lack of adequate price structure and procurement mechanisms to promote income generation to the farmers leads to exploitation by middle men and uncertain market conditions. | <ul style="list-style-type: none"> • Public-private partnerships may be promoted to facilitate storage facilities; direct market linkages (like Rythu Bazaars in AP) and access to IT kiosks would help in getting fair price to the farmers. | <ul style="list-style-type: none"> • GoTN / Agricultural Engineering Department |
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ANNEXURE - 1

| Component: B Water Resources Management | | | | | |
|---|--|---|--|---|--|
| Project Interventions | Environmental | | Social | | Responsible Agency |
| | Potential Negative Environmental Impacts | Mitigatory Measures | Potential Negative Social Impacts | Mitigatory Measures | |
| 1 | 2 | 3 | 4 | 5 | 6 |
| <p>1. State Level interventions: Effective implementation of the Policies/Acts related to the Resource regulatory mechanisms.</p> <p>2. Basin Level interventions: Execution of the State's Policies.</p> | <p>Though the proposed project won't lead to the following issues, State Level Committees must address the issues like</p> <ul style="list-style-type: none"> • Encroachment of catchments, riverbeds, supply channels, tank beds. • Sand mining | <p>A separate Resettlement Action Plan has to be adopted.</p> <p>Non judicial and excessive sand mining has to be controlled. Mining to be regulated in the riverbed considering the following:</p> <ul style="list-style-type: none"> • Sand to be mined evenly in the river bed without detrimental to the natural aquifer and the ground water at that location | <ul style="list-style-type: none"> • Watershed Management • Waste Land Development • Women's Issues | <ul style="list-style-type: none"> • Inter linking of supply channels has to be taken up. Creation of percolation tanks to hold run-off water must be implemented and maintained. • Waste lands in the sub basin should be used for horticulture crops/bio-diesel plants with less water and using organic farming. • Measures have to be taken in accordance with the gender action plan annexed at VI. | <p>MDPU/WRO</p> <ul style="list-style-type: none"> • Dept. of Agriculture/GoTN • GoTN/MDPU/TNCDW |

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| <ul style="list-style-type: none"> • Ground water quality | <ul style="list-style-type: none"> • Flow in the river to down stream should not be affected due to mining. • Quantum of replenishment of sand every year at the location is to be assessed and mining to be planned. • Dye effluents, sand mining etc has degraded the ground water quality. CETP/STPs have to be established wherever necessary and illegal sand mining has to be controlled. | <ul style="list-style-type: none"> • Livestock reduction • Lack of market linkages | <ul style="list-style-type: none"> • Livestock provision and management • Farmers have to be linked with the IT kiosk for information and backward and far ward linkages has to be established. | <ul style="list-style-type: none"> • Dept. of Animal Husbandry • GoTN/MDPU |
| <ul style="list-style-type: none"> • Sea water intrusion | <ul style="list-style-type: none"> • This can be achieved by controlling sand mining and minimizing the extraction of ground water. <p>Afforestation of barren & hilly slopes should be carried out. To protect forests the following are to be considered</p> | <ul style="list-style-type: none"> • Drinking water problem • Public Health | <ul style="list-style-type: none"> • Establishment of mini treatment plans to supply safe drinking water. • Waterborne diseases has to be controlled through action plans and awareness campaigns | <ul style="list-style-type: none"> • WRO/GoTN • MDPU/WRO • WRO/MDPU |
| <ul style="list-style-type: none"> • Deforestation | | <ul style="list-style-type: none"> • Lack of awareness/information | <ul style="list-style-type: none"> • Formers have to be enlightened on environmental issues | |

ANNEXURE - 1

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| | | <ul style="list-style-type: none"> Active participation of local population through VSSs for regenerating degraded forests. Implementation of eco development programmes | <ul style="list-style-type: none"> Deforestation of the Mangrove, grass lands and savannah wood lands, the characteristic floristic zones in these river basins, has affected the subsistence and survival strategies of the indigenous people like Irulars, Kanikars, Paliyans, Sholagas and Nari Kurugas who depend upon these forests for wild plant foods, honey, small game and minor forest produce. | <ul style="list-style-type: none"> Regeneration of these forested eco systems would not only benefit the indigenous peoples but also helps bio-diversity conservation. Developing social forestry to meet the demand for the fuel wood and fodder. | <ul style="list-style-type: none"> Dept. of Forest/GoTN |
| | <ul style="list-style-type: none"> Siltation | <p>Desilting must be done regularly. This silt and sediments cause not only the reduction in the storage capacity of the lake, but also accumulation of the nutrients that promote pollution of lake water and luxurious growth of aquatic weeds, algae and bio-organisms. To avoid this desilting and dredging work has to be given importance</p> | | | |

| | | | | | |
|--|--|--|--|--|--|
| | Aquatic weed, viz., Hyacinth, Ipomeas and Prosopis | <ul style="list-style-type: none"> The weeds along with channel courses can be removed by mowing using power equipment provided the banks of channels are relatively smooth and not too steep. The mowing operation is usually required at rather frequent intervals to control weed growth. A heavy chain attached between two tractors can be dragged down the channel for removing the weeds grown in it. The chain tears the rooted weeds from the bottom. The weeds can be controlled chemically by spraying 2,4-D, glyphosate or paraquat weedicides as post emergence herbicides. However, in the use of above chemicals for the control of these weeds, special care is required as all these chemicals are unsafe to crops grown in the command area and fish life. It is recommended that spraying of 2,4-D can be taken up in the dry season | | | <ul style="list-style-type: none"> MDPU/WRO <p>GoTN/MDPU/WRO/EC</p> |
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ANNEXURE - 1

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| | <ul style="list-style-type: none"> • Solid waste Management | <p>or when there is no water in the channel or during the agricultural off seasons.</p> <ul style="list-style-type: none"> • In small areas or lightly infested areas, the best way to control all these weeds is by manual weeding. <p>Steps should be taken to control the dumping of coir and domestic wastes in the canals. The principal methods of refuse disposal are:</p> <ul style="list-style-type: none"> • Dumping • Controlled on sanitary land fill • Incineration • Composting • Manure pits • Burial | | | | <ul style="list-style-type: none"> • WRO/MDPU/EC |
| <p>3. Water Resources Research Fund</p> <p>Suggested Studies are</p> <ul style="list-style-type: none"> • Degradation of catchments area and its impact on the river basin • Sustainable use of Ground Water • Crop Diversification and optimal crop pattern • Status and feasibility of Integrated Pest Management (IPM) and Organic farming • Study of aquatic Eco System • Project impact on socio-economic issues of the Basin • Need assessment Studies. | | | | | | |

Annexure - 2

Objectives of WRO Implementation Plan

Objective #1 Restoring the capacity of the Irrigation Storage Structures (surface water)

- a) Desilting, De-weeding
- b) Removal of encroachments
- c) Rehabilitation of the dilapidated structures
- d) Strengthening the Bunds
- e) Repairs / Renewal of shutters
- f) Checking the rubber seal in the shutters to prevent leakages

Objective #2 Restoring the carrying capacity of the Channels/Rivers

- a) Desilting, De-weeding
- b) Removal of encroachments
- c) Strengthening the Bunds
- d) Rehabilitation of Sluices
- e) Selective Lining
- f) Bringing the Cross masonry structures to proper condition for effective discharging of the channel flow
- g) Providing measuring structures wherever necessary
- h) Providing River Training Works for confining the Maximum Flood Discharge within the boundaries of the river
- i) Sand Quarrying is to be restricted to the extent that it does not interfere with the River Ecology and Environmental aspects
- j) Where excess siltation, scouring in the rivers affect the flow in the river, then Groynes at suitable places are to be provided

Objective #3 Harnessing the Ground Water Quality/Potential in deficit areas

- a) De-silting the existing recharge wells located in Tanks
- b) Providing Recharge wells in Tanks
- c) Construction of Check Dams
- d) Counter measures to improve the quality of Polluted water
- e) Creating awareness on the conjunctive use of water, water depletion, pollution and suitable counter measures

Objective # 4 Restoring the Command Area

- a) For the canals having less command-ability due to scouring in the river near the off-take points, Bed dams to be provided
- b) During normal flow in the river/canals the command ability in the command areas of the branch canal is to be checked and problems pertaining to non-command ability analysed in detail, solutions arrived for bringing the entire area under command ability, if necessary with mutual consultations with the WUAs.

Objective # 5 Quality of work in Execution

- a) Quality must be the primary concern of Engineers
- b) All the materials used on work and Concrete are to be tested as per the Quality Control Manual released by WRO & specifications of Bureau of Indian Standards (BIS)
- c) Records pertaining to Quality Control are to be maintained properly by the Engineer in-charge of the work and superior officials must check and give suitable instructions during inspections. OK cards should be maintained

Objective # 6 Completion Plan & Completion Report

- a) Before final payment for the work the completion plan & completion Report should be made ready and they should be recorded simultaneously with the payment of final bill for the work
- b) Detailed Completion Report on Physical & Financial aspects of the work is to be thoroughly scrutinized and sent to the HOD within one month from the date of final payment so as to furnish to the World Bank

Objective # 7 Impact Evaluation - Data on Sub Basin Water Potential

- a) Levels are to be taken for all the Water Bodies (Storage Structures) and Depth vs Storage Capacity Tables prepared and standardized
- b) Storage in all the Water Bodies of the Sub basin on fortnightly basis is to be compiled for the Sub Basins
- c) Periodical meetings with Line Departments IAMWARM field days etc & WUAs are to be conducted and based on the water availability, water budgeting is to be prepared for the system/tanks grouped according to the geography of the area in the Sub Basin. The storage situation & season forecast are to be analysed in detail for enabling to prepare a mutually agreed comprehensive Cultivation Plan that will project a water demand matching with the water availability during the cultivation period.
- d) This water budgeting is to be reviewed periodically every fortnight and corrections effected for the assured delivery of water

Annexure - 3

Results Framework and Monitoring

Tamil Nadu Irrigated Agriculture Modernization and Water-Bodies Restoration and Management Project

| PDO | Project Outcome Indicators | Use of Project Outcome Information |
|--|---|---|
| Sub-basin stakeholders increase the productivity of irrigated agriculture in a sustainable water resources management framework | <ul style="list-style-type: none"> % increase in value of crop production per unit of irrigation water supply increase in area under micro-irrigation % increase in area under high value crop % increase in targeted farmers' incomes compared to other (WOP) farmers Enhanced sustainable water resources planning capacity | <ul style="list-style-type: none"> Improved activity and resource management Designing future interventions |
| Intermediate Outcomes | Intermediate Outcome Indicators | Use of Intermediate Outcome Monitoring |
| <p><u>Component A: Irrigation systems modernization in a Sub-Basin framework</u></p> <p>Modernized irrigation systems and service delivery and management for tank-based systems (sub-component A1) and canal-based systems (A2)</p> | <ul style="list-style-type: none"> Physical modernization: % of schemes completed within planned time and costs, Tank systems modernized (number & Ayacut area) % increase in water availability and conveyance efficiency increase in area fully irrigated Joint preparation and implementation of Sub-Basin development plans across relevant implementing agencies | <ul style="list-style-type: none"> Preparation of Development and implementation plans for all Sub-Basins Adaptive project management Supervision planning Outlining additional needs |
| <p><u>Component B: Agricultural intensification and diversification</u></p> <p>Increased productivity of irrigated agriculture and allied sectors in project Sub-Basins for tank-based systems (sub-component B1) and canal-based systems (B2)</p> | <ul style="list-style-type: none"> % increase in area under SRI % increase in marketing surplus/commodity arrival to markets Number of market information kiosks increase in crop/animal, and fisheries production % area covered by IPM/INM/Organic farming Number of new agricultural enterprises/Value chains Developed | <ul style="list-style-type: none"> Adaptive project management (e.g. improved targeting of intensification and diversification efforts) Supervision planning Outlining additional needs |
| <p><u>Component C: Institutional modernization of irrigated agriculture</u></p> <p>Improved institutional capacity for modern irrigation service delivery in the State</p> | <ul style="list-style-type: none"> % staff trained/members of relevant professional associations Number of WUAs set up and trained, and effective Irrigation information management systems set up and functional | <ul style="list-style-type: none"> Adaptive project management (e.g. Design of training program and better use of information systems; Capacity building for irrigation department staff and WUAs) |
| <p><u>Component D: Water resource management</u></p> <p>Improved institutional arrangements and capacity for sustainable water resources management in the State and selected basins</p> | <ul style="list-style-type: none"> State Water Resources Management Agency created and strengthened Basin Boards set up/strengthened for 3 Sub-Basins and 1 basin by end of project Improved knowledge base and analytical capacity development and use for water resources management | <ul style="list-style-type: none"> Adaptive project management Identification of future technical assistance requirements Design of basin management interventions Improve the coordination among all agencies involved in WRM. |
| <p><u>Component E: Project management support</u></p> <p>Satisfactory project coordination and monitoring and evaluation</p> | <ul style="list-style-type: none"> MDPU adequately staffed All Sub-Basin plans appraised Monitoring reports of satisfactory quality submitted every six months Effective project management (reporting, financial management, procurement, etc.) | <ul style="list-style-type: none"> Adaptive project management Inter-agency coordination |

Arrangements for results monitoring

| Project Outcome Indicators | Target Values | | | | | | | Data Collection and Reporting | | |
|---|--|---|---|---|---|---|---|-------------------------------|-----------------------------|------------------------------------|
| | Baseline | YR1 | YR2 | YR3 | YR4 | YR5 | YR6 | Frequency and Reports | Data Collection Instruments | Responsibility for Data Collection |
| • % increase in value of crop production per unit of irrigated water (wrt WOP) | 0% | 0% | 15% | 40% | 60% | 80% | 100% | Annual | Survey | Line dept/ M&E agency/MDPU |
| • Increase in area under micro-irrigation | 0 ha | 0 ha | 20,000 ha | 40,000 ha | 50,000 ha | 75,000 ha | 100,000 ha | Annual | Survey | Line Dept/ &E agency/MDPU |
| • % increase in area under high value crop (wrt WOP) | 0% | 1% | 3% | 9% | 15% | 24% | 30% | Annual | Survey | Line dept/M&E agency/MDPU |
| • % increase in targeted farmers' incomes compared to other (WOP) farmers | 0% | 0% | 5% | 10% | 20% | 30% | 50% | Annual | Survey | External M&E agency/MDPU |
| • Joint preparation and implementation of Sub-Basin development plans across relevant implementing agencies | 9 Sub-basin Plans prepared for YR1 | Sub-basin Plans updated/ implemented as scheduled & 17 prepared for YR2 | Sub-basin Plans updated/ implemented as scheduled & 37 prepared for YR3 | Sub-basin Plans updated/ implemented as scheduled | Sub-basin Plans updated/ implemented as scheduled | Sub-basin Plans updated/ implemented as scheduled | Sub-basin Plans updated/ implemented as scheduled | Annual | Annual Reporting | Line dept/MDPU |
| • Enhanced sustainable water resources planning capacity | State Water Framework and Environmental Plans prepared for most TN Basins; 2 existing Basin Boards | State Water Resources Management Agency (SWaRMA) setup | Knowledge base and stakeholder consultations initiated | Decision Support Systems developed for 2 (sub) basins | Draft Basin Plans for 2 (sub)basins with stakeholder & analytical | Draft plans prepared for 3 Sub-Basins and 1 basin | At least 3 Sub-basin and 1 Basin Board formed | Annual | Annual Reporting | SWaRMA |

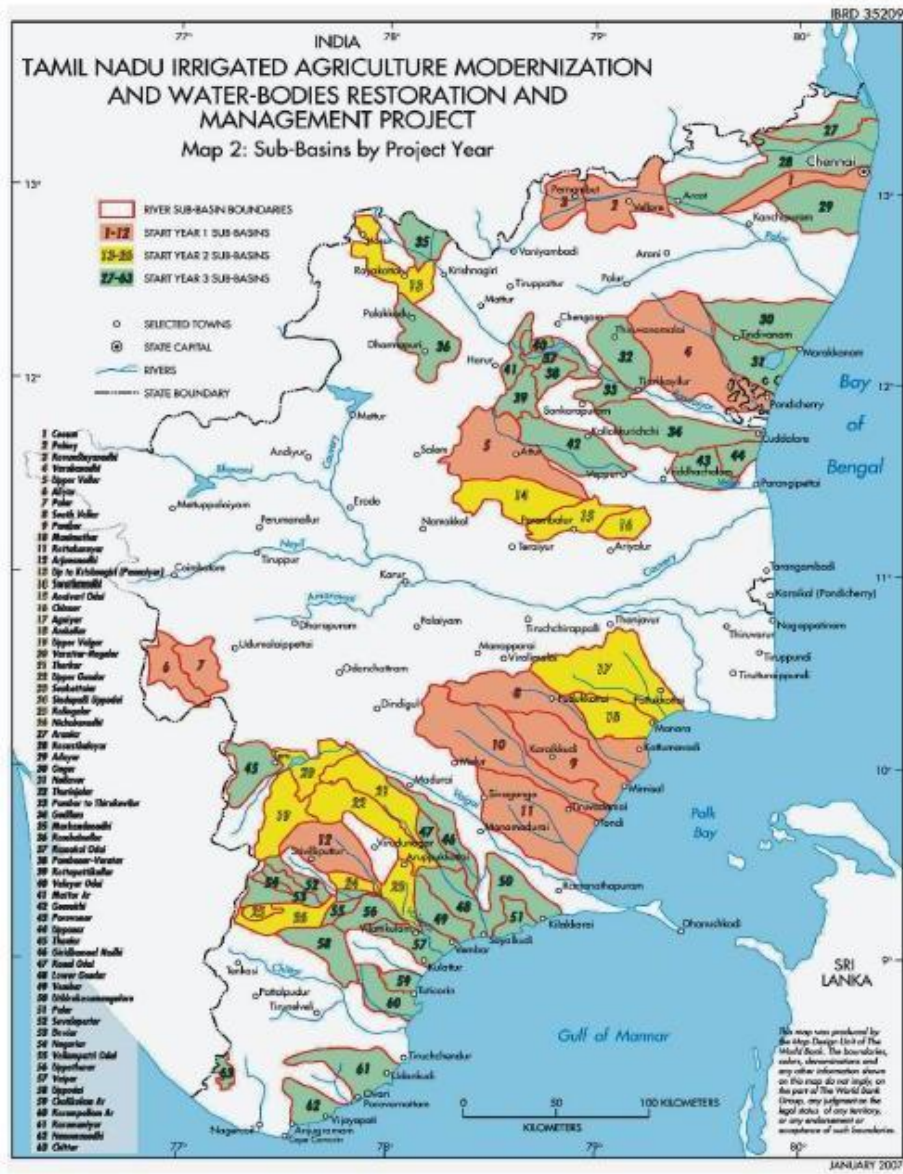
| Intermediate Outcome Indicators | Baseline | YR1 | YR2 | YR3 | YR4 | YR5 | YR6 | Frequency and Reports | Data Collection Instruments | Responsibility for Data Collection |
|--|--|--|---|--|---------------------------------------|---------------------------------------|--|-----------------------|-----------------------------|------------------------------------|
| Irrigation systems modernization in a Sub-Basin framework <ul style="list-style-type: none"> • % of schemes completed within planned time & cost. • Additional tank systems modernized (no. and ha.) • % increase in conveyance efficiency • % increase in area fully irrigated • Integration of the work of different line agencies for selected Sub-Basins | 0% | 5% | 20% | 40% | 60% | 80% | 100% | Half yearly | Report | Line dept/MDPU |
| | 0 tanks (0 ha) | 200 tanks (30,000 ha) | 500 tanks (70,000 ha) | 1,000 tanks (140,000 ha) | 2,850 tanks (200,000 ha) | 4,200 tanks (300,000 ha) | 5,700 tanks (400,000 ha) | Half yearly | Report | WRO/MDPU |
| | 0% | 0% | 5% | 10% | 15% | 20% | 25% | Half yearly | Report | Line dept/MDPU |
| | 0% | 0% | 8% | 15% | 20% | 30% | 40% | Annual | Report | Line dept/MDPU |
| | 9 integrated Sub-Basin plans drafted | 9 integrated Sub-Basin plans finalized | 17 integrated Sub-Basin plans drafted (9 updated) | 37 integrated Sub-Basin plans drafted (26 updated) | 63 integrated Sub-Basin plans updated | 63 integrated Sub-Basin plans updated | 63 Sub-Basin plans updated & 63 Sub-Basin ICRs completed | Half yearly | Report | Line depts. / MDPU |
| Agricultural intensification and diversification <ul style="list-style-type: none"> • increase in crop/animal, and fisheries production • % increase in area covered by IPM/INM/Organic farming • % increase in value of marketing surplus/commodity arrival to markets • Number of market information kiosks • Number of additional agricultural enterprises/value chains developed | 000 tons/yr 0 Crops 0 Milk 0 Fish | 0 Crops 0 Milk 0 Fish | 500 Crops 50 Milk 2 Fish | 1,500 Crops 200 Milk 10 Fish | 2,000 Crops 300 Milk 15 Fish | 3,000 Crops 450 Milk 20 Fish | 4,000 Crops 590 Milk 25 Fish | Annual | Survey | Line dept/M&E agency/MDPU |
| | 0% | 0% | 2% | 5% | 10% | 15% | 25% | Annual | Survey | Line dept/M&E agency/MDPU |
| | 0% | 5% | 10% | 30% | 45% | 60% | 75% | Half-Yearly | Marketing data/Reports | Line dept/M&E Agency/MDPU |
| | 0 | 0 | 20 | 50 | 100 | 150 | 200 | Annual | Project Reports | Line dept/M&E Agency/MDPU |
| | 0 enterprises 0 Value chains | To be determined (tbd) | tbd | tbd | tbd | tbd | tbd | Annual | Survey | Line dept/M&E Agency/MDPU |

ANNEXURE - 3

| Intermediate Outcome Indicators | Baseline | YR1 | YR2 | YR3 | YR4 | YR5 | YR6 | Frequency and Reports | Data Collection Instruments | Responsibility for Data Collection |
|--|---|---|--|---|---|--|---|-----------------------|-----------------------------|------------------------------------|
| Institutional modernization of irrigated agriculture | | | | | | | | | | |
| <ul style="list-style-type: none"> ▪ % of targeted staff trained/members of professional associations | Fragmented training | 10% (& training cell setup in WRO) | 30% | 50% | 65% | 80% | 100% | Annual | Report | MDPU/Line Dept |
| <ul style="list-style-type: none"> ▪ Number of WUAs set up, trained, and effective | WUAs set up only in 2 Sub-Basins among the 63 project Sub-Basins | Preparation for WUA setup; elections | 300 additional WUAs set up in project Sub-Basins | 1000 additional WUAs set up in project Sub-Basins | 2000 additional WUAs set up in project Sub-Basins | 2500 additional WUAs set up in project Sub-Basins | 2500 additional WUAs set up in project Sub-Basins | Annual | Report | MDPU/WRO |
| <ul style="list-style-type: none"> ▪ Irrigation information management systems set up and functional | No Irrigation IMS | IMS inception | IMS designed; data input initiated | IMS piloted | IMS deployed | IMS tested | IMS fully operational; 25% of staff able to use IMS | Annual | Report | MDPU/WRO |
| Water resource management | | | | | | | | | | |
| <ul style="list-style-type: none"> ▪ State Water Resources Management Agency created and strengthened | Institute for Water Studies and State Surface and GW data center in place | State Water Resources Management Agency (SWaRMA) created | | SWaRMA powers defined | | | SWaRMA, Basin Boards, and the analytical/structured stakeholder processes setup | Annual | Report | SWaRMA/ MDPU |
| <ul style="list-style-type: none"> ▪ Basin Boards set up and strengthened for 4 additional basins | Basin Boards setup for Palar/Thambiraparani basins | Stakeholder consultation in 2 other (sub)basins | | Stakeholder consultations in 4 (sub) basins | Basin Plans developed for 3 (sub) basins | Integrated plans developed for at least 3 Sub-Basins and 1 basin | are best-practice for sustainable water resources planning in India | Annual | Report | SWaRMA/ MDPU |
| <ul style="list-style-type: none"> ▪ Improved knowledge base and analytical capacity development & use for IWRM | Initial GIS data collected for all basins; fragmented modeling capacity | Basin Atlas /State of basin report; concept and pilots for 2 basins | Basin Atlases developed for 6 Basins | Strategic Social & Environment Assessments and DSS developed for 3 (sub) basins | | | At least 3 Sub-basin & 1 Basin Board setup | Annual | Report | SWaRMA/ MDPU |

| Intermediate Outcome Indicators | Baseline | YR1 | YR2 | YR3 | YR4 | YR5 | YR6 | Frequency and Reports | Data Collection Instruments | Responsibility for Data Collection |
|---|--|--|--|--|--|--|--|---------------------------|-----------------------------|------------------------------------|
| Project management support | | | | | | | | | | |
| <ul style="list-style-type: none"> Multi-Disciplinary Project unit adequately staffed | MDPU setup with core staff | MDPU fully staffed | MDPU fully staffed | MDPU fully staffed | MDPU fully staffed | MDPU fully staffed | MDPU fully staffed | Annual | Reports | MDPU |
| <ul style="list-style-type: none"> All Sub-Basin plans appraised | 9 first-year Sub-Basin plans appraised | 17 Sub-Basin plans fully appraised | 37 Sub-Basin plans fully appraised | Updated Sub-Basin plans managed for quality | Updated Sub-Basin plans managed for quality | Updated Sub-Basin plans managed for quality | Updated Sub-Basin plans managed for quality | Half Yearly | Reports | MDPU |
| <ul style="list-style-type: none"> Project monitoring reports of satisfactory quality submitted every six months | No project reports | Quarterly progress reports and semi-annual monitoring reports prepared | Quarterly progress reports and semi-annual monitoring reports prepared | Quarterly progress reports and semi-annual monitoring reports prepared | Quarterly progress reports and semi-annual monitoring reports prepared | Quarterly progress reports and semi-annual monitoring reports prepared | Quarterly progress reports and semi-annual monitoring reports prepared | Quarterly and Half yearly | Reports | MDPU |
| <ul style="list-style-type: none"> Effective project management (reporting, financial management, procurement, etc.) | Project Director in place | Project director in place with timely project management and quality oversight by MDPU | Project director in place with timely project management and quality oversight by MDPU | Project director in place with timely project management and quality oversight by MDPU | Project director in place with timely project management and quality oversight by MDPU | Project director in place with timely project management and quality oversight by MDPU | Project director in place with timely project management and quality oversight by MDPU | Annual | Reports | MDPU |

Annexure - 4



Annexure 5**Definitions**

1. "Annual Work Program" means the Project Implementing Entity's annual work program and budget for each line agency involved in the implementation of the Project, developed on the basis of each respective agency's Sub-basin Development Plan (as this term is hereinafter defined).
2. "ABDF" means Agribusiness Development Facility to be established by the Project Implementing Entity to increase stakeholder access to finance and business development services.
3. "ATMA" means the Project Implementing Entity's Agricultural Technology Management Agencies, established under the Recipient's Societies Registration Act, 1860.
4. "Beneficiary" means an individual farmer, an organized group of farmers, an agribusiness or stakeholder group meeting the eligibility criteria set forth in the Operations Manual (as this term is hereinafter defined) and to which the Project Implementing Entity has made or proposes to make a Grant (as this term is hereinafter defined) through the Innovative Grant Fund (as this term is hereinafter defined), Irrigation Research Fund (as this term is hereinafter defined) or Water Resources Research Fund (as this term is hereinafter defined).
5. "ESA" means the Project Implementing Entity's Environment and Social Assessment, satisfactory to the Association and the Bank, furnished to the Association and the Bank on September 27, 2006, which includes an Environmental and Social Management Framework (ESMF), whose objective is to address environmental and social issues and impacts arising from, or likely to result from, the carrying out of the Project, which sets forth the environmental, pest management, cultural property, involuntary resettlement and safety of dams-related actions, measures and policies applicable to the design and implementation of the Project.
6. "Irrigation Research Fund" means the funding mechanism to be established by the Project Implementing Entity under the provisions of the Project Agreement, whose purpose is to provide Grants to Beneficiaries for applied research in improved irrigation technologies.
7. "MDPU" means the Project Implementing Entity's Multi-Disciplinary Project Unit, responsible for Project coordination activities for the Project and the facilitation of Project implementation by the line departments and other agencies of the Project Implementing Entity.
8. "Operations Manual" means the Project's Operations Manual, adopted by the Project Implementing Entity, satisfactory to the Association and the Bank, containing, inter alia, the

operating procedures for the carrying out of the Project, including the criteria for the eligibility and selection of Beneficiaries to receive Grants and the procedures for the carrying out of Sub-Activities.

9. "Project Area" means 63 Sub-Basins in the State of Tamil Nadu, covering about 660,000 hectares of cultivable land, selected by the State of Tamil Nadu and approved by the Association and the Bank.
10. "Project Implementing Entity" means the State of Tamil Nadu or the Recipient or any successor thereto.
11. "PSC" means the Project Implementing Entity's Project Steering Committee whose responsibilities include the provision of oversight and policy guidance to those responsible for the carrying out of the Project.
12. "Sub-basin Development Plans" means the work program plans for each Sub-Basin in the Project area, prepared and developed by the Project Implementing Entity's line agencies responsible for the Project with the involvement of various stakeholders including, without limitation, representatives of the WUA established in the respective Sub-Basin, the private sector and the local community.
13. "Water Resource Research Fund" means the funding mechanism established by the Project Implementing Entity under the Tamil Nadu Water Resources Consolidation Project (Credit No. 2745-IN) whose purpose is to provide matching grants to promote targeted studies, awareness raising and applied research into key water issues facing the Project Implementing Entity.
14. "WUAs" means water user associations established pursuant to the Tamil Nadu Farmer Management of Irrigation Systems Act, March 2002.

Annexure - 6

Reporting, Monitoring and Evaluation

| | |
|---|---|
| Monitoring: | |
| <i>Definition</i> <i>Periodical and close monitoring helps achieving the intended results.</i> | Monitoring aims regular feedback and early indications of progress or lack thereof in the achievement of intended results. It tracks the actual performance against what was planned or expected according to pre-determined standards. |
| Monitoring mechanism: | |
| Field Inspection by HOD / MDPU members: | |
| <i>Project Cell has greater role.</i> | <ul style="list-style-type: none"> • HOD to have random visit to the sub basin area at least once in 3 months. • The project cell formed at HQ to visit the project area and monitor the progress. • MDPU members to make random visits to sub basin area at least once in 6 months for technical guidance. • QIR on inspection / field visits by HOD and report to be furnished to Govt. with copy marked to MDPU. |
| Sub Basin Level Monitoring: | |
| <i>Weekly Inspections should be performed.</i> | <ul style="list-style-type: none"> • Nodal officers of the Sub-basins to have continuous monitoring of the project implementation. • to make regular weekly field visits • Monthly inspection report should be furnished to HOD. |
| Reporting mechanism: | |
| <i>Quarterly / Monthly Progress Reports should be furnished in time</i> | <ul style="list-style-type: none"> • to furnish fortnightly, monthly and quarterly progress reports to the HOD (Physical & financial reports) • Reporting format containing all required information should be prescribed by HOD. • Calendar for reporting to the higher authorities is as given below. |

| Description | From whom | To whom | Date of furnishing |
|-----------------------------|-------------------------|---------------------------------|--|
| Fortnightly Progress Report | Sub-basin Nodal-Officer | SE/Regional Officer | 5 th & 15 th of every month |
| | SE/Regional Officer | HOD | 10 th & 20 th of every month |
| | HOD | Govt. & MDPU | 15 th & 25 th of every month |
| Monthly Progress Report | Sub-basin Nodal-Officer | SE/Regional Officer | 25 th of every month |
| | SE/Regional Officer | HOD | Last working day of every month |
| | HOD | Govt. & MDPU | 5 th of following month |
| Quarterly Progress Report | Sub-basin Nodal-Officer | SE/Regional Officer | Last working day of every quarter |
| | SE/Regional Officer | HOD | 5 th of following month |
| | HOD | Govt. & MDPU | 10 th of following month |
| Weekly Progress Report | Sub-basin Nodal-Officer | SE/Regional Officer | Every Friday |
| | SE/Regional Officer | HOD | Every Saturday |
| | HOD | Govt. & MDPU | Every Monday |
| Annual Work plan | Sub-basin Nodal-Officer | SE/Regional Officer | 31 st October |
| | SE/Regional Officer | CE/HOD | 5 th November |
| | CE/HOD | MDPU | 10 th November |
| | MDPU | Finance department / World Bank | 15 th November |

| | |
|--|---|
| Evaluation: | |
| | It is a time-bound exercise to assess systematically and objectively the relevance, performance and success, or the lack thereof, of ongoing and completed programmes. |
| Baseline and other periodic Survey: | |
| <i>Maintain a Master Register of all basic Data.</i> | <ul style="list-style-type: none"> • The basic data prior to the programme should be collated by the Implementing Departments and furnished to MDPU to assess progress and to have comparison. • Periodic survey to be conducted by the Implementing Departments and furnished to MDPU. <p>Post project survey should be done on completion of the programme for accurate evaluation of project impact.</p> |
| <i>Create a Data Base.</i> | |
| Internal Evaluation by Implementing Agencies: | |
| <i>Internal Evaluation should be done.</i> | <ul style="list-style-type: none"> • MDPU will have computerized Monitoring Information system to consolidate and manage data received from the various implementing agencies • HOD to form an Evaluation team of second level officers to evaluate and furnish an Annual Report by June of the following year, to Govt. with copy marked to MDPU. • The year wise outcome indicators mentioned in the (PAD) should be the base for the internal evaluation and compared with the completed works. |
| Concurrent Evaluation by External Agencies: | |
| | <ul style="list-style-type: none"> • MDPU will assign this task to some independent agency. All Implementing Departments should provide necessary data to this independent agency and cooperate for successful evaluation. |
| Implementation Completion Report (ICR): | |
| | <ul style="list-style-type: none"> • Necessary inputs for preparation of ICR for each sub basin should be furnished to MDPU. |

| Documentation: | |
|----------------|---|
| | <ul style="list-style-type: none">• The success stories on the problems encountered, solutions offered and the end results should be collected and documented for each WUA preferably.• Photos exhibiting the pre and post scenario of the programme should be taken up.• Necessary provision may be included in the estimate for these activities.• An Annual Report on the success stories should be furnished to MDPU by end of June of the following year. |

QIR : Quarterly Inspection Report
WPR : Weekly Progress Report

Annexure - 7

LIST OF KRISHI VIGYAN KENDRAS

1. Agricultural College And Research Institute, Coimbatore
2. Agricultural College And Research Institute, Madurai
3. Regional Research Station, Vridhachalam
4. Sugarcane Research Station, Sirugamani
5. Tnau Research Centre, Sandhiyur
6. Oilseeds Research Centre, Tindivanam
7. Regional Research Centre, Kovilangulam, Aruppukkottai
8. Agricultural Research Station, Virinjipuram, Vellore District
9. Horticultural Research Station, Pechipparai
10. Coastal Salinity Research Station, Ramanathapuram
11. National Pulses Research Centre, Vamban Colony, Pudukkottai District
12. Tamil Nadu Agricultural University, Sikkal
13. Tamil Nadu Agricultural University, Needamangalam
14. Rice Research Station, Tirur, Tiruvallur District

LIST OF RESEARCH STATIONS

1. Agricultural Research Station, Bhavanisagar
2. Agricultural Research Station, Kovilpatti
3. Agricultural Research Station, Vaigai Dam
4. Agricultural Research Station, Paramakudi
5. Agricultural Research Station Tirupathisaram
6. Rice Research Station, Tirur
7. Rice Research Station, Ambasamudram
8. Coastal Saline Research Institute, Ramanathapuram
9. Tnau Research Centre, Sandhiyur
10. Regional Research Station, Kovilangulam, Aruppukkottai
11. Agricultural Research Station, Virinjipuram
12. Agricultural Research Station, Pattukkottai
13. Hybrid Rice Research Centre, Gudalur
14. Oilseeds Research Station, Tindivanam
15. Sugarcane Research Station, Cuddalore
16. Sugarcane Research Station, Sirugamani
17. Sugarcane Research Station, Melalathur
18. Soil And Water Management Research Institute, Thanjavur
19. Coconut Research Station, Veppankulam
20. Coconut Research Station, Aliyarnagar
21. Cotton Research Station, Srivilliputhur
22. Regional Research Station, Paiyur
23. Regional Research Station, Vridhachalam
24. National Pulses Research Centre, Vamban
25. Tamil Nadu Rice Research Institute, Aduthurai
26. Tapioca And Castor Research Institute, Yethapur
27. Horticultural Research Station, Pechipparai
28. Horticultural Research Station, Thadiyankudi
29. Horticultural Research Station, Yercaud
30. Horticultural Research Station, Udhamandalam
31. Horticultural Research Station, Kodaikanal
32. Vegetable Research Station, Palur
33. Urban Horticulture Development Centre, Chennai

List of Selected 63 Sub-basins and WUAs

| SL No. | Year wise SL No. | Sub Basin | Division Name | No. of SB | Registered Ayacut (In ha.) | No. Of WUAs |
|---|------------------|-----------|-----------------------------|---|----------------------------|-------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Chennai Region - involving 9 Divisions | | | | | | |
| 1 | I | 1 | Cooum | Araniyaru Basin Division, Chennai. 59256.68 | 13475.23 | 70 |
| 2 | III | 1 | Adyar | | 18452.89 | 97 |
| 3 | III | 2 | Araniyar | | 27328.56 | 150 |
| 4 | III | 3 | Kosasthalaiyar | Kosasthalaiar Basin Division, Tiruvallur. | 38853.41 | 208 |
| 5 | III | 5 | Ongur | Lower Palar Basin Division, Kancheepuram. | 7400.05 | 48 |
| 6 | III | 15 | Thurinjar | Middle Pennaiyar Basin Dn Tiruvannamalai. | 3478.56 | 21 |
| 7 | I | 4 | Varahanadhi | Lower Pennaiyar Basin Division, Villupuram. 35924.54 | 25274.96 | 135 |
| 8 | III | 4 | Nallavur | | 8940.35 | 49 |
| 9 | III | 14 | Pambar to Tirukoilur | | 1709.23 | 10 |
| 10 | II | 1 | Upto Krishnagiri (Ponniyar) | Upper Pennaiyar Basin Division, Dharmapuri. | 5108.67 | 32 |
| 11 | III | 6 | Markandanadhi | 12443.21 | 1762.81 | 9 |
| 12 | III | 7 | Kambainallur | | 4027.26 | 25 |
| 13 | III | 8 | Kovilar (Kottapattikallar) | | 209.13 | 1 |
| 14 | III | 9 | Mottur | | 0.00 | 0 |
| 15 | III | 10 | Valayar | | 0.00 | 0 |
| 16 | III | 11 | Ramakkal | | 0.00 | 0 |
| 17 | III | 12 | Pambanar Verattar | | 1335.34 | 7 |
| 18 | I | 2 | Koundinyanadhi | Upper Palar Basin Division, Vellore. | 3849.54 | 20 |
| 19 | I | 3 | Poiney | 15406.43 | 11556.89 | 60 |
| 20 | III | 16 | Paravanar | Coleroon Basin Division, Chidambaram. | 6704.31 | 34 |
| 21 | III | 17 | Uppanar | 9335.93 | 2631.62 | 12 |
| 22 | III | 13 | Gadilam | Vellar Basin Division, Virudhachalam. | 12341.38 | 70 |
| 23 | III | 18 | Gomukinadhi | 20936.58 | 8595.20 | 45 |

| Sl. No. | Year wise Sl. No. | | Sub Basin | Division Name | No. of SB | Registered Ayacut (In ha.) | No. Of WUAs |
|--|-------------------|----|---------------------|--|--|----------------------------|-------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| Madurai Region - involving 10 Divisions | | | | | | | |
| 1 | II | 9 | Upper Gundar | Gundar Basin Division, Madurai. 59695.76 | 8 | 2236.99 | 15 |
| 2 | II | 10 | Therkar | | 7637.90 | 45 | |
| 3 | III | 19 | Kanal odai | | 8356.01 | 55 | |
| 4 | III | 20 | Uthirakosamangai | | 9963.43 | 60 | |
| 5 | III | 21 | Vembar | | 1789.04 | 10 | |
| 6 | III | 22 | Palar | | 2598.99 | 16 | |
| 7 | III | 23 | Girdhamal | | 24934.50 | 145 | |
| 8 | III | 24 | Lower Gunder | | 2178.90 | 18 | |
| 9 | I | 10 | Arjunanadhi | Upper Vaippar Basin Division, Rajapalayam. 24935.49 | 6 | 11185.78 | 64 |
| 10 | II | 11 | Nichabanadhi | | 4253.32 | 22 | |
| 11 | II | 12 | Kalingalar | | 2127.13 | 12 | |
| 12 | III | 25 | Deviar | | 5250.59 | 28 | |
| 13 | III | 26 | Nagarier | | 1359.50 | 7 | |
| 14 | III | 27 | Sevalaperiyar | | 759.17 | 5 | |
| 15 | II | 13 | Sindapalli Uppodai | | Vaippar Basin Division, Virudhunagar. 6990.99 | 5 | 448.25 |
| 16 | II | 14 | Sinkottariyar | 2016.00 | | 12 | |
| 17 | III | 28 | Uppathur | 288.29 | | 1 | |
| 18 | III | 29 | Vallampatti | 471.29 | | 2 | |
| 19 | III | 30 | Main River | | | 3767.16 | 20 |
| 20 | I | 8 | Manimuthar | Manimukthar Basin Division, Devakottai. | 1 | 16921.19 | 57 |
| 21 | I | 9 | Kottakkarayar | Sarguniaru Basin Division, Sivagangai. | 1 | 17424.04 | 43 |
| 22 | III | 36 | Chittar (Kodayar) | Kodayar Basin Division, Nagercoil. | 1 | 6148.72 | 30 |
| 23 | III | 31 | Uppodai | Korampallam Basin Division, Thoothukudi. 4288.09 | 3 | 1505.40 | 11 |
| 24 | III | 34 | Salikulamer | | 1858.96 | 22 | |
| 25 | III | 35 | Korampallam Ar. | | 923.73 | 6 | |
| 26 | II | 7 | Upper Vaigai | | Manjalar Basin Division, Periyakulam. | 3 | 801.23 |

ANNEXURE - 8

| Sl. No. | Year wise Sl. No. | | Sub Basin | Division Name | No. of SB | Registered Ayacut (In ha.) | No. Of WUAs |
|--|-------------------|----|------------------------------|--|-----------|----------------------------|-------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| 27 | II | 8 | Varattar - Nagalar | 3908.48 | | 557.55 | 2 |
| 28 | III | 37 | Theniar | | | 2549.70 | 12 |
| 29 | III | 32 | Hanumannadhi (Nambiyar) | Nambiyar Reservoir Basin Division, Valliyur. | 2 | 1930.69 | 10 |
| 30 | III | 33 | Karumeniar | 9765.25 | | 7834.56 | 40 |
| 31 | I | 7 | Pambar | South Vellar Basin Division, Pudukottai. | 1 | 18886.48 | 194 |
| Pollachi Region - involving 2 Divisions | | | | | | | |
| 1 | I | 11 | PAP Aliyar | Parambikulam Basin Division, Parambikulam. | 1 | 20536.36 | 2 |
| 2 | I | 12 | PAP Palar | Aliyar Basin Division, Pollachi. | 1 | 152717.94 | 5 |
| Trichy Region - involving 5 Divisions | | | | | | | |
| 1 | II | 5 | Agniar | Agniar Basin Division, Pattukottai. | 1 | 23253.87 | 135 |
| 2 | II | 3 | Anaivari odai | Maruthaiyaru Basin Division, Ariyalur. | 2 | 759.51 | 7 |
| 3 | II | 4 | Chinnar | 3712.51 | | 2953.00 | 15 |
| 4 | I | 6 | South Vellar | South Vellar Basin Division, Pudukottai. | 2 | 21079.18 | 197 |
| 5 | II | 6 | Ambuliyar | 30534.77 | | 9455.59 | 50 |
| 6 | I | 5 | Vasista Nadhi-Upper Vellar | Sarabanga Basin Division, Namakkal | 1 | 10145.45 | 52 |
| 7 | II | 2 | Swethanadhi | Sarguniaru Basin Division, Sivagangai. | 1 | 3758.35 | 20 |
| Abstract | | | | | | | |
| | | | Chennai Region Total | (I year - 4, II Year - 1 & III Year - 18) | 23 | 203035.39 | 1103 |
| | | | Madurai Region Total | (I year - 4, II Year - 8 & III Year - 19) | 31 | 168964.49 | 970 |
| | | | Pollachi Region Total | (I year - 2, II Year - 0 & III Year - 0) | 2 | 173254.30 | 7 |
| | | | Trichy Region Total | (I year - 2, II Year - 5 & III Year - 0) | 7 | 71404.95 | 476 |
| | | | Grand Total | (9 + 10 + 2 + 5 = 26 Divisions) | 63 | 616659.13 | 2556 |

Issues in a Typical Tank Irrigation System



IAMWARM

