TERMS OF REFERENCE FOR MONITORING AND EVALUATION OF TAMIL NADU IRRIGATED AGRICULTURE MODERNIZATION PROJECT

1. Project Background:

The State of Tamil Nadu state has made significant investments in modernization of irrigation systems and introduced institutional and policy reforms through a series of state and donor-sponsored projects, including the World Bank-supported Tamil Nadu Water Resources Consolidated Project (WRCP) concluded in 2004 and Tamil Nadu Irrigated Agriculture Modernization and Water-Bodies Restoration and Management Project (TN IAMWARMP) concluded in 2015. In agriculture sector, the GoTN introduced policy reforms to increase private sector participation in marketing of agricultural commodities by removing restrictions on purchase, stocking, movement, and sales of 13 key crops and allowed greater wholesale marketing outside restricted markets. The GoTN has also operationalized a decentralized, farmer- driven agricultural extension system through Agricultural Technology Management Agency (ATMA) model.

The Bank-supported TN IAMWARMP has made significant development impacts in the state by modernizing irrigation infrastructure, improving water use efficiency, enhancing yields and productivity of agriculture, livestock and fisheries, diversifying into high value crops, and also introducing major institutional reforms through participatory irrigation management and water users associations (WUAs). Under the TN IAMWARMP, in total over 5,000 tanks and irrigation supply canals were rehabilitated and modernized, and 2,800 WUAs were established resulting in expansion of fully irrigated area by 39%, water conveyance efficiency was improved by more than 30%, and the area under high value crops has been doubled. Moreover, TN IAMWARMP has made major contributions in improving state's water resource planning and implementation capacities.

The GoTN requested the World Bank assistance in undertaking modernization of irrigated agriculture in those parts of the State not covered by the IAMWARM Project. The Tamil Nadu Irrigated Agriculture Modernization Project (TNIAMP) is based on the discussion between GoTN and the World Bank.

PROJECT DEVELOPMENT OBJECTIVE (PDO)

The PDO is to: "*enhance productivity and climate resilience of irrigated agriculture, improve water management and increase market opportunities for farmers and agro entrepreneurs in selected sub basin areas of Tamil Nadu.*"

Project Components

The project interventions are grouped into four main components, including: (A) Irrigation and Water Management; (B) Agriculture Productivity Enhancement, Diversification, Improved Livelihoods, Marketing and Value Addition; (C) Project Management Support; and (Z) Contingency Response. The project activities will cover 66 sub-basins and other parts of the state as per design (individual components will cover different geographic areas). The individual components are summarized below.

Component A: Irrigation and Water Management, consist of four inter-related sub-components, including (i) institutional strengthening and capacity building of water management; (ii) irrigation systems modernization; (iii) participatory irrigation management; and (iv) converged service delivery at the grass-root level.

Component B: Agriculture Productivity Enhancement, Diversification, Improved Livelihoods, Marketing and Value Addition is aim to increase productivity and diversification of agriculture production systems, promote alternative livelihood income sources and generate improved value addition in post harvest management by adopting a value chain approach. Smallholder producers in project sub-basins will be facilitated to take advantage of rapidly changing market demand for agricultural commodities to increase production and manage risks associated with climate change. The component will provide incentives for capital investments, through unlocking opportunities for crowding-in private sector investments. The component consists of three sub-components: (i) Agriculture intensification and diversification; (ii) Improved alternative livelihoods through livestock and inland fisheries; and (iii) Agriculture marketing, value-addition and post-harvest management.

Component C: Project Management Support: The Multi-Disciplinary Project Unit (MDPU) established under the TN IAMWARMP will serve as the management and coordination unit for the project, with need-based modifications. The MDPU will coordinate and catalyze departments for preparation and implementation of their respective project budget, sub-basin development plans, and implementation progress reports. The MDPU will provide knowledge support on M&E, social, environmental safeguards, procurement and fiduciary related actions of the departments/implementing agencies involved in the project.

The project will be implemented over a period of seven years. About 70% of the project expenditure will be implemented by the Water Resources Department, and the remainder by the Government of Tamil Nadu's Agricultural Engineering Department, Agriculture Department, Horticulture Department, Tamil Nadu Agricultural University, Agricultural Marketing Department, Animal Husbandry Department (including TANUVAS) and Fisheries Department (including TNFU) with management support and co-ordination provided by the Multi-Disciplinary Project Unit (or MDPU which has representation from all the disciplines that are part of this innovative project and in procurement and financial management aspects). The MDPU also will report to review the progress of the TN IAMP at least once in every six months and provide strategic directions, guidance on policy matters and resolve conflicts, if any, amongst the implementing agencies during Empowered Committee Meetings chaired by the Chief Secretary, Government of Tamilnadu. Water resources planning and management will be carried out by the State Water Resources Management Agency or SWaRMA and Basin development and Management Boards, towards sectoral allocation.

Sub-basin development plans will be developed with effective consultative (involving farmers, WUAs, where set up, and other stakeholders) and technical input from the respective departments. These plans are expected to provide a shared vision of the community for preparation and implementation of investments in each sub-basin. These plans were prepared by involving stakeholders (mainly farmers) through bottom up approach.

2. Objectives of the Assignment:

The proposed consultancy is expected to assist the Government of Tamil Nadu in effectively monitoring and evaluating all aspects of the Tamil Nadu Irrigated Agriculture Modernization Project (TNIAMP).

In particular, to:

- Create a Monitoring and Evaluation Framework for the TNIAM Project in consultation with MDPU and other Line Departments
- Develop M & E Manual and conduct training for M&E Unit of MDPU and Line Departments.
- Track key indicators (input, output and outcome), including the development of baselines for the project and tracking changes to assess project impacts (using controls to track with and without project for comparison) as defined in the PAD
- Develop web-based computerized Project Performance Information System (PPIS) for monitoring all TN IAM Project activities of all Line departments with possible linkage with EIMS developed by Water Resources Department. This system should provide suitable flexible interactive user-friendly tools to allow collation of inputs from various implementing agencies, produce standard reports, allow specialized queries to track all aspects of project progress (including physical and financial progress and project impacts) at any time
- To provide concurrent reporting on project status, implementation processes and lessons learned during implementation (including data, analysis, surveys, interviews, photographs, description, easy-to-read visuals, etc.) to enable better adaptive management or improved interventions
- Strengthen the capacity of the project implementing agencies to monitor project impacts and use the PPIS by providing on-the-job training
- Evaluate project's impact at key junctures during project period to assess progress towards achieving project's objectives and preparation of ICR.

3. Scope of Services (Task) and Expected Deliverables

Tasks:

The Consultancy would involve the following primary tasks:

Task 1: Analyze project activities

Study various components of the project and current implementation; review project documents, including IAMWARM's Implementation Progress Reports and Impact Evaluation reports, contracts, other reports; discuss with Multi-Disciplinary Project Unit (MDPU), Head of Departments (HODs) of Water Resources Department (WRD), Agriculture Department, Horticulture Department, Tamil Nadu Agricultural University, Department of Agricultural Marketing & Agri. Business, Agricultural Engineering Department, Animal Husbandry Department (including TANUVAS) and Fisheries Department (including Fisheries University) and other entities related to the implementation of the TN IAM Project. The Consultants would need to undertake field visits to study various project activities for concurrent evaluation (including work being done under various line agencies)

and to have periodical discussions with WUA representatives, line department including WRD officials and other stakeholders.

Task 2: Develop a M&E Manual and Conduct training 1

The M&E Manual should provide guidance on the minimum requirements and agreed M&E approaches for the implementation of the TNIAMP. The purpose of this document is to clarify and formalize M&E procedures, define key performance indicators, define reporting format and roles and responsibilities of project staff and regional participating agencies. Thus, it is supposed to be the reference guide on M&E issues for the MDPU staff and line department officers.

Task 3: Develop a project baseline

The Consultant is expected to develop the baseline data for all project indicators (see Annexure A through C) with respect to 66 Sub-basins in the project. The M&E agency will prepare and undertake a baseline survey with collaboration of the line departments, collect data on the key project indicators (as outlined in Annex 3 of PAD and as agreed with the project) using agreed upon (with MDPU) statistical sampling size 1% ie. not less than 1% of all project area population & covering all the Agro. climate zone in the project area. (Adequately stratified)

However, to determine a specific sample size, information should be collected on the number and size of all schemes/tanks in every sub basins, number of villages in each of them, number of households in each village, population numbers, interventions undertaken or proposed by the agencies ,other differentiating characteristics across sub basins which could be used as strata etc...Consultants may propose different techniques to do so. The technical evaluation will then determine the best proposed sample size from basins and districts under the project, design Information gathering

Secondary Information:

- Published Data and Documents and research studies
- Data from the client Departments
- Data from the relevant Line Departments

Primary Information:

- Conducting Preliminary Consultations with the Implementing agencies
- field visit -,Village ,Tank ,WUA and Panchayat focus
- Situational Analysis Survey, house hold survey
- Focus Group Discussions
- Thematic and Case studies

1. The final sample size should be based on the total number of tanks across the 66 sub-basins (ie. Not less than 1% of project population area adequately stratified) determined. As a starting point at least 110 Tanks spread over 66 sub-basins in Agro. climatic zones and at least 2 River grading works in canal (10KM canal length) in consultation with the Regional Chief Engineers will be selected to begin

with. The consultant is expected to scale up to a more representative sample based on the information collected.

The criteria for selection of Tanks will consider amongst others

- Tank size, Canal Size, (length, Discharge data ,)
- Water use, Diversification, Availability etc Tank Performance(availability of Water, retention capabilities, restoration requirements, , indiscriminate use of tank water , pollution factors, loss of quality of water etc) and Canal performance
- Various farmer groups at different location(Head, Middle and Tail end)
- Other relevant indicators
- The Control site survey will include proportionate number of samples to be covered

2. Base line data - Existing Storage/ Canal discharge, Cultivation Statistics, Population of the village, gap area, cropping pattern to be collected.
3. Not less than 1% of all project area population. (adequately stratified)- In this, the impact caused by the interventions by each department is also to be assessed with concurrent surveys periodically.

Task 4: Determine Monitoring Indicators and Reporting Formats

Key performance indicators selected for measuring and monitoring progress towards the project's development objective include:

- Reduction in Gap area, partially irrigated area (hectares) served by irrigation systems in 66 selected sub-basins which have been effectively rehabilitated and modernized.
- Increase in Agricultural productivity in the modernized systems.
- Increase in Adoption of INM & IPM activities
- Improved WUA/ Conveyance efficiency.
- Increase in diversification towards less water requiring crops like Horticulture millets etc.,
- Increased enrolling of Farmer Members into the Commodity Groups
- Formation and registration of the Farmers Producers Companies
- Increase Annual Turnover of all FPCs
- Promotion of Agri-Enterprises through entrepreneurship development.
- Increase in Milk production and the number of crossbred calves born
- Increase in Inland aquaculture area and productivity.
- Increase in targeted stakeholders' incomes.
- Evaluate the performance of the State Water Resources Management Agency unit (SWaRMA)

The project is expected to have a state-of-the-art monitoring system to monitor key performance indicators, produce useful reports and track achievements according to development plan envisaged. These indicators and reporting formats (including easy-to-read graphics) can be further expanded, refined, and organized (e.g. into input/process, output/outcome, or core/ancillary indicators) by the Consultant with the

agreement of the Client, in the early stages of undertaking this assignment (after reviewing the PAD and reviewing project activities). All aspects of the project – including technical, institutional, environmental, social, economic, financial, and procurement status will be monitored to help indicate actual achievement compared to the plans in the PAD, Environmental and Social Management framework, Procurement and Financial Management guidelines, Project Implementation Plan and other relevant documents.

Task 5: Design Monitoring Surveys

Develop strategies and detailed information capture/survey methodologies to obtain information on all monitoring indicators and track progress towards achievement of the project development objectives and associated key indicators (see Annexure A-C). These survey methodologies may involve a mix of techniques depending on each indicator (household surveys for economic impacts, agricultural crop-cutting, remote sensing and other surveys for agricultural intensification/diversification, WRD, other line department and MDPU information for expenditures and physical progress on civil works and Sub-basin Plan information). Adequate attention to the statistical significance and use of control data would need to be made. The Consultant will need to generate appropriate ledgers/computerized systems to enable collation of information from all relevant sources and develop information flow arrangements for the same. A special effort (Geo tagging) is necessary to monitor tank-related activities and produce reports on these aspects, given that these need to be separately reported by MDPU to the Government and World Bank. The consultants would need to work closely with line agency staff to further refine methodologies, use existing information sources, and disseminate/train staff on modernized methods of monitoring. The Consultant will also design approaches to monitor environmental and social performance of the project in accordance with the Social and Environmental Management Framework developed as part of the project Environmental and Social Assessment in accordance with World Bank environmental and social operational policies. The Consultant will also help monitor compliance with the Transparency and Accountability framework developed for the project and annexed to the Project Appraisal Document. M&E Consultancy should evaluate the impact / outcome of the pilot projects taken up by the Department of Agri-Marketing and Agri.Business during initial years.

Task 6: Monitor key parameters (including baselines)

The Consultant will monitor on a regular basis (Annexure C for frequency for each parameter) on all project indicators. The Consultant will initially develop baseline information for all project indicators (see Annexure A-C) to indicate physical, productivity, financial, social, environmental and institutional performance. The Consultant will conduct the surveys in consultation with MDPU and other Project line departments. Collate, computerize and analyze information in a computerized Project Performance Information System (see below). Until the time that the PPIS is functional, the Consultant will make alternative arrangements for collating and periodic reporting on the monitored information. The PPIS should be made functional within one year after inception report. The Consultant will also help support each implementing agency to be able to monitor these indicators and take over the routine monitoring work. The Consultant will also help monitor the process aspects of the project through the use of appropriate indicators and collection methods (e.g. participatory

monitoring, monitoring of WUA effectiveness, etc.) in consultation with project staff. The Consultant will also monitor training activities, through the design of appropriate feedback formats and facilitating administration, collation and analysis of these. (All these can remain)

Task 7: Design and Implement a Project Performance and Information System (PPIS)

The Consultant would develop and revive an integrated, user-friendly web-based software already developed in the previous project to manage project activities and track key project indicators, install this on a secure web-server as per MDPU's specification and ensure that this can be accessed (with password protection and other security measures) in all project implementing entities. Costs for any software/licenses required to develop and use the PPIS should be included in the Consultant proposal and costing. The Consultant will:

- Input key monitoring indicators for each project agency at appropriate administrative levels (e.g. including division/sub-division offices of WRD, block/district offices of other related line departments, etc.) with appropriate security and access provisions and error-checking. The Consultant will test the systems in each office where input is required and input the data for sample sub-basins in each office and train the staff of the offices in updating the information and continue to provide handholding support as required during the project period. The Consultant will also aid in the field-level collection of such relevant data by developing suitable approaches (e.g. walkthroughs, crop-cutting experiments, surveys &previous years statistical Hand books by Govt. of Tamilnadu) and documents (survey/log books at different levels - e.g. WUA-level, division/district-level, etc.) by different project implementing agencies.
- Pilot the use of modernized monitoring systems – including about 100 low-cost handheld computers/PDAs (to be provided by the Consultant) to be used in 66 sub-basins by developing suitable software to input monitoring information - including system and household surveys customized to every department and level, making arrangements to have the input information collated, analyzed at sub-basin level and having the processed information available for review through the PDAs.
- Develop standard and specialized queries (e.g. progress by component, activity, institution, month, year, canal system, etc.) on the monitoring knowledge base and appropriately processing data entered and generate reports, including appropriate graphics, maps, and schematics, through user-friendly interfaces that allow for easy customization and expandability.
- Develop reporting tools to allow for generation of standard monitoring reports from various perspectives (formats developed in consultation with MDPU) at any time. The outputs should be interfaced with common GIS systems to allow for spatial visualization of the monitored data. The PPIS should be able to interface with common office software e.g. export to Microsoft Excel. In consultation with MDPU, a public domain version of regular monitoring reports would need to be designed and included in the project website and newsletters.
- Determine data management needs and information flow arrangements: The Consultant will work with MDPU to determine data needs, reporting arrangements, information flow arrangements, data

validation and checks, institutional arrangements and security precautions to ensure smooth and effective functioning of the PPIS. This would include both information to be collected by the Consultant, as well as information to be input by various project department staff.

- Host the PPIS web-based software and Test Access by MDPU and other line departments during the life of the project (the Consultant will be responsible for any outsourcing of this activity and ensuring that the software will be accessible at all times after its deployment with at least 95% uptime and troubleshooting assistance). The PPIS shall include an effective help and online tutorial built-in to enable ease of use.
- Linkage with the Geo tagging techniques proposed in the Project

Task 8: Evaluation of Project Performance

In addition to regular monitoring, impact assessments for each-sub-basin (in the form of Sub-basin ICRs) and for the overall project (at two key junctures during project period and performance benchmarking at all times) shall be undertaken to evaluate the project's performance and progress towards achieving the set objectives and provide advice to the MDPU one mid-course corrections. The mid-term evaluation report would be completed a month before midterm review and the final impact assessment will be undertaken prior to project completion. As part of project evaluation, the consultant shall:

- Undertake overall project evaluation (based on key output and outcome indicators such as Water spread area in the tank, Agricultural crop diversification details and information on increased cropping area during the various stages of the project period.) of the monitored information would require analysis of the monitored information, and spatial analysis at initial mid-term and final stages (e.g. use of remote sensing to determine diversification), with a focus on determining achievements and documenting lessons learned. The Consultant will help MDPU to procure the required satellite imagery (reimbursable by Client on actual expenses), for analyzing this imagery for evaluation and reporting, and train about 15 client staff. Project performance is to be evaluated on the basis of selected outputs and outcome indicators as described in the Project Appraisal Document. These evaluation reports are expected to serve as background reports for the midterm review and the ICR of the project and their completion dates should be finalized with the MDPU. As part of the evaluation studies, the consultant is expected to carry out surveys to analyze the impact of the project. These surveys should be household based, village based, and sub-basin based with appropriate sampling size and statistical techniques. A sample of households in areas where the project is not being implemented should also be surveyed as a control group. Indicative parameters that should be included in the impact assessment include: Engineering parameters including operation and maintenance, agricultural parameters, socio-economic parameters, environmental parameters, and institutional parameters, with examples indicated in the following table:

Engineering/Irrigation Indicators: • Tank system modernization quality • Water Delivery efficiency • Actual irrigated area • Water use efficiency at the sub-basin level • Water use efficiency at the WUA level • Improved water availability for tail end farmers • Planned command area • Actual O&M costs at WUA • Technical quality of work • Quantification of the impact of Artificial Groundwater Recharge Well	Agricultural Productivity Indicators • Area • Crop production • Crop Productivity • Cropping patterns and intensity • Diversification • Inland aquaculture area. • Dairy Cow productivity (Milk) • Marketing arrangements • Agribusiness development • Adoption of improved cropping practices (hi-value, reduced water demands)
Socio-economic and Environmental Indicators: • Increased farm incomes • Access to markets • Increased marketable surplus • WUA formation and effectiveness • Spread of demonstrations • Effectiveness of stakeholder forums • Effectiveness and adoption of IPM/INM/organic farming demonstrations and training • Adoption of water saving technologies and cropping practices • Improvement in environmental awareness related to the State's water systems • Performance of environmental/social development cells. • Communication with farmers for improving awareness and interaction • Availability of adequate labour for all activity.	Institutional Indicators • Quality of knowledge base and analytical capacity both for irrigated agriculture and sustainable water resources management • Functioning of irrigation service delivery management and maintenance institutions (WRD, WUA), incl. change management in WRD, WUA effectiveness in O&M • Coordination across IAMP implementing departments and partnerships developed for proving effective convergence • Effective technical, environmental, social, and economic appraisal of sub-basin development plans • Functioning of water resource management institutions (SWaRMA, basin/sub-basin boards/committees, PIM Wing). • Use of modern IT and management methods • Training effectiveness • Increased turnover in FPO • Effective functioning of Single Window Information and Knowledge Center (SWIKC) at Model Villages.

- Benchmarking: Develop appropriate indicators and software modules to allow for benchmarking of performance (e.g. for project and sub-basin as a whole, and also by Line departments, departmental unit, WUA, etc.) and their visualization in a spatial context
- Develop online surveys (in consultation with the MDPU) that can be emailed to various staff to obtain feedback and suggestions on project-related activities (including an annual project survey). The Consultant should ensure that appropriate software is developed to administer, collate, analyze, and summarize outputs from the survey with suggestions for revival of the software developed in the previous Project

- Organize the monitoring database to allow, secure access and analysis. Assist MDPU (including TNAU Members, TANUVAS and TNFU) and line department's staff in mining the monitored data to develop papers and presentations to assist with project learning and presentations at conferences/submission to journals, etc.
- Prepare impact assessment reports describing the status of achieving the expected output/outcomes and identifying the obstacles preventing the same with sound scientific reasoning and suggestions for corrective actions.
- Sub-basin ICRs The Consultant will also help the MDPU to develop formats (including documentation, surveys, data analysis, photographs, and interviews) for the sub-basin Implementation Completion Reports (ICRs) to be completed for each of the 66 project sub-basins. The Consultant will work closely with MDPU and line departments to develop these sub-basin ICRs at the end of the project.

Task 9: Reporting and Workshops

The Consultant will produce the reports (described in the Deliverables and Schedule section below) in formats agreed with the MDPU during inception. All reports will require draft versions with presentations made at MDPU by the Consultant to brief them about the status of the Consultancy and monitoring outputs and evaluating impacts and solicit feedback before finalizing. The Consultant is expected to make regular presentations on project performance at multiple levels (including at MDPU, Empowered Committee, etc. led by the Team Leader unless otherwise agreed with MDPU). In addition, the Consultant will develop special publications and Videos on project activities, success stories, and other lessons learned. All reporting and presentations should be made in an easy-to-understand manner, using graphics, spatial representation of data, schematics, photographs, videos, etc. as useful illustrations. In each report, Key observation / Recommendation are to be given in department wise in nut shell.

Task 10: Conduct Training 2: The Consultant will provide training to key project staff in all project-related Agencies (MDPU, WRD, SWaRMA, other line departments, including at sub-basin level) to use the PPIS. The table below illustrates the level of effort required for such training on the PPIS:

Level	Number	Participants Each	No. Days Training Expected
Sub-basin	66	20-40	2
District	32	40	1
Region (WRD)	4	20	1
State-level/HOD/ IAMWARM Cell/ MDPU	10	5 (can be combined across depts.)	3
Annual Refresher	10	5 (can be combined across depts.)	3

Other training will need to be conducted on specific issues (e.g. remote sensing analyses, and application of Geo Tagging PDA use, etc.) in addition to workshops and surveys to collate and share project learning.

4. Team Composition and Qualification Requirement for the Key Experts

Sl. No.	Key Position	Area of Specific Expertise Desired	Minimum Qualification and Professional Experience Desired
1	Team Leader	Experience in preparation of the inception report, comprising a detailed programme for the consultancy services. Capable in overall technical assistant, M & E objectives and procedures	At least Master degree in engineering or a similar technical field. Project management experience for 15 years, or with 5 years are international experience. Handling World Bank Projects is highly desirable.
2	M&E Specialist, Co.Team Leader	M & E objectives and procedures, Technology and skill transfer throughout the implementation period.	At least Masters degree in technical field. Project management and monitoring software development and use experience for 10 years.
3	Economist	Expert in financial management, Project evaluation, finance appraisal, increasing income of farmers	At least Masters degree in economics. Experience in agricultural economics for 10 years, including experience in agricultural monitoring. Expertise with use of computerized monitoring systems, including use of spreadsheets.
4	Irrigation Engineering	Review of prevailing irrigation practices good contact with farmers, development of modern Agricultural Engineering practices. Development of standard design facilities, good knowledge in O & M practices.	At least Masters degree in engineering or a similar technical field. Extensive experience in designing and operating irrigation systems for 15 years.
5	Agriculturalist	Assessing the water demand Agriculture, Horticulture suggesting suitable crops, cropping pattern/climate resilience and also, preparation of Project reports for baseline development on water sub-basin.	At least Masters degree in agriculture, horticulture or a similar technical field. Extensive experience in agriculture, horticulture or related areas for 15 years, including experience in agricultural monitoring.
6	Environmental Specialist	Environmental protection during construction and operation, formulating regular standards and criteria for framing environmental production measures, plantation of trees on bald areas & knowledge GHG emissions.	At least Masters degree in environmental engineering or a similar technical field. Experience in environmental aspects of irrigation and rural investments for 15 years
7	Social Development and Participatory Management	Identifying the Project condition and its development, organizing training for community organizer, WUAs etc., interface between farmers and Government agencies, increasing income of farmers, extension training services to farmer.	At least Masters degree in social sciences or a similar field. Extensive experience for 15 years in social issues in irrigation/agriculture; extensive experience in participatory irrigation management; knowledge of participatory monitoring indicators and indicators of participatory irrigation management.
8	Information Management	Scope of the MIS, selection of hardware and software, relating to installation, conducting training. Preparing standard manual & standard forms.	At least Masters degree in information technology or a similar technical field. Extensive experience for 10 years in modern information management systems, database management and queries, systems requirement studies, and

			information flow and format designs.
9	GIS Specialist	Scope of the GIS, selection of hardware and software, relating to installation, Geo tagging, conducting training. Preparing standard manual & standard forms.	At least Masters degree in Geographic Information Systems or a similar technical field. Extensive experience for 5 years in use of GIS, particularly as a query tool; experience on GIS systems.
10	Remote Sensing Specialist	Scope of the Remote Sensing, conducting training, Preparing standard manual & standard forms.	At least Masters degree in Remote Sensing or a similar technical field. Extensive experience for 5 years in use of remote sensing of agricultural uses and conversant with Agriculture / Horticulture Crops, and familiarity with interfacing with GIS
11	Institutional Development Specialist	Modernization objectives and organizational requirement training, master plan for long term training for overall institutional strengthening, assisting in specific institutional capacity building	At least Masters degree in institutional development, organizational behavior or a similar field. Extensive experience for 15 years in institutional development, monitoring indicators for institutional performance especially in large agencies in developing countries.
12	Web programmer	Scope of the website, selection of hardware and software, relating to installation, conducting training. Preparing standard manual & standard forms.	At least Masters degree in computer science or a similar technical field. Extensive experience for 10 years in the development of web-based database query systems.
13	Financial Management Specialist	Planning and developing in finance management, Expert in financial management, Project evaluation and finance appraisal.	At least Masters degree in financial management or a similar technical field. Extensive experience for 10 years in the development of web-based financial database query systems.
14	Agri. Marketing Specialist	Assisting Marketing potential and suggesting ways and means to improve Marketing strategy.	At least Masters degree in Agriculture Marketing or a similar technical field / MBA from reputed institutes Extensive experience in Agriculture Marketing or related areas for 15 years including experience in Agriculture Marketing Monitoring.

5. Reporting Requirements and Time Schedule for Deliverables:

Deliverable	Description	Schedule (months after signing)
Inception Report	Outline of overall methodology to be used Work plan Deployment schedule of key staff Monitoring and Evaluation Strategy Initial list of key indicators to develop baselines and methodologies for surveys Formats for Reports and Sub-basin ICRs	2 months
Detailed M&E Strategy Report	Identification of Indicators and Survey Methodologies	3 months
M&E Manual	Chapters are: 1. Introduction 2. Project Summary 3. TNIAMP M&E System 4. Reporting 5. Results Framework Indicators	4 months
PPIS Software Development and Report/Training Manual	Development of web-based software for project management and monitoring Technical Report Training Manual PDA Pilot	9 months
Regular Reports (monthly, quarterly, half-yearly, annual, sub-basin ICRs)	Summary of work completed in last half period and cumulatively Work expected in next six months Key issues for attention of MDPU 66 sub-basin Progress reports Process monitoring… Presentations/Documentation/Videos… Capturing field data given by department and presenting to MDPU in a dynamic way	As indicated starting from inception report stage fortnightly and Monthly
Remote Sensing	The details on water spread area, crop diversification (extra ordinary situations like flooding and drought) should be documented through satellite imaginaries in the implementing sub basins	Inception, Midterm and during final stage of the project.
Evaluation report	Impact assessment of project activities Sub-basin ICRs Online surveys Organized monitoring database Piloting Project reports for Agri. Marketing	ICR Benchmarking Mid-term Final… 1 month before scheduled midterm review
Mid-Term Report	Report on progress upto mid-term review Work expected in remainder of project Key issues for attention of MDPU (including any suggestions for restructuring related to this Consultancy)	1 month before scheduled mid-term review
Training	Training (as described in Task 2 and 10) On-the-job training 6 monthly workshops (to discuss half-yearly reports, draft final report and provide related training) Detailed guidelines for scheme improvement.	All through the assignment
Draft Final Report & Draft Project ICR	Project implementation experiences Suggestions for improvement, sustainability Impact assessment of project activities	72months
Final Report & Project ICR	After incorporating suggestions of the Draft Final Report	75 months

Reporting Arrangements:

- The Client would report to the Project Director, MDPU…
- Review Committee
    - PD
    - MDPU designates (2)
    - M&E Specialist, EE(Project) (2)
    - MDPU members of Line department - 8
    - IAMWARM Cell Heads (8)
- Client review processes (and review committee composition) for examining reports – providing feedback in 20 days.

All reports shall be submitted with 30 hardcopies and in electronic format (including spreadsheets, databases, GIS, analyzed remote sensing imagery, and other datasets, etc.).

Sub-basin ICRs, Overall project ICR & Evaluation (mid-term and final) final reports, 50 hardcopies and in electronic format

6. Clients inputs and Counter Part Personnel

Services to be provided by Client

- Office space for Dy. Team Leader and 1 assistant reporting to M&E Specialist in MDPU
- Facilitation – documents, people, integrate schedules; provide counterparts for co-ordination and to obtain data collection.
- Data, maps, drawings, satellite imagery
- People to be trained
- Concerned Line Department officials will accompany the M&E Team during field visit.

Available Reports

a. Project Appraisal Document for the Tamil Nadu Irrigated Agriculture Modernization Project (TNIAMP), the World Bank
b. Project Implementation Plan of TNIAMP, MDPU
c. Project Appraisal Document for the Tamil Nadu Irrigated Agriculture Modernization and Water-Bodies Restoration and Management Project (IAMWARM), the World Bank, 2006 http://documents.worldbank.org/curated/en/570481468035338407/pdf/37877.pdf
d. Implementation Completion and Results Report (ICRR) of IAMWARM, the World Bank, 2016 http://documents.worldbank.org/curated/en/442791467995046342/pdf/ICR3679-P090768-Box394877B-PUBLIC-disclosed-3-28-16.pdf
e. Final Impact Evaluation Report_Monitoring and Evaluation Consultantcy for IAMWARM, SMEC, 2014
f. Toolkit for Monitoring and Evaluation of Agricultural Water Management Projects, the World Bank, 2008 http://documents.worldbank.org/curated/en/137921468140948443/pdf/447990WP0Box321BLIC10m1etoolkit1web.pdf

Annexure -A

Monitoring and Evaluation Framework

Overall Framework: Systematic M&E will be carried out under the project to monitor performance of the project interventions, and to ensure that lessons learned are used throughout project implementation. As the project is being implemented in different sub-basins and interventions will be completed in a phased manner, the M&E system will enable the project to take any remedial action as project implementation proceeds. Availability of innovations and climate resilience in irrigation and agricultural technologies is a prime example.

The monitoring and evaluation of project implementation and progress will be under the overall supervision of the M&E unit in the MDPU. This unit will be assisted by an independent M&E Specialist in the MDPU. The M&E Specialist will be engaged by the MDPU by June 30, 2017 and the consultants will begin their tasks by compiling the baseline survey for the first year sub-basin interventions envisaged under the project. The physical implementation of works is expected to begin in July 2017 and the investments in agriculture and allied sectors will begin in the following crop seasons. Formation of new WUAs will also begin after July 2017. The M&E consultancy will cover all project interventions and assist in improving the monitoring parameters as implementation progresses. The consultant will provide quarterly inputs to the MDPU which will enable it to take corrective actions required.

In addition to the above, each of the project cells attached to WRD and other line departments will monitor the activities of their departments against the annual work plan approved prior to March 31 of each year for the following year. These reviews will also be monitored by the MDPU Unit. The M&E Consultant shall coordinate with these cells/units in discharging their performances.

Social audit of the interventions in the irrigation systems, provision of new irrigation and agriculture technologies will be carried out by the WUAs after they have received training in these aspects. The monitoring of all investment actions will be done real-time using the communications and connectivity provided under the project to various stakeholder groups in the first year of implementation.

There will be a formal mid-term review of the project based on the M&E reports in September, 2020. This formal review will focus on project progress and impact (as reflected in Annexure- C. Results Framework and Monitoring), help devise mid-course corrections needed in project implementation, and mutually agree to the need for additional formal reviews (in addition to the periodic implementation support reviews). The independent M&E consultant will also submit a final evaluation report at the end of the project. The project's impact will be measured against the findings of the baseline survey for each sub-basin and with reference to Results Framework indicated in the PAD

The main emphasis of the project M&E system will be to fully monitor and evaluate project activities in a timely manner in order to (i) track project activities progress, (ii) identify what is working well and what is not and help adaptive management during the course of implementation, (iii) evaluate the performance of various institutions (e.g. of WUAs, Farmer Producer Company, departments, units, etc.) and (iv) estimate project impacts and results on-the-ground. M&E mechanisms will emphasize stakeholder participation and will be designed to facilitate rapid identification of shortcomings and problem areas and facilitate mid-term corrections, where

necessary, to project re-design and/or implementation arrangements to ensure that the project meets its development objective.

M&E by implementing agencies and project stakeholders: M&E will be undertaken in parallel by various entities. First, various implementing agencies (line departments) and the MDPU will regularly monitor and report the physical and financial inputs and outputs of project activities. To facilitate this, MDPU will employ a senior full-time M&E Specialist, and have in-place a computerized monitoring information system to consolidate and manage data received from the various implementing agencies, and to collect its own data. Data will be used to update the key performance indicators of the project to input into the quarterly, semi-annual, and annual progress reports. Use of modern information tools (GIS, spreadsheets, etc.) will help collate, compare, analyze, and visualize the information. At the sub-basin level, MDPU will coordinate with the sub-basin committees in monitoring local activities. The involvement of project beneficiaries, more precisely the WUAs, will also be explored in monitoring and reporting activities at the local level. The WUAs will be trained to use simple monitoring tools (e.g. logbooks, maps) to monitor project progress and impacts and discuss implications.

M&E by an external agency: The project will enlist the services of an independent external M&E agency for the duration of the project, to monitor the progress of project activities, and carry out periodic impact evaluations at various intervals (annually, mid-term, end of the project). The M&E agency will prepare and undertake a baseline survey with collaboration of the line departments, collect data on the key project indicators using agreed upon (with MDPU) statistical sampling from basins and districts under the project, design and implement a web-based project monitoring system, and assist with documentation for project reporting and lessons learned. Terms of reference for the M&E agency (including the questionnaire and formats of the baseline surveys) will be prepared, and procurement initiated for the M&E agency to be in place early in the first year of project implementation.

Baseline and other periodic surveys: The Baseline for the project will be developed by MDPU with inputs from surveys and analysis from the M&E Agency. Some of the more challenging indicators used (e.g. increase in farmer incomes) will be gathered from survey data and refined as necessary during the early stages of the project. The focus will be on tracking the indicators specified in this Annexure. Periodic surveys will also be carried out throughout project implementation and post project completion in the same areas and if possible with the same households to allow for an accurate evaluation of project impacts on targeted beneficiaries. To enable comparative assessment of with / without project situation, as proposed to the more standard before/after project situation, the impact assessments and analyses will collect and use statistically robust comparable data from selected non-project areas also. Preparation of evaluation studies for different components will be an ongoing process resulting in a midterm review, and a final project completion review.

Reporting: MDPU will furnish to the Bank half yearly progress reports. These will include: (a) up-to-date physical and financial expenditure data compared to annual and end-project targets; (b) updated indicators of project performance compared to annual and end-project targets; (c) successes and problems encountered during the

reporting period, with suggested remedial actions, and; (d) socio-economic and environmental impacts of the project. In addition, the Project's Annual Work Program to be financed under the project will be prepared and submitted for Bank review and comments prior to the upcoming fiscal year.

The M&E agency will submit: (i) brief monthly and quarterly reports summarizing concurrent monitoring observations to the MDPU and respective implementing departments; (ii) half yearly reports summarizing project M&E of preceding six months, cross-cutting issues and recommendations, and updated project indicators and; (iii) three comprehensive reports - the baseline survey and the main impact evaluation assessments at the time of the project mid-term reviews and project completion.

The reports will be designed to follow a clear, logical format with supporting graphics (charts and GIS maps). The reports will be submitted in hardcopy as well as in electronic form to facilitate further analysis and dissemination. The reports will also be accessible in the web-based project monitoring system developed and shared with MDPU. The reports will be discussed at the MDPU on a monthly basis with all relevant line departments present. Quarterly and semi-annual workshops will be held to discuss the monitoring observations at a higher administrative level in order to facilitate any adaptive management decisions required.

In addition, M&E agency has to prepare an Implementation Completion Report (ICR) for each sub-basin to facilitate faster transfer of lessons learned during implementation and the status on achieving the mandated works. For the preparation of these sub-basin ICRs/ Overall Project ICR MDPU will co-ordinate with inputs from the line departments. In addition to regular six-monthly implementation support missions, the project will also have a formal mid-term review.

Annexure -B

Project Reporting Formats

Elements of the Project Six-Monthly Reports:

The project will report on the following monitoring indicators every six months:

Indicator	Units	Target for last six months	Target for Project to Date	Progress in last six months	Progress in Project to Date
No. of sub-basin plans finalized at MDPU	Number				
No. of sub-basin plans appraised (technical, economic, environmental, social) by MDPU	Number				
SRI/IPM/INM/Organic farming demonstrations	Number by type				
Ayacut Area initiated for modernization	Hectares				
Ayacut Area modernized	Hectares				
No. of tanks rehabilitated	Number				
Additional WUAs created	Number				
Additional drip coverage	Hectares				
Additional sprinkler coverage	Hectares				
Additional area under diversified crops	Hectares				
Number of farm ponds created	Number				
Number of additional water bodies with fisheries production	Number/ Area				
Sub-basins in which stakeholder meetings and Joint Walkthroughs undertaken	Number				
Staff trained – national	Number				
Staff trained - international	Number				
Farmers/WUAs trained	Number				
Information System status	# computers installed # staff trained IMS status				
Sub-basin ICRs prepared	Number				
Staffing in MDPU	Number by post				
Staffing in Project Cells in all Implementing Agencies	Number by post				
Model Villages Focused	Number				

In addition, the progress report will include detailed reports on the status of all procurement and on the financial reports as indicated later in this section. Relevant charts, maps/GIS output, photographs, and other

graphics will be used to better visualize the progress. The report will also have a reflection on the progress made in the last six months, lessons from implementation and any sub-basin ICRs completed, and focus areas to be indicated for the next six months.

Other Reports:

In addition, the project will also report on the monitoring indicators in Annexure-C every year, at mid-term review, and at the end of the project. In addition, the financial reports will be reported on as agreed to compare budgets and actual at any time, and with formal reporting every six months. Moreover, procurement status for key project procurement (such as of works, goods, consultancy and other services) for all implementing agencies will be monitored and compared to the Procurement Plan.

Annexure –C

Results Framework and Monitoring

PDO Level Results Indicators	Core	UoM	Baseline	Cumulative Target Values							Frequency	Data Source/ Methodology	Responsibility for Data Collection
				PY1	PY2	PY3	PY4	PY5	PY6	[1]PY7			
1.Area provided with improved irrigation and drainage services (ha)	☒	Hectare	-	1600	16000	56000	88000	112000	136000	160000	Annually	Revenue Department	Line Dept, and MDPU
2.A. Yields of agriculture crops i). Rice ii). Maize iii). Pulses	☒	Kgs/Ha	Average of Previous 5 years – 3390 4943 520	 3750 5400 540	 3850 5560 550	 3950 5720 560	 4050 5880 570	 4150 6040 580	 4200 6150 590	 4250 6200 600	Annually	Departmental Reports	Line depts.
2.B. Yields of horticulture crops i). Vegetables (Brinjal, Bhendi & Tomato) ii). T.C Banana	☒	MT/Ha	Average of Previous 5 years 9.216 42.000	 10.500 50.000	 10.950 52.600	 11.400 55.200	 11.860 57.800	 12.310 60.400	 12.650 62.000	 12.759 63.000	Annually	Departmental Reports	Line depts.
3.Area under climate resilient technologies (SRI, RCT, etc.)		Hectare	-	15000	30000	45000	50000	60000	70000	75000	Annually	Departmental Reports	Line depts.
4.Area under non-paddy crops		Hectare	-	10000	15000	25000	35000	50000	60000	75000	Annually	Departmental Reports	Line depts.
5. Share of selected commodities sold through new marketing channels		Percent	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd
6.A.Project Beneficiaries (including female) 6.B. Female Project Beneficiaries		Number Number	-	5000 2500	50000 25000	100000 50000	200000 100000	300000 150000	400000 200000	500000 250000	Annually Annually	Departmental Reports Departmental Reports	Line depts. Line depts.

[1] Year 7 values are the cumulative total of achievements of all previous years

Intermediate Results Indicators	Core	UoM	Base-line	Cumulative Target Values							Frequency	Data Source/ Methodology	Responsibility for Data Collection
				PY1	PY2	PY3	PY4	PY5	PY6	PY7			
7.Staff trained in water resources planning and management, improved service delivery both within WRD &allied departments and agencies		Numbers	-	50	200	400	550	700	850	1,000	Annually	Annual Reporting	Line dept
8.Sub-basin development plans jointly prepared, agreed and under Implementation by multiple agencies		Numbers	-	18	36	56	66	Updating of sub-basins and implemented	Updating of sub-basins and implemented	Updating of sub-basins and implemented	Annually	Annual Reporting	Line Dept and MDPU
9.Tank Irrigation system modernized		Numbers	59	150	350	1100	2000	3000	4000	4800	Half Yearly	Annual Reporting	WRD
10.Staffing and operationalizing PIM wing in EIC office and Regional offices		Numbers	13	24	24	24	24	24	24	24	Annually	Annual Reporting	WRD
11.Operational water users associations created and/or strengthened	☒	Number	-	-	800	800	1600	2400	3200	-	Annually	Annual Reporting	WRD
12.Multi Sectoral Convergence and Vision building trainings, with officers etc. and community involvement on a single platform		Number	-	18	36	56	66	132			Annual	Annual Reporting	WRD & Line Depts
13.Area under micro irrigation		Hectare	-	1,500	4,000	6,000	8,000	10,000	12,000	12,000	Annually	Departmental report	Line Dept

Intermediate Results Indicators	Core	UoM	Base-line	Cumulative Target Values							Frequency	Data Source/ Methodology	Responsibility for Data Collection
				PY1	PY2	PY3	PY4	PY5	PY6	PY7			
14.Area under improved agronomic practices		Hectare	-	5,000	30,000	60,000	70,000	90,000	100,000	100,000	Annually	Departmental report	Line Dept
15.Area covered by IPM/INM/Organic farming		Ha	-	1000	2500	3500	5000	7000	8000	8000	Annually	Departmental report	Line Dept
16.Increase in milk productivity by dairy cow		Lts / cow / Day	5 Lts / cow / day[2]	-	-	5.25	5.5	5.75	6	6.25	Annually	Sample milk recording	AHD
17.Area under improved fish production		Hectare	-	-	-	10,800	14,400	18,000	21,600	25,100	Annually	Fisheries Dept Records	Fisheries Dept
18.Number of FPCs formed and strengthened		Number	-	-	10	20	50	80	80	80	Annually	Departmental report	Dept of Agri. Marketing

[2] Based on IAMWARMP baseline plus 10%