

EXECUTIVE SUMMARY

The Government of Tamil Nadu (GoTN), consequent to the successful completion of the Tamil Nadu Irrigated Agriculture Modernization and Water Bodies Restoration and Management (TN-IAMWARM-1) Project, has requested the World Bank's assistance in undertaking the modernization of irrigated agriculture in the remaining sixty six sub-basins of the state not covered by the TN-IAMWARM-1 Project. The aim is to maintain the model of multi departmental co-ordination and convergence, and to follow the general component design of TN-IAMWARM Project. The main objectives of the proposed TN-IAMWARM-2 project areas follows:

- Enhancement of productivity and climate resilience of irrigated agriculture
- Improvement in water management
- To support value-addition for farmers and agro-entrepreneurs in agricultural, horticulture, livestock and fisheries sectors

The proposed project aims to introduce innovative aspects in the design process built on lessons learned from TN-IAMWARM-1 Project and also reflect the evolving needs of the state in the sectors of irrigation, agriculture, horticulture and allied activities, livestock and fisheries. The project interventions are grouped into three main components:

Component A: Irrigation and Water Management

This component intends to address the irrigation and water management in a holistic manner by covering both supply and demand simultaneously. It consists of following four sub-components:

- Institutional Strengthening and Capacity Building for Water Management
- Irrigation Systems Modernization
- Participatory Irrigation Management (PIM)
- Convergence for Improved Service Delivery

Component B: Agriculture Productivity Enhancement, Diversification, Marketing and Value Addition

The component consists of following three sub-components:

- Intensification and diversification of agriculture production systems
- Improving alternative livelihood sources through livestock and inland fisheries
- Agriculture marketing, value-addition and post-harvest management

Component C: Project Management Support

The TN-IAMWARM-2 project shall be implemented by eight line departments and coordinated by MDPU. The MDPU shall report to a Project Steering Committee (PSC) that will be established to review the progress of the TN-IAMWARM-2 at regular intervals and shall provide strategic directions, guidance on policy matters and resolve conflicts, if any, amongst the implementing agencies. The concerned Executive Engineer (EE) of PWD/WRO and Deputy Director of concerned line department in each sub-basin, shall act as Project Implementing Units (PIU's) for all the project activities falling within their domain/responsibility.

Senior Environmental Specialist (WRD) shall be mainly responsible for providing technical inputs on implementation of the different interventions, assessing/screening environmental impacts of projects being undertaken, supervising the implementation of the Environmental Guidelines, coordinating between PIU's of different regions while Senior Social Scientist (WRD) shall be responsible for preparation of Social Management Plans (SMPs), undertaking site visits, assistance in IEC related activities.

ESA study and preparation of ESMF and ESMPs was undertaken with the following objectives:

- To identify any potential, significant, long-term and irreversible environmental and social impacts due to implementation of proposed project activities in the proposed project areas.
- To identify potential opportunities for enhancing environmental and social sustainability of project investments, including reducing Green House Gas (GHG) emissions, where possible.
- To prepare an Environmental and Social Management Framework (ESMF)
- To prepare templates for Environmental and Social Management Plans (ESMPs)
- To suggest process steps for integrating the ESMF and ESMPs

As part of the World Bank procurement policy, project which triggers environmental and social impacts has to mandatorily undergo the process of Environmental and Social Assessment (ESA) before funding. ESA is generally defined as a process to predict, interpret, and communicate possible environmental and related social impacts of the proposed activities which is an effective tool in ensuring an integrated approach to the planning of development projects and programs. A key objective of the ESA process is to ensure the efficient delivery of development projects in a manner that minimizes adverse environmental impacts and respects all relevant legislations. The study addresses the following:

- Description of the environment of the potentially affected area that includes the present relevant baseline information
- Identify and assess the likely impacts of the project in terms of the biological, physical, social, economical, cultural and environmental aspects and suggest appropriate mitigation measures.
- Assessment of institutional capacity to implement and monitor the implementation of the environmental and social mitigation measures
- Review and discussion of environmental and social policies, legal and administrative frameworks, as well as World Bank policies.
- Preparation of an ESMP
- Consultations with key stakeholders on the findings of the ESA assessments

The proposed project will have both positive as well as negative impacts as a result of subproject activities envisaged in the sectors of Agriculture, Irrigation, Livestock and Fisheries during different phases of implementation in the selected sixty six sub-basin areas. The potential positive impacts associated with the proposed project include:

- Efficient and judicious management of water resources.

- Improved crop productivity
- Increasing cropping and irrigation intensities
- Increase in groundwater recharge and reduction in groundwater abstraction
- Increasing vegetal cover
- Reduction in the current water deficit
- Increased dairy and inland fisheries production.
- Reduction in soil erosion rates
- Improvement in employment opportunities, social capital and access to amenities
- Socio-Economic empowerment of women farmers and vulnerable groups
- Impetus to local growth and development of the selected sub-basin areas

The potential negative impacts during construction phase include:

- Construction debris
- Disposal of dredged material
- Increase in vehicular traffic
- Solid waste generation from labour sheds
- Exclusion of vulnerable groups in the new employments created

These impacts can be mitigated through suitable mitigation measures such as using construction debris for levelling of burrow areas, utilization of tank bed material as construction material in the tank bunds, implementation of air, water and noise pollution control measures, proper solid waste management etc and providing employments to the vulnerable groups.

The potential negative impacts during operation phase include:

- Increase in use of agro-chemicals, especially pesticides due to opportunities to increase agriculture and horticulture
- Groundwater resources and quality as a result of higher withdrawals and pollution from agricultural and other non-point sources
- Improper disposal of wastes (organic and other solid wastes) during construction and operation of built infrastructure (irrigation, agriculture marketing and post-harvest management)
- Clearing/conversion of coastal wetlands for construction of fishery ponds
- Domestic sewage, wastewater generated from animal washings, floor cleaning
- Exclusion of small and marginal farmers and women farmers in the project activities

These impacts can be mitigated through suitable mitigation measures such as implementation of IPM, INM, SRI, SSI micro irrigation with fertigation etc which shall help in reducing the use of chemical fertilizers and pesticides, building artificial recharging and rainwater harvesting structures in sub-basin areas where fluoride exceeds the permissible limits to decrease its concentration, prohibiting ponds in areas of particular ecological significance, onsite treatment systems. Creating community based organizations like

WUAs and targeting the small and marginal farmers and women farmers to include in the project activities.

Based on the ESA study, it is evident that sub-project activities under the TN-IAMWARM-2 project will result in agriculture modernization, water-bodies restoration and management and related social benefits to intended beneficiaries as envisaged.

Based on the impacts certain mitigation measures have also been discussed. It has been found that the positive impacts outweigh the negative impacts as the project is beneficial to all the categories of farmers, agriculture labourers and other vulnerable groups.

- The barren area will be brought under agriculture and this will significantly improve the livelihood of the farmers.
- The continuous cropping over barren and mono-cropped land would act as soil binder and reduce the soil erosion rates.
- The proposed project would reduce the dependence on ground water with corresponding reduction in groundwater abstraction. The increased groundwater recharge will also replenish the groundwater resources.
- The proposed project would lead to improvement in water availability, which will manifest into increased cropping and irrigation intensities.
- Enhanced income shall enable beneficiary-households to purchase the necessary new farm implements. This will lead to the increase in agriculture production.
- The area that has been barren will be brought under agriculture and this will significantly improve crop area, mono crop to two crops, crop diversity, intensity and the yield.
- The proposed project would reduce the dependence on ground water with corresponding reduction in groundwater abstraction. The increased groundwater recharge due to irrigation would also replenish the groundwater resources.
- The proposed project would lead to improvement in water availability, which will manifest into increased cropping and irrigation intensities.
- As a part of Environmental Management Framework, appropriate control measures in the form Pest Management Plan, covering IPM and INM measures have been recommended. The project functionaries are proposed to popularize the use of FYM and green manure in the command area being irrigated by the project. These practices are likely to improve the per unit yield with minimal impact on the environment and reduction in the cost of cultivation.

- The project implementation will enhance overall employment opportunities in the project area and reduce the out migration rate. There will also be an increase in the income of agricultural labourers and other vulnerable groups.
- Continuous need based training programmes conducted in the project will increase the skill and capacity of the farmers to adopt sustainable and modern farming practices and become more resilient.
- Enhanced income shall enable beneficiary-households to purchase new farm implements and modernize agriculture. This will lead to the increase in agriculture production and reduction in the input costs.
- Project interventions in livestock management will enhance the milk and meat production, similarly through revival of fish farming in the tanks and farm ponds fish production will go up.
- The formation of community based organization like WUAs, FPOs and collaboration of other existing organizations such as SHGs and Farmers clubs to effectively implement the project will increase collective action among the farmers for participatory management of the irrigation system and farmers entering in to direct marketing of the produce.
- Addressing gender concerns and facilitating of the active participation of women farmers in the project activities would enhance the socio economic status of the women farmers.

The brief tasks that are to be carried out by the line departments are as follows.

Agriculture Department	<ul style="list-style-type: none"> • Implementation of INM and IPM (organic practices). • Distribution of critical inputs in time and farm implements • Need based trainings and demonstrations to men and women farmers and field staff
Water Resources Department, PWD	<ul style="list-style-type: none"> • Development of good-practice and decision support systems for sustainable water resources management • Strengthening institutions and instruments dealing with water resources management.
Horticulture Department	<ul style="list-style-type: none"> • Popularization of commercial horticulture techniques for enhanced revenue and crop diversification • Precision farming for horticultural crops and conducting need based trainings
Agriculture Engineering Department	<ul style="list-style-type: none"> • Introduction and promotion of water saving Micro Irrigation systems like Drip & Sprinkler Irrigation and solar powered pumps • Promotion of water harvesting structures
Agriculture Marketing –	<ul style="list-style-type: none"> • Development of small scale processing units, Storage godowns, solar cold storage & Solar driers, creating marketing centres

	<ul style="list-style-type: none"> • Value addition – drying, processing etc • Promotion of agri – entrepreneurs and FPOs
Tamil Nadu Agriculture University (TNAU)	<ul style="list-style-type: none"> • Development of Precision Farming Techniques, demonstration of SRI method, conducting trainings • Development of price-forecasting information model in Agribusiness • Develop Model Seed Village Concept to generate good quality and hybrid seeds
Animal Husbandry Department	<ul style="list-style-type: none"> • To ensure total health cover both preventive and curative. • Distribution of mineral mixture • Reduce the gap between the requirement and availability of green fodder through promotion of fodder cultivation
Fisheries Department	<ul style="list-style-type: none"> • Development of Aquaculture in Farm Ponds • Development of Aquaculture in Irrigation Tanks by establishing Fish Seed Bank, development of Ornamental Fish Culture

The ESMF provides a negative list of activities that the project will not finance, an environment impact identification tool and a screening tool for categorizing the various sub-projects based on risk posed to environment, a mitigation plan, pest management plan, gender and other project specific strategies, monitoring and capacity building plan and a budget for implementing the EMPs and ESMF.