

**COMBINED PROJECT INFORMATION DOCUMENTS / INTEGRATED
SAFEGUARDS DATA SHEET (PID/ISDS)**

Appraisal Stage

Report No.: PIDISDSA20871

Date Prepared/Updated: 15-May-2017

I. BASIC INFORMATION

A. Basic Project Data

| | | | |
|--|--|------------------------------------|------------------------------|
| Country: | India | Project ID: | P158522 |
| | | Parent Project ID (if any): | |
| Project Name: | Tamil Nadu Irrigated Agriculture Modernization Project (P158522) | | |
| Region: | SOUTH ASIA | | |
| Estimated Appraisal Date: | 27-Mar-2017 | Estimated Board Date: | 28-Aug-2017 |
| Practice Area (Lead): | Agriculture | Financing Instrument: | Investment Project Financing |
| Borrower(s) | Republic of India | | |
| Implementing Agency | Water Resources Organization, Public Works Department, GoTN | | |
| Financing (in USD Million) | | | |
| | Financing Source | | Amount |
| | Borrower | | 136.30 |
| | International Bank for Reconstruction and Development | | 318.00 |
| | LOCAL BENEFICIARIES | | 1.50 |
| | Financing Gap | | 0.00 |
| | Total Project Cost | | 455.80 |
| Environmental Category: | B-Partial Assessment | | |
| Appraisal Review Decision (from Decision Note): | The review did authorize the team to appraise and negotiate | | |
| Other Decision: | | | |
| Is this a Repeater project? | Yes | | |

B. Introduction and Context

Country Context

India in recent years witnessed impressive economic growth and poverty alleviation. During 2005-15, India's Gross Domestic Product (GDP) grew at 7.04 % annually and poverty incidence reduced on

average by 2.2 percentage points per year during 2005–12. Also, improvements in key development indicators have been remarkable: life expectancy increased from 31 years in 1947 to 68 years in 2015 and adult literacy increased from 18% in 1951 to 71% in 2015.

Despite such impressive progress in economic growth, poverty alleviation, and improved human development indicators, India remains home to 263 million poor people (80% of whom reside in rural areas) living on less than US\$1.90/day and the country is still at the bottom of the group of middle-income countries. To address these challenges, the Government of India (GoI) put forward an ambitious goal for economic growth, poverty reduction, job creation, and environmental management. According to Economic Survey 2016-217, GDP is expected to grow at 7.0% in 2017.

Because of its inherently inclusive nature, agriculture sector growth is essential for achieving the national development goals: the sector currently accounts for 14% of national GDP, is a source of livelihood for more than half of the population, and more than two thirds of country's poor live in rural areas, whose chances of getting out of poverty directly depend on the performance of agriculture and allied rural sectors.

Over the past two decades the agriculture sector has performed below its potential and has not met the envisaged growth targets. In the 1990s and 2000s, the annual agriculture growth rate was around 3-3.5% and during 2013-15 it was less than 2% per annum caused by low productivity, growing water and land scarcity, rising labor costs exacerbated by frequent droughts, floods, and declining international commodity prices.

As indicated in Economic Survey 2016-17, the GoI has put forward an ambitious 4.1% annual agriculture growth target in FY17. To achieve the long-term agriculture growth rates, the Government envisages five strategic shifts that will structurally transform Indian agriculture. These shifts reflect underlying trends in demand for food and factors affecting supply of food, and include: (i) a shift away from food grains towards high value vegetables, fruits, dairy and fish products; (ii) a shift away from on-farm production towards value addition in post-harvest segments; (iii) a shift away from the focus on productivity towards resilience of diversified farming systems to address climate change effects; (iv) a shift away from food security towards nutrition sensitive agriculture; and (v) a shift away from increasing irrigation water supply towards improved water use efficiency.

In recent years, the GoI has launched a number of policy initiatives and programs to support these shifts, including the Second Green Revolution Program (2013) with a focus on higher productivity and diversification; the National Agricultural Development Program (2008); National Food Security Mission (2008) to promote increasing production and productivity for rice, millets, minor millets, pulses, oilseeds, cotton and sugarcane for sustainable agriculture; the National Mission for Integrated Development of Horticulture (2013) to promote diversification into fruits and vegetables, the National Agricultural Market Promotion to accelerate the integrated development of agriculture marketing and trade, as well as India's Intended Nationally Determined Contribution (INDC) (2013) as presented to the COP21 in Paris to address the adverse effects of climate change. In the water and irrigation sector, the National Water Policy (2012) puts emphasis on increasing water storage capacity and improved water application methods, including micro irrigation (drip, sprinkler), as an adaptation to climate change. The Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) launched in 2012 also advocates efficient irrigation practices and improvement of on-farm water use efficiency.

Income growth and urbanization are changing consumer demand for food commodities in India towards better quality and higher value agricultural commodities such as vegetables, fruits, meat, and dairy products. The shift to high value commodities and opportunities in post-harvest management

underscore the enormous potential for commercialization, job creation, and income growth in irrigated agriculture. India has considerable comparative advantage as it has a very large and untapped domestic market, which reduces reliance on exports as the principal driver for near term agriculture growth. Beyond the domestic market, there are also strong comparative and competitive advantages in trade of high value agriculture produces.

Sectoral and Institutional Context

Tamil Nadu is the second largest state economy in India with one of fastest growth rates: over the past three years its Gross State Domestic Product (GSDP) grew at 9.2% per annum. The average annual per capita income of the state is around INR 61,500 (at 2010/2011 constant prices), which is 42% higher than the national average. Tamil Nadu is also the most urbanized state in India with 48% of population living in cities.

Agriculture accounts for 12% of the state's GSDP. About 40% of state's population is dependent on agriculture for their employment and more than two thirds of state's poor people live in rural areas and are engaged predominately in agriculture activities. The majority of farmers are small and marginal with average family landholdings of 0.83 ha. The main crops are rice, maize, pulses, groundnut, sugarcane, vegetables, and banana. Rice dominates agriculture production systems accounting for 34% of total cropped area and 60% of irrigated area. Due to seasonality and scarcity of water supply, cultivation is mostly limited to only one crop per plot per year.

Tamil Nadu is one of the driest and most water stressed states of India with average annual rainfall of 925 millimeters, which is well below the national average of 1,200 millimeters. Per capita availability of water in the state is around 750 cubic meters a year compared with the national average of 2,100 cubic meters. The state is heavily dependent on irrigated agriculture, and over the years it has built an impressive inventory of irrigation and water infrastructure. In Tamil Nadu, there are 89 major reservoirs, 39,000 tanks (traditional water harvesting structures) and 3 million wells. Irrigated agriculture is the largest consumer of water in Tamil Nadu accounting for 75% of total water usage. About 3 million ha of land (54% of total crop land) is under irrigation with different sources of water: 30% of total irrigated area is under canal irrigation, 21% is under tank irrigation, and 49% is irrigated by wells.

In recent years the state's agriculture sector has grown modestly at less than 3% per annum compared with 6-9% growth of the state's economy. This performance of agriculture sector below its potential is due to multiple factors, including increasing water shortages, stagnant crop yields, low level of diversification, weak market development, high rates of post-harvest losses, and increasing climate change threats.

Increasing water shortage. Tamil Nadu, being a water-stressed state, continues to experience water shortages, which are expected to further exacerbate in the future. According to State Action Plan on Climate Change in Tamil Nadu (2014), in 2011 the total demand for water was around 49.8 billion cubic meters against total supply of 47.8 billion cubic meter or 4% of shortage. This gap between demand and supply in water is projected to increase to 11% in 2020 and 17% in 2050 unless drastic measures are taken to rectify these imbalances. Currently, only half of the registered command area (ayacut) is adequately irrigated, and the increasing use of wells for irrigation is depleting ground water level. Such water shortages are due to decreasing storage capacity, dilapidated infrastructure of irrigation systems, and poor water management. In addition, increasing population and greater demand from non-agriculture sectors put further pressure on water supply.

Stagnant crop yields. In Tamil Nadu for the past 15 years yield growth of major crops has been largely

stagnant. According to an evaluation study commissioned by Tamil Nadu Planning Commission, between 2000 -2010 yields of rice and sugarcane in the state grew by less than 1%, whereas yields of pulses and ginger had negative growth rates. Today average yields of rice and maize are slightly higher than the national average, but the average yields of vegetables, cotton and pulses are lower than the national average.

Low level of diversification and high post-harvest losses. Despite significant progress in crop diversification over the last decade, agriculture in the state remains dominated by paddy cultivation, which occupies 34% of total cropped areas. Fruits and vegetables on the hand are grown on 11% of cropped land, and pulses and oilseeds on 14%. Value-addition is low and post-harvest losses of agriculture products are significant: Only 25% of food grains is stored with adequate standards, less than 2% of fruits and vegetables produced are processed and the estimated post-harvest losses are 10% for grains and 25% for fruits and vegetables.

Weak agriculture marketing system. Agriculture marketing system in Tamil Nadu is weakly developed compared to its own potential and to performances of other states: most agriculture commodities are still traded through traditional marketing channels such as Agriculture Produce Market Committees (APMCs), Direct Procurement Centers (DPCs), and traders, which are primarily geared for paddy procurement, have not been modernized, and suffer from severe infrastructure bottlenecks. New alternative marketing channels such as direct procurement by lead buyers or farmer aggregations of producer for direct sale have not been developed yet. These constraints not only hamper farmers' ability to remuneratively market their produce, but also do not provide market incentives for diversification from paddy to alternative crops.

Increasing climate change risk. Agriculture sector of the state is highly exposed to climatic risks, especially to droughts, floods, cyclones, and erratic rainfall, which have frequently affected the performance of agricultural sector in the past. The dry season lasts five months (January through May) even in good years, and droughts occur in three out of ten years. Recent evidence shows that climate change is exacerbating the vulnerability of agricultural sector with increasing erratic weather patterns and climatic shifts. A clear example is the consequence of devastating floods in November-December 2015, which severely damaged irrigation infrastructure in three districts and Chennai, the capital city of Tamil Nadu. According to State Action Plan on Climate Change in Tamil Nadu (2014), temperature across the state has increased by about 0.7-0.8 degrees of Celsius since 1950s, and each year sees more dry days than wet days coupled with significant increase in heavy precipitation events. Also, there is an increasing trend in the frequency of severe cyclones. The report projects that by end of this century, the minimum and maximum temperatures and intensity of rainfall will increase, and the average temperature will increase by 3 degrees of Celsius.

Nutrition. In Tamil Nadu, due to imbalanced nutrition, a significant proportion of population is either under or overweight, or anemic. According the National Family Health Survey conducted in 2015/16, 46% of women in the 15-49 age group are under or overweight, and 51% of children under 5 years and 55% of women are anemic due to iron deficiency. In Tamil Nadu, it is estimated that one out of 10 people is diabetic and eight out of 10 people exhibit abnormal lipid levels. The excessive use of rice is considered among the main factors of these health issues.

Gender. The overall literacy rate in Tamil Nadu is 80%, and the literacy rate for females is 66% compared with 82% for males. Continued decline of employment opportunities in rural areas forces men to migrate to urban areas, leaving women behind in rural areas. These women get more actively involved in agricultural works, that are often underpaid. Also, while the number of male farmers has been declining, the number of female farmers has been rising. In Tamil Nadu, currently, more than

78% of women are involved in various agriculture, horticulture, and livestock activities. Female laborers and farmers are often denied access to resources, assets, and there is an increasing need for pro-poor community-based organizations that can help enhance the skills and capacity of rural women and strengthen women empowerment.

To address the above issues and unlock the full potential of agriculture sector growth in Tamil Nadu, there is a strong need for policies and programs to focus on: (i) improvement of water efficiency productivity; (ii) intensification of cropping systems, and diversification into high value crops; (iii) enhancement of post-harvest management and value addition; and (iv) improvement of the resilience of agriculture system to deal with increasing threats of climate change.

Tamil Nadu has been tackling these challenges through a multiple-pronged approach of promoting policy reforms, institutional changes, and investment programs. Recently, the Government of Tamil Nadu (GoTN) developed the Tamil Nadu Vision 2023 and the State Framework Water Resources Plan for River Basins. The Tamil Nadu Vision 2023 Phase 2 (2014) sets out nine strategic initiatives to “achieve the best in class productivity in key agricultural produces and to be a global supplier with robust infrastructure”. These are to: (i) improve agriculture productivity; (ii) promote market driven agricultural production; (iii) promote agriculture marketing intelligence and business promotion; (iv) accelerate innovation and extension reforms; (v) promote functional consolidation of land holdings; (vi) promote greater farm mechanization; (vii) create a robust supply chain; (viii) assure timely irrigation; and (ix) enhance capacity building in agriculture.

In February 2017 the GoTN introduced an amendment to the State Agriculture Produce Marketing Act (1987), which brings in significant reforms the state’s agriculture marketing system. The new approach seeks to ensure: (i) inclusion of private markets into formal marketing systems; (ii) allowing direct procurement of agriculture produce from farmers by industries and trading companies; (iii) promoting contract farming; (iv) promoting e-trading including billing, booking, contracting, negotiating information exchange through internet; (v) promoting farmer consumer markets to provide direct interface between consumers and farmers; (vi) introduction of single point levy of market fee to avoid multiple taxation; and (vii) new provision of unified single license to traders to enable them to trade in any market committee in Tamil Nadu. The amended Agriculture Produce Marketing Act provides significant opportunity for enhancing agriculture marketing system in the state.

The GoTN has earlier 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 state has also made significant investments in modernization of irrigation systems through a series of 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. The Bank-supported TN IAMWARMP has had significant development impact by helping farmers improve water use efficiency and diversify into high-value crops, thus enhancing yields and productivity of agriculture, livestock and fisheries. It also helped introduce major institutional reforms through participatory irrigation management and water user’s 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. These achievements and lessons learned during implementation of Tamil Nadu IAMWARMP provide a solid basis for further enhancing the performance of irrigated agriculture in the state as envisaged under the project.

The proposed project will build upon the policy and institutional developments achieved under TN IAMWARMP and help the state further enhance water and agriculture productivity, bringing crop diversification to a new level, and improve farmers' linkages to markets. The project will also rehabilitate and modernize high priority tank irrigation systems in more than 50% of sub-basins of the state, that were not included under TN IAMWARMP.

C. Proposed Development Objective(s)

Development Objective(s)

The proposed Project Development Objective (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.

Key Results

- (i) Area provided with improved irrigation and drainage services (resilience, water use efficiency) ;
- (ii) Increase in agriculture productivity (productivity);
- (iii) Increase in areas cultivated for non-paddy crops (diversification and value added);
- (iv) Adoption of climate-resilient technologies and practices (resilience);
- (v) Share of selected commodities sold through new marketing channels (increased market opportunities)
- (vi) Total number of project beneficiaries (including number of female beneficiaries).

D. Project Description

The project design includes a number of innovative aspects that build on lessons learned from IAMWARMP, and good practices of similar tank rehabilitation and agriculture development projects in India and other countries. These innovative aspects include improved designs of irrigation infrastructure, a much stronger focus on the demand-side of irrigation with aim to improve water-use efficiency, further advances in agricultural diversification, agri-entrepreneurship, and movement toward climate resilient agriculture with relevant agriculture-water related investments and substantial improvements of participatory irrigation management practices by beneficiaries, and extensive application of ICT-based technologies for improved water resource management and better linkage of farmers to markets .

The project will bring in greater resilience to agriculture production systems and will generate significant adaptation and mitigation co-benefits to climate change through multiple channels of interventions, including: (i) rehabilitation and modernization of irrigation tanks covering more than 50% of state sub-basins will significantly improve the availability and reliability of irrigation water for farming communities making them less prone to climatic hazards; (ii) improved design of irrigation tanks will provide greater flood control features; (iii) major expansion in high efficiency irrigation systems (micro-irrigation), resource conservation technologies (SRI, SSI) and improved agriculture practices will reduce water usage and stabilize crop yields; and (iv) diversification into high value crops and improved market access by farmers will increase sustainability and profitability of their businesses.

The project will also have significant positive nutritional impacts for state's population through diversification (into high value pulses, millet, vegetables, and fruits) and enhancement of dairy and fisheries sectors. The expected increases in pulse production under the project will provide high levels of fiber, protein and minerals, especially iron and zinc to consumers in the state. Also, by promoting grain millets and sorghum as complementary staple food to rice, the project will contribute to reductions in diabetes among state's population. Further, major expansions of horticulture program under the project will contribute to increased consumption of fruits and vegetables, milk and dairy products, rich vitamin A, low fat protein (fish), calcium, and magnesium.

The project is expected to bring increased agriculture productivity, diversification, resilience, and enhanced market access to farming communities in more than half of total state sub-basins and enhanced nutrition for the population through institutional strengthening of state-wide water resource planning and management organizations, modernizing tank irrigation systems and promoting farmer-led participatory irrigation systems, climate resilient technologies and improving farmers' access to markets. These would eventually bring inclusive rural growth, mainstreaming of climate-resilient resource conservation technologies and practices and enhance market access by farmers in the state

Component Name:

Component A: Irrigation and Water Management

Comments (optional)

This component would address irrigation and water management in a holistic manner by covering both supply and demand simultaneously. It consists of four sub-components: (i) Institutional strengthening and capacity building for water management; (ii) Irrigation systems modernization; (iii) Participatory irrigation management; and (iv) Convergence for improved service delivery

Component Name:

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

Comments (optional)

This component will 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. 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 Name:

Component C: Project Management Support

Comments (optional)

The component will support: (i) establishment and operations of MDPU; and (ii) setting up a monitoring and evaluation (M&E) system for the project, and contracting an external M&E agency to monitor project activities and impact. This component will also finance dedicated staffing for the project activities, consultancies, training and related material, office equipment, and incremental operational costs.

Component Name:

Component Z: Contingency Response

Comments (optional)

This zero cost component will finance eligible expenditures under the Immediate Response Mechanism (IRM) in case of natural or man-made crises or disasters, severe economic shocks, or other crises and emergencies in Tamil Nadu.

E. Project location and Salient physical characteristics (if known) relevant to the safeguard analysis

The project will be implemented in 66 sub-basins, including the areas experiencing droughts, floods and other climate/natural shocks, particularly in coastal areas. The project activities might influence a diverse set of habitats/ecosystems, including, coastal, plains, hilly, wetlands, rivers and sub-river basins. The project will finance rehabilitation of existing small, medium and large tanks (total around 4800 tanks) and some of the associated canals to improve irrigation efficiency in the sub-basins and also replace old and non-functioning sluices and weirs where necessary. These tanks have been built several decades ago and require rehabilitation. Only localized impacts on the environment are anticipated. In addition, there will be investments on farmlands for enhancing crop productivity, intensity and diversity. Investments will also be made on improving value chains and agri-marketing. Most of these investments are on existing farmlands where agriculture has been practiced for generations.

F. Environmental and Social Safeguards Specialists

Anupam Joshi(GEN06)

Charu Jain(GEN06)

Samuel Thangaraj(GSU06)

II. IMPLEMENTATION

The implementation arrangements of the project are fully integrated within the existing structures of participating line departments and agencies at state and district levels to ensure strong government ownership and long term sustainability of project impacts. In case of gaps in specific technical skills and institutional capacity, the project will engage outside (national and international) expertise.

A Project Empowered Committee (PEC) chaired by the Chief Secretary and comprising the Principal Secretaries/Secretaries to the Government of Tamil Nadu for Finance, Public Works, Agriculture, Animal Husbandry and Fisheries will provide policy directions and guidance, promote inter-agency coordination, resolve major implementation issues, and will review and approve major project proposals.

The Multi-Disciplinary Project Unit (MDPU), headed by the Project Director, will provide operational management support and co-ordination. The MDPU will have representation in all disciplines that are part of the project, and in procurement, financial management and safeguards aspects. These would include external specialists and other technical personnel deputed from line departments and agencies. Currently, several specialists deputed by the participating line departments and agencies work in the MDPU. Additional specialists in environment, social development, media and communications, market intelligence, GIS and other areas will be recruited when the project becomes effective.

Individual interventions and activities will be implemented by nine line departments and universities. The lead implementing agency will be the WRD under the administrative jurisdiction of Principal Secretary, PWD. Other implementing agencies will be the Departments of Agriculture, Agricultural Engineering, Agricultural Marketing and Agribusiness, Horticulture, Animal Husbandry and Fisheries; Tamil Nadu Agricultural University (TNAU),

Tamil Nadu Fisheries University (TNFU), and Tamil Nadu Veterinary and Animal Sciences University (TANUVAS). A Project Coordination Unit (PCU) will be established in each of participating line department and agency to oversee the implementation of their specific activities. The key functions of each PCU will be to prepare, implement, monitor their annual work plans and coordinate with MDPU. The PCU will consist of a nodal officer and other staff in technical, procurement, finance, and safeguards areas.

Implementation of Sub-components A.1, A.3 and A.4. These three sub-components will be primarily executed by WRD with support from other participating agencies in the formation and capacity building of WUAs. The Participatory Irrigation Management (PIM) Wing in Engineer-in-Chief's office will lead the efforts in formation and capacity building of WUAs. Synergies with other participating agencies will be pursued. The PIM Wing will recruit individuals, Experts, Civil Society Organizations (CSOs) / agencies for mobilizing the communities. WUAs would be supported to create Single Window Information and Knowledge Centers. Modernization of information and communication technology across WRD offices and to select SWIKCs will be implemented by the Engineer-in-Chief's office. The SWARMA and the IWS under WRD will be responsible for policy analysis, expanding knowledge base and providing technical support for water resource management. Further, extensive change management interventions and training to tackle service delivery and convergence challenges will be carried out at all levels.

Implementation of Sub-component A.2 and Component B. constitute a bulk of project investments involving modernization of tank systems, anicuts, water distribution canals and on-farm development, as well as demonstration and dissemination of improved technologies related to agriculture, horticulture, animal husbandry and fisheries, organization of farmers into commodity groups, producer organizations/companies, training of staff, farmers and fishers, renovation of markets, promotion of market linkages and agri-business development. These tasks will be organized at the sub-basin level

For each sub-basin (or a cluster of sub-basins where the command areas are small), one Executive Engineer of WRD will be designated as a nodal officer. A team of specialists deputed at the field level by the participating agencies will work with nodal officer and will prepare sub-basin development plans (SBDPs). A Nodal Officer in WRD will monitor and facilitate tank-related investments (sub-component A2, A3 and A4).

The process of preparing SBDPs, covering engineering and agriculture (crops, horticulture, livestock and fishery) aspects, developed and refined under IAMWARMP will be followed. The plans will be prepared in a participatory manner, with the involvement of the field staff of all the implementing agencies, WUAs, and other stakeholders in joint walk through of the irrigation infrastructure and consultation sessions in several villages in the sub-basin irrigation commands. Requirements for modernization of irrigation infrastructure will be tailored to meet the needs of crop, horticulture, and livestock and fish production. The specific crop, horticulture, dairy and fish production interventions appropriate for the sub-basin will be identified, and the agricultural, horticultural, dairy and fish production, and on-farm irrigation technology options, marketing strategies and other interventions will be prioritized.

Each sub-basin development plan will be sent to the District Collector and nodal cells of the line departments for their review and inputs. These plans and designs will be then submitted by the respective line agencies to MDPU for ensuring multi-disciplinary and integrated nature of Sub-basin development plans. The MDPU acts as facilitator and assists the sub-basin groups in preparing comprehensive plans.

Implementation of various activities contained in SBDPs will be the responsibility of the concerned implementing agency. The MDPU will monitor the implementation of an integrated development plan through monthly and quarterly progress reports. Individual departmental physical and financial progress will be monitored by PCU.

MDPU will also oversee the work of the monitoring and evaluation consultancy. Monitoring of project outputs and outcomes will be undertaken by an independent consultant under the guidance and supervision of MDPU in addition to line agency internal monitoring and reporting systems.

The Department of Agriculture Marketing and Agribusiness will be responsible for organizing farmers into commodity groups and larger producer groups and companies using service providers. It will also carry out modernization of selected markets and provide infrastructure and logistic support to producer companies, farmers and agri-entrepreneurs. The MDPU will coordinate implementation of project activities in collaboration with all the participating agencies; and will also be responsible for monitoring and evaluation, compiling project reports and disseminating fiduciary and safeguards compliance requirements.

III. SAFEGUARD POLICIES THAT MIGHT APPLY

| Safeguard Policies | Triggered? | Explanation (Optional) |
|-------------------------------------|------------|---|
| Environmental Assessment OP/BP 4.01 | Yes | Significant physical investments are planned under the project and although the nature of these investments would be largely rehabilitation of existing irrigation infrastructure assets, improper construction could result in adverse impacts. An Environmental and Social Assessment was undertaken and templates of Environmental and Social Management Plans have been prepared that will be used for managing potential impacts and risks and maximize environmental and social opportunities. In addition, an Environment and Social Management Framework (ESMF) has been prepared that provides guidance on screening the sub-projects, includes a negative list of activities that project will not finance, suggests appropriate mitigation measures and includes a monitoring and capacity building plan for addressing environmental and social risks. The assessment took into account earlier |

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| | | work and experiences of the two earlier projects (TN WRCP and TN IAMWARMP) and consideration of new activities envisaged in the TN IAMP project. |
| Natural Habitats OP/BP 4.04 | Yes | This is triggered, as a large number of tanks will be rehabilitated, including canal system, which may impact natural habitats, particularly wetlands. The ESMF proposes mitigation action to avoid any damage to natural habitats. These include measures to reduce disturbance to avian and other faunal elements associated with the tanks and other smaller water bodies as well as provisions to reduce dust pollution. Smaller water bodies will be protected against any possibility of damage and/or destruction. |
| Forests OP/BP 4.36 | No | No impacts on forests are expected and the project will not affect existing forest management practices. |
| Pest Management OP 4.09 | Yes | No pesticides and fertilizers are expected to be financed directly by the project, except in limited amounts for demonstrative pilots; however, there may be induced impacts of increased fertilizer and pesticide use due to improved agricultural intensification and diversification. A Pest Management Plan has been prepared. The project is supporting scaling-up state-wide Integrated Pest Management and Integrated Nutrient Management efforts and support for safer and organic food production and marketing. Adequate provisions have been made to provide training to farmers and other stakeholders on safe handling and disposal of pesticides and other agro-chemicals. |
| Physical Cultural Resources OP/BP 4.11 | No | Any excavation is limited to removal of deposition of silt in existing tanks and no new large to medium excavation are to be undertaken. All tanks and canals are existing ones. No significant adverse impacts on any kind of cultural property are expected. No religious and other physical cultural property sites are associated with planned investments |
| Indigenous Peoples OP/BP 4.10 | No | There are scheduled tribes, who live in districts covered by the project, but since they do not live in project intervention areas, the project will not have any adverse social impacts on them. |

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| Involuntary Resettlement OP/BP 4.12 | Yes | ESIA noted that there are some limited cases, where irrigation tanks are encroached. Before rehabilitation of irrigation tanks, the project will carry out social screening involving all key stakeholders to establish if there are encroachments and will not select those tanks with encroachments into project scope. Nevertheless, O.P 4.12 has been triggered and RPF developed to apply policy framework in exceptional cases if some high priority tanks with encroachments are considered for rehabilitation. The project will not have any private land acquisition. |
| Safety of Dams OP/BP 4.37 | No | The project involves rehabilitation of existing irrigation tanks with average embankment height of 2-3 meters. These tanks have been in operation for several decades. Tanks that will fit the criteria of OP4.37 (exceed 15 m and/or with height of 10-15 m and meet other requirement of crest length, discharge rate and storage volume) will be excluded from project. This policy is therefore not triggered. |
| Projects on International Waterways OP/BP 7.50 | No | The project does not fall on any international waterways. |
| Projects in Disputed Areas OP/BP 7.60 | No | The project is not in any disputed areas. |

IV. Key Safeguard Policy Issues and Their Management

A. Summary of Key Safeguard Issues

1. Describe any safeguard issues and impacts associated with the proposed project. Identify and describe any potential large scale, significant and/or irreversible impacts:

There are no potential significant and irreversible impacts associated with the project. The rehabilitation and improvement of tank irrigation systems involves small remedial and upgrading measures and often do not involve major revision of the design standards of existing structures. These tanks, totaling around 4,800 in numbers are geographically well dispersed across 66 sub-basins in the State and therefore pose no cumulative impacts. Any potential impacts expected are local impacts and could include improper disposal of silt and/or waterlogging during construction period. All such impacts are manageable through the ESMPs and ESMF. The WRD (lead implementing agency) has a substantial experience in implementing such programs under Bank-financed two successive previous projects (TNIAMWARMP and TNWRCP). However, for the rehabilitation of large tanks, a hydrological assessment will be carried out for each sub basin prior to undertaking rehabilitation to ensure that they meet the national design codes of India and are in line with international good practices. The hydrological assessment will include water availability and quality assessment, and estimation of design flood. Based on findings of hydrological assessment, if any surplus weir/spillways have insufficient capacity to pass the design floods,

the necessary modifications will be introduced to meet the required standards. Some impacts could also arise from excessive use of pesticides and other agro-chemicals, the use of which are known to increase when investments are made on improving agriculture productivity, diversification into horticulture and poor awareness of farmers in using banned pesticides.

Labor camps may be established in certain places for rehabilitation works. It would be important to take care of occupational health and safety measures, especially during construction, provide proper amenities in the labor camps and agree on a code of conduct with labor. Labor camps are likely to be put up on public lands only. Irrigation tanks with encroachments will be excluded from project activities. However, to deal with exceptional cases, where the rehabilitation of some high priority tanks with encroachments are considered for inclusion, a Resettlement Policy Framework has been developed to guide project implementation.

2. Describe any potential indirect and/or long term impacts due to anticipated future activities in the project area:

There are no potential indirect and/or long term impact envisaged as the activities proposed under the project are to improve short term and long term impacts. The risk of use excessive of agro-chemicals, particularly pesticides, is well offset by focusing on promotion of organic agricultural approaches, Integrated Pest Management (IPM) and Integrated Nutrient Management (INM) strategies and capacity building for safe handling and disposal of pesticides. The proposed investments are therefore likely to reduce the use of harmful agro-chemicals.

3. Describe any project alternatives (if relevant) considered to help avoid or minimize adverse impacts.

Several alternatives were considered and adopted over the traditional approach for irrigation infrastructure management. These alternative approaches have been mainstreamed in the project design. Continued use of traditional agricultural practices as well as usual approach of rehabilitating irrigation tanks was considered but rejected. The traditional agricultural practices will be replaced by an alternative approach which lends agriculture to become more climate resilient. Since the project focuses on rehabilitation and modernization of tank irrigation systems covering almost 50% of the state (areas not covered by TN IAMWARMP), it envisages a series of innovative aspects including improved designs of irrigation infrastructure, third party technical supervision, a much stronger focus on the demand-side of irrigation with an aim to improve water-use efficiency, further advances in agricultural diversification, agri-entrepreneurship, and movement toward climate resilient agriculture with relevant agriculture-water related investments and substantial improvement of participatory irrigation management practices by beneficiaries. Improved resilience of agriculture production systems will be achieved through higher water use efficiency, increased adoption of sustainable technologies and practices, and enhanced diversification of production systems. Activities under the project will be duly complimented by experiments in use of innovative ICT and new media technologies for enhanced efficiencies and faster turnaround time for delivering services to project beneficiaries.

4. Describe measures taken by the borrower to address safeguard policy issues. Provide an assessment of borrower capacity to plan and implement the measures described.

A full ESA has been carried out, which identifies a range of potential adverse impacts and risks. An ESMF and EMPs templates have also been prepared. The ESMF includes, among others, a capacity building plan for improving safeguards management, a list of monitoring indicators and a negative list that the project will not finance. The ESA also undertook a mapping of Schedule Areas 5 and 6 and also areas where the Forest Rights Act, 2006 is implemented. According to the ESIA, there are scheduled tribes who live in districts covered by the project, but since they do not live in project interventions areas, the project will not have any adverse impacts on them. The ESIA, however, has identified encroachment in some water-bodies/irrigation tanks. During implementation, the project will undertake public and participatory social screening involving all key stakeholders before any rehabilitation activities take place to determine if encroachment is present and will avoid rehabilitation of such irrigation tanks from its scope. The project also will not resort to acquisition of private land and other assets under the provisions of RFCTLAR&R Act.

In addition, the GoTN through its recent policies on tackling climate change threats (State Action Plan on Climate Change) and developing agriculture and water sectors (State's Vision 2023 Strategy) has made clear political commitments in areas addressing the emerging climate change impacts. Extensive training of project staff in procurement, financial management, environmental and social safeguards will be carried out as part of project implementation.

5. Identify the key stakeholders and describe the mechanisms for consultation and disclosure on safeguard policies, with an emphasis on potentially affected people.

The key stakeholders were identified and widely consulted during the Environment and Social Assessment across several sub-basins. The ESIA report contains a full chapter on the consultation process and stakeholder feedback. The direct beneficiaries of the project are farmers, water users' associations, farmer producer organizations and agribusiness entrepreneurs. An estimated 500,000 people are expected to benefit directly from the project. Indirect beneficiaries will be the farmers and others stakeholders, who benefit from technology demonstrations on modern agriculture and water management techniques and practices and those, who sell their agriculture produces at local and regional markets improved under the project. Also, a large of number technical and managerial staff of participating line departments and agencies will benefit from the project through training and capacity building activities.

The project will actively promote gender inclusion and women participation in all key project interventions to ensure they benefit from the project appropriately. The project will ensure that women are fully engaged in activities of WUAs, and represented in farmer producer organizations, and livestock and other alternative livelihood sources.

The project will have appropriate institutional arrangements at the levels of Sub-Basins, Regions, PWD/WRO to undertake Social Screenings and that these Social Screenings are conducted in a transparent manner, documented and monitored. The Bank's team will monitor the process and the monitoring will include site visits. As part of social safeguards capacity building efforts, the Sub-Basin level PWD and other staff will be provided with orientation programs on Bank's social Safeguards Policies.

The ESIA, including the ESMP, ESMF, PMP, R&R Framework and other project strategies, M&E and capacity building arrangements has been disclosed in country by the client on March 24, 2017 and disclosed at the InfoShop on March 21, 2017. An executive summary translated in vernacular language has also been disclosed.

B. Disclosure Requirements

| Environmental Assessment/Audit/Management Plan/Other | |
|---|-------------|
| Date of receipt by the Bank | 20-Mar-2017 |
| Date of submission to InfoShop | 21-Mar-2017 |
| For category A projects, date of distributing the Executive Summary of the EA to the Executive Directors | |
| "In country" Disclosure | |
| India | 12-Jan-2017 |
| <i>Comments:</i> The initial version of ESIA was disclosed on January 12, 2017, which was then updated on March 24, 2017 | |
| Resettlement Action Plan/Framework/Policy Process | |
| Date of receipt by the Bank | 20-Mar-2017 |
| Date of submission to InfoShop | 21-Mar-2017 |
| "In country" Disclosure | |
| India | 24-Mar-2017 |
| <i>Comments:</i> Resettlement Framework was submitted to the Bank on February 3, 2017 to review. | |
| Pest Management Plan | |
| Was the document disclosed prior to appraisal? | Yes |
| Date of receipt by the Bank | 20-Mar-2017 |
| Date of submission to InfoShop | 21-Mar-2017 |
| "In country" Disclosure | |
| India | 24-Mar-2017 |
| <i>Comments:</i> | |
| If the project triggers the Pest Management and/or Physical Cultural Resources policies, the respective issues are to be addressed and disclosed as part of the Environmental Assessment/Audit/or EMP. | |
| If in-country disclosure of any of the above documents is not expected, please explain why:: | |
| | |

C. Compliance Monitoring Indicators at the Corporate Level

| OP/BP/GP 4.01 - Environment Assessment | | | | | | |
|---|-----|-------------------------------------|----|-------------------------------------|-----|--------------------------|
| Does the project require a stand-alone EA (including EMP) report? | Yes | <input checked="" type="checkbox"/> | No | <input type="checkbox"/> | NA | <input type="checkbox"/> |
| If yes, then did the Regional Environment Unit or Practice Manager (PM) review and approve the EA report? | Yes | <input checked="" type="checkbox"/> | No | <input type="checkbox"/> | NA | <input type="checkbox"/> |
| Are the cost and the accountabilities for the EMP incorporated in the credit/loan? | Yes | <input checked="" type="checkbox"/> | No | <input type="checkbox"/> | NA | <input type="checkbox"/> |
| OP/BP 4.04 - Natural Habitats | | | | | | |
| Would the project result in any significant conversion or degradation of critical natural habitats? | Yes | <input type="checkbox"/> | No | <input checked="" type="checkbox"/> | NA | <input type="checkbox"/> |
| If the project would result in significant conversion or degradation of other (non-critical) natural habitats, does the project include mitigation measures acceptable to the Bank? | Yes | <input type="checkbox"/> | No | <input checked="" type="checkbox"/> | NA | <input type="checkbox"/> |
| OP 4.09 - Pest Management | | | | | | |
| Does the EA adequately address the pest management issues? | Yes | <input checked="" type="checkbox"/> | No | <input type="checkbox"/> | NA | <input type="checkbox"/> |
| Is a separate PMP required? | Yes | <input checked="" type="checkbox"/> | No | <input type="checkbox"/> | NA | <input type="checkbox"/> |
| If yes, has the PMP been reviewed and approved by a safeguards specialist or PM? Are PMP requirements included in project design? If yes, does the project team include a Pest Management Specialist? | Yes | <input checked="" type="checkbox"/> | No | <input type="checkbox"/> | NA | <input type="checkbox"/> |
| OP/BP 4.12 - Involuntary Resettlement | | | | | | |
| Has a resettlement plan/abbreviated plan/policy framework/process framework (as appropriate) been prepared? | Yes | <input checked="" type="checkbox"/> | No | <input type="checkbox"/> | NA | <input type="checkbox"/> |
| If yes, then did the Regional unit responsible for safeguards or Practice Manager review the plan? | Yes | <input checked="" type="checkbox"/> | No | <input type="checkbox"/> | NA | <input type="checkbox"/> |
| Is physical displacement/relocation expected? | Yes | <input type="checkbox"/> | No | <input checked="" type="checkbox"/> | TBD | <input type="checkbox"/> |
| Is economic displacement expected? (loss of assets or access to assets that leads to loss of income sources or other means of livelihoods) | Yes | <input type="checkbox"/> | No | <input checked="" type="checkbox"/> | TBD | <input type="checkbox"/> |
| The World Bank Policy on Disclosure of Information | | | | | | |
| Have relevant safeguard policies documents been sent to the World Bank's Infoshop? | Yes | <input checked="" type="checkbox"/> | No | <input type="checkbox"/> | NA | <input type="checkbox"/> |

| | | | | | | |
|--|-----|-------------------------------------|----|--------------------------|----|--------------------------|
| Have relevant documents been disclosed in-country in a public place in a form and language that are understandable and accessible to project-affected groups and local NGOs? | Yes | <input checked="" type="checkbox"/> | No | <input type="checkbox"/> | NA | <input type="checkbox"/> |
| All Safeguard Policies | | | | | | |
| Have satisfactory calendar, budget and clear institutional responsibilities been prepared for the implementation of measures related to safeguard policies? | Yes | <input checked="" type="checkbox"/> | No | <input type="checkbox"/> | NA | <input type="checkbox"/> |
| Have costs related to safeguard policy measures been included in the project cost? | Yes | <input checked="" type="checkbox"/> | No | <input type="checkbox"/> | NA | <input type="checkbox"/> |
| Does the Monitoring and Evaluation system of the project include the monitoring of safeguard impacts and measures related to safeguard policies? | Yes | <input checked="" type="checkbox"/> | No | <input type="checkbox"/> | NA | <input type="checkbox"/> |
| Have satisfactory implementation arrangements been agreed with the borrower and the same been adequately reflected in the project legal documents? | Yes | <input checked="" type="checkbox"/> | No | <input type="checkbox"/> | NA | <input type="checkbox"/> |

V. Contact point

World Bank

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VII. Approval

| | | |
|----------------------|---|-------------------|
| Task Team Leader(s): | Name: Bayarsaikhan Tumurdavaa, Kazuhiro Yoshida | |
| <i>Approved By:</i> | | |
| Practice Manager: | Name: Martien Van Nieuwkoop (PMGR) | Date: 16-May-2017 |
| Country Director: | Name: Junaid Kamal Ahmad (CD) | Date: 17-May-2017 |