PROJECT INFORMATION DOCUMENT (PID)
CONCEPT STAGE

Report No.: AB1926

<table>
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<tr>
<th>Project Name</th>
<th>Tamil Nadu Irrigated Agriculture Modernization and Water Resources Management Project</th>
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<td>Region</td>
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<td>Sector</td>
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<td>Implementing Agency</td>
<td>Water Resources Organization Government of Tamil Nadu</td>
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<td>Date PID Prepared</td>
<td>November 2, 2005</td>
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<td>Estimated Date of Appraisal Authorization</td>
<td>April 2006</td>
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1. Key development issues and rationale for Bank involvement

Background:
Faster growth in agriculture is central to sustainable development and poverty reduction in Tamil Nadu. Although agriculture accounts for only 15.7 percent of total GSDP, farm income accounts for about half of household income for 35 million people (56 percent of the state’s population) who live in rural areas. Much of this rural population is poor, with estimates ranging from 7.4 million people (20.6 percent of the rural population) to 11.4 million (31.8 percent of the rural population). For the poorest rural quintile (approximately 1.5 million households, or 7.5 million people), more than three-quarters of income is derived from agriculture, with agricultural wage labor alone accounting for half of household income. Given the importance of agriculture in the incomes of the poor in Tamil Nadu, growth in labor-intensive agriculture could further reduce rural poverty through higher yields to small producers, higher real wages to agricultural laborers, and increased income and employment opportunities with forward and backward links to the rural non-farm sector.

Tamil Nadu is one of the driest states in India, averaging only 925 millimeters of rainfall a year. Per capita availability of water resources in Tamil Nadu (Population about 62 million) is only 900 cubic meters a year, compared with 2,200 cubic meters for all of India. The state’s dry season lasts five months (January through May) even in good years, and severe droughts occur in 3 of 10 years, severely limiting cultivation of crops between June and September. A recent series of droughts and water shortages has highlighted the importance of good water resources and irrigation management. Tamil Nadu’s geographic area can be grouped into 17 riverbasins, a majority of which are water-stressed. There are 61 major reservoirs, about 40,000 tanks (traditional water harvesting structures) and about 3 million wells, that heavily utilize the available surface water (17.5 BCM) and groundwater (15.3 BCM). Agriculture is the single largest consumer of water in the state, using 75% of the state’s water. Irrigation through a combination of canals, wells, and tanks increases the reliability and availability of water for farming and is essential for cultivating crops in much of the state. Approximately 30% of the net irrigated area of 3 million hectares is watered by canals and 21% by tanks, while 49% is fed by wells. The remaining area is...
irrigated by other sources such as streams and springs. Rainfed agriculture, employing approximately 25% of farmers, accounts for 46% of the net sown area of 5.5 million hectares.

A recent Bank report\(^1\) has shown that the agriculture sector faces major constraints due to dilapidated irrigation infrastructure coupled with water scarcity (both quantity and quality) due largely to growing demands from industry and domestic users and intensifying interstate competition for surface water resources. In some parts of the state, the rate of extraction of groundwater has exceeded recharge rates, resulting in falling water tables. Water quality is also a growing concern. Effluents discharged from tanneries and textile industries and heavy use of pesticides and fertilizers have had a major impact on surface water quality, soils, and groundwater. Long-term growth in agriculture and rural income depends in large part on increasing efficiency of use of water. In addition, diversification into higher value, less water-intensive products, such as fruits, vegetables, spices, and livestock products, may be one of the most promising sources of agricultural growth. Tamil Nadu’s agro-climatic conditions are well suited for diversified agriculture. Rapidly increasing incomes and changing patterns of food demand also provide strong impetus for diversification. Increased agricultural diversification and private investment in high-value processing are likely to generate new rural non-farm employment opportunities and raise rural incomes. Increased availability of water and greater efficiency of water use in the dry season (for example, through the widespread adoption of drip irrigation) could enable cultivation of crops year-round, providing employment in agricultural production and processing, benefiting the rural poor. Improving efficiency of water use and diversification require improved irrigation service delivery together with better resource management measures. This requires asset modernization with a multi-sectoral perspective, focus on market linkages, as well as technical and managerial upgrading of asset developers, users and managers.

**Government Actions:** The GoTN has taken a number of progressive actions on water resources and irrigation management, particularly through the Bank-assisted Tamil Nadu Water Resources Consolidation Project (WRCP), which closed in September 2004 with a satisfactory rating. Some of these actions taken include:

- **Institutional:** Creation of a Water Resources Organization (WRO) from the PWD; initiation of the separation of cadres between water resources management and buildings; strengthening of the Institute for Water Studies and the State Surface and Groundwater Data Center and preparation of detailed spatial knowledge base for water management; setting up of a Reforms Task Force and the initial efforts to implement its recommendations such as rightsizing through Voluntary Retirement Schemes; creation of a multi-sectoral Water Resources Control and Review Council (WRCRC) chaired by the Chief Minister with seven thematic sub-committees which is a precursor for unbundling resource management from service delivery; creation of operational environmental cells in WRO; decentralization of operational Chief Engineers in a basin/cluster of basins framework; and formation of water users associations.
- **Policy and Strategy:** TN was one of the first states to pass a Groundwater Bill, Procurement/Right to Transparency Act and a Farmers Management of Irrigation Systems Act. The state has prepared a State Framework Water Resources Plan for all the river basins except Cauvery, an Environmental Planning Framework for Water Resources Management, and a State Water Policy.
- **Investments:** Basins have become the organizing framework for investments and staff deployment.
- **Modernizing Irrigated Agriculture:** The state has adopted a multi-disciplinary approach on a pilot demonstration covering about 3000 ha in the Hanuman Nadhi sub-basin of the Thambiraparani system (system tank improvement, drip and sprinkler irrigation, introduction of tissue culture for banana)..

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\(^1\) Tamil Nadu Agricultural Development November 2004 by Paul Dorosh and Mona Sur of the South Asia Agriculture and Rural Development Unit
This approach fostered engineer-extensionist-farmer linkages and helped agencies to work together. The ICR mission for the WRCP project has reported that there is a perceptible change in mind-set. Demonstrations in this exercise were focused on crop diversification to high value crops.

- Water Resources Management: Comprehensive water planning on a river basin basis with micro-level plans having been completed for five basins and work is under way for another eleven basins. First two representative River Basin Boards formed in the South Asia Region (Palar and Thamiraparani Basin Development and Management Boards), development of a good database for all river basins and enhanced analytical capacity for water planning at the Institute of Water Studies.

Issues:

Many of the actions taken by the GoTN serve as a good foundation to further the reform processes and to move towards a more efficient irrigation service delivery and improved resource management. However there are still a few key issues and assisting Tamil Nadu to deal with these issues will be the main aim of the proposed project.

Institutional weaknesses which continue to constrain optimum management and development of water resources in the state need to be addressed. Public administration in the water sector would be improved by separating responsibilities for water resource management and irrigation service delivery (as per the Bank’s “Rules of Engagement”). Two agencies are needed: a regulatory agency to allocate the share of water resources to agriculture, industry, and other uses, and an irrigation department focusing on irrigation delivery systems, instead of the current setup of a single organization.

The approach to operation and maintenance needs to be improved. As is common in many Indian states, inadequate priority to, and funding for, operations and maintenance has led to deterioration of surface irrigation systems not covered under the earlier Bank project. Traditionally, there has been minimal involvement of farmers in the operations and maintenance of irrigation systems. The current provisions for surface irrigation water charges allow full cost recovery for required operations and maintenance expenditures. However, these charges have not been consistently collected. The Government has to put in place a consistent framework for collection of water charges to meet full O&M expenditures.

Participatory irrigation management has to be strengthened and rolled out state-wide. Irrigation management transfer is at an early stage in Tamil Nadu but making substantial progress with the enactment of the FMIS Act. About 1600 Farmers’ Councils (Water Users” Associations) have been set up and another 3000 need to be set up covering the entire State. These associations need considerable training and capacity building to manage irrigation systems under their purview.

Agricultural diversification has to be promoted to increase the productivity of water. Paying greater attention to market infrastructure, strengthening research and extension, and improving irrigation pumpset efficiency will foster diversification and is also likely to make introduction of power charges for groundwater abstraction more acceptable to farmers. If farmers’ costs and incomes varied according to the amount of electricity (and water) used with well irrigation, they would have an incentive to shift some land from water-intensive crops (rice and sugar cane) toward less water-intensive crops (including cotton, maize, and vegetables). Marketing of produce and better use of information technology in this regard need special attention.

Greater attention is needed for modernizing irrigation infrastructure and scaling-up the adoption of water saving irrigation technologies. While the use of sprinkler and drip technology has been promoted in the state, the high capital cost of these technologies constrains widespread adoption by smallholders and marginal farmers. The development of more affordable technologies or a suitable system of targeted incentives to increase the use of sprinkler and drip systems are issues to consider in this regard.

The Basin Development and Management Boards set up for two basins need technical support to enable them to function to their full potential. Social and environmental issues related to irrigation service
delivery and water resources management have to be better integrated and mainstreamed. Effective
drought forecasting, preparedness and management mechanisms have to be developed.

**Rationale for Bank involvement:** The World Bank has supported, and is supporting, the Government of
Tamil Nadu’s efforts of sustainable growth and poverty alleviation through a number of projects. Since
the management of water and irrigated agriculture is so closely linked to the performance of the economy
and creation of employment opportunities, it is important that further reforms and infrastructure
modernization be pursued in these areas as a core part of our support to the State.

The lessons learned from WRCP (ICR rated “exemplary” by OED) indicate that although a number of
reforms have been initiated and some irrigation infrastructure rehabilitation has been carried out, there is
still a substantial need for modernization of infrastructure (upscaling the Hanuman Nadhi pilot) coupled
with skills upgradation. The Bank’s India Country Water Resources Assistance Strategy indicates the
need for Tamil Nadu to focus more on effectively applying the “useful building blocks” built so far to
resolve its many pressing problems on the water front. It also cautions against a focus on “zero-sum”
storage development investments in water-stressed basins where a water management focus may be more
pragmatic.

Tamil Nadu has already taken some important steps in expenditure prioritization (a detailed public
expenditure review will be done as part of preparation) and organization reforms in irrigation and
drainage institutions that are vital to improving the delivery of surface irrigation services and helping to
ensure the longer-term performance of irrigation infrastructure. Further organizational reforms to
streamline business processes to enhance efficiency and transparency and professionalize the work culture
will be essential to improving service delivery to the client farmers, reduce costs of service provision
(especially by modernizing and rightsizing), ensure financial sustainability of operations and maintenance
of systems and reduce the fiscal burden on state governments. Through previous and ongoing
engagements, the Bank has established a close working relationship with the GoTN and has developed a
good understanding of the problems of the water and irrigated agriculture sectors of the State and has a
good assessment of the institutional capacity and what is achievable in the State. The ongoing
engagement on cross-cutting knowledge initiatives also has maintained water resources as a key focus
area. This project would also help improve the benefits of the Hydrology project and its successor, HP II.

The GoTN has indicated in several forums that the proposed project is the single highest priority in its
requests to the World Bank for assistance, and has shown its commitment and ability through a
satisfactory performance in the wide-ranging activities under TN WRCP.

2. **Proposed objective**

The proposed project development objective is to improve irrigation service delivery and productivity
of irrigated agriculture with effective integrated water resources management in a river basin/sub-
basin framework in Tamil Nadu.

3. **Preliminary description**

The above objective is to be achieved through investments for modernizing irrigation infrastructure
(including systems rehabilitation, on-farm works, technical and managerial upgrading of institutions
involved in irrigation development, operation and management, diversification of agriculture with
appropriate extension measures and market linkages, promoting public-private partnerships, piloting
innovative irrigation infrastructure development and management options) and re-orienting and
strengthening institutions and instruments required for integrated effective water resources
management in the State (including unbundling resource management from service delivery institutions).
The proposed project would consist of the following two primary components:
Component A: Irrigated Agriculture Modernization (US$450 million)

This component is intended to improve the productivity of irrigated agriculture. Project supported activities include:

- **Irrigation systems modernization in a sub-basin framework** (including participatory and sustainable modernization of any water storages and related irrigation infrastructure including **system/non-system/rainfed tanks** (to support of the revival and restoration of traditional water bodies outlined by GOI in its Bharat Nirman program), distribution systems, pumpset efficiency; measurement and monitoring) covering about **one million hectares** expanding on the experience of the Hanuman Nadhi pilot. It is expected that this would be initiated in the Palar, Parambikulam Aliyar, Thambiraparani, Vaigai and Kodayar Basins and extended to other basins.

- **Institutional Modernization for Irrigated Agriculture** (targeted modernization – improved asset inventory and management plans (for instance, dams, tanks, irrigation infrastructure, agricultural, Horticultural fisheries data) technical and managerial upgrading of irrigation development and service delivery institutions, modernization of manuals/procedures, computerization, LAN and WAN, knowledge management software, information management and sharing, public interaction, closer integration of WRO/PWD and Agriculture, Horticulture, Agricultural Engineering, Livestock/Fisheries Departments.,)

- **Sustainable Agriculture modernization** (cropping systems diversification and management to improve water conservation and farmer returns, integrated pest and nutrient management, public private Partnerships for extension, post-processing, certification, marketing)

Component B: Water Resources Management (US$50 million)

This component is intended to strengthen the policy and institutional framework for improved sustainable management of water resources in the State. These activities would include:

- **State-level** (converting the WRCRC) to a State Water Council, amalgamating the associated sub-committees and upgrading the Institute of Water Studies (IWS) and the Surface and Groundwater Data Center (SGDC) to a State Water Resources Agency, establishment of a Water Regulator, development of appropriate policy and institutional arrangements, instruments, and information tools, to promote flexible water resources management

- **Basin-level** (Strengthening, empowering and expanding Basin Development and Management Boards, development of basin analytical decision support systems targeted to support key policy and investment decisions, drought/flood preparedness, participatory structured consultations including strategic social and environmental assessments to systematically develop sub-basin development and management plans, demonstration pilots)

- **Water Resources Research Fund (WRRF)** Capitalizing on the success of the WRRF established in the TN WRCP, this investment would expand the activities undertaken using the fund for targeted studies, awareness raising and applied research on key water and irrigated agriculture issues facing the state. A similar approach to that in the previous project is envisaged – competitive allocation of funds with the State providing a matching contribution to the fund. In addition, partnerships with relevant Universities and other key institutions throughout the State are envisaged to improve the local participation, outreach and sustainability of project technical assistance.
4. Safeguard policies that might apply
Given that the physical investments proposed in the project are all of a rehabilitation/modernization nature, there are expected to be no major adverse environmental or social impacts associated with the project activities. However, given the scale of the project (entire State) and the large-scale water resources and irrigated agriculture modernization activities, the project is tentatively classified as Category A. Dam safety issues relevant to the OP would be addressed under the project as a mandatory requirement. There are not expected to be any major negative impacts on cultural property, natural habitats or forests. Although the project is not expected to finance any pesticide procurement, there may be induced impacts of increased pesticide and fertilizer use by intensifying and diversifying agricultural systems. These would be mitigated with significant strengthening of the State’s IPM and INM activities; organic farming and water conservation in agriculture would be promoted. Although the proposed activities are not expected to require any resettlement, the rehabilitation grants and asset maintenance grant frameworks used in the earlier project will be applied in the case of any minor land acquisition. The existing Environment Cells would be strengthened to Environment and Social Cells. The environmental and social issues related to irrigation service delivery in an integrated water resources management framework have been studied in detail in an Environmental and Social Assessment already carried out by GoTN for the proposed project. This assessment would be updated by GoTN focusing on the interventions targeted under this investment.

5. Tentative financing

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6. Contact point

Contact: Srinivasan Raj Rajagopal
Title: Lead Water Resources Specialist.
Tel: (202) 473-1517
Fax: (202) 522-1770
Email: Srajagopal@worldbank.org