

**PROJECT INFORMATION DOCUMENT (PID)  
APPRAISAL STAGE**

Report No.: PIDA683

<b>Project Name</b>	Uttar Pradesh Water Sector Restructuring Project Phase 2 (P122770)
<b>Region</b>	SOUTH ASIA
<b>Country</b>	India
<b>Sector(s)</b>	Irrigation and drainage (35%), General water, sanitation and flood protection sector (25%), Crops (25%), Agricultural extension and research (15%)
<b>Lending Instrument</b>	Specific Investment Loan
<b>Project ID</b>	P122770
<b>Borrower(s)</b>	Government of UP, Department of Economic Affairs
<b>Implementing Agency</b>	Project Activity Core Team
<b>Environmental Category</b>	A-Full Assessment
<b>Date PID Prepared</b>	07-Jan-2013
<b>Estimated Date of Appraisal Completion</b>	15-Feb-2013
<b>Estimated Date of Board Approval</b>	28-May-2013
<b>Decision</b>	Task Team authorized to appraise (December 18, 2012)

**I. Project Context**

**Country Context**

With a population of more than 1.2 billion, India is the second most populated country and the largest democracy in the world. Over the past decade, its integration into the global economy has been accompanied by impressive economic growth. While share of agriculture in the economy is progressively declining, India remains a global agricultural powerhouse. India has the largest area under wheat, rice, and cotton, largest producer of milk, pulses, and spices and is also home to the largest number of cattle (buffaloes) in the world. However, with nearly three-quarters of Indian families dependent on rural incomes, agricultural productivity must grow and should benefit from modern technological developments.

Uttar Pradesh is the most populous state in India with a population of over 190 million (2008 census). Most of the state lies in the fertile Indo-Gangetic Plain, with its high natural soil fertility, abundant rainfall, and rich surface and groundwater resources. Despite this endowment, the state however is often characterized as a 'lagging state' with low per-capita income (US\$238 per annum in 2005/6) compared to the national average of US\$450 per annum. State growth rates also lag national figures. During the 1990s economic growth faltered and Uttar Pradesh fell behind India's better performing states. Power shortages, low rates of capital formation and low productivity of existing irrigation systems and road networks, were some of the main causes of economic stagnation in the state. Currently, over 50 million people live below the poverty line with the large majority living in rural areas. Uttar Pradesh also lags behind most Indian states across a number of human development indicators (e.g. literacy, infant mortality).

**II. Sectoral and Institutional Context**

Agriculture will continue to play an important role in alleviating poverty in the State. The major economic activity in the state is agriculture. The sector accounts for about 30 percent of the state GDP and 60 percent of the total employment. The rural population where most of the poor live is especially dependent on the sector as a source of labor and livelihoods. Agricultural growth not only has a direct impact on the incomes of rural households but can stimulate growth in the non-agricultural sector through both demand and supply linkages and elevated rural wages. In addition, horticulture and cash crops such as sugarcane will grow in importance and have positive income impacts, especially in the eastern and central parts of the state.

Uttar Pradesh is one of the most important states from a food security perspective. In 2002/3, over 44 million tons of food grain (i.e. rice and wheat) was produced over an area of about 20 million hectares. This apparent low average yield (2 tons per ha) hides significant regional variations within the state. Agriculture performance in the western region dominates, both in terms of grain production and other higher-value crops. Crop value per acre in the eastern and central regions averages two-thirds that of the western region (Bhalla and Singh, 1996).

Irrigation has a strong impact on agricultural productivity and growth. About 70 percent of the agriculture in Uttar Pradesh is dependent on irrigation with about 30 million hectares of cropland currently irrigated (40% utilizing surface water sources and the remainder utilizing groundwater) at cropping intensities greater than 100 percent. The current surface irrigated area only represents about half of what the Central Water Commission identifies as the potential for the state (including major, medium, and minor schemes). Reasons for this gap include non-construction of on-farm development works below the outlets, changes in cropping patterns to more water intensive crops, loss in live storage due to sedimentation, low water use efficiency due to disrepair of the system, and a lack of a needs-based operations and maintenance system. Furthermore, water use efficiency in most parts of the irrigation systems is low in the range of 30-40 percent. The lack of focus of the Uttar Pradesh Irrigation Department (UPID) on effective irrigation service delivery, timely and needs-based operations and maintenance, and accountability for performance to its client farmers are areas that require attention if enhancements to productivity and growth are to be expected. Finally, the management and maintenance of these large irrigation systems remains a critical sustainability challenge and one that is in need of primary attention if the long and well known vicious cycle of build-neglect-re-build cycle is to be broken. Greater local user involvement and decentralized responsibility will be a more sustainable model under this context.

Farmers and water users associations are central to efforts to managing systems at the local scale. This will be an important determinant for improving agricultural productivity and water-use efficiency at the field level. In 2009, the State Assembly passed the seminal Participatory Irrigation Management (PIM) Act. The vision of the PIM approach to irrigation water delivery is to establish and build the capacity of local Water User Associations (WUAs) to take charge of and monitor the current status of the irrigation system under their control, participate actively in undertaking system design with the UPID (e.g. through either carrying out works themselves or through tripartite agreements with the UPID and the contractor whereby they have a role of formal signoff on design and quality of works), carry out on-farm development (OFD) works where required, manage themselves the local water distribution, assess water charges, manage finances, operate and maintain local infrastructure, resolve conflicts, plan and operate the schedule of water, encourage conjunctive use of surface and ground water for intensified and diversified agriculture production system, and promote greater efficient water use. These associations require continued attention and support to make them effective. This is a major new responsibility of the Irrigation Department and requires a change management approach.

A re-orientation towards service delivery by the Irrigation Department is required to ensure productivity gains. The Uttar Pradesh Irrigation Department (UPID) is one of the oldest (set up in 1823) and largest government departments in India comprising of almost 100,000 staff (amongst which 5,000 are degree holders). The State Water Policy broadens the UPID mission to provide irrigation, drainage, and flood control services to its customers in a sustainable manner, to promote participatory irrigation management, and to deliver bulk water to other users as appropriate. This requires re-orientation towards efficient and effective service delivery, financial, human resources and legal professionalism, and sustainable resource management. Continued reform and modernization involving introduction of new skills and tools and business process re-engineering is needed. More clear incentives and performance monitoring of field engineers (vis-à-vis water user association satisfaction) are needed. Moreover, the Water and Land Management Institute (WALMI) in Lucknow, the only remaining training ground for irrigation department engineers, will need to be enhanced to reflect the skill sets required for a modern-day department, especially community-oriented skills.

Irrigation is only one dimension of the overall water resources management challenge. Water used for agriculture (the largest consumptive user in Uttar Pradesh) cannot be considered in isolation. An integrated approach within the river basin framework is needed to effectively promote sustainable water use planning, management, and operation. This is complicated by the current fragmented nature of the water sector and a weak and inchoate legal, regulatory, and administrative framework. As the state continues to develop, competition amongst demands for agriculture, municipalities, health and sanitation, industry, power, and the environment for the appropriate quantity and quality of water will become increasingly difficult. Water institutions (established under the Phase 1 operation, see below) for inter-sector analysis, regulation, monitoring, planning are in their infancy.

The drought-prone Bundelkhand region in the southern part of the state is of particular concern. Bundelkhand is the poorest region in the state. Here low rainfall, drought-prone conditions, and marginal lands characterize the landscape. A severe continuous four-year cycle of drought during 2004-08 (more than 25% deficit against the annual averages) lead to reduced sown area, loss of productivity, failure of crops already grown, and non-availability of forage, grass and fodder. Moreover, of the available 2 BCM of storage capacity available, filling of these reservoirs during this period progressively decreased to 17%. Also, various tanks, ponds, dug-wells dried and groundwater tables fell. With the lowest irrigation intensity in the state, only mono cropping is possible. The crop value per acre is half of that observed in the western parts of the state.

This project is a follow-up to the previous Uttar Pradesh Water Sector Restructuring Project (UPWSRP) Phase 1 operation. During the preparation of UPWSRP Phase 1, based on the Bank experiences in the irrigation and water sectors in the 1990s it was recognized that simple one-off investments in rehabilitation of infrastructure would not result in sustainable solutions and long-lasting improvements to the living standards of the poor. As a result, a multi-faceted long-term program covering a 15-20 year horizon including both infrastructure and major institutional reform measures was identified. The UPWSRP Phase 1 (US\$ 173.70 million approved February 19, 2002 and closed October 31, 2011) was the first step in this program. Under the Phase 1 operation, irrigation and drainage systems covering about 3% of the irrigated area (300,000 ha) were rehabilitated and modernized in the pilot Jaunpur Branch basin using modern surveys and designs. Moreover, more than 800 WUAs (at the minor levels) have been established and are to be strengthened following the passing of the seminal Uttar Pradesh Participatory Irrigation Management Act (2009). Other achievements include: (1) the establishment of a water regulatory commission and a state-level water resource agency, (2) introduction of a management information system for the UPID including an enhanced information technology (IT) infrastructure, and (3) numerous crop demonstrations for farmers (16,955 demonstrations for rice and wheat, 794 demonstrations for zaid green gram, and 800 demonstrations for mustard). The Implementation Completion Report (ICR) rated the project a moderately satisfactory (MS) operation. This in part due to the fact that the operation took 10 years (2002-2011), significantly beyond the planned implementation period and reflects the institutional reform push given and delays in civil works. Moreover, the final disbursed amount was SDR 86 million, below the original commitment of SDR 117 million. Following the lessons learned from this initial investment, design changes were made and an appropriate level of readiness is needed to avoid the pitfalls of the earlier operation.

### III. Project Development Objectives

- (a) Strengthen the institutional and policy framework for integrated water resources management for the entire State; and
- (b) Increase agricultural productivity and water productivity by supporting farmers in targeted irrigation areas.

### IV. Project Description

#### Component Name

Component A: Strengthening of State-Level Water Institutions and Inter-Sector Coordination

Component B: Modernization and Rehabilitation of Irrigation and Drainage Systems

Component C: Consolidation and Enhancement of Irrigation Department Reforms

Component D: Enhancing Agriculture Productivity and On-Farm Water Management

Component E: Feasibility Studies and Preparation Activities for the Next Phase

Component F: Project Coordination and Monitoring

### V. Financing (in USD Million)

For Loans/Credits/Others

Amount

BORROWER/RECIPIENT	154.44
International Development Association (IDA)	360.36
Total	514.80

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## VI. Implementation

The primary multi-disciplinary coordination unit managing UPWSRP Phase 2 is the Project Activity Core Team (PACT) that is headed by a Chairman (Senior IAS officer) and supported by various technical and administrative experts. This entity administratively reports to the Principal Secretary of the Irrigation Department and to a Program Steering Committee chaired by the Chief Secretary Uttar Pradesh (also established vide a Government Order ).As in the Phase 1 operation, the PACT will be staffed with experts who will provide support to the various line departments.

### Implementing Departments

The Uttar Pradesh Irrigation Department (UPID) will be responsible for implementing Components A, B1, B2, C, E, and F1. The rehabilitation and modernization works will cover 16 Irrigation Divisions. The Chief Engineer Ramganga, Chief Engineer Sarda Sahayak, and Chief Engineer Betwa, Jhansi will be the approving authorities with the relevant Superintending Engineers and Executive Engineers the primary executing agencies. The Department of Agriculture is responsible for implementing Component D. To ensure close coordination between these departments (especially given the overlapping responsibilities vis-à-vis the water users association agenda), a senior (Joint Director-level) agriculture officer will be posted in the PACT. The Groundwater Department is responsible for implementing Component B3. Implementation of identified civil works (e.g. recharge structures) will not be executed by the Groundwater Department. The Remote Sensing Applications Center will receive resources directly to carry out crop analysis and monitoring of project areas using satellite imageries. The State Institute of Rural Development will also be contracted by the UPID to undertake the primary activities related to education awareness campaigns and capacity building of water users associations.

### Project Description

The total project cost is \$514.8M (including physical and financial contingencies). The project will consist of the following components:

#### Component A: Strengthening of State-Level Water Institutions (\$18M)

This component aims to provide support to the institutions in the state responsible for overall integrated water resources management and implementation of the State Water Policy. This directly contributes to the PDO of strengthening the institutional and policy framework for water management in the state. This would include strengthening the (a) independent Uttar Pradesh Water Management and Regulatory Commission (UPWAMREC), (b) the technical secretariat of the UPWAMREC, the State Water Resources Agency (SWARA) and Data Analysis Center, and (c) the primary training institute for Irrigation Department engineers, the Water and Land Management Institute (WALMI).

#### Component B: Modernization and Rehabilitation of Irrigation and Drainage Systems (\$305M)

The inefficient performance and poor condition of canal and drainage infrastructure in the State is a major contributor to the poor water service delivery observed by many farmers (particularly in the tail reaches) in these canal commands. Learning lessons from the pilot rehabilitation and modernization investments in the Jaunpur Branch (in the Sarda Sahayak System), this component expands the rehabilitation and modernization efforts to new areas identified as critical by the Government of Uttar Pradesh. This includes irrigated areas in the Lower Ganga Canal System, in Haidergarh (23 km and down), and three reservoir systems in Bundelkhand. This component represents the major infrastructure and civil works component of the project (almost 60% of the total project costs). This component directly contributes to improving agricultural productivity as reliable, timely, and measured quantities (i.e. restoring the system to its original design discharges) of irrigation water are important determinants of agricultural performance. Moreover, rehabilitation and modernization (by way of improved control and regulation) will help to improve system-wide water use efficiency by reducing losses. This component will also support groundwater management activities.

#### Component C: Consolidation and Enhancement of Irrigation Institutional Reforms (\$43M)

This component will enhance the efficiency of the Uttar Pradesh Irrigation Department (UPID) and strengthen the PIM approach both in the department as well as in the community. The aim is to improve the efficiency of UPID personnel through the provision of advanced IT based tools, performance-based systems for staff evaluation, modern survey and design techniques as well the overall management of the department through administrative and managerial skills enhancements and tools (e.g. management information systems). Through this business process re-engineering and strengthened governance approach (started under the Phase 1 operation), a more flexible, accountable, and responsive Department can be nurtured. Moreover, a strengthened role for water users associations and the concomitant Department role in this agenda will be critical. The passage of the Participatory Irrigation Management (PIM) Act in 2009 was a major reform enacted under the previous Phase 1 operation. This requires further support and nurturing. Enhancing these reforms and building greater farmer participation in water management are crucial to achieving the development objective of improving agricultural productivity and water-use efficiency.

#### Component D: Enhancing Agriculture Productivity and On-Farm Water Management (\$36M)

This component, to be implemented directly by the Department of Agriculture, aims to improve the overall agriculture productivity and water-use efficiency at the field level. This component will focus on both Phase 1 and 2 outlet command areas where improvements in irrigation water availability and timely support to water users associations will be integrated with improved agriculture production and on-farm water management practices. The component will use a specifically developed Farmer Water School (FWS) approach targeted at the area below the outlet as a mechanism to introduce improved agronomic and water management practices, and also to develop the institutional capacity of the WUAs for water management and operation and maintenance. A network of trainers will be developed under the project to support the FWS. In addition to the emphasis on FWS, this component will also support a limited number of demonstrations/adaptive research trails, field level physical works related to improved water use, field days (block level), exposure visits, staff development, and purchase of equipment.

#### Component E: Feasibility Studies and Preparation Activities for the Next Phase (\$2M)

This component is to prepare detailed surveys and designs for future Phase 3 areas. These new areas will be identified by the Government of Uttar Pradesh and will make use of similar design principles (and the lessons learned) adopted under this Phase 2 operation. The resource requirements for the preparation of these future investments will be revisited at project mid-term.

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**Component F: Project Coordination and Monitoring (\$25M)**

This component will include two sub-components. The first will support the existing multi-disciplinary Project Activities Coordination Team (PACT) (established under UPWSRP Phase 1) to provide overall coordination and project management. This component is designed to assist the PACT with its role in facilitating and guiding the implementation and monitoring of all project activities, ensuring synergy and coordination amongst activities and Departments (Agriculture, Groundwater, Remote Sensing Agency, State Institute for Rural Development), and in preparing consolidated reports and facilitating training and study tours. The second will support the services of the UP Remote Sensing Applications Center (RSAC) in monitoring of the project area using satellite imageries. Under this component, RSAC will throughout the life of the project prepare annual reports for the project areas tracking a wide range of parameters including cropping intensity, cropping calendar, acreage and productivity, irrigated areas (under the canal command and groundwater), and land use at the cadastral levels.

**Safeguards**

While no potentially large scale, significant and/or irreversible negative impact is envisaged as a result of project activities, implementation of project components may result in adverse impacts on people and land. Accordingly, the project is rated as Category A. As summarized in Section VII, the project triggers five safeguards policies: Environmental Assessment (OP 4.01), Safety of Dams (OP 4.37), Involuntary Resettlement (OP 4.12), Pest Management (OP 4.09), and Projects on International Waterways (OP7.50).

Environmental Assessment (OP 4.01) is triggered as adverse environmental impacts may arise due to certain planned activities e.g. disposal of silt during rehabilitation of irrigation infrastructure, construction and installation of irrigation control structures, small bridges, increased agro-chemicals use, etc. Per OP 4.01 requirements, an independent Environmental Assessment (EA) was carried out as part of preparation. The EA covered the three geographical focus areas of the project and categorized investments by the magnitude of potential impacts. The assessment included stakeholder consultations and a detailed Environment and Social Management Framework (ESMF), and was disclosed (also in Hindi) on the UPID website (<http://irrigation.up.nic.in/project.htm>).

To ensure that all the requirements of Safety of Dams (OP 4.37) are met satisfactorily, the Dam Safety Cell (DSC) would be strengthened under the ongoing World Bank funded Dam Rehabilitation and Improvement Project (DRIP) in which State of Uttar Pradesh is also participating. Involuntary Resettlement (OP 4.12) is triggered to provide for the possibility of involuntary resettlement and rehabilitation, although this is not expected given that no new structures or irrigation systems are being established. Pest Management (OP 4.09) policy is triggered due to the potential use of pesticides in the project area and also the integrated pest management training and awareness under Component 4 of the project, and will be addressed through the preparation of a Pest Management Plan. While OP 7.50 is triggered as the project is in an international river basin (the Ganges), no significant impact is anticipated upstream or downstream on water quality or quantity, and an exception to the notification requirement will be sought.

**VII. Safeguard Policies (including public consultation)**

<b>Safeguard Policies Triggered by the Project</b>	<b>Yes</b>	<b>No</b>
Environmental Assessment OP/BP 4.01	<b>X</b>	
Natural Habitats OP/BP 4.04		<b>X</b>
Forests OP/BP 4.36		<b>X</b>
Pest Management OP 4.09	<b>X</b>	
Physical Cultural Resources OP/BP 4.11		<b>X</b>
Indigenous Peoples OP/BP 4.10		<b>X</b>
Involuntary Resettlement OP/BP 4.12	<b>X</b>	
Safety of Dams OP/BP 4.37	<b>X</b>	
Projects on International Waterways OP/BP 7.50	<b>X</b>	
Projects in Disputed Areas OP/BP 7.60		<b>X</b>

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