PROJECT INFORMATION DOCUMENT (PID)
APPRAISAL STAGE

Report No.: PIDA19001

Project Name	National Hydrology Project (P152698)
Region	SOUTH ASIA
Country	India
Lending Instrument	Investment Project Financing
Project ID	P152698
Borrower(s)	Ministry of Finance, Department of Economic Affairs
Implementing Agency	Ministry of Water Resources, River Development & Ganga Rejuvenation
Environmental Category	B-Partial Assessment
Date PID Prepared/Updated	19-Sep-2016
Date PID Approved/Disclosed	28-Sep-2016
Estimated Date of Appraisal Completion	12-Aug-2016
Estimated Date of Board Approval	23-Nov-2016
Appraisal Review Decision (from Decision Note)	

I. Project Context

Country Context

India is the second most populous country in the world, with a population of 1.3 billion (2015) growing at 1.2 percent per year. Gross Domestic Product (GDP) is approximately US$2 trillion and per capita income in 2015 was US$1,590. India is one of the fastest growing economies in the world (6 to 9 percent per year during last decade) and poverty rates have declined by an average of 2.5 percentage points per year during 1993-2011 (World Bank data). Significant changes are occurring in sectoral contributions to GDP: agriculture contribution to GDP fell from 50 percent in the 1970s to 14 percent in 2013, while the contribution of services and industry grew to 60 percent and 27 percent, respectively. Notwithstanding declining of agriculture share of GDP, the sector employs 50 percent of the labor force and is critical to the socioeconomic fabric of the country.

While India has made remarkable progress and economic growth is projected to remain strong, the country continues to face daunting development challenges. More than 360 million Indians (one-third poor of the world) still live on less than US$1.25 per day. Two-thirds of the population is rural, with 26 percent poor and largely dependent on farming. Although ranking of India on the United Nations Human Development Index has improved, it still lags behind the majority of nations, at 130th rank out of 188 countries in 2015.

Sectoral and institutional Context

While India has made remarkable progress and economic growth is projected to remain strong, the country continues to face daunting development challenges. More than 360 million Indians (one-third poor of the world) still live on less than US$1.25 per day. Two-thirds of the population is rural, with 26 percent poor and largely dependent on farming. Although ranking of India on the United Nations Human Development Index has improved, it still lags behind the majority of nations, at 130th rank out of 188 countries in 2015.

On a national level, India can be considered to have an abundance of water resources. Total renewable water resources of India are estimated at 1,869 billion cubic meter, including about 1,123 billion cubic meter of annual utilizable water resources. More than 60 percent of water in India is in transboundary basins. There are 12 major river basins and 46 medium river basins in the country, which are interstate across 29 states and 7 union territories (UTs). In northern India, the Indus, Ganga, and Brahmaputra are major transboundary river basins and also house the majority of Indian population. Out of total annual surface water resources of India, the Ganga and Brahmaputra basins account for 60 percent of streamflow and 70 percent of the population of the country.

Growing populations and rapid economic development have translated into demand for water outstripping supply in many areas and into growing inter-sectoral competition for available water. Demand will continue to rise in all sectors, particularly in the industrial and domestic sectors, placing pressure on agriculture, which currently accounts for 90 percent of water use. National programs such as the Prime Minister Irrigation Scheme (Pradhan Mantri Krishi Sinchaiyee Yojana, PMKSY), which aims to ensure irrigation water supply to every field in India, already face water constraints due to overexploitation of groundwater, limited water availability in surface storage, and growing demand for reallocation of agricultural water to other priority sectors.

The quality of surface water and groundwater is a rising concern that is further decreasing effective water availability. According to the Central Groundwater Board (CGWB), groundwater in 276 of 660 districts of India has high levels of fluoride; in 387 districts, it has nitrates exceeding safe levels; and in 86 districts, it has arsenic. According to the Central Pollution Control Board (CPCB), about 650 major towns and cities in India are on the banks of rivers contaminated with pesticides from farms and effluents from industries.

India has a highly seasonal pattern of rainfall, with 50 percent of precipitation falling in just 15 days and over 90 percent of river flows occurring in just four months. It is estimated that around 68% area is drought prone (Government of India data) and 12% is flood affected. Almost 3 million people are affected annually by floods, at an average annual cost to the economy of US$1 billion (Planning Commission, Government of India, Twelfth Fiver year plan, 2013).

Flood management is hampered by the lack of advanced hydrological forecasts combined with weather forecasts and the absence of integrated reservoir operations and timely warning for preparedness. Reservoir operations are still based on original operating rules and are not geared to the flexible release of water in to better manage flood risk and optimize storage. Preparedness for drought is weakened by the lack of information on water availability that integrates both meteorological forecasts and assessments of water availability. The knowledge base and drought management capability are not adequate to provide early warnings on drought or to plan for appropriate responses.

Climate change, will further exacerbate water resources management challenges of India. Changing climatic conditions could affect not only water availability but also water quality and demand. In regions that are sensitive to water stress (arid and semiarid regions of India), any shortfall in water supply will increase competition for water use for a wide range of economic, social, and environmental applications.

The challenge of managing water resources in India is particularly complex given the institutional structure in the country and the roles and responsibilities at various levels of government. Under the Indian Constitution, water management is a state subject, with interstate river basins managed by each state under the guidance of the central government. At the state level, state agencies are responsible for planning, development, and management of water resources and hence, monitoring of water resources and use. The Government of India (GOI) is responsible for interstate river planning and management issues, data validation for states, and clearances of large irrigation/ hydropower projects on technical and economic grounds, among others.

Water resources challenges faced by India are thus considerable and need to be addressed by adopting an integrated approach that considers all water uses and all water sources (surface water, groundwater, and so on) on a hydrologic/river basin basis. This requires sound information and knowledge on the water resource base and water uses, coupled with appropriate tools for analysis and decision making. There is a need to improve hydrological forecasting, particularly in the upper reaches of rivers; provide flood alerts; and integrate streamflow predictions with weather forecasts to advance the lead time for f lood management, including integrated reservoir operation. India must embrace
The Government of India is cognizant of the need to forge an integrated approach to developing, managing, and regulating both surface water and groundwater resources jointly at the basin and aquifer scale and must strengthen its institutional capacity for integrated water resources management (IWRM).

Responses to Water Resources Challenges in India

The national government and most state governments have recognized the importance of IWRM to ensure water security for economic growth and poverty reduction and the critical role of a strong knowledge base and decision support systems (DSS) and products as an input to this process. Indeed, over the last 20 years, the World Bank has supported the ambitious program of country to strengthen water resources data collection and management in different parts of the southern (peninsular) states, Himachal Pradesh, and Punjab through the two phases of the hydrology project (HP-I in 1995 to 2003 and HP-II in 2006 to 2014).

HP-I and HP-II can be credited with a number of achievements. They supported establishing a Hydrological Information System (HIS) that will provide validated and timely hydrometeorological data integrated at the state level. The projects built hydrometeorological observation networks for surface water and groundwater (quantity and quality), established data processing and storage facilities, set up reliable data communications, and trained staff for operations and user support. The two projects also standardized database management and DSS for river basin operations, planning, and management; and helped modernize design, operation, and planning functions across water resources agencies. The HIS, together with modern software tools, supported improved structural designs for infrastructure, faster project report preparation, and selection of more cost-effective

investment options.

Despite the progress made under HP-I and HP-II, institutional capacity for IWRM, including flood and drought management, remains weak, particularly in the state water resources departments. During HP-II and through other projects, some states have been equipped with the tools for river basin planning and management, but there is generally little human resource capability for integrated management approaches. There is an acute shortage of hydrologists, water resources planners, water managers, and other skills.

Based on these recognized needs and experiences over the last twenty years in establishing the HIS in southern India and in Himachal Pradesh and Punjab, both national and state governments are now committed to building a comprehensive national WRIS that supports integrated river basin planning and management. The National Hydrology Project (NHP) responds to this demand by extending its reach to cover the entire country and ensuring that disparities between those states who participated in HP-I and HP-II are closed.

II. Proposed Development Objectives

The project development objective (PDO) is to improve the extent, quality, and accessibility of targeted water resources information and to strengthen the capacity of targeted water resources management institutions in India.

III. Project Description

Component Name

Component A: Water Resources Monitoring Systems

Comments (optional)

This component will focus on improving the extent, timeliness, and reliability of water resources data. It will finance the establishment or upgrading of new and existing hydromet data systems including meteorology, streamflow, groundwater, and water storage measurements, together with construction of data centers that capture both water resources and uses. The component, which will be implemented by all states/UTs with the support of central Implementing Agencies (IAs), has three subcomponents: (A1) Hydromet observation networks; (A2) Supervisory control and data acquisition systems for water infrastructure; and (A3) Establishment of state and national water informatics centers.

Component Name

Component B: Water Resources Information Systems

Comments (optional)

This component will support the strengthening of national and subnational water information centers with web-enabled WRISs through standardization of databases and products from various data sources/departments and make comprehensive, timely, and integrated waterresources information available to decision makers for effective planning, decision making, and operations. The sources of data/information will include the real-time data acquisition networks and centers under Component A, remote sensing data, and topographical maps and knowledge products developed under Component C. There are two sub-components: (B1) National WRIS; and (B2) Regional WRIS.

Component Name

Component C: Water Resources Operation and Planning Systems

Comments (optional)

This component will support the development of interactive analytical tools and decision support platform that would integrate database, models and scenario manager for hydrological flood forecasting, integrated reservoir operations and water resources accounting for improved operation, planning and management of both surface and groundwater. Component C has three sub-components: (C1) Development of analytical tools and decision support platform (river basin modeling; streamflow forecasting and reservoir operation systems; and irrigation design and operations); (C2) Purpose-driven support; and (C3) Piloting innovative water resource management solutions.

Component Name

Component D: Institutional Capacity Enhancement

Comments (optional)

This component will build capacity and capability for the technical and planning dimensions of water resources management. Component D has four subcomponents: (D1) Water Resources Knowledge Centers; (D2) Professional Development; (D3) Project Management; and (D4) Operational Support.

IV. Financing *(in USD Million)*

Total Project Cost:	350.00	Total Bank Financing:	175.00
Financing Gap:	0.00		

For Loans/Credits/Others	**Amount**
Borrower	175.00
International Bank for Reconstruction and Development	175.00
Total	350.00

V. Implementation

The Ministry of Water Resources, River Development & Ganga Rejuvenation (MoWR, RD&GR) will be the lead implementing agency (IA) for the project. Implementation in each participating state/UT will be the responsibility of the respective state/UT-level agencies (groundwater and irrigation/water resources department). In addition, seven central agencies and two river basin agencies will also implement project activities pertaining to their specific mandates or basin areas. Overall, there will be 49 IAs: the lead IA (the MoWR, RD&GR); 7 central agencies; 2 River basin Organizations (RBOs); and 39 state/UT agencies dealing with surface water and groundwater development and management.

Out of the 27 states and 2 UTs participating in the project, 19 states/UTs have a joint department for surface water and groundwater and thus, would have one IA each. In the remaining 10 states, the surface water and groundwater departments operate under different secretariats, which reflect the compartmentalization of water sector institutions in India, including at the central level.

Implementation responsibilities are distributed across the central and subnational IAs to maintain the balance and risk between centralized and state-based activities and minimize interdependence between the center and states while ensuring the integration and standardization of systems. All central and subnational IAs will be required to have project management units (PMUs), with a multidisciplinary team required to implement project activities. Each IA will be accountable for technical, fiduciary, safeguards, and monitoring and evaluation (M&E) aspects and will have

designated trained experts to perform these functions. The eligibility to participate in the project as an IA requires the establishment of a PMU, submission of detailed project implementation plans (PIPs) and signing of MoA.

VI. Safeguard Policies (including public consultation)

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

Comments (optional)

The Environmental Assessment (EA) identifies multiple enhancement opportunities in the project and proposes ways of mitigating small negative impacts. Overall, the project will contribute to sustainable environmental management in India and will build capacity in environmental management. Greater use of hydrological models and analytical tools based on improved data will help incorporate mainstream environmental concerns into water resources planning and management. Project investments will make it easier to collect information on environmental impacts, identify issues, and implement measures aimed at diminishing adverse effects and enhancing positive ones.

VII. Contact point

World Bank

Contact: Anju Gaur
Title: Sr Water Resources Spec.
Tel: 5785+47712
Email: agaur@worldbank.org

Borrower/Client/Recipient

Name: Ministry of Finance, Department of Economic Affairs
Contact: Mr. Rishikesh Singh
Title: Director (MI)
Tel: 011-23093542
Email: rishikesh.singh74@nic.in

Implementing Agencies

Name: Ministry of Water Resources, River Development & Ganga Rejuvenation
Contact: Shashi Shekhar
Title: Secretary, Ministry of Water Resources, River Development &
Tel: 23715919
Email: secy.mowr@nic.in

VIII. For more information contact:

The InfoShop
The World Bank
1818 H Street, NW
Washington, D.C. 20433
Telephone: (202) 458-4500
Fax: (202) 522-1500
Web: http://www.worldbank.org/infoshop