

**PROGRAM-FOR-RESULTS INFORMATION DOCUMENT (PID)
CONCEPT STAGE**

Report No.: PID0017448

Program Name	National Groundwater management Improvement Program
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Country	India
Sector	Water
Lending Instrument	Program for Results
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<i>{If Add. Fin.}</i> Parent Program ID	NA
Borrower(s)	Republic of India
Implementing Agency	?
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Concept Review Decision	
Other Decision <i>{Optional}</i>	

I. Introduction and Context

A. Country Context

1. India is one of the fastest growing economies in the world, and its achievements in improving several dimensions of human development are impressive. Economic growth has steadily risen over time, resilient even to global economic crisis. Between 2005 and 2010, India's share of global GDP increased from 1.8 to 2.7 % and by 2014-15, India's GDP reached an impressive 7.3 %. Since 2005, over 50 million people have been lifted out of poverty. India achieved the first Millennium Development Goal (MDG) of halving the proportion of people living on less than US\$1.25/day¹.

2. While India has made remarkable progress and economic growth is projected to remain strong, the country continues to face daunting development challenges. More than 400 million people (one-third of the world's poor) still live on under US\$1.25/day. Due to high population growth amongst other factors, the number of poor people in several of India's poorest States actually increased over the past ten years. Roughly 26% of India's rural population continues to live in poverty, and the majority of the poor are still highly dependent on low-productivity agriculture.² Although India's ranking on the United Nation's Human Development Index has improved, it still lags behind the vast majority of nations, at 130 out of 188 countries in 2015.

¹ World Bank (October 2015), India Country Snapshot.

² Ibid.

3. A key development challenge is achieving water security, which is required for India's continued economic growth and poverty reduction. With 18% of the world's population, but only 4% of global renewable water resources, India is classified as a water scarce country. Increased competition – and even conflict – over fragile and finite water resources is already evident, posing risks to economic development, food and energy security, livelihoods, and environmental services. Pressures on the water resource base are expected to be exacerbated under a changing climate.

4. Government of India (GoI) has placed water security at the forefront of its development agenda. Water resources management is a central element of the Planning Commission's 12th Five Year Plan (2012-2016). Indeed, the Government acknowledges that sustaining a yearly growth rate of 8.2% under the 12th Plan will require a greater focus on the management of water resources. The government is pursuing multiple initiatives to boost efforts to make more efficient use of its scarce water resources for economic growth and shared prosperity.

5. Increasingly, these initiatives are being conceived and implemented following an integrated water resources management (IWRM) approach that addresses in a holistic fashion surface and groundwater, quantity and quality, and issues that cut across multiple jurisdictions and multiple sectors. Greater attention is being given to areas of IWRM that have hitherto been neglected. Chief amongst these is the sustainable management and use of groundwater resources, a critical resource in India and key to achieving the country's water security.

B. Sectoral and Sectoral (or multisectoral) and Institutional Context of the Program

6. India has extensive groundwater resources and it is the largest user of groundwater globally. India abstracts about 245 BCM of groundwater per year, which represents about 25% of the total global groundwater abstraction³. Groundwater use helped to spur the Green revolution and currently provides 65% of the water used for irrigation. Over 80% of the rural and urban domestic water supplies in India are served by groundwater⁴. It contributes to the base flow in rivers and wetlands and supports terrestrial vegetation. In arid and semi-arid regions, it is often the sole water supply source. Therefore, groundwater plays a crucial role in the socioeconomic development of the country.

7. However, India's groundwater resources are under threat from uncontrolled and over abstraction and contamination. Between 1950 and 2010, the number of tubewells drilled increased from 1 million to nearly 30 million, representing an unprecedented scale of development. This explosive groundwater use – the so-called 'silent revolution' – has led to extensive overdraft in several rural areas, including in the "bread basket" states of the North and the Northeast, peninsular states, as well as in major urban settings. Falling water tables have, in turn, led to groundwater yield reductions, pump failure in rural water-supply wells, unreliable urban water supply, salinization, land subsidence and drying of wetlands, all of which have direct consequences for the

³ Approximately 60% of India's annual renewable water resources have been assessed as utilizable and, of this, nearly 40% is groundwater. See CGWB, 2011, Dynamic Ground Water Resources of India. <http://www.cgwb.gov.in/documents/Dynamic-GW-Resources-2011.pdf>. Panda (2011) notes that India has roughly 432 cubic kilometers of yearly replenishable groundwater. See Panda, R. (2011). A growing concern: How soon will India run out of water?. Journal of global health, 1(2), 135.

⁴ World Bank (2010), Deep Wells and Prudence: Towards Pragmatic Action for Addressing Groundwater Overexploitation in India, World Bank

economies, livelihoods and societies that are dependent on groundwater resources. A recent assessment of selected districts in India finds that poverty rates are 9-10% higher in areas where groundwater tables are below 8 meters.⁵

8. Deteriorating groundwater quality is also a significant and growing problem. Pollution from poor sanitation, mining, industry and agro-chemicals (pesticides and fertilizers) together with naturally occurring contaminants (arsenic, fluoride and iron) reduce 'effective' groundwater supply further. In areas with high groundwater tables, poor drainage is contributing to waterlogging, salinization and alkalinity problems, especially in the States of Uttar Pradesh, Rajasthan, Gujarat, Punjab and Haryana. Improving the quality of polluted aquifers is often prohibitively expensive and sometimes technically challenging. Groundwater protection measures are often the most cost effective ways of managing groundwater quality.

9. Currently, over half of all districts in the country show signs of groundwater depletion and/or contamination. If the current trends persist, 60% of the districts could reach a critical groundwater condition⁶ within two decades. Climate change will likely exacerbate current pressures on groundwater resources, particularly if users increasingly turn to this relatively more shielded resource with changes in the reliability of surface water supplies. On the other hand, groundwater can play an important role in adapting to climate change, if it is protected and managed in conjunction with surface water.

10. The causes of the dramatic increase in largely uncontrolled and unplanned groundwater abstraction over the last fifty years are many. Cheap drilling and pumping technologies and energy subsidies are predominant 'pull' factors. Groundwater irrigation fueled by cheap energy made a significant contribution to India's green revolution, provided food security and allowed millions of farmers to increase their income but in many regions the uncontrolled development exceeded the capacity of the available groundwater resources. Poor water supply and irrigation service delivery from surface water 'pushed' many to resort to this alternative source. The rapid development of groundwater occurred in an environment where there was limited information on the nature and capacity of groundwater resources and poor understanding of this 'invisible' resource.

11. When the first signs of overuse and degradation of the groundwater reserves became visible, corrective actions were hampered by limited investment in the protection and management of water resources; a weak policy (i.e., legislative and regulatory) framework; the fragmented and sometimes conflicting roles and responsibilities of various entities involved in groundwater

⁵ Sekhri, S. (2014). Wells, water, and welfare: the impact of access to groundwater on rural poverty and conflict. *American Economic Journal: Applied Economics*, 6(3), 76-102.

⁶ As cited in Livingston, 2009. The Central Ground Water Board categorizes the groundwater blocks according to the decline in water level and the stage of groundwater use (the stage of groundwater use is the annual groundwater draft expressed as a percentage of net annual groundwater availability). Safe (stage < 90%; no pre- or postmonsoonal significant long-term decline in water level); semi-critical (stage > 70% and < 100%; significant long-term decline in pre- or postmonsoonal water level); critical (stage > 90% and < 100%; significant long-term decline in both pre- and postmonsoonal water levels); overexploited (stage > 100%; significant long-term decline in pre- or postmonsoonal water level or both). Deep wells and prudence: towards pragmatic action for addressing groundwater overexploitation in India. Report, World Bank, p .3.

management and development at the central, State and local levels⁷; the limited capacity of groundwater departments (where they exist at all); the inadequate coordination of groundwater management and development with other related sectors (drinking water, agriculture, energy, environment, health, etc.); and the limited knowledge base on the condition of the nation's groundwater resources. Decisive corrective action did not happen because of the growing importance of groundwater as a corner stone of India's rural economy and the significant and largely unpredictable social consequences of any measure affecting the accessibility or cost of groundwater. The prevailing political economy resulted in a continued push for supply side measures focusing on increasing water availability and insufficient attention to demand side measures.

12. Several ministries have activities that relate directly or indirectly to the state of groundwater resources. For example, the Ministry of Agriculture (MoA) is implementing a flagship GoI scheme, the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) which aims to provide assured irrigation supplies to every farmer field in India, without taking into full consideration groundwater availability. Ministry of Energy and Power (MoEP) has the mandate for electric power supply and is heavily subsidizing power for agriculture, which is a major contributor to groundwater over-draft. Ministry of Rural Development (MoRD) operates the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) which provides employment, notably through the construction of local water-related structures. The Ministry of Water Resources, River Development and Ganga Rejuvenation (MoWR, RD&GR) has been implementing the Accelerated Irrigation Benefits Program (AIBP) to improve irrigation efficiency, with arguably limited success, in addition to the Repair, Restoration and Renovation (RRR) of water bodies program that only made a limited impact. In addition to these central level programs, there are a number of State-driven initiatives related to groundwater, largely implemented on a pilot basis. The issue is that these various initiatives have been designed and are being implemented without understanding or taking into full consideration the groundwater resource base. The Central Groundwater Board is responsible for estimating groundwater availability across the country, but currently only produces this information for planning and management purposes every five years.

13. In the GoI's 12th Five Year Plan more attention has been given to the planning, protection, regulation, and management of groundwater resources in the country. At the central level, the principal ministry for groundwater management and regulation is the MoWR, RD&GR. The MoWR, RD&GR is making significant efforts to address groundwater governance and management challenges through the Groundwater Management and Regulation (GWMR) program launched in 2013. The Central Groundwater Board (CGWB) implements the program, which is comprised of four activities⁸: (i) aquifer mapping under the National Program on Aquifer Mapping

⁷ In the Constitution of India, 'water' is specified as a State subject, implying that State governments have final authority on water use within their geographic domains. The central government's mandate is limited to a regulatory role and the provision of technical support to the States to assist them in making informed decisions. Under the Constitution, several State powers are delegated to the lower level Panchayat Raj institutions (District, Block and Gram Panchayats) and to urban local bodies. Gram Panchayats – the lowest unit of governance – are responsible for planning economic development in their jurisdiction and overseeing implementation. However, the extent to which State powers have actually been devolved to the local level as per the Constitution varies from State to State.

⁸ In addition to these activities financed under the Scheme, CGWB has prepared a national artificial groundwater

and Management (NAQUIM); (ii) participatory groundwater management (PGWM); (iii) procurement for technological up-gradation; and, (iv) groundwater regime monitoring, assessment, regulation, and outreach. INR 3,319 crores (US\$ 493 million) was budgeted to the GWMR program under the 12th Five Year Plan (2012-2017), the majority going to the first activity, NAQUIM. NAQUIM's objectives are to: (i) map and characterize aquifers in terms of both quantity and quality, spatial and temporal distribution, etc.; and (ii) prepare Aquifer Management Plans (AMPs).

14. As recently announced⁹ at COP 21, GoI aims to strengthen, expand and accelerate the GWMR program and has approached the World Bank for support. The proposed National Groundwater Management and Development Program (NGMIP) responds to this request. The proposed NGMIP would focus on building the requisite institutional foundation, knowledge and information base, and on-the-ground investments for more efficient and sustainable use of India's groundwater resources.

C. Relationship to CAS/CPF

15. The proposed Program is fully aligned with the World Bank's Country Partnership Strategy (CPS) (FY13-17) and the World Bank's twin goals to end extreme poverty and promote shared prosperity. There is a strong relationship between access to groundwater, rates of groundwater exploitation, and poverty levels, which this program would address. The CPS outlines World Bank support to India under the three pillars of integration, transformation, and inclusion, with a cross-cutting focus on improving governance, environmental sustainability, and gender equality. The CPS recognizes that the proper management of water resources is emerging as the next key developmental challenge in India.

16. On governance, the proposed Program is designed to reinforce and strengthen the Government's own systems for sustainably managing the groundwater resource by building sound fiduciary, environmental and social management practices. Additionally, the Program will directly support Engagement Area: 2 "Transformation." Under this engagement area, the Program will promote sustainable access to water supply for agriculture and other uses. By supporting improvements in water use through efficient water technologies; restoring groundwater recharge areas throughout the country; strengthening institutions to foster community-based management; and promoting the use of scientific evidence as a foundation for improved planning, design and implementation of water-related investments, the Program will specifically support Outcome 2.3: "Improved access to water supply and sanitation services" and Outcome 2.4: "Increased agricultural productivity."

17. By supporting sustainable management and use of groundwater resources in India, the Program is also closely aligned with the achievement of Sustainable Development Goal 6 on Water and Sanitation.

recharge plan which was presented for State implementation in 2013⁸. The scheme is currently undertaking work in aquifer mapping concentrating on over-exploited or critical⁸ administrative blocks with respect to their exploitable groundwater resources derived from annual recharge.

⁹ World Bank: <http://www.worldbank.org/en/news/press-release/2015/12/02/multi-million-dollar-funding-boost-for-water-programs>

D. Rationale for Bank Engagement and Choice of Financing Instrument

18. The proposed Program has been requested by the GoI to support improved groundwater management in India. There are potentially various entry points for achieving this objective – from high level policy changes to local level citizen engagement / action; covering various sectors from agriculture to energy and beyond. However, the GWMR program is unique in that it is the only GoI program that directly addresses groundwater issues and could promote optimal and sustainable groundwater use across all related sectors, including by establishing an enabling legislative and regulatory framework for sustainable groundwater management. The proposed Program would strengthen, expand, and accelerate implementation of the GWMR program by facilitating and encouraging implementation of the key components needed for groundwater sustainability. These include strengthening institutions; enhancing the information system for informed decision making; and improved planning, design and implementation of appropriate investments to improve groundwater management and use.

19. Prevailing agriculture and energy sector policies have a significant – and perhaps primary – influence on the current poor state of groundwater resources. Indeed, there is ample evidence pointing to the role of subsidized power and agricultural support prices in driving groundwater withdrawals. The corollary is that these issues would need to be tackled in order to realize sustained improvements in groundwater availability, quality, management and use. While true, the reality is that changing these policies is politically challenging and the potential consequences are exceedingly complex, reaching far beyond the condition of India's groundwater resource base to fundamental questions of food security, poverty and the livelihoods of hundreds of millions of individuals. The proposed Program capitalizes on a window of opportunity to enter into this arena. While perverse incentives are likely to persist, a feasible and necessary starting point for improved groundwater management is more accountable institutions empowered by regulatory mandates, near-real time information and decision support systems, and the capacity to pursue investments on the ground to arrest the decline in groundwater conditions. Such pathways to sustainability have been demonstrated under specific initiatives that have supported community level interests to positively transform local groundwater economies, such as Andhra Pradesh Farmer Managed Groundwater Systems (APFAMGS) model. The former National Planning Commission intended to take these models to scale across a variety of hydrogeological settings where by community demand has been well articulated. It is these approaches that the proposed Program would fully support.

20. Various options for support were considered, including IPF and DPL. A PforR was found to be the most suitable instrument for various reasons. In order to fundamentally improve the management of groundwater resources in India, behavioral change is needed at the State and lower levels. This is because, constitutionally, States have final authority on water use within their geographic domains and Gram Panchayats – the lowest unit of governance – are responsible for planning economic development in their jurisdiction and overseeing implementation. The central government's mandate is limited to the provision of technical support to the States to assist them in making informed decisions, in addition to providing model bills for State adaptation. The PforR instrument provides an ideal vehicle for prompting required behavioral changes by introducing performance-based incentives to 'reward' States and lower levels for improvements in groundwater management, including by better integrating multi-sectoral initiatives and taking best practice to scale (as opposed to implementing small piece-meal pilots). Although the PforR is a

relatively new instrument, the GoI is already familiar with it through experience with ongoing Bank-funded PforR operations in India.¹⁰

21. The PforR Program is expected to:

- incentivize the achievement of the most important results of the ongoing government program (e.g., implementation of aquifer management plans by states) through financial support from the central government to participating States;
- strengthen the Government’s program, including at the State and lower levels, by establishing a structured framework to enhance its own systems and procedures with respect to groundwater management;
- support the development of a results based culture for groundwater management within the GoI, with strengthened output and outcome monitoring and evaluation and a credible and independent verification system, which will continue beyond the life of the Bank-funded Program; and
- allow for flexibility in State implementation, as well as promote new and innovative approaches that have the potential to make a transformational impact on groundwater management in India.

II. Program Development Objective and Results

A. Program Development Objective(s)

22. The development objective for the Operation (hereinafter the “Program Development Objective” or “PDO”) is to improve management of groundwater resources in selected states of India. This PDO is the same as that of the GWMR program, but specific to the States participating in the proposed Program.

B. Key Program Results

23. The Operation will focus on three key result areas that are closely aligned to the GWMR program’s results areas (refer table below):

1. *Strengthened institutions:* The first result area focuses on strengthening the institutional competencies and trans-sectoral linkages between key groundwater agencies, including the Central Ground Water Board and State groundwater departments.
2. *Improved information and knowledge systems for informed decision making:* This result area will strengthen the knowledge base on the state of groundwater resources, their availability and use including by promoting near real-time groundwater monitoring of both water quantity and quality and extended aquifer mapping. Data management, analysis and sharing will be improved, feeding into a fully operational groundwater-availability modeling and decision-support system that will be established under the Program.

¹⁰ In the water sector there are the Third Maharashtra Rural Water Supply and Sanitation Project and the Swachh Bharat Mission Support Program

3. *Improved Investments and Management Actions:* This result area will provide performance incentives for States to develop and implement aquifer / groundwater management plans that aim to reduce the number of blocks exposed to over-exploitation and contamination. The management plans will rely both on supply-side and demand-side strategies to close supply-demand gaps for improved water security and increased resilience to climate change. Measures to address groundwater quality issues will also be targeted. Implementation of Groundwater Management Plans will require high-level coordination among the major sectors driving groundwater use within the state. Interventions will span both physical and policy aspects of irrigation efficiency, power system management, crop diversification, conjunctive use strategies and artificial recharge. In order to be taken to scale, the Program is expected to help tailor locally adapted groundwater security plans that reflect the nature of the aquifers at risk and the communities that depend upon them. It is expected that 80 percent of the proposed PforR will be linked to the implementation of these plans.

II. Proposed Program-for-Results Operation Context

A. PforR Program Boundary

24. The approach taken under the Program is to strengthen the GoI's GWMR program over a five year period in 5 states¹¹ (see table below of the major features of the GWMR program and the proposed NGMIP). The activities supported under the GWMR program are mapped to three major results areas under the NGMIP to improve the effectiveness of the national program. Five states have been selected to participate in the Program in order to ensure quality of implementation and learn lessons that can be used to scale up the approach to additional states in the future. The NGMIP will enhance institutional capacity and improve decision making and planning relating to groundwater at both the state and the central level. The Program will support investments that include supply-side and demand-side measures to reduce overdraft and degradation of groundwater resources.¹² The Program will also include interventions to strengthen the program

¹¹ The states selected by MoWR are Gujarat, Maharashtra, Haryana, Karnataka, and Rajasthan. Discussions is ongoing to add Punjab to address groundwater quality issues. The selected States contain some of the most heavily exploited groundwater areas in India and confront serious groundwater availability and quality issues that are expected to intensify in the future and might not be reversible if business continues as usual. These States represent 25 percent of the total number of over-exploited, critical and semi-critical blocks in India, cover the two major types of groundwater systems found in India (alluvial and hard rock aquifers), and span a broad spectrum in terms of established legal and regulatory instruments, institutional readiness, and experience in groundwater management, amongst others. For example, some States (such as Gujarat) are making moves towards a groundwater legislation and have relatively strong groundwater institutions, whereas other States have not made as much progress in these areas. Some states have tended to focus purely on supply-side measures for improving the status of groundwater resources, whereas others are beginning to place needed focus on demand-side measures. The selected States are also among the 15 States with the largest numbers of poor and vulnerable both in rural and urban areas, Maharashtra appearing in the top 3. Regarding the distribution of monthly per capita consumption expenditures, 8 percent of that bottom 40 % population lives in Maharashtra, 5 % in both Karnataka and Gujarat, 4 % in Rajasthan and 1 % in Haryana. In terms of State groundwater development in Rajasthan and Haryana the annual groundwater consumption is more than the annual recharge (133 % and 137 % respectively). All five States have expressed commitment for reform and a keen interest to participate in the proposed Program.

¹² Supply side measures include those activities that augment or protect groundwater availability and quality (such as groundwater recharge structures, land use zoning, etc.). Demand side measures address consumptive uses of water and include improved irrigation technologies, crop mix, etc.).

management, advocacy, monitoring and evaluation capacity of the CGWB. Participatory approaches will be used at all levels in order to ensure that interventions are appropriate and effective in reducing areas exposed to overexploitation and contamination.

Table 1. Summary of Government program and PforR

Item	Government program	PforR
Duration	2012-2022 ¹³	2017-2022
Title	Ground Water Management and Regulation (GWMR) program ¹⁴	National Groundwater Management Improvement Program (NGMIP)
Objective	to improve sustainable management of groundwater resources	is to improve management of groundwater resources in selected states of India
Areas of focus	<p>Four areas:</p> <ol style="list-style-type: none"> 1. Procurement for technological up-gradation (i.e., improving institutions) 2. Groundwater regime monitoring, assessment, regulation, and outreach. (i.e., improving institutional capacity and building information and knowledge systems) 3. Aquifer mapping under the National Program on Aquifer Mapping and Management, (NAQUIM) (i.e. building information and knowledge systems) 4. Participatory groundwater management (PGWM) (i.e., on-ground investments) 	<p>Three areas under the NGMIP:</p> <ol style="list-style-type: none"> 1. Strengthening Institutions 2. Improving Information and knowledge systems for informed decision making 3. Improving Investments and Management Actions
Geographic scope	National covering all States in India	National covering all States in India, with performance-based incentives for five selected States: Gujarat, Maharashtra, Haryana, Karnataka, Rajasthan.
Total financing	The program to be financed in two tranches (i.e. Tranche I under the 12 th Five Year Plan (2012-2017 and Tranche II under the successor Plan). Tranche I amounts to INR 3,319 crores (US\$ 493 million). In addition, GoI plans to	Total: US\$ 500 million (total of US\$ 1 billion with GoI contribution)

¹³ GWMR is an element of the 12th year plan 2013-2017. Government of India has indicated that the GWMR will continue under the next socio-economic development cycle.

¹⁴ Technically, a 'Centrally-sponsored Scheme' of MoWR, RD, G&R

contribute US\$500 to Tranche I as part of the proposed NGMIP.
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25. The table below outlines the preliminary results areas for the Program that will be developed further during preparation. **A preliminary set of indicators** are presented Table 2. Two types of results indicators have been defined: (a) those that are linked to disbursements, referred to as “disbursement-linked indicators” (DLIs); and (b) those that are not linked to disbursements, referred to as “other results indicators”.

26. The Bank will disburse funds to the MoWR,RD&GR based on the submission of consolidated, verified information on the State performance against the DLIs. The MoWR,RD&GR will then be responsible for the release of funds to participating States following the agreed Program Fund Flow Guidelines. As in the case of the Swachh Bharat PforR, the Ministry of Planning and Statistics is proposed as the Independent Verification Agency (IVA) for conducting annual Program Audits and for the annual verifications of results, which will consist technical audit and will verify the achievement measured by each of the DLIs. The agency will report the results of verifications to the MoWR,RD&GR and the Bank as the basis for disbursement.

Table 2: Preliminary Disbursement-linked Indicators

	Results Indicators	
	Disbursement-Linked Indicators	Other Results Indicators (which do not trigger disbursements)
PDO level		
<i>To improve management of groundwater resources in selected states</i>		
Result Area 1: Strengthened Institutions	<p>DLI#1: Groundwater Development, Management and Protection polices and principles¹⁵ established and approved in the participating States.</p> <p>DLI#2: Professionally staffed and equipped CGWB and participating State Groundwater Bodies.</p>	<ul style="list-style-type: none"> • Groundwater legislation provisions used at State level. • Recognition of groundwater sustainability in related energy and agriculture policies. • Annual capacity building plan developed and delivered to targeted audiences in accordance with such annual plans (Central and State plans)

¹⁵ Preliminary policies and principles are defined in the Model Bill for the Conservation, Protection, and Regulation of Groundwater, 2011. These will be tailored to the needs and circumstances of the individual states.

	Results Indicators	
	Disbursement-Linked Indicators	Other Results Indicators (which do not trigger disbursements)
Result Area 2: Improved information and knowledge for informed decision making	DLI#3: Block ¹⁶ level groundwater-availability modeling ¹⁷ developed and used to inform groundwater management decisions	<ul style="list-style-type: none"> • Number of representative water level monitoring wells providing near real-time monitoring data • Enhanced groundwater databases, data sharing and collaboration by establishing a Groundwater IS at the Central level integrating data from all levels • Data and decision support tools established at the State and updated frequently • Bi-annually Block level groundwater status reports
Result Area 3: Improved Investments and Management Actions	<p>DLI#4: Groundwater security action plans prepared with clear targets for recharge, water use efficiency, conjunctive use and aquifer protection disseminated by the participating States</p> <p>DLI#5: Groundwater security actions plans targets achieved.</p>	<ul style="list-style-type: none"> • Scientifically-based groundwater management plans to identify locally suitable aquifer management strategies developed and implemented to arrest decline in water tables in selected areas in conjunction with groundwater users • <i>subject to the investments menu, the indicators will be defined around: arrest in groundwater decline and improvement in groundwater quality and protection</i>

27. The proposed Program is being designed in coordination with existing programs and activities managed by other line Ministries, including the Mahatma Gandhi National Rural Employment Guarantee Act 2005 (MGNREGA), the Pradhan Mantri Krishi Sinchayee Yoiana (PMKSY) as well as the National Hydrology Project (NHP). In order to effectively implement the Program it will be critical to develop linkages with other related sectors, such as the agriculture and power sectors. The institutional arrangements under the Program will be aligned with the structures of the GoI. At the central level, MoWR, RD&GR will coordinate implementation of the Program through a dedicated Program Management Unit (PMU). Multi-sectoral links will be established with the MoEP, MNRE the MoA and the MoRD.

¹⁶ A 'block' is the proposed groundwater management unit and is the second lowest administrative unit (between Gram Panchayat and District).

¹⁷ Groundwater-availability modeling defines the process of developing and using computer programs to estimate and future trends in the amount of water available in an aquifer. It is based on hydrogeological principles, actual aquifer measurements, and stakeholder guidance. The goal is utilize the data systems to provide timely and reliable data about groundwater that can be accurately used to estimate aquifer storage and long-term pumping on water yields.

28. At the State level, coordination and supervision will take place through interdepartmental PMUs comprising the irrigation, agriculture, public health and power departments. The precise implementation arrangements will be finalized during program preparation. Both MoWR, RD&GR and the participating States will establish preparation teams to further refine institutional arrangements and other aspects of the Program, working closely with the Bank.

III. Initial Environmental and Social Screening

29. As groundwater in India is such a significant resource for agriculture, rural poverty reduction, and drinking water and industrial supply, improving effective management is likely to bring overall positive social effects. Bolstering understanding and monitoring of groundwater resources, and advancing towards better resource utilization and management will help protect human health, improve livelihoods, and support ecosystems dependent on groundwater flows. While there is expected to be an overall positive social and environmental outcome of the Program, a number of potential risks will be examined along with capacity and institutional strengthening needs as core components of the Environmental and Social Systems Assessment (ESSA). The ESSA will examine environmental and social factors from a topical standpoint (i.e. groundwater management broadly) and an institutional perspective.

30. At present, there are a number of social equity issues in managing groundwater. Access, for example, is disproportionately skewed in favor of those who have control over land and to power and infrastructure for extraction and distribution. Small and marginal farmers as well as poor household access to groundwater is further strained due to declining groundwater levels, which only adds to their drudgery (particularly women) and leads to exclusion. With limited investments in capacities and institutional structures such that communities can plan, manage and monitor water security, the vulnerabilities are only increasing. While there are multiple needs and uses of groundwater, given its shared management at national and state level, and complexities on resource ownership, grievance redress at the local farmer and user level is problematic. The social assessment will consider if and how the Program will foster positive progress on these issues.

31. Since at least Results Area 3 will include civil works, the Environmental and Social Assessment (ESSA) will review the capabilities of institutions at the national, local and district level to address direct social and environmental risks (including public and worker safety as well as physical cultural resources) through the permitting, environmental assessment and land acquisition process (as relevant). The ESSA will also consider any elements of the Program that could have unexpected indirect negative consequences. Examples include: (i) aquifer management plans that could favor large industrial users rather than small farmers; and (ii) plans for irrigation network expansion that are not accompanied by efficiency improvements and good permitting/enforcement, thereby exacerbating water table decline and impacts on vulnerable groups.

32. The ESSA will focus on institutional, organizational, and procedural considerations (at national, sub-national, panchayat and community levels) that are relevant to environmental protection and management, social inclusion, good governance, participation and grievance redressal. The assessment will review existing policies, rules and procedures applicable to the

Program to manage environment and social risks. Community level impacts and mitigating factors will be considered – including on smallholder agriculture and socially vulnerable communities, gender equity, food security, livestock economy, and resilience to weather and climate impacts. Community participation will play a central role in defining the investment plans under results area 3 and under which gender equality considerations will be emphasized.

IV. Tentative financing

Source:	(\$m.)
Borrower/Recipient	500
IBRD	-
IDA	500
Others (specify)	-
Total	1000

V. Contact point

World Bank

Contact: Abedalrazq F. Khalil
Title: Sr. Water Resources Specialist
Tel: +01 202- 473-5456
Email: AKhalil@worldbank.org

Borrower/Client/Recipient

Contact:
Title:
Tel:
Email:

Implementing Agencies

Contact:
Title:
Tel:
Email:

VI. 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>