Trends in Private Sector Participation in the Indian Water Sector:
A Critical Review

wsp
water and sanitation program

The Water and Sanitation Program is a multi-donor partnership administered by the World Bank to support poor people in obtaining affordable, safe, and sustainable access to water and sanitation services.

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Printed by: PS Press Services Pvt. Ltd.

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Executive Summary

Public Private Partnerships (PPPs) have been explored in India's urban water supply services since the 1990s. Several projects have been attempted with varying roles and extent of participation envisaged for the private sector. These attempts have had mixed outcomes: while several projects planned during the initial years were abandoned in the development phase, there has been an increase in the number of contracts awarded to the private sector in recent years. Further, the nature and type of projects developed on a PPP basis have also changed. There is now an increased recognition of the fact that PPPs in urban water supply services have evolved significantly since the earlier years.

Recognizing the emergence of private sector participation in Indian urban water supply services, the Water and Sanitation Program (WSP) has undertaken a study to review these projects. This review involves a study of PPPs in the urban water supply sector since the 1990s, to determine the trends emerging in the sector, and to analyze the factors that have facilitated or impeded the development and implementation of PPPs in the sector.

Further, the study analyzes the direction in which the sector is heading with respect to private sector participation. Since most PPPs are at early stages of operation, this study focuses only on learnings from PPP design and transaction. This study does not seek to assess the operating or financial performance of PPPs.

The study covers 26 successful as well as failed attempts in both industrial and domestic water supply in urban areas since 1990. It has attempted to cover all water PPPs that were in the public domain, except those which may have been abandoned at the concept stage.

Information gathered for these projects is based on primary and secondary data. Primary information on these projects, and the sector as a whole, was collected on the basis of consultations with government and private sector stakeholders, directly or indirectly involved in the development of the projects. Information was also collected from PPP experts from the sector and from the academia. Seventeen consultations involved one-on-one interviews and roundtable discussions. Secondary information on the projects has been collected from publicly available documents and relevant project case studies. The projects covered in the study are indicated in Table 1.

Two city level projects in Nagpur and Aurangabad were awarded during the final stages of this study and therefore have not been included in the study.

Emerging Trends in the Indian Urban Water Supply PPP

The emerging trends from PPP projects in the urban water supply services since the 1990s are summarized below.

Increase in the Number of PPP Projects Reaching Contract Award Stage

Since the 1990s, there has been an increase in the number of PPP projects initiated or awarded. The proportion of projects successfully awarded has also increased. Only four PPP projects were awarded till 2004. Since 2005, 13 projects have been awarded. Till 2004, only 40 percent of the initiated projects were successfully awarded. Since 2005, this number has more than doubled. PPP projects today have a total reach of approximately five million[1] urban population. The year-wise increase in the population of cities with active PPP contracts is presented in Figure 1.

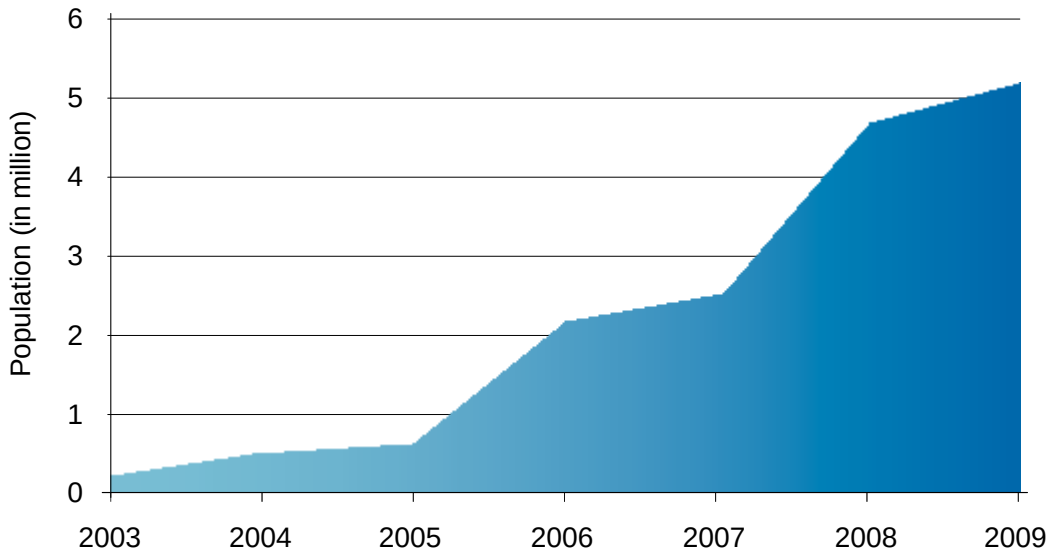
1. Estimated on the basis of information on the population of cities with PPP projects. For pilot projects, the entire city population has been taken.

Table 1: List of PPP Projects Covered in the Study

1990-2000	2000-04	2005 onward
Cauvery Bulk water Supply project: Stage iV, phase-ii (Karnataka)	O&M contract, Sangli (maharashtra)	KUwASip: 24x7 water supply for Belguam, Hubli-dharwad, and Gulbarga (Karnataka)
Krishna Raw Bulk water supply project (Andhra pradesh)	water treatment plant, Sonia Vihar, Delhi	dewas industrial water supply (madhya pradesh)
Tirupur industrial water supply project (Tamil Nadu)	O&M contract for mumbai K east (maharashtra)	Chennai desalination plant (Tamil Nadu)
Selaulim Bulk water Supply (Goa)	O&M contract for 21 pilot zones in Delhi	Contract for water supply system, Sector V Salt Lake, Kolkata (west Bengal)
water supply and sewerage project, pune (maharashtra)	O&M contract for 2 pilot zones in Bengaluru under BwSSB (Karnataka)	O&M contract for pilot zone, nagpur (maharashtra)
-	O&M contract for 8 municipal councils in Bengaluru under BwSSB (Karnataka)	management contract for O&M, Latur (maharashtra)
-	Visakhapatnam industrial water Supply project (Andhra pradesh)	industrial water supply contract, Haldia (west Bengal)
-	O&M for Chandrapur (maharashtra)	Bulk water supply project, Bhiwandi nizampur city (maharashtra)
-	-	O&M contract for water supply system, mysore (Karnataka)
-	-	O&M contract for water supply system, madurai (Tamil Nadu)
-	-	Concession agreement distribution system, Khandwa (madhya pradesh)
-	-	Concession agreement: distribution system, Shivpuri (madhya pradesh)
-	-	Agreement: bulk water supply, naya Raipur (Chhattisgarh)

BWSSB: Bangalore Water Supply and Sewerage Board; KUWASIP: Karnataka Urban Water Sector Improvement Project; O&M: operation and maintenance.

Figure 1: timeLine oF popULAtion oF CitieS witH ACtiVe ppp ContRACtS



Shift in the Geographic Concentration of PPPs

Over the years, there has been a shift in the geographic concentration of water PPPs in the country, with a broadening of states/cities where PPPs are being undertaken in the water sector. The PPP projects which were developed and planned during the 1990s were largely concentrated in the southern states of the country such as Tamil Nadu, Karnataka, and Andhra Pradesh. Since 2000, this trend has changed to include more states. During the period between 2000 and

2004, projects were being proposed for implementation in the states of Karnataka, Delhi, Maharashtra, and Andhra Pradesh. Since 2005, while states in South India continue to lead in terms of the number of projects being implemented, the tally now also includes states where, so far, water PPP projects had not been undertaken. Among these are Madhya Pradesh and West Bengal. The availability of public funding under schemes such as the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) would have enabled a wider cross-section of states/cities to initiate projects on their own. At an overall level, successful experiences with PPP in various infrastructure projects have also prompted more states/cities to explore PPP models.

Increased Focus on PPP Arrangements for Distribution Improvements

Most water supply PPP projects during the 1990s were aimed at augmentation of the bulk water supply system. However, this predominance of bulk water supply PPP projects decreased during the early part of the 2000 decade. Among the PPP attempts during this time, 80 percent of the projects were attempted to bring in the private sector for operation and maintenance (O&M) improvements of the distribution system. Learning from the failure of the earlier large-scale PPP attempts at bulk water supply augmentation, state governments and international funding agencies now encouraged the water services management contract model to emulate the operational efficiencies of the private sector.

Today, approximately 60 percent of the PPP projects address O&M improvements in the distribution system, while 30 percent aim at bulk water supply augmentation. The remaining projects include both bulk water supply augmentation and O&M of the entire water supply system.

Further, the type of PPP arrangements being implemented has also changed. During the 1990s, the majority of the

projects were primarily based on Build Operate Transfer (BOT) models with 100 percent private financing. This changed to a scenario in the early 2000s when the majority of O&M improvements were sought through management contract-based interventions. Today, the operational contracts are a mix of BOT, long-term concessions, and management contracts.

Possibly as a reflection of this shift in scope and type of PPPs, there has been a steady decline in the time taken between project initiation and the award of contract. For instance, in the case of those projects which were initiated prior to 2000, the average time to reach the contract award stage was four years. As against this, the time taken between project initiation and award of contract for the PPP projects developed since 2005 has been 2.5 years on an average.

Reduced Reliance on Multilateral Funding Agencies for PPP Project Development

An assessment of the project initiation and development process indicates a steady decline in reliance on multilateral agencies for PPP-based project development and implementation. During the 1990s, apparently, there was strong advocacy by multilateral funding agencies to develop water projects on a PPP basis. Several projects initiated during the early years of the 2000 decade depended heavily on financial assistance from multilateral funding agencies to meet their capital costs. However, since 2005, most water PPP projects have been initiated by the project- sponsoring authority: Urban Local Bodies (ULBs) and state departments. Today, in India, water PPP projects are conceptualized at the city/state level rather than with the help of external agencies.

Increased Share of Public Financing in PPP Projects

Projects which were being developed during the 1990s and early 2000s were based on PPP structures which envisaged private financing. This trend has been observed to change in the recent past, with several urban water supply PPP projects being developed on the basis of availability of a substantial amount of public funding. More and more water supply PPP projects rely on schemes such as JNNURM and the Urban Infrastructure Development Scheme for Small and Medium Towns (UIDSSMT). At present, 50 percent of the ongoing projects have been developed with financial support extended by the government.

While the availability of public funding has helped increase the viability of private sector participation, the structure and process of JNNURM funding itself has created an impetus for adoption of private sector participation. This has occurred in two ways: firstly, ULBs are required to contribute a share of the project cost; and secondly, the appraisal process encourages PPP-based projects. The increased and changed form of public funding has thus had two benefits: a) it has encouraged cities to opt for PPP; and b) it has helped lower the cost of PPP.

Shift in Private Operator Mix

During the 1990s, the Indian water supply PPP sector was dominated by international private operators. Industry feedback suggests that, of the five water supply PPP projects which were initiated during the 1990s, international private operators were directly involved in three, that is, the Cauvery Bulk Water Supply Project of the Bangalore Water Supply and Sewerage Board (BWSSB); the Selaulim Bulk Water Supply Project of Goa; and the Krishna Bulk Water Supply Project of the Hyderabad Metro Water Supply and Sewerage Board (HMWSSB). The projects planned during the early part of the 2000s continued to see the presence of international operators. However, a few projects initiated during this time period also involved domestic national and provincial level private operators.

For the projects awarded since 2005, domestic private operators have emerged as the most important category of players in the water supply PPP space in the country. In as many as 75 percent of these contracts, the bidding consortia are led by national-level domestic private operators. These private operators are mostly Indian engineering, procurement construction (EPC) companies or other business houses which have entered the space of water service provision. They have a greater risk-taking ability than international players, and skills to navigate through the local project environment. Only two ongoing water supply PPP projects in the country are led solely by international private operators. Even amongst the international operators, there has been a shift with increasing participation by South East Asian water supply utilities.

Comparison with International Experience

Several trends described above mirror those observed in other developing country contexts. A recent study by the World Bank[2] of PPPs since the 1990s reveals a move toward increased public funding, a shift away from full concessions, and a growing role of domestic operators (accompanied by withdrawal of large international operators). The Indian experience, at this early stage, thus appears to be mirroring the trends observed in other parts of the developing world.

Factors Contributing to Success or Failure of PPP Projects in the Urban Water Supply Sector

It is too early to arrive at a conclusion about the success or failure of private sector participation in urban water in terms of outcomes. It is possible, however, to obtain an insight about factors that have contributed to or constrained the progress of anticipated PPPs to the point of contracts being awarded.

In the analysis below, the terms 'success' and 'failure' are used with reference to the award of contract and do not encompass performance outcomes of the PPP project.

Analysis of Failed Projects

Most anticipated water PPPs that did not move to contracting stage failed to do so because of cost concerns and the limited financial and technical capacity of utilities. As a result, political and administrative support has remained tenuous. It would be worthwhile to analyze these constraints in greater detail.

- **Inconsistent and inadequate local stakeholder support:** Lack of stakeholder support for water PPP projects has been a significant reason for several PPPs not moving forward. This has blocked some high-profile attempted PPPs, such as the proposed Cauvery Bulk Water Supply Project, Selaulim Bulk Water Supply Project, Goa, and a water and sewerage PPP planned in Delhi. Local political parties, civil society groups, and utility or municipal employees of the public water utilities were the primary opponents. Such opposition to PPPs has taken place due to perceived threats to the specific interests of these stakeholders, and a view of water as a public good. Much of the debate has been quite emotive, with any form of private sector participation being seen as attempts at "privatization," which dramatizes the notion of a public good being misappropriated at the behest of private profiteers.
- **Weak financial capacity to implement water PPPs and lack of mechanisms to address tariffs:** Financial risk perceptions have prevented several planned PPPs from moving forward. Most water PPPs proposed in the 1990s were to be highly capital-intensive and dependent on 100 percent private financing. Mostly, the implementing agencies could not provide the guarantees required by the private water operators, and lacked the financial capacity and internal revenues to pay bulk charges. Severe opposition developed towards PPP projects, as consumers expected water tariff escalation.
- **Limited awareness and technical capacity to undertake PPPs:** The lack of experience and limited understanding of water PPPs resulted in implementing agencies not satisfactorily addressing the risk concerns of private operators and the demands of project structuring. Inadequate baseline information, lack of clarity on risk sharing, and poorly managed procurement processes contributed to difficulties in getting these PPPs off the ground.

Analysis of Successful Projects

Where PPP contracts have been awarded, one or more of the following facilitative factors seemed to have been present:

- **Availability of public funding:** Water PPPs in recent years have benefited from public funding more than in earlier years when private investment was anticipated to be the major source of financing. The JNNURM has made a new form of public funding available which has enabled ULBs to pursue PPP approaches, unlike in the past when the use of public funds required public procurement. In Salt Lake City (Kolkata), and Shivpuri and Khandwa (Madhya Pradesh), public funding covered 50-60 percent of project costs which has reduced the financial burden on the private operator, thus lowering projects costs and tariff increases.

2. Marin, P. 2009. Public-private partnerships for urban water utilities: a review of experiences in developing countries. Report. The World Bank.

- **Improved mechanisms to address tariff concerns:** In some recent water PPP projects, measures have been built in to minimize the tariff and revenue risk of the private operator. In the Naya Raipur project, costs outside the concessionaire's control (especially power and chemicals) are subsidized by the public sector. In the Khandwa and Shivpuri PPP projects, safeguards are provided against defaults in customer payments.
- **Increased attention to stakeholder support:** Recent projects have benefited from improved stakeholder consultation at an early stage of the project (for example, the Karnataka Urban Water Sector Improvement Project [KUWASIP], Salt Lake City). In several of these projects, the need for intervention was substantiated and articulated to stakeholders. For instance, against the backdrop of acute water shortage, unreliable supply and financial losses, stakeholders in Chandrapur, Khandwa, and Shivpuri were more receptive to exploring private sector participation as there was a strong demand for better services. The turnaround in services delivered through KUWASIP further strengthened faith in the private sector's ability to provide viable options for service improvements.
- **Strong project ownership and expertise:** An important success factor has been strong project ownership and expertise in the project initiating authority. In KUWASIP, the state infrastructure financing agency, the Karnataka Urban Infrastructure Development and Finance Corporation (KUIDFC), played an active role in project conceptualization, feasibility studies, stakeholder consultations and procurement. Similarly, PPP projects in Madhya Pradesh, Kolkata, Haldia, Naya Raipur, and Latur have benefited from project management expertise in state government departments or agencies.
- **Growth in domestic private sector interest:** In several recent projects, domestic operators have exhibited high risk-taking appetite, and the ability to manage their costs better. Higher participation by bidders has also contributed to the increase in contract awards.

In summary, successful contract awards in water PPPs have been based on a platform of well structured public funding, which helped address tariff concerns and thereby gain stakeholder support. The trend has been further supported by a rise in domestic private operator interest, and improved project ownership and expertise in state agencies.

Emerging Issues that have an Impact on Water Sector PPPs

Recent trends in urban water supply PPPs indicate that the sector has moved in a positive direction. However, there are some emerging issues that could hamper progress of water PPPs in the future.

Current progress is still at a project level, rather than sector wide

In other infrastructure sectors (such as power, highways), PPP has been adopted as a sector strategy and sector-level enablers have been created (such as model concession agreements, new Electricity Act, and so on). Compared to this, PPP momentum in the water sector has been a project-level initiative. Stakeholder support for water PPPs tends to be tactical and opportunistic, often aimed at trying to maximize a temporary public funding opportunity. Moreover, the dependence on public funding and inadequate movement on tariff reform raise questions on the long-term sustainability of projects.

Project preparation, structuring, and risk sharing remain weak

The current project preparation process tends to be rushed, due to short timeframes for submission of proposals for grant programs and the short tenures of decision makers. The result is weak information baselines and hurried procurement, poor quality proposals, and high risk perception by operators. In several performance-based O&M contracts for distribution improvement, performance expectations from private operators are unrealistic with respect to both standards set and timeframes. Risk sharing is not widely adopted, so that operators bear risks related to costs not under their control (for example, raw water, electricity).

Cities lack the capacity to design, implement, and monitor PPPs

The commitment to PPP is often restricted to the higher levels of the decision-making body and not matched by technical capacity at the operating level. Given their prior focus on asset creation, the implementing agencies usually lack the capacity to monitor and oversee contracts and service standards. They also lack the skills and flexibility to engage in dialog on contractual and financial terms in the course of the project. Lastly, employee acceptance of private operators is a challenge, especially for contracts that require existing employees to be absorbed by the latter.

Way Forward and Possible Interventions

Four aspects will be relevant to achieve successful water PPPs:

Create enablers to widen the current project-specific approach into a sector trend

A clearly articulated stand by the national government will enable stakeholders and utilities to strengthen their position with respect to PPPs in the water sector. Given the substantial investment gap and weak financial health of utilities/ULBs, public funding from the central and state governments will continue to be necessary to support PPPs, for example, through JNNURM-type funding.

Pricing would become more realistic if quantitative analysis of sector viability is improved, and guidance on tariff structures and subsidies become clearer. Widespread adoption of the Ministry of Urban Development's (MoUD's) Service Level Benchmarking program would strengthen the drivers for private sector participation and also improve project development.

Help cities follow well established and accepted principles to increase the chance of success of PPPs

To reduce unrealistic performance expectations from private operators, a practical framework is required to phase capital investments and achieve desired service levels over a period of time. A framework to address common issues in water PPPs can provide a much desired uniformity across water PPPs. This would include connection policies, tariff collection procedures, disconnection policies, and payment security mechanisms as well as a common set of risk-sharing principles.

Build cities' implementation and monitoring capacity

Even as external enablers are activated, cities' capacity to engage in PPP needs to be enhanced. Funding assistance for project preparation from the national level (for example, the India Infrastructure Project Development Fund) can help cities devote the required resources in this very important and often expensive activity. To accelerate knowledge transfer, a forum of administrators from utilities, ULBs, and states, who have successfully implemented water PPP projects, can be created to share lessons with other cities. State governments and nodal agencies could play an important role in creating an enabling environment (for example, public funding, tariff policies, and supporting and mentoring project development and implementation).

Develop sector regulation as a long-term measure

The presence of a regulator can strengthen the performance orientation of local bodies, provide an objective basis for tariff setting and targeted subsidies. In doing so, it can help create a more transparent and predictable environment for attracting private sector participation in the sector. The introduction of sector regulation, however, also needs to be accompanied by other enablers such as rationalized public funding, institutional role clarity as well as stakeholder participation.

In summary, recent trends indicate a growing interest in water PPPs, with more projects reaching the contracting stage, supported largely by increased availability of public funding for water PPPs. If the private sector is to play a significant role in addressing the investment and service backlogs in the sector, suitable interventions are necessary to scale up this momentum while ensuring projects that deliver the desired service outcomes on a sustainable basis.

1. Introduction

1.1 Background of the Study

Public Private Partnerships (PPPs) in the water supply sector began to emerge in the early 1990s in most developing countries of the world. Initiated in most countries by international private operators, these arrangements were typically large-scale PPP projects which required the private operators to finance, develop, operate, and manage the water supply system for a large population base.

However, international observers have noted that most of these large-scale projects could not be successfully implemented on account of a host of interrelated factors. These factors included difficulties in achieving financial closure by the private operators, sociopolitical barriers, tariff-setting issues, and high financial risk. The failure of several large-scale projects during this phase resulted in many international private operators withdrawing from such projects in the developing countries. This gave rise to the perception that the number of PPP contracts being pursued in the water supply sector was declining.

Various studies have assessed the performance of PPP contracts initiated in the developed and developing countries over the last two decades.[3] These suggest that the phase of failed PPP projects of the 1990s has been slowly replaced by one in which different types of PPP contracts are being tried and implemented in the developing countries. These studies also indicate several trends which have emerged in the type of PPP contracts being implemented, the role of the public and private sector utilities, and the changing political environment. These studies provide significant inputs to policy makers in developing countries.

However, these studies have not analyzed or covered the Indian experience with PPPs in the water sector. Thus, although a substantial number of water PPPs has been attempted in India, due to the lack of an analysis of these projects, policy makers have not been able to benefit from this experience.

This study aims at closing this information gap by assessing the evolution of PPP in the Indian water sector, highlighting the developments over the last two decades, and providing suggestions for future approaches towards PPP in the sector.

The study is an activity under the advisory services of the Water and Sanitation Program (WSP). It is part of WSP's advocacy for institutional options for reform in the water sector.

1.2 Objective of the Study

The study seeks to analyze the evolution of PPPs in the water sector in India, key trends emerging over the last two decades starting 1990, the current scenario of water PPPs, and their likely future. The specific objectives are to:

- Provide inputs for an informed assessment of past PPP transactions in India;

3. Marin, P. 2009. Public-private partnerships for urban water utilities: a review of experiences in developing countries. Report. The World Bank. Gassner, Katharina, *et.al.* 2009. Does private sector participation improve performance in electricity and water distribution? The World Bank.
Prasad, N. 2006. Privatization Results: Private Sector Participation in Water Services After 15 Years. In: *Development Policy Review,* 2006, 24 (6): 669-692. Marin, P. and A.K. Izaguirre. 2006. Private Participation in Water—Toward a New Generation of Projects? In: *Gridlines,* 14, The World Bank.

- Understand the trends in PPP transactions since the 1990s;
- Identify factors impeding and supporting the development of successful PPPs; and
- Suggest ways for an optimized delivery of services based on PPPs.

Although several PPPs have been attempted, many are under construction and only a few are in the operations stage. Therefore, this study focuses only on learnings from PPP design and transaction. This study does not seek to assess the operating and financial performance of PPPs.

1.3 Structure of the Study

The report comprises the following six chapters:

- Introduction;
- Methodology and Framework of Analysis;
- Overview of Indian Urban Water Supply Sector;
- PPP in Urban Water Supply Sector in India and Emerging Trends;
- Factors Contributing to Success or Failure of PPP Projects in the Urban Water Supply Sector; and
- Emerging Issues and Interventions for Way Forward

2. Methodology and Framework of Analysis

This section of the report discusses the framework used for undertaking the assessment of PPPs in the Indian urban water supply sector.

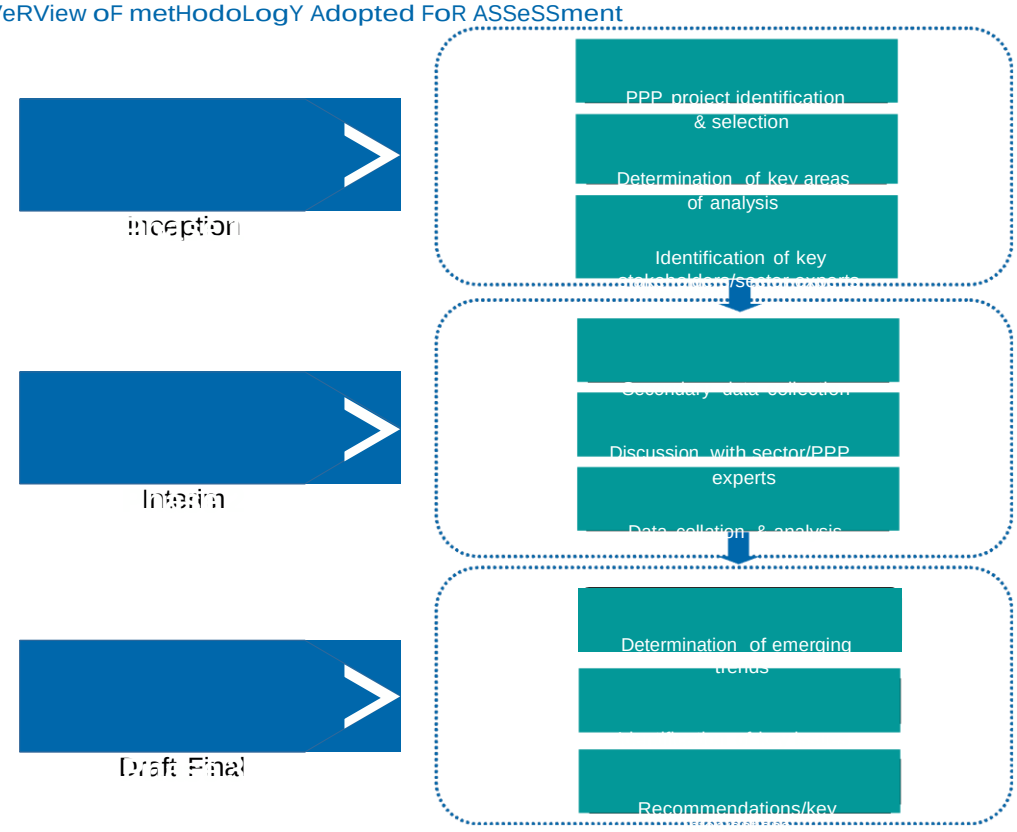
2.1 Overview of Methodology of Assessment

The study was undertaken in three phases as indicated in Figure 2.1.

2.2 Definition and Coverage of Projects

This study adopts a definition for "PPP" that is broader than that used by the Government of India (GoI). For the purposes of this study, any project where a private operator delivers services (such as bulk water or domestic piped supply or treated water or performance improvement) and is remunerated based on output or performance-linked payments (from the project sponsor or from the consumer) is termed a PPP project. This contrasts with the GoI definition which stipulates "payment of user charges" as an essential

Figure 2.1: oVeRView oF metHodoLogY Adopted FoR ASSeSSment



feature of a PPP arrangement. Under the definition adopted for the study, the following examples of projects will qualify as PPP:

- Construction and operation of water treatment plants or bulk water supply systems where the payment for operations is based on delivery of treated or bulk water; and
- O&M of the water supply system where the payment to the operator is made:
  - By the project sponsor based on water supplied to the consumers
  - By the project sponsor based on agreed performance improvements
  - By the customers based on user charges
  - By the sponsor as payment of annuities on availability of services.

Such projects may or may not involve private sector investments. Accordingly, the payments to the operators may, or may not, include the component of capital cost recovery.

The following projects will not qualify as PPP:

- Design or design-construction of water supply systems; and
- Installation and/or maintenance of equipment, such as meters.

It may also be noted that there are many examples of informal private provisioning of water services in cities, especially in low-income neighborhoods. Such instances are a result of poor levels of service provided by the concerned local body/ utility. Therefore, private provisioning is not a new trend in cities. However, formal PPP arrangements sanctioned by the city/utility are relatively new. This study focuses only on formal PPP arrangements.

The study covers successful as well as failed attempts for both industrial and domestic water supply in urban areas since
1990. It has attempted to cover all water PPPs that were in the public domain, either at planning stages or at bidding stages. It is possible that a few projects were abandoned at the concept stage itself and therefore these may not be covered in this study. The time period has been divided into three phases: 1990s, 2000-04, and 2005 onward. These time periods are post facto classifications to aid in the understanding of broad sectoral trends.

2.3 Data Collection and Consultations

Information on projects and the overall performance of water PPPs in India was collected from various secondary data such as records of water PPP projects developed in India, policy documents, relevant project case studies, and research reports. These were complemented by detailed interviews and roundtable discussions with stakeholders from the public and private sectors (Annex 1 provides a list of stakeholders consulted). These included officials of the public water utilities, Urban Local Bodies (ULBs), state water departments, and state PPP cells of Maharashtra, Karnataka, Madhya Pradesh, and Tamil Nadu. Further, one-on-one interviews and roundtable discussions were held with private sector representatives including operators and sector experts. Detailed discussions were carried out with both international and domestic operators who have been active in PPPs in the urban water supply sector in India. In addition, members of the academia were interviewed as also experts associated with the sector over several years. For projects which were initiated during the 1990s and the early years of the 2000 decade, documented information is limited, and hence the analysis is primarily based on discussions and consultations undertaken with key stakeholders.

2.4 Projects Covered

An overview of the projects selected corresponding to the three time periods is presented in Table 2.1. Two more projects have reached key milestones: a) in Nagpur, a private operator has been selected to scale up of the pilot project for continuous water supply; and b) in Aurangabad, two financial bids have been received for a city-level water supply project. These projects are not included in the analysis, since these milestones were achieved during the final stages of this study.

2.5 Framework of Analysis

To synthesize the information collected, a two-level analysis was undertaken. In the macro analysis, detailed project profiles were drawn up for all the projects, capturing year-wise information on the type of PPP project, city/state of project initiation, stakeholders involved in the development of the project, the year of initiation and contract award, the tenure of the contract, the operators involved, project cost, and the project's current status. Project profiling was carried out

Table 2.1: List of PPP Projects Selected For Assessment

1990-2000	2000-04	2005 onward
Cauvery Bulk water Supply project: Stage iV, phase-ii (Karnataka)	o&m contract, Sangli (maharashtra)	KUwASip: 24x7 water supply for Belguam, Hubli-dharwad, and gulbarga (Karnataka)
Krishna Raw Bulk water supply project (Andhra pradesh)	water treatment plant, Sonia Vihar, delhi	dewas industrial water supply (madhya pradesh)
tirupur industrial water supply project (tamil nadu)	o&m contract for mumbai K east (maharashtra)	Chennai desalination plant (tamil nadu)
Selaulim Bulk water Supply (goa)	o&m contract for 21 pilot zones in delhi	Contract for water supply system, Sector V Salt Lake, Kolkata (west Bengal)
water supply and sewerage project, pune (maharashtra)	o&m contract for 2 pilot zones in Bengaluru under BwSSB (Karnataka)	o&m contract for pilot zone, nagpur (maharashtra)
-	o&m contract for 8 municipal councils in Bengaluru under BwSSB (Karnataka)	management contract for o&m, Latur (maharashtra)
-	Visakhapatnam industrial water Supply project (Andhra pradesh)	industrial water supply contract, Haldia (west Bengal)
-	o&m for Chandrapur (maharashtra)	Bulk water supply project, Bhiwandi nizampur city (maharashtra)
-	-	o&m contract for water supply system, mysore (Karnataka)
-	-	o&m contract for water supply system, madurai (tamil nadu)
-	-	Concession agreement distribution system, Khandwa (madhya pradesh)
-	-	Concession agreement: distribution system, Shivpuri (madhya pradesh)
-	-	BOt agreement: bulk water supply, naya Raipur (Chhattisgarh)

BWSSB: Bangalore Water Supply and Sewerage Board; BOT: Build Operate Transfer; KUWASIP: Karnataka Urban Water Sector Improvement Project; O&M: operation and maintenance.

for all projects identified over the three time periods, that is, the 1990s, 2000-04, and from 2005 onward.

In the next step, the micro analysis assessed the reasons for success/failure of the project, the role of stakeholders involved, and project planning, development and procurement aspects. For this analysis, one out of the four industrial water supply projects was chosen (Haldia Industrial Water Supply Project). Two distribution projects (Madurai and Bhiwandi) were not studied due to lack of detailed information. The Sonia Vihar water treatment PPP was also not analyzed further since its scope was limited to water treatment alone.

For the interested reader, a detailed chronology of events has been provided in Annex 2, relating to development of projects. Further, Annex 3 contains details of select projects to provide a deeper insight into the structuring of these projects.

3. Overview of the Indian Urban Water Supply Sector

This section of the report provides an overview of the Indian water supply sector. It discusses the institutional, policy, and financial framework governing the sector, investment gaps, key indicators of sector performance, and the major issues faced by the sector.

3.1 Institutional Framework for the Urban Water Supply Service

In the Indian legislative context, provision of urban water supply services is the primary responsibility of the state government and ULBs. Until the 1990s, urban water supply services in the country were managed largely through state departments and public water utilities. The 74th Constitutional Amendment Act[4] (CAA) of 1992 encouraged the transfer of responsibility and powers to provide and manage urban water supply services to the ULBs. The delegation of power to ULBs is still underway. Today, there are several institutions which are involved in the provision of urban water supply services. These include the state Public Health and Engineering Departments (PHEDs), specialized state Water Supply and Sanitation (WSS) boards, specialized city boards, Municipal Corporations, and other urban local bodies. Therefore, there are varying institutional arrangements which are prevalent today.

The pattern observed in most cities is that a state agency, such as the PHED or WSS board, undertakes the capital works and post construction, and hands over the responsibility of operation and maintenance (O&M) to the local government. In some cities, the state agency handles the capital works and O&M while the revenue functions reside with the local government.

The institutional set-ups, engaged in the provision and delivery of water supply services in the country, have been classified into four broad categories, and are shown in Figure 3.1.

The first arrangement is where the entire value chain of services of the water supply is managed by the municipal government. The local government is responsible for development, operation, and management of the water supply services from the source to the distribution end. This form of arrangement is generally seen in those cities which have a strong financial and technical base, such as Ahmedabad, Mumbai, Pune, and Chandigarh. It is also the predominant arrangement in states such as Gujarat and Madhya Pradesh.

The second arrangement is one where the city water supply and sewerage boards are responsible for all the water supply functions. This is observed in the case of cities such as Delhi, Chennai, Hyderabad, and Bengaluru.

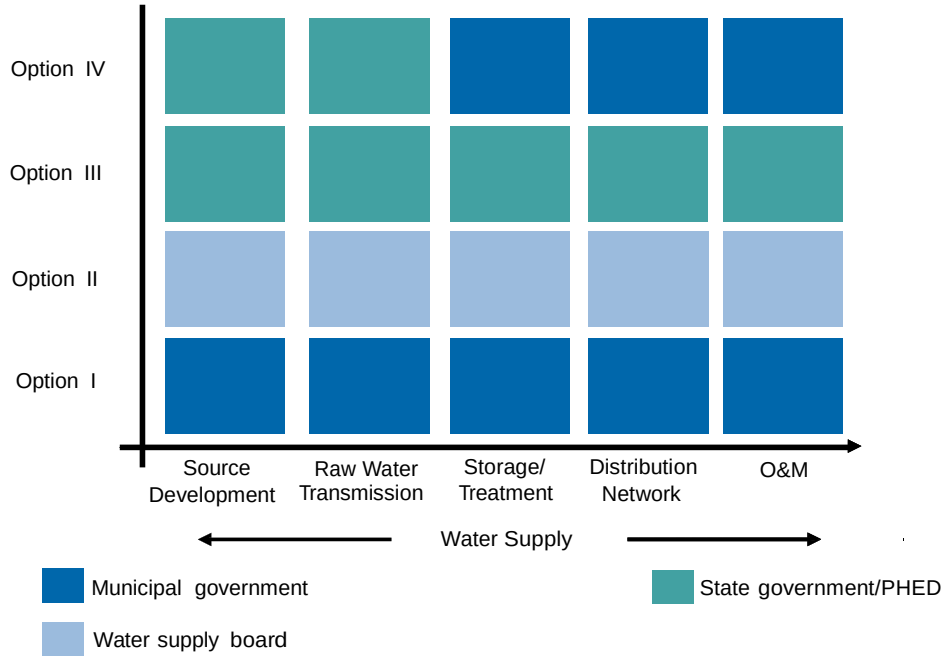
The third arrangement is one where all the functions are carried out by the PHED. Such an arrangement is seen in several major states of India such as Rajasthan, Orissa, and in most cities of Haryana. In the smaller states and union territories of the country, typically the PHED or the Public Works Department (PWD) performs all the functions related to water supply.

The fourth arrangement is one where the management of the distribution network, O&M and revenue collection is the responsibility of a municipal government, whereas source development and capital investment in the system are managed by a state department such as PHED.

Such an arrangement is seen in Port Blair, where the Andaman PWD is responsible for the capital works while the O&M function is shared between the PWD and the Municipal Council, and the revenue-related function is entirely with the Municipal Council. In Agartala, only the revenue-related functions are the responsibility of the local body while O&M and capital works are with PHED.

4. A brief explaining the 74th Constitutional Amendment has been provided in a subsequent section of this chapter.

Figure 3.1: Institutional Set-Up for the Urban Water Supply Sector[5]



The role of the central government with respect to urban water supply is limited to defining performance norms for the sector, providing sector policy guidelines and direction, and extending technical and limited financial assistance, through specific funding programs. The Ministry of Urban Development (MoUD) is the nodal ministry responsible for policy formulation, guidance on sector strategies, monitoring, and support to state governments. MoUD is assisted by several other agencies[6] in providing technical, training, and financial assistance to states for urban water supply. In addition, the Planning Commission of India along with the Ministry of Finance also plays an important role in the urban water supply services through allocation of funds for sector development under the Five Year Plans and the Finance Commission reports.

Unlike several other infrastructure sectors in the country such as telecom or power, the urban water supply sector does not have a regulatory agency at the national or state level which monitors the water service provision. Only the state of Maharashtra instituted a state-level water regulatory body focusing mainly on water resources management. Formed under an Act in 2005, the Maharashtra Water Resources Regulatory Authority (MWRRA) is primarily responsible for prioritization, allocation, and distribution of bulk water supply resources in the state along with setting of tariff for bulk water. Its responsibilities do not extend to include the distribution system within ULBs. Nevertheless, a proposal is under consideration to introduce some form of a regulator to cover these services as well. Similar proposals are under consideration in a couple of other states as well.

5. Based on National Institute of Urban Affairs (NIUA), 1997, information.
6. These include the Central Public Health and Environmental Engineering Organization (CPHEEO), National Environmental Engineering Research Institute (NEERI), and so on.

box 3.1: 74th Constitutional Amendment Act, 1992

Prior to 1992, the Constitution of India did not make local self governments in the urban area a direct constitutional obligation. As a consequence of inadequate Constitutional provision for local self governments, municipal governance in the country was unstable resulting in many ULBs becoming weak and ineffective.

As part of its efforts to decentralize and strengthen the system of governance, GoI, in 1992, passed the 74th CAA. This Act essentially attempted to strengthen local governments in the urban areas with greater power and authority to effectively discharge the duties accorded to them. The 12th Schedule of the 74th CAA lists a set of obligatory and discretionary functions which are to be performed by the ULBs along with their planning, regulation, and development powers. Among the obligatory functions devolved to the ULBs was that of *"water supply for domestic, industrial, and commercial purposes"*. With the passing of this Act, the onus of provision of water supply services in the urban areas of India rests with the respective local governments, that is, the ULBs. In some states in India, the devolution of powers in the context of the 74th CAA has been undertaken while in others this process is currently underway.

3.2 Policy Framework Governing Urban Water Supply Services

Growth and development of a sector is generally guided by policy frameworks which provide direction and support institutional and other mechanisms which facilitate implementation of the policy. In India, at the national level, the country has a National Water Policy (NWP). Other than this, at the level of the GoI, no policy has been introduced exclusively for urban water supply services.

Water supply services being a state subject, the sector is largely guided by policies drawn by the state government. Where it exists, the state water policy articulates the overall sector objectives along with the use, allocation, and management of resources for both urban and rural purposes. Urban water supply services, in particular, are generally guided by the vision and agenda of the state water supply departments, water supply boards, ULBs, and so on. Other than the state policy on water supply as a whole and the vision documents of the implementing agencies, currently there are no exclusive policies at the level of state government for urban water supply services. The only exception to this is Karnataka, where the state government introduced the Karnataka Urban Drinking Water and Sanitation Policy in 2002.

National Water Policy

The Ministry of Water Resources introduced a NWP in 1987 which has been revised and updated in 2002. GoI's NWP focuses on effective planning and water resource management. NWP allocates the highest priority to drinking water among the various uses of water. Further, it emphasizes the need to ensure safe drinking water supply to both urban and rural areas. The NWP of 2002 has also commented on the need to encourage private sector participation to improve service delivery:

> *Private sector participation should be encouraged in planning, development, and management of water resources projects for diverse uses, wherever feasible. Private sector participation may help in introducing innovative ideas, generating financial resources and introducing corporate management, and improving service efficiency and accountability to users.*

3.3 Financing of Urban Water Supply Services in India

Financing of urban water supply services in India is undertaken primarily through two broad sources:

- Government (central, state, local, nodal agencies); and
- Development agencies (bilateral and multilateral).

Funding from government sources is made available to the sector through planned allocations and budgetary provisions. These funds are channelized through central and state sponsored schemes and through other fiscal transfers made to the various implementing agencies.

In recent years, significant fund allocations have been made to this sector by the central government, which have had substantial impact on the development of the urban landscape. The following section provides a brief overview of the nature of these schemes and the trends in fund allocations by the central government to the urban water supply services.

Five Year Plan-based Intervention in Urban Water Supply Sector

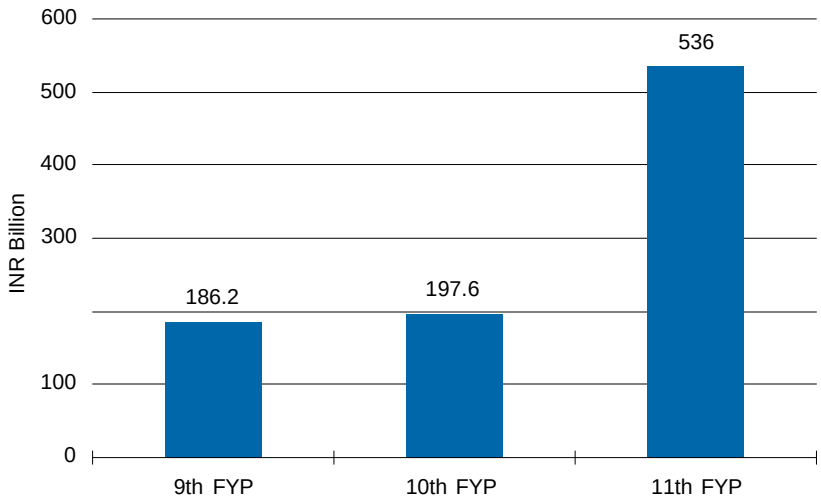
The economy of India is based in part on planning through its Five Year Plans (FYPs), developed, executed, and monitored by the country's Planning Commission. FYPs are being implemented in India since 1951. The 10th FYP completed its term by March 2007 and, currently, the 11th FYP is underway. For each FYP, specific objectives are laid out along with sector-level strategies and schemes, to support which investment outlays are marked out.

Over the years, the budgetary allocations have increased substantially with each FYP. Provision of WSS services has been included since the first FYP as a developmental priority, but it was not until the first NWP of 1987 was formulated that drinking water was given priority over other water uses.[7] From the 9th FYP, there has been direct focus on service-level improvements in the water supply sector.

During the 10th FYP, focus was laid on improving coverage of the water supply services to the unserved population and to encourage stakeholder participation in planning and implementation of schemes. The 10th FYP, in addition to laying down universal objectives for the water supply sector, also focused on the need to make urban water supply services self sustaining through the introduction of tariff recovery mechanisms. During the tenure of the 10th FYP, GoI revised its earlier water policy and introduced the NWP of 2002, which once again accorded primacy to drinking water supply.

The 11th FYP has been in line with the objectives laid out in the 10th FYP including that of ensuring 100 percent coverage of the urban population by the end of the Plan period. It emphasizes improvement measures such as reduction of nonrevenue water (NRW), higher recovery of O&M cost, and so on. Box 3.2 provides a brief summary of the interventions laid out in the 11th FYP. Figure 3.2 shows the increase in the allocation made in the last three FYPs toward improvement in the urban water supply services. Though urban water supply has remained an important area of concern, and allocation of funds for the sector has been increasing, its share of the total public sector outlay has remained in the range of 1-1.5 percent since the first FYP.

Figure 3.2: Five Year Plan Allocation for Urban Water Supply Sector



Source: Planning Commission of India.

7. India: Water supply and sanitation, Bridging the gap between infrastructure and service. The World Bank, January 2006.

box 3.2: interventions identified in the 11th Five Year Plan to improve urban water supply scenario

To achieve 100 percent coverage of the population with urban water supply by end of the 11th FYP, the following steps have been identified:

- Introduction of state groundwater legislation based on model groundwater legislation;
- Formulation of state water policy by respective state governments;
- Special attention to cities and towns affected by water contamination under the Jawaharlal Nehru National Urban Renewal Mission (JNNURM);
- Evolution of suitable strategies to meet O&M costs by states/ULBs, mandatory water metering along with levying of telescopic tariff;
- Minimization of leakages and check on unaccounted for water;
- State governments/ULBs to take up reform measures under JNNURM; and
- Efforts to be made to step up the quantum of funds through alternative financing modes including institutional finance, pooled finance funds, Foreign Direct Investments (FDIs), from multilaterals and PPP.

The funds allocated under the FYPs are disbursed through various schemes introduced by the central government and through state-central government supported initiatives. Two schemes that have had an impact on the urban water supply sector, and PPP activity, in particular, are discussed below.

Centrally-sponsored Infrastructure Development Schemes

In 2005, the central government initiated two major schemes to improve the urban infrastructure scenario:

- The Urban Infrastructure and Governance (UIG) component of the Jawaharlal Nehru National Urban Renewal Mission (JNNURM); and
- The Urban Infrastructure Development Scheme for Small and Medium Towns (UIDSSMT) component of JNNURM.

Both these schemes were aimed at prioritizing infrastructure development, good governance, and basic services to the poor in urban areas of the country. Sectors covered under these schemes include urban water supply, sewerage, solid waste, storm water drains, and urban transport.

UIG Component of JNNURM

This covers 65 select urban centers[8] and has investments spread over seven years. Financial assistance is provided for projects through a mix of central, state, and local government funding in the ratio from 35:15:50 up to 80:10:10, depending on the size of the city, and is linked to implementation of certain reform measures by ULBs/states. Through these reform measures, the scheme attempts to develop linkages between asset creation and asset management, and provide universal access to basic services.

With urban water supply being one of the core sectors identified for assistance under the scheme, several projects have been proposed by ULBs for grant assistance under JNNURM. As on October 2010, of the total project funding of INR 600 billion sanctioned, urban water supply projects accounted for the highest share at 33 percent with a total project value of INR 192 billion.[9] JNNURM funding represented a break from past forms of public funding in a couple of ways. Firstly, JNNURM provided partial funding. Therefore, cities had to look elsewhere (internal resources or markets) for the rest of financing. Secondly, JNNURM made grant funding available

8. The urban centers selected have a population of a million, are state capitals or heritage/tourist centers.
9. As per MoUD. Web site: http://jnnurm.nic.in/wp-content/uploads/2011/01/sectowise-approved-projects.pdf, as in November 2011.

even if the project was implemented on PPP basis. These two factors were a significant departure from earlier funding programs which provided almost 100 percent funding and emphasized traditional execution styles.

UIDSSMT

GoI also launched the UIDSSMT scheme for financial assistance to urban centers which are not covered under the UIG scheme. Similar in scope and design, the UIDSSMT scheme offers a higher central government grant component. Project funding is accordingly provided by central, state, and local governments in the ratio of 80:10:10. As in August
2010, cross-sectoral projects worth INR 199 billion had been sanctioned under UIDSSMT, of which 52 percent projects are under the urban water supply sector with a total value of INR 105 billion.[10]

In addition to centrally sponsored schemes, the respective state governments also provide assistance for development of urban water supply through schemes or programs launched at different points in time. Therefore, the urban water supply sector in the country is currently heavily dependent on central and state assistance for development and implementation of its augmentation and improvement programs.

3.4 Investment Requirement and Financing Gap

With rising urbanization, India faces several challenges on the infrastructure front. This is especially true in the case of basic urban services including water supply. Today, the sector is faced with the dual challenge of deteriorating infrastructure and a rising infrastructure gap to meet the growing demand for services. Any intervention for improvement of the existing scenario requires significant capital investment. Further, there is critical need to ensure that the infrastructure created through the investments is of a sustainable nature.

There are several estimates of the scale of investment needed for the urban water supply sector. The 11th FYP has estimated the investment requirement for the urban water supply sector during the ongoing Plan period at INR 536 billion. According to a World Bank estimate, India would need to invest INR 855 billion (US$2 billion/year) during the 11th (2007-12) and the 12th (2012-17) Plan period to meet the infrastructure gap and achieve the Millennium Development Goals (MDGs) fixed for the sector. CRIS has also estimated the investment requirement for the sector based on figures provided in the City Development Plans (CDPs) prepared under JNNURM. According to this estimation, the investment requirement for the sector for the period 2007-12 can be pegged at INR 701 billion (US$3 billion/year). The investment gap, which has been worked out, is indicated in Table 3.1.

According to the recently published *Report on Indian Urban Infrastructure and Services* (March, 2011) by the High Powered Expert Committee (HPEC) for Estimating the Investment Requirement for Urban Infrastructure Services, the investment requirement in the urban water supply sector is estimated at INR 3.2 trillion for the period 2012-31 (US$3.5 billion/year).[11] Approximately 50 percent of this requirement is to meet the unmet demand and is, therefore, an immediate requirement. HPEC has also estimated O&M requirements of INR 5.46 trillion—the highest among all urban infrastructure sectors—resulting in an aggregate cost of INR 8.67 trillion between the years 2012 and 2031. Figure
3.3 provides a sector-wise break up of funding requirements estimated as per the HPEC report.

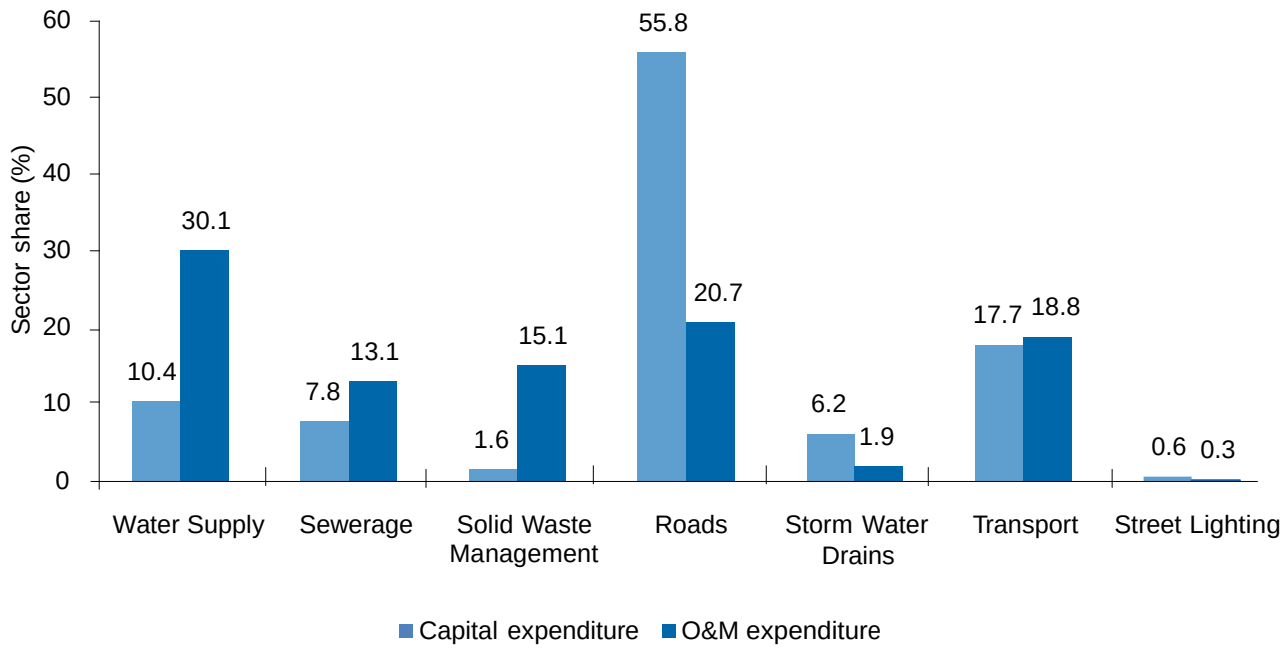
Table 3.1: Investment Gap in the Urban Water Supply Sector (Period 2007-12)

Indicators	Investment (INR billion)
investment requirement (JNNURM+UIDSSMT+other towns)	701
11th Five Year plan fund allocation[12]	536
investment gap	165

Source: CRIS analysis.

10. As per MoUD. Web site: http://urbanindia.nic.in/programme/ud/uidssmtbody.htm, as in November 2011.
11. In comparison, INR 300 billion is committed to the sector under JNNURM over a seven-year period.
12. In terms of source of funds for investments in basic services (water supply, sewerage, drainage, and solid waste management), only 3.2 percent was estimated to come from the private sector.

Figure 3.3: Sector-wise Funding Requirement in Urban Infrastructure



Source: HPEC Report on Indian Urban Infrastructure and Services.

The urban water supply sector clearly has significant resource requirements to meet the existing and emerging service gaps. Given the weak status of municipal finances, central and state financing will continue to play a predominant role in the sector; estimated at over 80 percent in the 11th FYP formulation, as presented in Figure 3.4.

Despite the predominance of public financing (approximately 97 percent),[13] given the investment gap in the urban water supply sector and the issues concerning poor service delivery, the government at all levels has been compelled to explore the option of increased private sector involvement in the sector. This is indicated in the NWP 2002 where private participation has been encouraged in feasible areas. The 11th FYP also emphasizes the need for leveraging governments' investments to initiate PPPs and for bringing in efficiencies of the private sector.

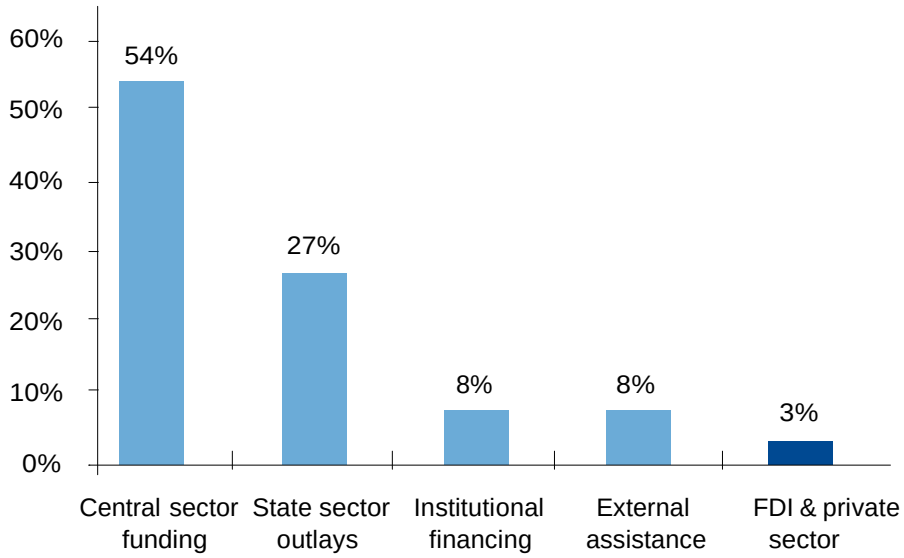
3.5 Challenges in the Urban Water Supply Sector

With the acceleration in the rate of India's urbanization and growth in consumption levels, there is increasing demand for urban water supply services. On the other hand, the urban water supply service delivery systems continue to be characterized by chronic inefficiencies, and poor service quality.

According to the Census of 2001, over 90 percent of urban households in India have access to improved sources of water supply. Access to piped water supply is closer to 75 percent,[14] with about half the urban households directly connected with the network.[15] While this suggests that a significant portion of the urban population has access to infrastructure, it does not necessarily reflect access to safe and reliable water. Water supply services in urban India are characterized by poor

13. Includes central and state funding as well as investments by financial institutions (largely government owned) and multilateral agencies.
14. India: Water supply and sanitation, Bridging the gap between infrastructure and service, The World Bank, January 2006.
15. Eleventh Five Year Plan (2007-12).

Figure 3.4: Source of Funding for Investment Requirement identified under 11th FYp



Source: The Planning Commission of India.

quality of access, low reliability of supply, poor water quality, high loss levels, and low cost recovery.

The per capita availability of water in most urban centers indicates a high degree of variability. While the acceptable norm as per the Centre of Public Health and Engineering Organisation (CPHEEO) is at 135 liter per capita per day (lpcd), approximately 203 of the Class I towns in India have per capita availability less than 100 lpcd.[16] Typically, water is supplied for just one to three hours per day, regardless of the quantity available. The existing infrastructure suffers from a high degree of operational inefficiencies. For instance, approximately 40-50 percent of the water pumped into the system is not available for consumption since it is lost in transmission, through theft, and so on. Consumer level metering is still not the norm in most cities and, where adopted, the maintenance and functionality of meters tend to be poor. Low tariffs, operational inefficiencies, and poor collection practices by the utilities have resulted in low cost recovery rates at 40-50 percent of O&M cost. These shortcomings are compounded by the low levels of technical, financial, and managerial capacity of local governments, which are inadequate to meet the service needs of their citizens.

Table 3.2 provides a set of key indicators of the urban water supply sector in India.

The problem of inadequate water availability, as described above, has tended to be addressed primarily through creation of new assets to augment supply. These have usually resulted in increased costs, without necessarily improving services. Little or no effort was made to improve service delivery through better management of existing assets. The neglect of asset maintenance has resulted in declining asset quality, and consequent deterioration in service levels and operational efficiencies. Efforts to restore or refurbish assets are further constrained by poorly maintained asset registers and records.

Underlying the above is the fundamental issue of institutional weaknesses that plague the sector. The institutional set-up governing water supply services in the country involves several

16. Water Supply and Sanitation Study, Planning Commission, Government of India, 2002.

Table 3.2 URBAN WATER SUPPLY INDICATORS

Indicators	unit	Average level
water coverage (direct connections)	%	66.6
water availability	Hours	3.3
Consumption per capita	lpcd	126.4
NRW	%	44.1
Connections metered	%	49.8
operating ratio	-	1.49
Staff/1,000 connection	Ratio	8.4

Source: MoUD's Service Level Benchmarking Databook 2008-09 (data for 27 cities).

agencies at the state and local levels (refer Section 3.1), which results in a lack of role clarity and dilution of responsibilities. The multiplicity of agencies also raises coordination issues. This is further exacerbated by weak oversight and accountability mechanisms for service delivery. Low tariff levels result in lack of customer orientation in the providers, as also poor financial health of the sector. The sector is severely challenged with respect to skills available for effective management of water supply services. The implementing agency, in most cases, not only lacks technical skills to manage water supply services but also to design, plan, and implement projects. Large-scale capital-intensive projects are taken up without adequate skills of project management. This has, in several instances, led to substantial delays in project implementation and subsequent cost escalations. Weak information databases make it difficult to implement processes for effective monitoring of water supply services.

In recent years, policies focusing on improved urban services and reform-linked schemes such as JNNURM and UIDSSMT have created a new sector vocabulary that has helped mainstream the elements of cost recovery, service accountability, and private participation. However, despite the investments and allocations made in the sector over the years, adequate water supply service is still lacking. As per the census, there have been improvements; nevertheless, wide service gaps and serious institutional challenges continue to dominate the sector.

4. PPP in Urban Water Supply Sector in India and Emerging Trends

This section of the report provides an overview of PPPs which have been initiated in the urban water supply sector in India since the 1990s.

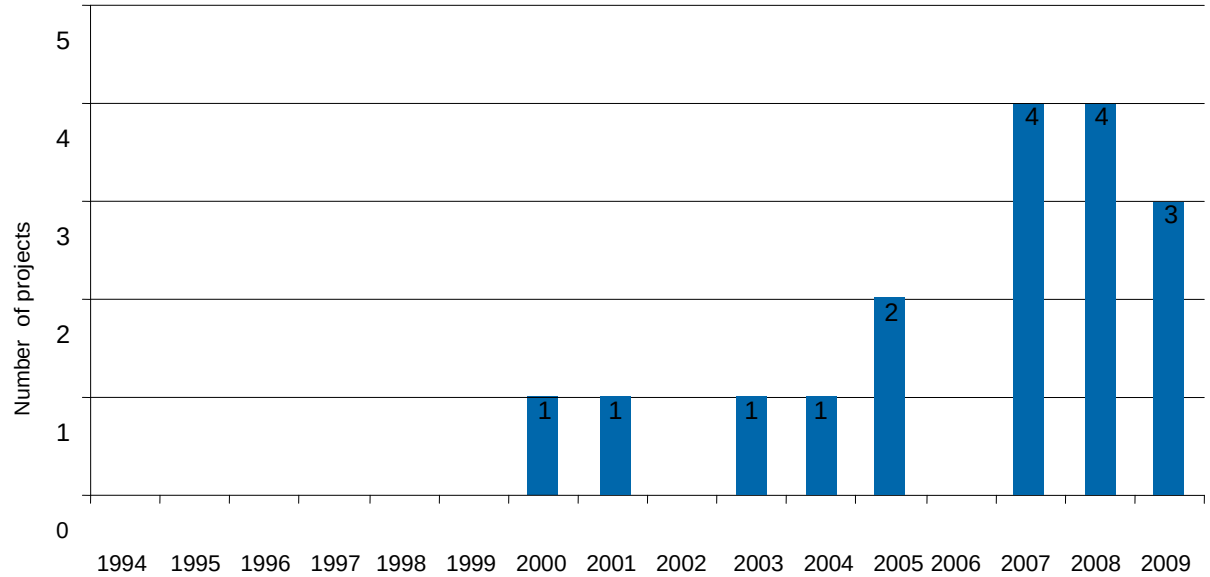
4.1 Overview of PPP Projects in Urban Water Supply Sector in India

PPPs in urban water supply services have been attempted in India since the mid-1990s. From the 1990s till 2009, at least 26 projects[17] have been initiated in the urban water supply sector for implementation on a PPP basis in the following areas:

- Augmentation of bulk water supply system;
- Rehabilitation, expansion, and the management of distribution systems; or
- Management of water supply from the source to end consumer.

The 1990s were shaped by significant activity in the sector, with several state governments proposing the development of large-scale capital-intensive projects through PPP arrangements. Yet, most of these projects failed to be implemented. The early years of the 2000 decade continued to see several attempts at implementing PPP projects, most of which were unsuccessful. With a series of failed initiatives, the number of attempts at developing PPP projects saw a decline. However, since 2005, PPP activity in the sector has regained momentum with a significant increase in the number of contracts awarded. Since 2005, 13 contracts have been awarded in the urban water supply services sector. Figure 4.1 captures the growth in water PPP contracts awarded in India since the 1990s, year-wise. From the Figure, it is evident that, until 2004, the instances of contract award were few and far between. Since 2005, the number of contracts awarded in the sector has been more consistent and generally rising—albeit this remains, as yet, a nascent trend.

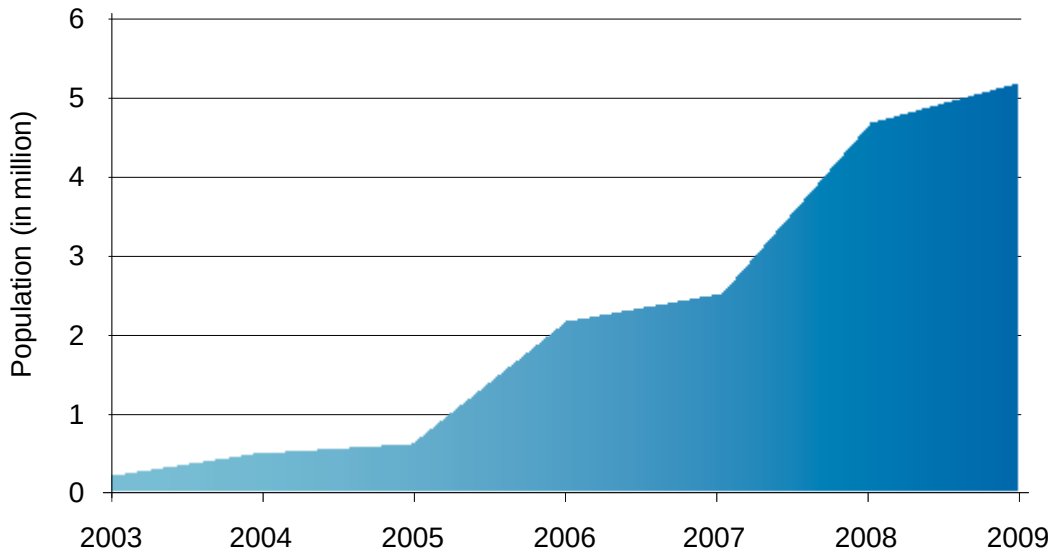
Figure 4.1: Year-wise Contract Awarded of Water Supply PPP Projects in India



Source: CRIS, based on primary and secondary information.

17. As per available primary and secondary information.

Figure 4.2: timeLine oF popULAtion CoVeRed BY URBAn wAteR SUppLY ppp pRojeCtS



Of the total contracts awarded in the sector, currently at least 14 water supply PPP projects are active. Together, these projects cover an urban population of approximately five million.[18] The year-wise increase in the population outreach of the active PPP contracts is presented in Figure 4.2.

The PPP contracts active in the country today include a mix of bulk water supply augmentation and distribution services improvements projects. These projects are being implemented under Build Operate Transfer (BOT) contracts or short-term management contracts or long-term contracts with tenures up to 30 years. Further, these projects are being developed with a varied mix of public and private funding. While some projects were developed on the expectation of 100 percent private financing, several of the active PPP projects today have seen public funding in the range of 50-60 percent of the project cost.

Given below is a brief on the evolution of PPPs in the sector over a period covering the last two decades. A summary of the PPP projects during this period is provided in Tables 4.1 to 4.3. The trends are discussed subsequently.

18. Estimated on the basis of information on the population of the city in which the projects have been implemented. For pilot projects, the city population has been taken.

Table 4.1: PPP Projects Initiated in the Urban Water Supply Sector during the 1990s

Project	Sponsor	Status	Cost[19] INR Mn	Operator responsibility	Share of Public Funding	Nature of Contract	Revenue Model for Operator
Krishna Raw Bulk water Supply project	Hyderabad metro water Supply and Sewerage Board (HmwSSB	Abandoned prior to award	3,000	Bulk water supply	Nil	BOT	Bulk water supply fee from Board to operator
Selaulim Bulk water Supply, Goa	public works department (PWD)	Abandoned prior to award	1,200	Bulk water supply	Nil	Build Own Operate Transfer (BOOT)	Bulk water supply fee to the operator
water Supply and Sewerage project, pune	pune municipal Corporation (pmC)	Abandoned prior to award	7,400	a) EPC, O&M b) Billing and collection under a separate contract	100% public funding	EPC + O&M and a separate billing and collection contract	EPC + O&M fee, management contract fee
Cauvery Bulk water Supply project: Stage iV, phase-ii	Bangalore water Supply and Sewerage Board (BwSSB)	Abandoned during award*	8,870	Bulk water supply	Nil	BOT	Bulk water supply fee from Board to operator
Tirupur industrial water Supply project	new Tirupur Area development Corporation Limited (NTADCL)	Awarded in 2000, in operation	9,360	Bulk supply to municipal body, retail supply to industries	Nil	Concession	payments from industries, bulk water fee from municipal body to operator

* Not included in contracts awarded.

19. Cauvery Bulk Water Supply Project indicated at 1999 prices, Krishna Raw Bulk Water Supply Project at 1995 prices, Goa Bulk Water Supply Project at 1998 prices, and Pune Water Supply Project at 1999 prices.

Table 4.2: PPP Projects Initiated in the Urban Water Supply Sector Between 2000 And 2004

Project	Sponsor	Status	Cost INR Million	Operator responsibility	Share of Public Funding	Nature of Contract	Revenue Model for Operator
O&M contract, Sangli, Maharashtra	Sangli Miraj Kupwad Municipal Corporation (SKMC)	Abandoned prior to award	-	Phase I— O & M, system studies	100% public funding	Short-term management contract	Management fee to the operator
				Phase II— investment and operations	private investment envisaged	Concession	na
O&M contract for Mumbai K east	Municipal Corporation of Brihan Mumbai (MCBM)	Abandoned prior to bidding	-	Rehabilitation and performance improvement	100% public funding	management contract	Operator fee from ULB
O&M contract for 21 pilot zones	Delhi Jal Board (DJB)	Abandoned prior to bidding	6,300	na	na	na	na
O&M contract	BWSSB	Abandoned	3,000	performance improvement	100% public funding	Delegated management contract	performance-based management fee from Board to the operator
O&M contract for 8 municipal councils	BWSSB	Abandoned prior to bidding	3,000	na	na	na	na
Water treatment plant, Sonia Vihar, Delhi	DJB	Awarded to Degremont in 2001, plant operational	2,000	Water treatment	100% public funding	design Build Operate (DBO) contract	Water treatment fee from Board to operator
Visakhapatnam industrial water Supply project	Andhra Pradesh industrial infrastructure Corporation Limited (APIICL)	Awarded in 2003	4,530	Rehabilitation of canal and supply of bulk water	Nil	Long-term BOOT	Bulk water payments from customers to the operator
O&M contract for Chandrapur, Maharashtra	Chandrapur Municipal Council (CMC)	Awarded in 2004, operational	15.3	O&M	na	Long-term lease	Revenue collection from consumers

Table 4.3: PPP Projects Awarded Since 2005

Project	Sponsor	Status	Cost INR Million	Operator responsibility	Share of Public Funding	Nature of Contract	Revenue Model for Operator
Karnataka Urban Water Sector Improvement Project (KUWASIP): 24x7 water supply for Belguam, Hubli-Dharwad, and Gulbarga	Karnataka Urban Infrastructure Development Finance Corporation (KUIDFC)	Awarded in 2005. Project completed. Private operations have been extended through bidding	620	Rehabilitation of distribution network, operations, and performance improvement	100% public funding	Short-term management contract	Performance-based management fee to the operator
Dewas industrial water Supply	Madhya Pradesh State Industrial Development Corporation (MPSIDC)	Awarded in 2005. Project operational	770	Supply of industrial water to consumers	Nil	Long-term concession	Revenue collection from consumers
Chennai desalination plant	Chennai Metropolitan Water Supply and Sewerage Board (CMWSSB)	Awarded in 2007. Project operational	7,000	Bulk water supply	Nil	Long-term BOT contract	Bulk water supply payments from the Board to the operator
Water Supply and Sewerage System, Sector V Salt Lake City, Kolkata	Kolkata Metropolitan Development Authority (KMDA)	Awarded in 2007. Operations have commenced	700	Construction and operation of water and sewage network	35% public funding	Long-term concession	Revenue collection from consumers
O&M contract for pilot zone, Nagpur	Nagpur Municipal Corporation (NMC)	Awarded in 2007. Project completed	100	Rehabilitation of distribution network and performance improvement	100% public funding	Short-term management contract	Fixed fee from ULB to operator
Management contract for O&M, Latur Maharashtra	Maharashtra Jeevan Pradhikaran (MJP)	Awarded in 2008. Private operations underway	430	O&M of water supply system	Incremental investments from private operator[20]	Lease	Revenue collection from consumers
Industrial Water Supply Contract, Haldia, West Bengal	Haldia Development Authority (HDA)	Awarded in 2008	1,000	Supply of industrial water	Nil	Long-term concession	Revenue collection from consumers

20. Project awarded to private operator after completion of a publicly funded project.

Table 4.3: PPP Projects Awarded Since 2005 (Continued)

Project	Sponsor	Status	Cost INR Million	Operator responsibility	Share of Public Funding	Nature of Contract	Revenue Model for Operator
Bulk water Supply project, Bhiwandi Nizampur city, maharashtra	Bhiwandi Nizampur municipal Corporaton (BNMC)	Awarded in 2008. Financial close yet to be achieved	3,420	Bulk water supply, O&M	Nil	BOT for bulk water management contract for O&M	Bulk supply fee from ULB, management fee for O&M
O&M contract for water supply System, mysore	mysore municipal Corporation	Awarded in 2008. Construction underway	1,620	Constructing distribution network, O&M	90% public funding	EPC and short-term management contract	EPC payments from the city, management fee for O&M
O&M contract for water supply system, madurai	madurai municipal Corporation	Awarded in 2008. no significant progress reported	140	na	na	na	na
Concession agreement for distribution system, Khandwa, madhya pradesh	Khandwa municipal Corporation and Urban Area development department	Awarded in 2009. Construction underway	930	Construction of additional bulk water supply, O&M of water supply system	90% public funding	Long-term concession	Revenue collection from consumers
Concession agreement for distribution system, Shivpuri, madhya pradesh	Nagar palika parishad, Shivpuri and Urban Area development department	Awarded in 2009. Construction underway	520	Construction of additional bulk water supply, O&M of water supply system	90% public funding	Long-term concession	Revenue collection from consumers
Bulk water supply system, Naya Raipur	Naya Raipur development Authority (NRDA)	Awarded in 2009. Construction underway	2,000	Construction and operation of water supply system	Nil	Long-term annuity contract	Annuity payments to the operator

Evolution of PPP Projects in 1990s

During the 1990s, the PPP initiatives in the urban water supply sector were set against the backdrop of economic liberalization. A larger private sector role was envisaged across infrastructure sectors. Private investments in electricity generation were being pursued vigorously.

The period also saw continued stress on the water supply infrastructure with rising demand due to increased urbanization. The state and city level water supply utilities were facing the multiple challenges of poor service delivery, low coverage, and limited financial resources to undertake large-scale capital investments.

In this context, five major PPP initiatives were attempted in the urban water supply sector. Most of these initiatives were bulk water supply augmentation projects designed under the BOT model. On an average, the estimated cost of the projects initiated during this time period was INR 4.700 billion. These projects were developed under a PPP arrangement that was dependant on substantial private financing. Innovative mechanisms of private financing, hitherto not experimented with in the urban water supply sector, were also attempted, such as the formation of a Special Purpose Vehicle (SPV) for project development and implementation.

These PPP projects also attracted substantial international private operator interest. International private water supply operators such as Bi Water, Veolia Water, Suez Environment, Anglian Water, and so on, exhibited interest in the development and implementation of PPP projects.

Despite extensive preparatory activities and international interest, of the five projects, contracts were awarded for only the Tirupur Industrial Water Supply Project, which is currently operational. All other projects were abandoned at different stages of project development. These projects failed on account of issues related to weak risk mitigation measures in the contractual structures, inconsistent political support, and procurement issues. A detailed chronology of these projects is provided in Annex 2.

Projects between 2000 and 2004

After the large-scale PPP projects of the 1990s, starting from 2000, several PPP projects aimed at distribution improvements were proposed.

The projects developed during this phase shifted focus from bulk water supply augmentation to O&M improvements in the distribution system. In line with this shift, the type of PPP arrangement developed also changed with increased exploration of the management contract model. For the PPP arrangements involving O&M improvements, financial assistance was envisaged from the respective state governments or from international funding agencies such as the World Bank. Feedback collected during discussions with government officials and sector experts suggests that, learning from the failure of the earlier large-scale PPP attempts at bulk water supply augmentation, state governments and international funding agencies now encouraged the management contract model to emulate the managerial efficiencies of the private sector.

It is understood from stakeholders engaged in a few of these projects that extensive preparatory activities were undertaken, such as baseline data verification, development of a capital refurbishment plan, and so on, to ensure development of a well structured PPP contract. The projects developed during this phase continued to attract the interest of international private water operators.

Despite these efforts, contracts were awarded for only three projects of the eight planned. Among these, two were bulk water augmentation/treatment projects and one an O&M improvement project. Of these, only two are currently operational, that is, the Water Treatment Plant (WTP) at Sonia Vihar, New Delhi, and the O&M contract in Chandrapur, Maharashtra. All the other projects were abandoned at the development phase itself. In most cases, the primary reason for failure was the strong local stakeholder opposition to these projects, including resistance from employees of the public water utilities and from civil society groups. Involvement of the private sector in the provision of urban water supply services was largely perceived as a move towards privatization of water supply services, with apprehensions about steep increase in water tariffs. Failures/controversies associated with some large concession contracts in Latin America and East Asia were invoked to strengthen these arguments.

Projects Awarded since 2005

The trend of unsuccessful attempts at introducing PPPs in the urban water supply services, however, appears to have changed since 2005 with an increase in successful contract awards.

These projects have a mix of PPP arrangements, including concession agreements, management contracts, BOT projects. They cover both domestic and industrial consumers, and include bulk water supply augmentation, upgradation of distribution networks or operation of the entire water supply system. Unlike the earlier PPP projects which saw an active engagement of international private operators, the PPP projects awarded since 2005 have seen a growing presence of the domestic national and provincial private operators. Of the 13 projects contracted out, 12 are operational, while activity on one of the projects—the Madurai contract—is currently stalled.

Two projects implemented in this phase have had a significant impact on the perception and trajectory of PPPs undertaken in the water sector. These are: a) the Karnataka Urban Water Sector Improvement Project (KUWASIP) project which was the first demonstration of 24x7 water supply in the country; and (b) the Latur project which helped increase domestic operator interest. The KUWASIP project had the right ingredients of: (i) focus on distribution; (ii) use of public funding to keep costs low; and (iii) restricted risk exposure for the operator while maximizing efficiency gains from private sector expertise.

A profile of these projects along with those attempted in the earlier years has been included in Annex 3 of this report.

4.2 Emerging Trends in Urban Water Supply PPPs

Based on the assessment of the PPP projects initiated in the urban water supply sector since the 1990s, a few trends appear to be emerging. These trends indicate a shift in the profile of contracts being developed, and a change in the role of stakeholders involved. A summary of PPP activity across these three time periods is provided in Table 4.4.

Table 4.4: Summary of PPP Projects in the Indian Urban Water Supply Sector

Parameters	1990s	2000-04	2005 onward
Number of PPP projects attempted	5	8	13
Contracts awarded	1	3	13
Current status of contracts awarded	1 operational	2 operational	12 projects are in various stages of implementation/operation; 1 project is currently stalled
Cumulative cost of projects attempted (INR million)	26,960	30,360*	12,360**
Project scope	100% bulk water supply	• 75% distribution O&M • 13% bulk water supply • 12% water treatment	• 38% distribution O&M • 31% distribution investment + O&M • 15% bulk system investment + O&M • 8% desalination • 8% treatment + system rehabilitation/upgradation + distribution O&M
PPP model	100% BOT/BOOT	• 75% management contracts • 25% BOT/BOOT	• 38% management contracts • 62% BOT/DBFOT and similar
Private operator mix	100% international	• 65% international • 35% domestic	• 65% domestic • 21% international • 14% local/regional

* excludes cost of Sangli and Mumbai K East projects
** excludes cost of Bhiwandi Water Supply Project

BOOT: Build Own Operate Transfer; DBFOT: Design Build Finance Operate Transfer.

The emerging trends observed are discussed below.

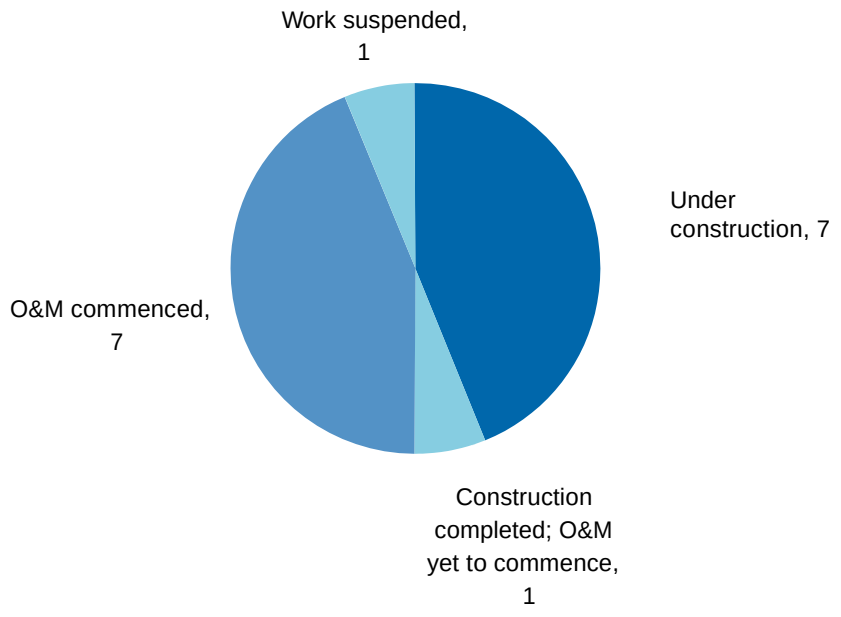
Increase in Number of PPP Projects Reaching Contract Award Stage

The number of instances of successful contract awards has risen only since 2005. Of the projects attempted during the 1990s and the initial years of the 2000 decade, only 40 percent reached the stage of contract award.[21] This proportion has increased since 2005. Table 4.5 indicates the projects attempted vis-à-vis the contracts awarded. The currently active projects are in various stages of operation as indicated in Figure 4.3.

Table 4.5: Number and Status of PPP Projects Initiated

Parameters	1990s	2000-04	2005 onward
Number of PPP projects attempted	5	8	13
Number of contracts awarded	1	3	13
existing status of projects awarded	1 operational	2 operational	12 operational 1 stalled

Figure 4.3: Status of the Active PPP Projects



21. While this is lower than other infrastructure sectors in India during the same time period, water sector PPPs generally have a lower conversion rate compared to other sectors.

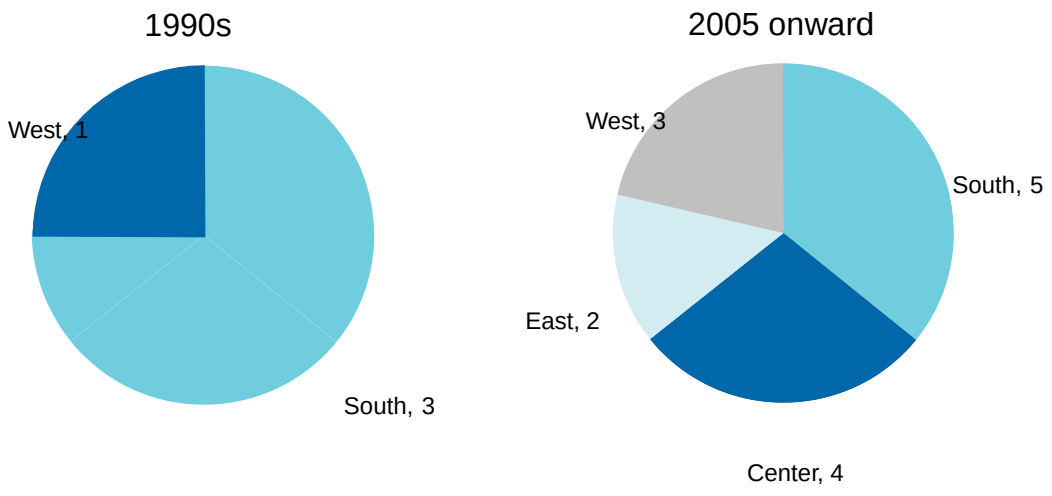
Shift in the Geographic Concentration of PPPs

Over the years, there has been a shift in the geographic concentration of water PPPs in the country. The PPP projects which were developed and planned during the 1990s were largely concentrated in the southern states of the country such as Tamil Nadu, Karnataka, and Andhra Pradesh. Since 2000, this trend has changed to include more states. During the period between 2000 and 2004, projects were being proposed for implementation in the states of Karnataka, Delhi, Maharashtra, and Andhra Pradesh. Since 2005, while states in South India continue to lead in terms of the number of projects being implemented, the tally now also includes states where, so far, water PPP projects had not been undertaken. Among these are Madhya Pradesh where three projects are being implemented and West Bengal with two projects.

The initial clustering of projects in South India could possibly have been: a) a reflection of the concentration of multilateral funding agencies in that region which supported most of the PPPs in the initial phase (refer Sec 4.2 page 33); and b) the presence of city level utilities in Hyderabad and Bengaluru which were seen as more amenable institutional structures for undertaking PPPs. With later PPPs drawing on public funding available under schemes such as JNNURM, a wider cross-section of cities/states were able to initiate projects on their own. In addition, over the decades, a shift has taken place in the overall environment wherein successful experiences with PPP models in various sectors has prompted more states and cities to explore PPP models.

This shift in the geographic distribution of projects is shown in Figure 4.4. From this, it is reasonable to infer that PPP activity is becoming increasingly broad-based across the country, and is being adopted in a diverse set of institutional and operational contexts. There are at least 20 more water PPP projects at the planning stage with a similar distribution across the country (Page 42).

Figure 4.4: geogRApHiC ConCentRAtion oF wAteR SUppLY ppp pRojeCtS

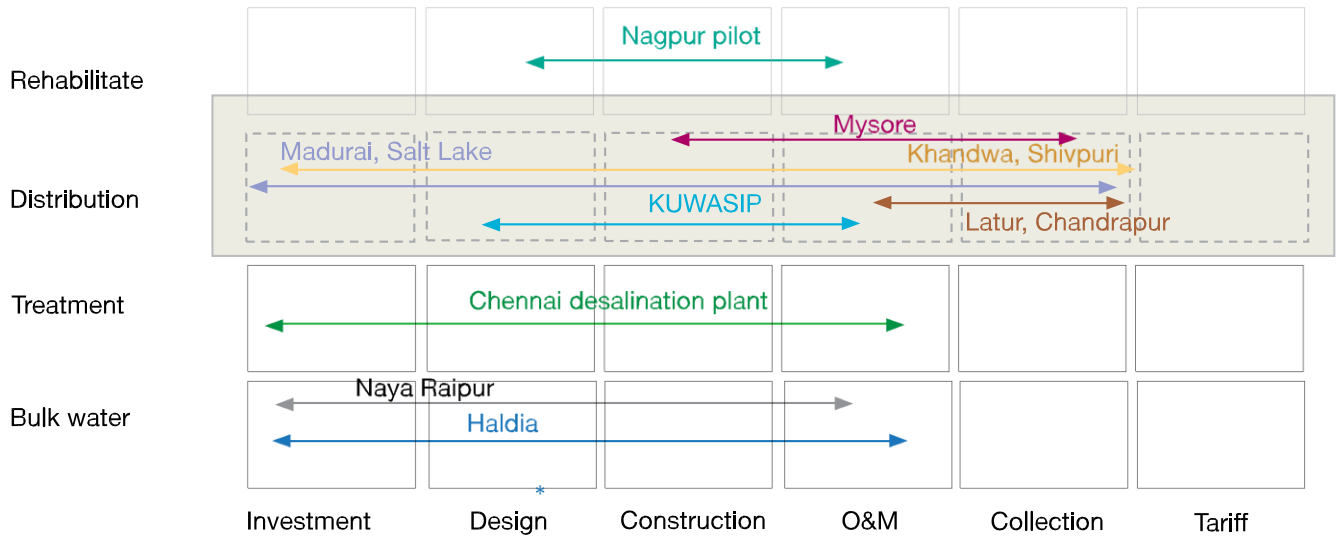


Increased Focus on PPP Arrangements for Distribution Improvements

Most of the water supply PPP projects during the 1990s were aimed at augmentation of bulk water supply systems. However, this predominance of bulk water supply PPP projects reduced during the early part of the 2000 decade. Among the PPP attempts during this period, 80 percent of the projects aimed at bringing in the private sector for delivering improvements in the distribution system. However, though several distribution improvement projects were attempted during this period, a contract was awarded for only one such project. Today, approximately 60 percent of the PPP projects are focused on improvements of the distribution system while 30 percent are aimed at bulk water supply augmentation. The remaining projects include both bulk water supply augmentation and O&M of the entire system. The KUWASIP project played an important role in encouraging this shift, by demonstrating the significant service gains that could be achieved through improvements in the distribution system. This was further encouraged by the JNNURM appraisal process, which favored projects targeted at 24x7 water supply. Since public agencies did not have the expertise to deliver this goal, private sector participation was sought in the implementation of these projects. The focus area of the ongoing water PPP arrangements is presented in Figure 4.5.

Possibly, reflecting the shifting scope of projects, the type of PPP arrangements being implemented have also changed. During the 1990s, a majority of the projects were primarily BOT models with 100 percent private financing. In early 2000s, this changed to a scenario when the majority of O&M improvements were sought through management contract-based interventions. Today, the operational contracts see a mix of BOT and management contracts. There are variations in the BOT models implemented with a few requiring partial to full private financing. Figure 4.6 represents the shift in the type of PPP arrangements since the 1990s.

Figure 4.5: Focus Area of ongoing water ppps



* Includes some distribution component.

Interestingly, over the years, there has also been a decline in the time taken between project initiation and the award of contract. For instance, in the case of projects initiated prior to 2000, the average time to reach the contract award stage was four years. As against this, for the PPP projects developed 2005 onward, the time taken has been two-and-a-half years on an average. The reduced private investment component and absence of tariff implications could be one of the factors contributing to a shorter project development period.

Reduced Reliance on Multilateral Agencies for PPP Project Development

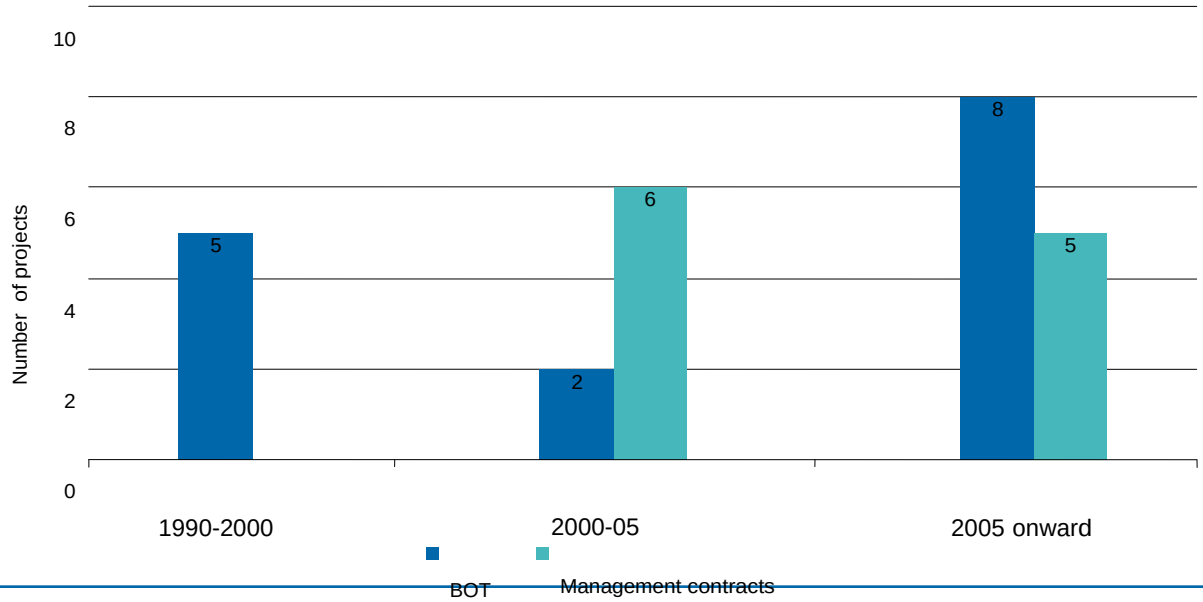
An assessment of project initiation and development process indicates a steady decline in reliance on multilateral agencies for PPP-based project development and implementation. During the 1990s, several projects were driven by strong advocacy from multilateral funding agencies to develop water projects on a PPP basis. Even during the early years of the 2000 decade, project development was largely driven by financial assistance available from multilateral funding agencies to meet the capital costs. This was the case in projects proposed for Mumbai, Delhi, and Bengaluru.

However, since 2005, most water PPP projects are being developed by the project sponsoring authority itself, that is, ULBs and state departments. For instance, the PPP projects developed in Latur, Salt Lake City, Khandwa, Shivpuri, Naya Raipur, and so on, have been initiated and developed by the respective state departments or the ULBs.

Increased Share of Public Financing in PPP Projects

Discussions with key stakeholders and secondary information suggest that, in the initial phase, it was envisaged that PPP projects would attract a significant amount of private investment. Projects developed during the 1990s and early 2000s were accordingly based on a PPP structure which had limited dependence on public financing. The Pune Water Supply PPP project was the only exception to this. It was proposed to be developed with a significant amount of funding from the project sponsoring authority, that is, Pune Municipal Corporation (PMC). All the other PPP projects expected the private operator to arrange finances. This trend has changed in the recent past, with most urban water supply PPP projects being developed on the basis of availability of substantial public funding.

Figure 4.6: mix oF ppp ARRAngementS



With several of the first wave of PPP attempts failing to take off, the expectations from the private sector have also changed over a period of time. Government funding through own sources and by way of schemes such as the JNNURM and UIDSSMT are being relied upon extensively for the development of water supply PPP projects. At present, 50 percent of the ongoing projects have been developed under financial support extended by the government; 75 percent of these projects have received funding support from the central government-sponsored JNNURM and UIDSSMT schemes (Table 4.6). The share of public funding in these projects ranges from 35 percent of planned investment (in the Salt Lake City project) to 90 percent of planned investment (in Shivpuri and Khandwa). Actual share of public funding has been lower, since cost escalations were not covered under public funding. While availability of public funding has helped increase the viability of private sector participation, the structure and process of JNNURM funding has itself created an impetus for adoption of private sector participation. To the extent ULBs are required to contribute a share of the project cost, and to the extent the appraisal process favors PPP-based projects, the nature of JNNURM funding has encouraged ULBs and project initiating authorities to explore PPP models more aggressively than in the past.

The increased and changed form of public funding has thus had two benefits: a) it has pushed cities to choose PPP; and b) it has helped lower the cost of PPP. Till such time the risk perceptions regarding water PPPs in India continue to remain high, the share of private investment will continue to be relatively small, with substantial reliance on public funding. Moreover, given the weak financial health of ULBs, most of this public funding would need to come from state/central government sources.

Shift in Private operator Mix

The private operator mix in the Indian water supply PPP projects has changed since the 1990s, when the projects were dominated by international private operators. These operators viewed India as an emerging market due to the immense challenges faced by the urban water supply sector and the scale of projects developed by public water utilities in Bengaluru and Hyderabad. This phenomenon was also in line with the international trend of increasing involvement of international operators in PPP projects in other developing countries.

The international operators who were active in the Indian market during this period included Anglian Water, Veolia

Table 4.6: Government-Sponsored PPP Projects

Projects	Scheme
Water Supply and Sewerage project, Sector V, Salt Lake City	JNNURM
Integrated Water Supply project, Mysore	JNNURM
Water Supply project for pilot zone, Nagpur	JNNURM
Water Supply project, Khandwa	UIDSSMT
Water Supply project, Shivpuri	UIDSSMT
Bulk Water Supply project, Naya Raipur	UIDSSMT

The funding available for these projects covers approximately 60-70 percent of the escalated project cost. The cumulative value of government-sponsored PPP projects is INR 6.27 billion.

Water, Bi Water, Suez Environment, and Thames Water. While Anglian Water, Bi Water, and Thames Water are United Kingdom (UK)-based private operators, Suez Environment and Veolia Water are French private operators.

Industry feedback suggests that of the five water supply PPP projects which were initiated during the 1990s, international private operators were directly involved in three, that is, the Cauvery Bulk Water Supply Project of Bangalore Water Supply and Sewerage Board (BWSSB); the Selaulim Bulk Water Supply Project of Goa; and the Krishna Bulk Water Supply Project of Hyderabad Metro Water Supply and Sewerage Board (HMWSSB). Discussions revealed that the involvement of international operators was not limited to participation in the bid process stage, but extended to the entire project development phase from conceptualization to procurement, including direct engagement with the concerned public water utilities.

In the case of the BWSSB project, consortiums led by Bi Water, Veolia Water, and Suez Environment had participated in the bid process. Reportedly, the PPP model was considered by BWSSB, with encouragement from the international operator Bi Water. Similarly, discussions revealed that the Goa and Hyderabad bulk water supply projects also directly involved Anglian Water in the project conceptualization and development process. The only domestic private operator in the country at that time was Mahindra Water Utilities which was involved in the Tirupur Industrial Water Supply Project.

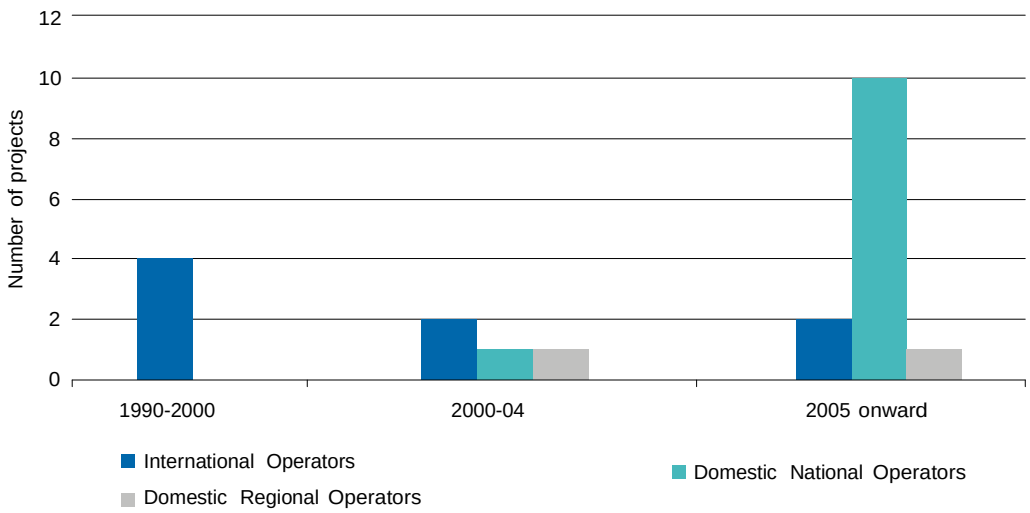
Projects planned during the early part of the 2000s continued to see the presence of international operators. The O&M pilot project planned by BWSSB for two zones was expected to involve French operators Suez Environment and Veolia. Of the three contracts which were awarded during this time period, the Sonia Vihar WTP saw the involvement of Degremont, a subsidiary of the French firm Suez Environment. This period also saw, for the first time, the award of water PPP contracts to national-level domestic operators. The Visakhapatnam Industrial Water Supply Project was awarded to Larsen and Tubro (L&T) Infrastructure Development Projects Limited, an India- based engineering and construction company. The other project awarded during this time period was the Chandrapur O&M contract, which was awarded to a domestic (local) private operator. Thus, both domestic and international private operators were involved in water supply PPPs during this period.

For the projects awarded since 2005, domestic private operators have emerged as the most important category of private players in India's water supply sector. In as many as 75 percent of the contracts signed during this period, the consortiums that bid for these projects were led by national-level domestic private operators. Currently, only two water supply PPP projects underway in the country are led solely by international private operators. Figure 4.7 shows the shift in the private operator mix in the country.

It has also been observed that, in recent times, water supply PPP projects are being handled by domestic private operators who have a provincial presence. For instance, the contract for the Khandwa water supply PPP project was awarded to a Hyderabad-based engineering procurement construction (EPC) player, Vishwa Infrastructure and Services Private Limited.

The domestic operators participating in the Indian urban water supply sector have been EPC firms that were traditionally engaged in engineering construction works in infrastructure sectors. In line with the trend in other sectors, such as power and transport, the domestic companies have grown from EPC firms to investors and operators. A list of domestic and international companies that have participated in the ongoing water PPPs is provided in Table 4.7.

Figure 4.7: Shift in private operator mix in water ppps in india



Over the years, there has also been a shift in the international operators who have been interested in the Indian water supply PPP market. For instance, during the 1990s, the international private operator scene was dominated by UK-based operators such as Bi Water, Thames Water, and Anglian Water, and French operators such as Suez Environment and Veolia Water. Today, however, there is limited participation from UK-based operators. This is also in line with the international trend as per which several large private operators retreated from the developing markets. One of the few UK-based operators currently exploring the Indian water supply PPP market is Cascal NV. The French operators continue to explore the Indian water PPP market and are also engaged in a few of the ongoing projects.

In contrast, there is increasing participation by South-East Asian water supply utilities in the Indian water PPP market. These utilities include Ranhill Utilities Berhard (Malaysia), Manila Water Company (Philippines), and a few others.

Furthermore, in several of the ongoing projects, private operators have participated in the bid process by forming joint ventures or consortiums with other operators. The technical qualification criteria required in the bid documents usually make it necessary for the domestic operator to enter into agreements with a local or international private operator. Similarly, international operators very often tie up with Indian firms while bidding for water supply PPP projects.

Comparison with International Experience

Several trends described above mirror those observed in other developing country contexts. A recent study by the World Bank[22] of PPPs since the 1990s reveals a move toward increased public funding, a shift away from full concessions, and a growing role of domestic operators (accompanied by the withdrawal of large international operators). The Indian experience, at this early stage, thus appears to be mirroring the trends observed in other parts of the developing world.

22. Marin, P. 2009. Public-private partnerships for urban water utilities: a review of experiences in developing countries. Report. The World Bank.

Table 4.7: Domestic And International Companies with Interest in Indian Water Sector

Domestic companies	International companies
Infrastructure Leasing and Financial Services (IL&FS) Water	Acciona Agua
IVRCL Ltd.	Befesa-Acqua
Jain Irrigation Ltd.	Cascal
Jamshedpur Utilities & Services Company (JUSCO) Ltd.	Hydro-comp
Jindal Water Infrastructure Limited	Manila Water
JMC Projects	Metito Berlinwasser
L&T Ltd.	NWSC
Mahindra Infrastructure Developers	Ranhill
Nagarjuna Construction Company Ltd.	Salcon
Pratibha Industries	Suez
Ramky Infrastructure	Veolia
Shriram EPC	
SPML Limited	
Tatva Global Water Technologies	
Vishwa Infraprojects	

4.3 Summary of Trends in Urban Water Supply PPPs

Water PPPs in India have gathered significant momentum in the recent past and have evolved from a scenario of failed attempts up till the mid-2000s to an increased rate of success in the award of contracts. While most of the initial water PPP projects were abandoned at the development phases, the situation has changed to one where currently 16 projects are at various stages of operation.

Today, the ongoing water PPPs cover the Indian urban population across various states, as against the earlier trend where water PPPs were largely concentrated in a few states such as Karnataka and Maharashtra. The trend of increasing water PPPs is also accompanied by several other changes in the sector, especially in the scope of the water PPP projects.

While a majority of the earlier water PPPs focused on augmentation of bulk water supply systems, a large number of recent PPPs are targeting improvements in O&M activities and distribution services. Several models of water PPP contracts, ranging from management contracts to BOT arrangements, are being developed. Such a shift in focus has probably been facilitated by the increased and changed nature of public funding support to water PPP projects in recent times. Today,

50 percent of ongoing water PPPs have been developed using conditional grants from the central and state governments. This is a marked departure from the earlier scenario when water PPPs were largely driven by expectation of substantial private financing. This increase in public financing support to water PPPs, as also the changed nature of public financing, is matched by a trend of increased facilitation by the project sponsoring authority. Today, water PPPs are less reliant on multilateral or external agencies for project development and implementation. Further, the private operator market in this sector is also observed to have changed with increased interest and participation by domestic players.

4.4 PPP Projects at Planning Stage

Recently, two PPP projects have been awarded on a city-wide basis in Nagpur and Aurangabad. In addition, at present, at least 20 water PPP projects are at the planning stage, emphasizing the increasing reliance on PPPs in the Indian water sector. A select list of projects in various states is provided in Table 4.8.

Table 4.8: PPP Projects at Planning Stage

State	Project description
Delhi	Three PPP projects of various sizes are in the design stage
Karnataka	Scaling up of pilot projects in the cities of Hubli-Dharwad, Belgaum, and Gulbarga distribution focused projects in the coastal cities of Mangalore, Udupi, Kundapura, and Tiptur
Maharashtra	pilot project in Sangli
Madhya Pradesh	City project in Bhopal pilot projects in Indore, Bhopal, and Gwalior
Bihar	Patna
Jharkhand	Ranchi
Rajasthan	two pilot projects in Jaipur and Kota City projects in Ajmer and Udaipur

5. Factors Contributing to Success or Failure of PPP Projects in the Urban Water Supply Sector

This section of the report highlights the factors that have facilitated or constrained the progress of anticipated PPPs to the point of contracts being awarded in the urban water supply sector in India.

5.1 Introduction

It is too early to arrive at a conclusion about the success or failure of private sector participation in urban water in terms of outcomes. It is nevertheless possible to gain an improved understanding of factors which have contributed to the success or failure of contracts being awarded for water PPP projects.

A detailed assessment of 20 select PPP initiatives has been undertaken (refer Section 5.3, page 46), which highlights the factors that contributed to the success and failure of projects (Table 5.1). These have been categorized under three broad heads: (i) local project context; (ii) project development and implementation; and (iii) external influence factors.

Given the relatively limited number of projects reviewed, this assessment can be at best seen as being indicative and not a comprehensive set of factors that determine the fate of a water PPP project. **It is also important to note that, for the purpose of this analysis, the terms 'success' and 'failure' are used with reference to the award of contract and the project's subsequent status (operational or abandoned). It does not attempt to assess the performance outcomes of the project.**

To identify the various factors, an assessment was carried out separately of the failed as well as successful projects.

5.2 Analysis of Failed Projects

If we review the failure of the water PPPs attempted during the 1990s and the early years of the 2000 decade, a set of critical constraints emerge that contributed to these failures. Table 5.2 provides a project-wise summary of these factors.[24]

Table 5.1: Factors Constraining or Facilitating water ppps

Category	Factors
local project context	▪ Local political and stakeholder support to the project ▪ need for the project
Project development and implementation	▪ Awareness and capacity to undertake ppps ▪ ULB's financial capacity and mechanism to address tariff concerns ▪ project planning and contract structuring ▪ transparency in procurement process
external influence factors[23]	▪ public funding to the ppp project ▪ State-level project development assistance ▪ private operator interest

23. External influence, in this context, refers to factors that are not internal to the project or its immediate context, but are attributable to factors at a state/sector level.
24. Based on discussions and interactions with functionaries/profession

Table 5.2: Factors Contributing to Failure of Project

Parameters	Inconsistent Stakeholder Support	Weak Financial Capacity and Tariff Mechanisms	Low Awareness and Capacity for PPP Projects
Krishna Raw Bulk water Supply project, Hyderabad	-	x Unaffordable bulk water charge	x weak risk mitigation measures
Selaulim Bulk water Supply project, Goa	x Lack of support at state level	x Unaffordable bulk water charge	-
water Supply and Sewerage project, Pune	x Limited political consensus at local level	-	-
Cauvery Bulk water Supply project: Stage iV, phase-ii	x inadequate state government support	x Unaffordable bulk water charge	x weak risk mitigation measures and lack of transparency in procurement
O&M contract, Sangli, maharashtra	x Limited political consensus at local level	x inability to raise capital	-
O&M contract for mumbai K east	x Civil society/NGO opposition	-	x Lack of clarity on project need
O&M contract for 21 pilot zones, delhi Jal Board	x Limited employee engagement	-	-
O&M contract for 2 pilot zones, BwSSB	x Limited employee engagement	-	-
O&M contract for 8 municipal councils, BwSSB	x Limited employee engagement	-	-

Inconsistent and Inadequate Local Stakeholder Support

The lack of stakeholder support for water PPP projects has been a significant reason for failure of projects. Stakeholder support for water PPPs was uncertain during the initial period of water PPPs.

Failures occurred on account of: a) a change in political support during the course of the project; and b) civil society and employee opposition.

Change in Political Support During the Course of the Project

In the case of the Cauvery Bulk Water Supply Project, state government support to the project wavered after several contractual and procurement issues arose between the BWSSB and the private operators. This resulted in the project being abandoned despite a contract award.

In Goa, the Selaulim Bulk Water Supply Project had to be shelved due to successive changes in the political establishment resulting in inconsistent support from the state government. The Pune Water Supply and Sewerage Project initiated in the mid-1990s received political support, with Municipal Council resolutions being passed in favor of the project. However, it had to be abandoned on account of subsequent lack of local political consensus around the project. Changes in the state and central political establishment resulted in a change of stance by the local politicians. Similar opposition is also said to have resulted in the failure of the water supply project at Sangli in Maharashtra.

Stakeholder support has been more likely to falter when the need for a project on a PPP basis was not clearly established and articulated, for example, cost savings, loss reduction. This was observed in the case of the O&M project proposed for Mumbai's K East ward where the value addition to be made by the private operators could not be clearly established.

Civil Society and Employee Opposition

Several water PPP projects, developed during the early
2000s, also had to be abandoned due to strong resistance from the employees of the public water utilities. This was specially observed in the case of the O&M improvement projects of the Delhi Jal Board (DJB), and two projects initiated by BWSSB. The employees of these utilities opposed the involvement of the private sector in the distribution services—a position that was also supported by some civil society groups.

Weak Financial Capacity and Mechanisms to Address Tariff Concerns

Water PPP projects have been observed to fail in those instances where the financial risks have not been adequately addressed.

The water PPP projects initiated in the 1990s were highly capital-intensive and were dependent on a 100 percent private financing model. These PPP arrangements thus required public water utilities to pay bulk water charges to the private operators. Feedback from discussions suggests that the public water utilities were not in a position to commit the bulk water charges quoted due to low revenue base, owing to the low tariffs levied and collected from end- consumers. The private operators were also apprehensive about the ability of the Boards to sustain these payments. Owing to the high financial risk in these capital-intensive projects, the private operators demanded strong mitigation measures such as guarantees from the state governments, which the implementing agencies were unable to secure.

In case of the Krishna Bulk Water Supply Project, it is understood from discussions with the stakeholders that the private operators had high-risk perceptions with regard to the credit quality of the water Board. Further, under the contract principles, periodic escalations in bulk water tariff were envisaged but there was limited commitment from the Board to adhere to these escalations.

In case of the O&M project at Sangli, it is understood that the project failed not only because of the opposition to the project from local stakeholders but also on account of the inability of the Sangli Miraj Kupwad Corporation (SMKC) to raise its share of the project cost. Further, there were apprehensions among the local stakeholders that engagement of a private operator in provisioning of urban water supply services would eventually result in a multifold increase in the water tariff. In case of all the failed PPP projects for O&M improvements, discussions suggest that stakeholders such as civil society groups, sections of the local political parties, and others anticipated significant tariff escalation as a result of engagement of private operators. In the absence of formal mechanisms for addressing tariff

concerns, these apprehensions fuelled further opposition to the projects.

Limited Awareness and Technical Capacity to Undertake PPPs

Sector experts suggest that several of the earlier attempts at PPPs failed due to limited understanding, awareness, and capacity regarding PPPs in the water supply sector. In view of the lack of experience in developing water PPPs, BWSSB, HMWSSB, and the Goa PWD had hired experts to assess the technical and financial feasibility of the proposed projects and develop appropriate project structures. Despite this, a PPP structure that would adequately address and balance all risks between the two parties was not successfully developed. For instance, in the case of the Cauvery Bulk Water Supply Project, during the procurement phase, the public water utilities required the private operators to sign raw water purchase agreements. These were to be signed without providing adequate clarity or information on the costs of raw water purchase, which would have resulted in the bids being incomparable. In the absence of clarity on several aspects relating to the project, the private operators had to bear huge counter party risk, which they attempted to cover by charging premiums on the bulk water charges quoted. Lack of prior experience and limited understanding regarding the requirements of water PPPs resulted in the implementing agencies' inability to fully appreciate the various financial concerns of the private operators and develop an appropriate project structure.

Water PPP projects have also suffered due to lack of transparency in the procurement process. Industry feedback suggests that the bid evaluation process for BWSSB's bulk water supply project lacked transparency and eventually raised substantial controversy.

Higher Incidence of Failures in Large Cities

Most of the failed projects have been in large cities. This has been partly because several of the initial PPPs were attempted in large cities, especially in standalone utilities, which were perceived to be better candidates for PPP, due to their institutional structure, size, and technical and financial capacity. However, despite these seemingly favorable factors, stakeholder opposition often tended to be amplified in large cities, and project champions constrained by multiple political pressures. This appears to have been the case in Delhi, Bengaluru, and Mumbai. Conversely, in smaller cities, where media pressure and stakeholder opposition are comparatively lower, and project champions more empowered, PPP arrangements may enjoy a greater chance of success. Possible instances of this could be Shivpuri and Khandwa in Madhya Pradesh, which are discussed later.

5.3 Analysis of Successful Projects

A review of successful projects (largely from 2005 onward) reveals a host of factors that helped facilitate successful award of contract. Table 5.3 provides a project-wise summary of these factors.

A note of caution is warranted here in that the term 'successful project' is used with respect to the award of contract. The analysis does not address the impact of the project on service outcomes. In addition, given that most of these contracts have been awarded less than five years ago, it is not possible to comment on their long-term sustainability.

Table 5.3: Factors Contributing to Success of Project

Project Name	Public Funding	Project ownership & expertise	Stakeholder Support	Strong Project Need	reduced revenue risk	High Private operator Interest
KUwASip: 24x7 water supply for Belguam, Hubli-dharwad, and gulbarga	3 world Bank loan to the state government	3 KUidFC	3 Local political, ngo, and consumer support	3 High o&m inefficiency	3 perform-ance fees	-
Chandrapur o&m contract	-	3 municipal department	3 Local political and consumer support	3 High operating loss	-	3 domestic local operator
Chennai desalination plant	-	3 CmwSSB	-	3 water shortages	-	-
Lease contract for water supply system, Sector V Salt Lake City, Kolkata	3 jnnURm	3 KmdA	3 end user support	3 Unreliable supply	3 Safeguards provided	-
o&m contract for pilot zone, nagpur	3 nmC	3 municipal department	-	3 High o&m inefficiency	3	
management contract for o&m, Latur, maharashtra	3 prior public investments*	3 mjp	-	3 High o&m inefficiency	3 perform-ance fees	3 domestic national operator
industrial water supply contract, Haldia, west Bengal	-	3	-	3 inadequate supply+ high o&m inefficiency	3 Safeguards provided	-
o&m contract for water supply system, mysore	3 jnnURm	-	-	-	3 Safeguards provided	3 domestic national operator
Concession agreement for distribution system, Khandwa, madhya pradesh	3 UiddmSt	3 UAdd	3 Local political and consumer support	3 inadequate and unreliable supply	3 Safeguards provided	3 domestic regional operator
Concession agreement for distribution system, Shivpuri, madhya pradesh	3 UiddmSt	3 UAdd	3 Local political and consumer support	3 inadequate and unreliable supply	3 Safeguards provided	-
Concession agreement for bulk water supply system, naya Raipur	3 UiddmSt	- nRdA*	-	-	3 Safeguards provided	3 domestic operator

* Factor of low significance in contributing to the success of the project.

Availability of Public Funding

Unlike in the case of several failed projects, where substantial private financing was expected, successful water PPPs are backed strongly by public funding. Funds from central government-sponsored schemes, JNNURM and UIDSSMT, have addressed approximately 60-70 percent of the final project costs (and up to 90 percent of the initially approved costs). In the past, even though grant funding was available, grants could be used only if projects were implemented using the public procurement route. Under JNNURM and earlier, under KUWASIP, public funds were made available to pursue PPP approaches as well. This ensured that the projects could be structured in a way that payments by the public body were assured to the operators. Examples of such an approach are Mysore and Naya Raipur. Even in instances where the operators relied on revenue collection from customers, public funding enabled the tariffs to be maintained at affordable levels. Salt Lake City in Kolkata, Shivpuri, and Khandwa are examples of such an approach. In the KUWASIP and Latur PPP arrangements, the capital investment needs have been met through grants from the World Bank and from Maharashtra Jeevan Pradhikaran's (MJP's) own resources, respectively.

Today, there is a growing realization that the private sector cannot be expected to fund substantial capital investment needs. Given the prevailing low water tariff levels and the high capital requirement for refurbishment and expansion, water PPPs are not commercially viable yet. Therefore, a viability gap mechanism in the form of grants is necessary to promote PPPs in this sector.

Improved Mechanisms to Address Tariff Concerns

In several projects, measures have been incorporated to minimize the revenue risk of the private operator. For instance, in the case of the Naya Raipur project, the concessionaire is required to bear all O&M expenses except those related to power and chemical charges which are borne by the public sector. In case of the Khandwa and Shivpuri contracts, a security mechanism has been developed to cover the revenue risk. According to the arrangement, the private operator is required to undertake O&M of the water supply system, levy telescopic tariffs, and collect and retain the revenue. The connection charges collected from the consumers are, however, transferred to the ULB. In case of default in payment of water charges by the consumers, 50 percent of the connection charge collected from the consumer is to be paid to the private operator. Further, the private operators have been authorized to disconnect defaulting connections and are also permitted to escalate the tariff by 10 percent every three years.

In the Salt Lake City project, the private operator is permitted to retain the one-time connection fee, and escalate the tariff by 10 percent every three years. In the Haldia project, the private operator is allowed to sell surplus treated water and share the revenues in the ratio of 50:50 with the Haldia Development Authority (HDA). In case of the Mysore contract, construction cost overruns up to 1.10 times the original tender cost would be reimbursed by the Mysore City Corporation (MCC) in addition to the electricity costs which would be borne by MCC.

In the Chandrapur project, the private operator was expected to incur initial capital expenditure towards repair and maintenance. Further, the O&M responsibility of the project fully rested with the private operator. Given this, it was anticipated that the returns on investments made by the private operator would be low in the initial years of the contract. Accordingly, the private operator was given the flexibility to determine the quantum of the yearly lease payment made to Chandrapur Municipal Council (CMC) over the contract period.

The KUWASIP project—the first among the projects in this period—was a management contract and had minimal revenue risk. The revenue to the operator was a fixed management fee and an additional performance linked incentive.

As is evident from the above, increased flexibility in the project structure to address revenue risks has been critical to the success of several recent water PPP projects.

Increased Attention to Stakeholder Support

The availability of grant funding and appropriate tariff mechanisms helped address one of the key concerns of stakeholders. In addition, projects with successful contract awards have also received the requisite stakeholder support largely due to two factors: a) a strong need for the project; and b) an elaborate process of stakeholder consultation.

In the case of several projects where contracts have been successfully awarded, there was an established **need for intervention**—for capacity augmentation, O&M improvements, and so on—and hence increased stakeholder willingness to explore the option of private sector participation. For instance, prior to the project, Chandrapur was facing high year-on-year losses in water supply operations. Since the ULB was not in a position to sustain the financial losses and did not have the capacity to improve efficiency, it was thought prudent to engage the private sector to effectively manage the water supply operations. In this context, stakeholder buy-in for the project was also forthcoming more easily.

Similarly, prior to the project, Khandwa and Shivpuri faced severe water supply problems. Due to inadequate and unreliable supply, large sections of the population were dependant on private water tankers. In such a context, the proposal by the state Urban Administration and Development Department (UADD) to engage the private sector was met with greater acceptance by the stakeholders. Similarly, the projects in Salt Lake City, Haldia, and Chennai were undertaken against a backdrop of perceived need for intervention.

The other factor contributing to increased stakeholder support was the extensive consultation undertaken during the entire project cycle by the concerned public agencies and success in explaining the project's cost benefits to stakeholders. In case of the KUWASIP project, the Karnataka Urban Infrastructure Development and Finance Corporation (KUIDFC) engaged nongovernment organizations (NGOs) to create awareness regarding the project. The project faced initial resistance from local politicians who were wary of engaging the private sector. However, through regular consultations and with demonstrated gains in the pilot zones, the project received widespread acceptance.

For the Salt Lake City project, Kolkata Metropolitan Development Authority (KMDA) engaged in several consultations with the end-consumers, that is, the information technology units and other service industries, to determine acceptable tariff levels. At the negotiation stage, the indicative tariff quoted by the preferred bidder was discussed with end-consumers to ascertain its acceptability, and was put through renegotiations until the identified tariff levels were found acceptable by the end-users.

The exception to this was in the case of Latur where the project has, in the recent past, faced opposition from local stakeholders, resulting in temporary suspension of activities. A review of the project preparatory phase indicates lack of Information Education and Communication (IEC) efforts by the public water utility. Though it has been acknowledged earlier that an elaborate stakeholder consultation process does not guarantee consistent support throughout the project lifecycle, its absence increases the likelihood of failure, especially in projects focusing on O&M improvements.

Strong Project Ownership and Expertise

Several of these successful projects have been developed due to consistent efforts by the project initiating authority and availability of sound project expertise with the authority (often a state agency). In the case of the KUWASIP project, the state infrastructure financing department—KUIDFC—played an active role in the project's conceptualization, development and implementation, including preparatory studies, stakeholder consultations, development of the project structure, contract terms, bid process management, and oversight of implementation.

Similarly, in the projects recently awarded for Khandwa and Shivpuri, UADD of the Government of Madhya Pradesh took the onus for handholding these PPP projects. The projects developed in Kolkata, Haldia, Naya Raipur, and Latur have also benefited from project development and management expertise. This involvement and project ownership by concerned government departments/agencies is in sharp contrast to that in the failed projects.

Similarly, the project at Chandrapur has been primarily implemented on account of the interest and ownership of the project by CMC, which laid down the scope for the private operator and managed the bid process; it continues to play an important role in the project implementation period.

While project ownership appears to be high, the levels of project preparation, including the involvement of transaction advisors, vary across projects. The KUWASIP project involved substantial project preparation efforts. At the other end of the spectrum, the bid documents for the Salt Lake City project did not include a detailed draft of the project agreement, and only terms and conditions were

provided to bidders. The involvement of transaction advisors also varied. The Naya Raipur project had a transaction advisor, the Latur Project had a transaction advisor till the preparation of draft bidding documents, and a few successful projects did not have an external transaction advisor.

In projects where transaction advisors were not involved, the project sponsoring agencies seem to have relied on their internal efforts to ensure the success of the projects.

Growth in Domestic Private Operator Interest

As has been noted earlier, the water PPP sector in the country is today seeing active participation by several national-level domestic operators and also regional and local players. In a majority of successful contract awards, the domestic operators have exhibited a high risk-taking appetite, possibly to strengthen their presence in the sector.

Despite the high risks associated with the sector, it is understood that the domestic operators are in a better position to price the risk and manage costs. These high participation levels by the domestic bidders have also contributed to the trend of an increase in contract awards.

5.4 Summary of Analysis

Failures were more common in the early stages of water PPPs. This stage was characterized by experimentation. Utilities intended to attract private investments although their finances were too weak to support such investments (and associated tariffs). International developers were exploring the Indian market and multilateral agencies were introducing the PPP concept in the sector. Most water PPPs attempted in this stage failed since they received inadequate support, and pursued PPP models that were inconsistent with the financial capacity of utilities. Projects appeared to impose high costs on the city, resulting in limited political and administrative support for most of the projects. Against this background, in the face of any stakeholder opposition, it was easier to avoid the PPP approach and go for 100 percent public funding or simply abandon the project.

The KUWASIP and Latur projects were, in a sense, implemented in the transition stage since they revived interest in water PPPs. KUWASIP focused on distribution, kept costs low through public funding for the entire project, and kept the operator's risk low. Its success provided the first tangible example of a working PPP. The Latur project increased domestic operator interest. Though the project went through stakeholder opposition, it stimulated domestic operator interest.

When JNNURM was announced, these two projects had been structured and procured. JNNURM provided the funding solution for water PPPs in two strong ways. Firstly, it provided only partial funding for a project; cities had to mobilize the rest of the funding themselves. Secondly, JNNURM made grant funding available even if the project was implemented on PPP. These two factors were a significant departure from earlier funding programs which: a) provided almost 100 percent funding; and b) emphasized traditional execution styles.

Partial public funding encouraged cities to look outside to meet the gap. The availability of public funding for PPP projects made cities open to the possibility of PPPs. The demonstrated example of KUWASIP (and later, to some extent, the Nagpur 24x7 pilot), accompanied by an active operator community, convinced many cities to adopt the PPP approach. Public funding of this kind thus encouraged cities to consider the PPP option and it also lowered the cost of PPP.

Another contributor was the parallel debate on distribution improvements to achieve continuous water supply. In the years preceding JNNURM, this debate had been quite vocal. Though JNNURM did not specify continuous water supply as a funding condition, the appraisal process encouraged it. This also created a parallel demand to involve the private sector in implementation since public agencies were perceived to lack the technical capacity to implement this.

With increased adoption of the PPP model, and reduced stakeholder apprehensions associated with it, the environment is more conducive to increased transparency and engagement of stakeholders. This is reflected in recent successful projects that have invested in stakeholder consultation at the preparatory stage. Support extended by state project

development agencies or departments has also helped offset the lack of project development and implementation capacity at the ULB level.

In summary, failed projects pursued PPP models that were inconsistent with the utility finances and received inadequate stakeholder support. In contrast, successful water PPPs have been based on a platform of public funding, which has helped address tariff concerns and gain stakeholder support.

The analysis underscores two factors that are specific to the water sector:

a) Tariff concerns can affect the success of PPP projects; and

b) Water PPPs are not commercially viable yet, and therefore well structured public funding support is necessary to promote PPPs.

6. Emerging Issues and Interventions for the Way Forward

Recent trends in urban water supply PPPs indicate that the sector has moved in a positive direction. Making public funding available for PPP projects and focus on distribution improvements have together helped overcome initial stakeholder concerns about engaging the private sector. Operator interest (both domestic and international) has also increased. The following section discusses the key issues impacting water sector PPPs and the measures required for scaling up momentum.

6.1 Key Issues Impacting Water Sector PPPs

The key issues impacting the water sector PPPs are:

a) Current success is still at the project level; sector-level enablers to mainstream PPPs are lacking;
b) Project preparation, structuring and risk-sharing principles required for sustained success are not yet in place; and
c) Cities lack the capacity to facilitate, implement, and monitor PPPs.

These issues will constrain the scaling up of PPPs. The following section elaborates these issues.

Current progress is still at a project level; sector-level enablers are lacking

Water PPPs are Still Fringe Initiatives and are Not Mainstreamed in the Sector

It is useful to bear in mind the difference between PPPs in the water sector and PPPs in other sectors (such as power, highways, and so on). In other sectors, PPP has been adopted as a sectoral strategy and sector-level enablers have been created (such as a model concession agreement for highways, PPP approach for investments in major ports, new Electricity Act, and so on). Compared to this, PPPs in the water sector have been local, project-level initiatives. Cities (or states, in some cases) have chosen the PPP model for specific projects. There is no state or country-level approach or enabling framework for water PPPs.

Stakeholder Support for Water PPPs is Tactical, and May Not be Deep Rooted

The availability of grant funds and limited internal resources has resulted in easier and quicker acceptance of the PPP approach by local stakeholders, including political representatives. However, the commitment of ULBs to water PPP projects is a tactical response at times. It does not necessarily arise on account of an improved understanding of potential benefits of engaging the private sector. Moreover, public funding has helped only when cities have been financially weak to contribute their share of project costs. If a city is reasonably strong, partial public funding will help it pursue the EPC route. In such cases, public funding may actually crowd out PPP. On the other hand, weak cities will find the cost of PPP high when public funding is withdrawn or becomes insufficient.

Public Funding May Not be Sufficient if Fundamental Tariff Reforms are Not Undertaken

Today, since substantial grants-based assistance is available, no attempts are made to link the provision of public funding to tariff reforms in the sector. In several cases, water PPP projects have been developed without revision of the prevailing tariffs to more sustainable levels. In the long run, large volumes of public funds may not be necessarily available, and therefore tariff reforms will become essential for sustained asset management and service quality.

Project preparation, structuring, and risk-sharing principles, required for sustained success, are not adopted

Project Development and Procurement Process is Rushed

The water sector requires careful project preparation which needs to be based on accurate information. However, the current project preparation process tends to be rushed. One of the reasons for this is that public funding available for these projects needs to be accessed or utilised within a short timeframe.

Therefore, projects are developed in a hurried manner, on the basis of poor technical and commercial information. Risk perceptions are higher due to poor information base and project structuring. This hinders the ability of the private operators to price the services effectively. The procurement process is also rushed and does not provide adequate time for preparation of high quality project proposals. The appetite for thorough preparation and procurement is lacking also because of the short tenure of decision makers and apprehensions that political support will not sustain for a long time.

Performance Expectations from Private Operators are Unrealistic

Industry feedback suggests that, in several performance-based O&M contracts, the time allocation for meeting targets is inadequate. In most cases, performance standards are set without a realistic assessment of the prevailing ground scenario; more so in distribution improvement projects where baseline information is missing and the complexities of the project are not fully appreciated. For instance, not enough time is provided for achieving complex performance standards such as NRW reduction and 100 percent coverage levels. Similarly, in BOT projects involving system refurbishment, private operators are provided with insufficient time to undertake a detailed system study before the preparation of a capital investment plan.

Risk Sharing is Unfavorable

In several PPP contracts, the private operators are expected to bear most of the risks, including external risks such as cost of raw water and electricity. In most cases, the private operators are unwilling to take up such risks owing to uncertainty regarding the schedule and rate of increase of these cost factors. In some projects, even the risk of timely availability of grants is fully borne by the operator.

Cities lack the capacity to design, implement, and monitor PPPs

PPP Awareness Exists Only Among Senior Decision Makers in the Implementing Agency

The commitment to PPP and awareness about it are often restricted to the higher levels of the decision-making body. This understanding and awareness is not matched by technical capacity at the operating level, which has the responsibility to implement PPP projects and monitor their progress. City-level engineers and other personnel directly

engaged with provisioning and managing water supply services have little or no exposure to concepts of PPPs and lack adequate know-how to develop projects suitable for a PPP approach.

This lack of understanding is also reflected in the technically substandard contracts that are being prepared in the sector today. For instance, though the water PPPs today are largely focused on O&M improvements, this agenda is not reflected in the performance standards drawn up in the PPP contracts. Several sector experts and private operators have indicated that O&M activity continues to be viewed as a routine task, and the contracts developed have rarely been based on strong and measurable O&M performance indicators.

Monitoring Capacity is Weak

Implementing agencies are only conversant with contracts that focus on asset creation. Monitoring PPP contracts requires a focus on O&M and service standards. Cities lack the capacity and systems to monitor PPP contracts at implementation and operational stages. Moreover, PPP projects also require substantial ongoing dialog with respect to grants, tariffs, compensation, and so on, based on agreed risk-sharing principles. Capital investment plans may also need revisions to reflect site conditions that are discovered as the contract progresses. These require a different approach from that which the cities are traditionally conversant with.

Limited Employee Acceptance and Weak Stakeholder Communication

Despite instances of some projects where stakeholder engagement was actively undertaken (refer Chapter 5, page 43), a lot remains to be done on this front. Consultations with the consumers need to be carried out along the entire project cycle.

Moreover, several water PPP projects being developed today require that existing employees of the implementing agencies be fully absorbed by the private operator. Whether the employees accept such a proposition is, however, not established upfront. In most instances, a strategy regarding absorption of the employees is not developed. The apprehensions that employees may have regarding PPPs are also not well addressed. A similar weakness is seen regarding communication with citizens.

6.2 Way Forward and Possible Interventions

The way forward for water PPPs needs to focus on three aspects:

a. Create enablers so that the current project-specific approach can be converted into a sectoral trend;
b. Help cities follow well established and accepted principles to increase the chances of success of PPPs; and
c. Help cities gain implementation and monitoring capacity as well.

In addition, in the long term, sector regulation will also be an important factor.

Create enablers to widen the current project-specific approach into a sector trend

Articulation of Water PPP Strategy

Almost all infrastructure sectors in India have adopted PPPs as a sector strategy. The national target for private investment in infrastructure is 30 percent of total investment. In the water sector, however, the extent of private investment is a fraction of this target. Although the public funding approach implicitly supports water PPPs, a clearly articulated stand is largely missing. An affirmation from the national government, similar to that which exists for other infrastructure sectors, will help stakeholders and utilities to strengthen their position with respect to PPPs in the water sector.

Institutionalizing Availability of Public Funding for PPP Projects

Given the substantial investment gap and weak financial health of utilities/ULBs, public funding will be necessary to support performance improvement through PPPs. At present, only JNNURM makes public funding available for water PPP projects. This approach needs to be adopted by other programs which provide public funding for water projects. Some interventions required are:

- At present the Viability Gap scheme of GoI provides partial grant support for PPP projects. The extent of support is limited to 40 percent. Evidence shows that successful water PPP projects have required higher grant support, along the lines that JNNURM provides. Therefore, for water sector projects, the scheme may need to provide additional grant support, exceeding the current cap;
- The current process of appraisal and approval is more suited for the traditional method of execution. For example, most programs focus on construction specifications whereas PPP projects require specification of service standards and O&M requirements. These processes need to be modified to accommodate the requirements of PPP projects. The appraisal process, for instance, needs to be modified to accommodate improvements to the Detailed Project Report (DPR) that a PPP operator may suggest, and which may reduce life cycle costs;
- Over a period of time, instead of providing only grants to PPP projects, advanced support such as guarantees or annuities can also be explored to make public funding more effective, and also leverage public funding. Preparatory work for these measures needs to be undertaken; and
- State governments provide substantial support to water sector projects, often with the assistance of multilateral or bilateral agencies. They could also be encouraged to adopt similar measures so that PPP projects can benefit from public funding.

Even while increased public funding is made available for the water sector, there may be a risk of increased share of grant funding reducing incentives for the operator to harness efficiency gains. The focus of the project may shift towards the agency providing grants rather than focusing on the customers. Well designed performance incentives that are aligned with customer preferences would need to be built into the contract where the share of private capital is relatively low. Simultaneously, public funding should incentivize service and efficiency gains through a performance-based funding approach.

Initiating Water Tariff Reforms

The water tariff debate today takes place only at a policy level, with a strong emphasis on cost recovery and the need for a pro-poor tariff structure. The viability of the sector is, however, not being debated with quantitative and objective information. A more informed discussion will assist states and cities in reforming water tariff. The following specific actions may be considered:

- A discussion on the viability of the water sector at a national level (also covering a framework of full cost analysis of water services);
- Tariff levels required to sustain sector viability;
- Guidance on tariff structures (addressing pro-poor lifeline tariff, volumetric and telescopic tariffs, connection charges, tariff adjustment mechanisms, subsidy/cross subsidy policies, and so on); and
- Comparison of sustainable water tariff structures that may exist in select cities.

A national debate on water tariffs, based on this analytical information base, might help distance the topic from a project-specific context and associated local emotions. It could thereby help inform stakeholders on development of appropriate tariff strategies suited to their local context.

Support the Service Level Benchmarking Initiative so that a Performance-oriented Approach for PPPs is Created

MoUD is supporting cities in service level benchmarking (SLB) and development of improvement plans. This has also been adopted by the 13th Finance Commission. Maintaining the focus on the SLB initiative will create two benefits to support PPPs: a) bottom-up demand for performance improvement; and b) acceptance of PPPs as a credible implementation mechanism. Focus may be maintained on the technical detail of the service improvement plan: a) baseline information; b) status of existing service standards; and c) service delivery targets and improvement strategy. The SLB initiative supported by performance-oriented planning processes can, therefore, help provide a steady shelf of well thought-out water PPP projects in the future.

Help cities follow well-established and accepted principles to increase the chance of success of PPPs

One of the reasons for the success and scaling up of PPPs in sectors such as highways in India has been the establishment of standardized bidding frameworks. Based on this, many arguments have been made to standardize the framework for PPPs in other sectors as well, including the water sector. However, the institutional variety in the water sector is very high. Water projects are also Brownfield projects (unlike Greenfield projects in the highways sector) resulting in a vastly differing scope for PPPs. Therefore, the scope for

standardization is limited. Further, standardization may also result in highly rigid structures, which may actually end up decreasing the prospects for PPP.

While there is a strong case against standardization, other interventions are possible to help inform decision makers on good practices, enabling frameworks and clauses, which can help improve the probability of success of the PPP project. These are discussed below.

Guidelines for Phased Achievement of Service Standards A key risk facing water PPPs is unrealistic performance expectations from PPP operators. Cities are hesitant to phase responsibilities and, therefore, set rapid deadlines for complex parameters such as service coverage, loss reduction, and so on. A practical framework to phase capital investments and achieve desired service levels over a period of time is required. Such a framework can help cities specify practical performance targets in water PPP contracts. This will reduce unrealistic performance targets in PPP contracts.

Key Enablers for Bankability of Individual Projects

Even if a city is pursuing a water PPP as a conscious approach, its stand on project-specific issues can impact the viability/ bankability of the project. A framework to address common issues in water PPPs can provide a much desired uniformity across water PPPs. The framework can cover:

- Most of the rules governing service standards, providing connections, procedures for tariff collection, and disconnection are specified in the water byelaws of a city. In effect, these determine the commercial autonomy the operator may or may not have. Therefore, these byelaws need to be revised to provide the required commercial autonomy to the operator;
- Tariff adjustments are not routine at present. Electricity tariff revisions and employee cost escalations are two important and regular changes in the cost structure. Water tariff needs to be adjusted to reflect these changes on an annual basis. A process for such regular tariff adjustments needs to be introduced;
- Water PPP projects will possibly require an annual subsidy to be paid by the local body. In some cases, the local body may commit to compensate the

operator, if tariff revisions are not undertaken as per contractual commitments. For effective financing, these commitments also need to be supported by credible payment security mechanisms. Cities need to design and provide such structures in their PPP projects; and

- A similar payment security mechanism as above is also required for grant funds that are committed to the PPP project.

Commonly Accepted Risk-sharing Principles

A common set of risk-sharing principles, addressing key contractual issues (such as cost escalations, force majeure clauses, and so on) will also be beneficial to cities. This will also increase the comfort level of operators. However, as discussed earlier, these should be seen as sharing of best practices, rather than as providing rigid and standard frameworks.

Build cities' implementation and monitoring capacity

City-level responsibilities such as thorough project preparation, financial commitment to support PPPs, stakeholder involvement, a transparent bidding process, and capacity building will continue to be important. Though external help is possible, it can only supplement city-level commitment. Specific areas where a national or state-level approach can help cities in building capacity are described below.

Project Development Funding

Project preparation for water PPPs is expensive and cities often lack the flexibility to mobilize internal resources for this activity. National-level project preparation assistance can help cities devote the required time and resources. The India Infrastructure Project Development Fund has been able to support project preparation activities for many water projects. Supplementing this fund can help cities.

Forum of Administrators to Support Cities Pursuing PPPs

As has been mentioned earlier, in several instances, the project-sponsoring authority has limited capacity to develop water supply PPP projects. In reality, building this capacity will take substantial time. In the meantime, it is safe to assume that cities would continue to lack the capacity, and, therefore, the confidence to address complex commercial and technical issues which arise in water PPP projects. In such a scenario, a forum of administrators from utilities/states who have successfully implemented water PPP projects can be of immense catalytic value. Cities which intend to develop water PPP projects may enter into an arrangement where they receive continuous inputs from these public officials. Such a forum can facilitate capacity-building, transfer learnings, and, most importantly, develop confidence among city officials that they can implement water PPPs.

Role that State Governments Play

Evidence from successful PPP projects shows that state governments and agencies have an important role to play in encouraging PPPs:

- Many of the key enablers for PPPs are outside the control of a local body (such as availability of public funding, tariff reforms, and so on). State governments can provide these key enablers so that cities can pursue PPPs as a practical choice; and
- State governments can also facilitate specific projects through project development funding and handholding support for transactions. Provision of such support at a project level increases the confidence of both local bodies and private operators. Evidence shows that state governments have performed such roles through state nodal agencies (such as KUIDFC). Therefore, nominating such an agency to support cities in water PPPs can be a strong enabler for project development and execution.

In the longer term, state governments have a critical role to play in assisting local bodies to build their capacities to implement and monitor water PPPs. Cities will not be able to gain these skills on their own and a suitable state program is required to build these skills.

Develop sector regulation as a long-term measure

The presence of a regulator can help create an enabling environment for more effective private participation in the water sector. Firstly, the regulator can set service standards, make cities accountable for service delivery and hence address consumers' needs. This pressure on improving service delivery may push cities to overhaul internal processes and systems to meet the set standards. In many cases, where the capacity to improve services is limited, cities may seek private sector expertise for improving services.

Secondly, the presence of a regulator can provide a more transparent and predictable environment for PPP projects. It can help balance the concerns of the cities as well as those of operators and consumers. There is a need for developing a consensus on what the role of the regulator can be and how its presence can serve as a catalyst for improving services.

It should be noted that regulation by itself cannot deliver effective PPPs; other enablers are also needed for PPPs to succeed, such as rationalized public funding, institutional role clarity, and stakeholder support. Therefore, any strategy to facilitate PPPs needs to be a holistic one that encompasses all these elements along with regulation.

6.3 Conclusion

In summary, recent trends in water PPPs have been in a positive direction. If the private sector is to play a significant role in addressing the investment and service backlogs in the sector, suitable interventions are necessary to scale up this momentum while ensuring projects that deliver the desired service outcomes on a sustainable basis. Interventions should focus on creating sector enablers; helping cities follow well- established frameworks; and supporting cities in gaining implementation and monitoring capacity. Cities need to keep in mind that two critical responsibilities of thorough project preparation and assuring a balanced commercial structure will continue to rest with them.

Annex 1
List of Stakeholder Consultations

A1.1 Introduction

In order to undertake the assessment of water PPPs in India, for the study *Trends in Private Sector Participation in the Indian Water Supply Sector: A Critical Review,* CRIS has undertaken, in all, 17 consultations with public and private sector representatives. Further, CRIS has also held discussions with PPP and water supply sector experts to gather a comprehensive perspective on the PPPs being undertaken in the sector today.

A1.2 List of Consultations

The stakeholder consultations undertaken for the study are indicated in Table A1.1.

Table A1.1: List of Consultations

Name	Designation	organization
dr. S.V. dahasahasra	member Secretary	maharashtra jeevan pradhikaran
mr. Shreerang deshpande	Head-Business development	mahindra infrastructure developers Ltd.
mr. ganapathy pg.	director	milestone ecofirst Advisory Services (i) pvt. Ltd.
mr. Anand K. jalakam	Chief operating officer	jalakam Solutions
mr. K.A. joseph	Regional director	Veolia water
mr. Kusnur	Retired engineer	municipal Corporation of Brihan mumbai
mr Ashwin mahalingam	professor	indian institute of technology-madras
mr. A. mahendra	deputy general manager (Business development and marketing water Services)	jUSCo
mr. Sudhir malhotra	Senior Vice president	jindal Aquasource
ms. meera mehta	professor emeritus	Faculty of planning and public policy, Center for environmental planning and technology University
mr. Ashok natrajan	managing director	Hydro-Comp enterprises
mr. prabhakaran	Senior engineer	Chennai metro water Supply and Sewerage Board
ms. gabriela prunier	Country Head	Suez environment
mr. dinesh Rathi	Consultant	dinesh Rathi Consultants
mr. Ajay Saxena	ppp expert	Asian development Bank
mr. K.K. Shrivastav	Chief engineer, member of ppp Cell	Urban Administration and development department, government of madhya pradesh
mr. m.n. thippeswamy	Retired Chief engineer	Bangalore water Supply and Sewerage Board

Annex 2
A Detailed Chronology of PPP Projects in India's Urban Water Supply Sector

A2.1 PPP Projects Initiated during the 1990s

The five PPP projects initiated during the 1990s are listed in Table A2.1.

Table A2.1: PPP Projects Initiated in the Urban Water Supply Space during the 1990s

Project Name	ULB/Utility/Agency	Investment estimate (INR Million)[25]
Krishna Raw Bulk water Supply project	Hyderabad metro water Supply and Sewerage Board (HmwSSB)	3,000
Selaulim Bulk water Supply, Goa	public works department (pwd)	1,200
water Supply and Sewerage project, pune	pune municipal Corporation (pmC)	7,400
Cauvery Bulk water Supply project: Stage iV, phase-ii	Bangalore water Supply and Sewerage Board (BwSSB)	8,870
Tirupur industrial water Supply project	new Tirupur Area development Corporation Limited (nTAdCL)	9,360*

Source: CRIS, based on secondary information and discussions.
* The Tirupur water supply project was contracted in 2005.

25. Cauvery Bulk Water Supply Project indicated at 1999 prices, Krishna Raw Bulk Water Supply Project at 1995 prices, Goa Bulk Water Supply Project at 1998 prices, and Pune Water Supply Project at 1999 prices.

- One of the projects to be initiated during this time period was the Tirupur Industrial Water Supply Project.[26] Conceived at an initial cost of INR 5,900 million,[27] the project included development of a 100 million liter per day (mld) supply infrastructure to the industries, 45 mld treated water to the Tirupur Municipality, and 40 mld supply to 21 surrounding villages. The project was initiated in 1994 by Infrastructure Leasing and Financial Services (IL&FS) along with Tirupur Exporter's Association. Through the project, the concept of SPV was introduced for water supply infrastructure development in the country for the very first time. An SPV was instituted in 1995 with several stakeholders, including the Government of Tamil Nadu, Indian private operator Mahindra and Mahindra, United Utilities, North West Water, L&T, and Bechtel. The project was planned to supply water to the industrial units at tariff levels higher than the production cost and supply to domestic consumers at cross-subsidized rates.
- Given the scale of investment of the Tirupur Water Supply Project and the nature of project development being adopted for the very first time in the water supply space, it generated substantial interest and impetus for the development of similar projects in the domestic market. In 1995, HMWSSB proposed the development of a 410 mld capacity bulk water supply system at a cost of INR 3 billion on a PPP basis. HMWSSB was assisted by international consultants M/s. Mott Macdonald and KPMG to undertake the necessary techno-commercial feasibility studies for the project. The Government of Andhra Pradesh took special interest in the development of this project on a PPP basis in line with the general trend of economic liberalization in the country at the time. Further, the project also generated interest among international private operators, who also encouraged a PPP-based approach.
- The momentum generated by these projects resulted in other state governments also exploring the PPP model for project development. In 1996 alone, three water PPP projects were initiated in the country. One of these was by BWSSB for a 540 mld bulk water supply facility. To be developed at an estimated cost of INR 6 billion, the project also generated interest among international private operators, who further encouraged the adoption of a PPP model for the project. BWSSB was assisted by KMPG and Tata Consulting Engineers in undertaking the techno-commercial feasibility studies for the project. Simultaneously, a 500 mld capacity bulk water project was also proposed to be developed at an initial cost of INR 1,200 million by the PWD of Goa.
- In 1996, PMC also developed a water supply and sewerage project to be undertaken in PPP mode. As in the other cases, the PMC project too was in line with the trend of liberalization in the country.[28] PMC proposed the development of the water supply project at a cost of INR 7.4 billion as part of its long-term strategic plan for Pune city. PMC was assisted by consultants such as Kirloskar, Infrastructure Development and Finance Company (IDFC), and Nishit Desai & Associates through the project development process.

A2.2 PPP Projects Initiated between 2000 and 2004

The PPP projects initiated between 2000 and 2004 include the eight projects listed in Table A2.2.

- One of the first projects tried during this phase through PPP was for O&M of the distribution system at Sangli Municipal Corporation (SMC) in Maharashtra. The project was started by SMC under the "Initiative Incentives Grants" scheme of the Government of Maharashtra, through which financial assistance was extended to ULBs to improve the efficiency of their water supply and sewerage services. Additionally, the scheme encouraged private sector participation in water supply to improve the efficiency of service delivery. The project was developed by the

26. This project includes water supply for both industrial and domestic users and is, therefore, referred to among the list of urban water supply PPP projects.
27. The current estimates on the project cost are INR 9,350 million, as per www.pppindiadatabase.com.
28. Marie-Helene Zerah. 2000. Case Study: The Cancellation of the Pune Water Supply and Sewerage Project. Water and Sanitation Program.

Table A2.2: PPP Contracts initiated between 2000 and 2004

Project Name	ULB/Utility/Agency	Investment estimate (INR Million)
O&M contract, Sangli, Maharashtra	Sangli Municipal Corporation	-*
WTP, Sonia Vihar, Delhi	Delhi Jal Board	2,000
O&M contract for Mumbai K East	Municipal Corporation of Brihan Mumbai	-*
O&M contract for 21 pilot zones	Delhi Jal Board	6,300
O&M contract for 2 pilot zones	BWSSB	3,000
O&M contract for 8 municipal councils	BWSSB	-*
Visakhapatnam industrial water Supply project	Andhra Pradesh Industrial Infrastructure Corporation Limited	4,530
O&M contract for Chandrapur, Maharashtra	Chandrapur Municipal Council	15.3

* Accurate cost information unavailable.

Department of Water Supply and Sewerage (DWSS) of Maharashtra along with United States Agency for International Development's (USAID's) Financial Institutions Reform and Expansion Project-Debt Market (FIRE-D) and IL&FS. It was proposed to be split into two phases, the first being a management contract for three years and the second a long-term concession agreement. The management contract was intended to reduce leakages in the system, bring about energy savings, and lead to staff training. It also included preparation of a long-term plan for system augmentation. The second phase was planned as a concession agreement whereby system augmentation would be undertaken. The state government had approved a grant of INR 600 million which was meant to cover 75 percent of the management contract costs and an additional grant to the extent of 23.3 percent of the project cost for the second phase of the project. Though several preparatory studies were undertaken, the project was eventually abandoned before the tendering stage.

- DJB undertook a Greenfield project around the same time for the development of a 635 mld capacity WTP in the Sonia Vihar region of Delhi. The project was proposed to be developed on a Design, Build and Operate (DBO) basis with a 10-year concession agreement. The concession was awarded in 2001 under a take or pay arrangement between an international private operator (Degremont) and DJB. The project began trial operations in 2006.
- The period also saw three O&M contracts being attempted on a pilot project basis. One such attempt was by BWSSB for the rehabilitation of the distribution system in two select zones of Bengaluru city. BWSSB prepared to undertake the project on account of direct interest and encouragement by the concerned department of the French government. By way of a Memorandum of Agreement signed between BWSSB and the French department, two French operators were proposed to be involved in the rehabilitation and O&M contract planned at a cost of INR 3 billion. As part of the preparatory work, detailed technical studies were undertaken to ascertain baseline data and to

prepare a rehabilitation and improvement plan for the zones. Based on the output from the technical studies, BWSSB also prepared a performance-linked management contract which was to be implemented for these two zones. The project, however, had to be abandoned due to inability to win support from employees and the local population for private sector participation in provisioning of water supply services.

- Parallel to the BWSSB project, two pilot projects were proposed by the World Bank: one was a management contract for O&M of 21 pilot zones of Delhi, and the other for the K East ward of the Municipal Corporation of Brihan Mumbai (MCBM). Sector experts suggest that both these projects were proposed to be developed with the objective of demonstrating the effectiveness of the PPP approach to improve O&M efficiencies. For both projects, technical assistance was extended by the World Bank to ascertain the status of existing infrastructure. While a significant extent of preparatory activity was undertaken for both these projects, the projects were abandoned before the tendering stage. In the case of the pilot project for Delhi, DJB did not win support from its own employees as well as civil society over private sector involvement in water supply services. In the case of Mumbai K East pilot project, there was strong civil society opposition to the project. Further, there was a lack of consensus over the baseline information between MCBM and the international consultant appointed by the World Bank to carry out technical studies. Consequently, these two projects were also abandoned before reaching the tendering phase.
- In 2003, BWSSB attempted a PPP project for O&M for water distribution for eight municipal councils. The project received assistance from the International Finance Corporation (IFC). The proposed contract was expected to cover 1 million population spread over an area of 210 square kilometer (sq km). This project too was abandoned due to lack of employee support after going some distance into the preparatory activity stage.
- In the same year, the Andhra Pradesh Industrial Infrastructure Corporation Limited (APIIC), along with IL&FS, proposed the development of an industrial bulk water supply scheme for the Visakhapatnam industrial zone. The project was conceived at a cost of INR 4.5 billion. The preferred bidder for the project was the engineering construction firm, L&T. The contract for the project was awarded in 2003. However, once operational, the project faced several issues which resulted in all the private promoters exiting from the project. Currently, the project is managed by APIIC and the Greater Visakhapatnam Municipal Corporation.
- The only project for the O&M of a water supply system which was contracted during this period was the one for CMC. In 2003, CMC initiated a project to engage the private sector for O&M of the water supply system in Chandrapur. Until then CMC was incurring significant revenue losses from its water supply operations. With the agenda of reducing system operating losses and increasing the overall efficiency of service delivery, CMC entered a 10-year agreement with a local private operator (Gurkrupa Associates). The private operator was appointed through a tendering route. This contract is currently operational.

A2.3 PPP Projects from 2005 Onward

The list of the PPP contracts initiated since 2005 is indicated in Table A2.3. Since 2005, six contracts have been awarded for projects with a primary focus on distribution system improvements.

- One of the first O&M contracts to be awarded in 2005 was for a 24x7 demonstration project under the KUWASIP program. Conceptualized in 2002-03, the project was implemented as part of a larger initiative of the Government of Karnataka to improve the performance of the urban water sector by providing high quality and sustainable services in all the ULBs of the state. The state government was assisted in this project

Table A2.3: PPP Contracts Awarded From 2005 Onward

Project Name	ULB/ Utility/Agency	Investment estimate (INR Million)
KUWASIP: 24x7 water supply for Belguam, Hubli-Dharwar, and Gulbarga	Karnataka Urban Infrastructure Development and Finance Corporation (KUIDFC)	620
Dewas industrial water Supply	Madhya Pradesh State Industrial Development Corporation (MPSIDC)	770
Chennai desalination plant	Chennai Metropolitan Water Supply and Sewerage Board (CMWSSB)	7,000
Water Supply and Sewerage System, Sector V Salt Lake City, Kolkata	Kolkata Metropolitan Development Authority (KMDA)	700
O&M contract for pilot zone, Nagpur	Nagpur Municipal Corporation (NMC)	100
Management contract for O&M, Latur, Maharashtra	Maharashtra Jeevan Pradhikaran (MJP)	430
Industrial water supply contract, Haldia, West Bengal	Haldia Development Authority (HDA)	1,000
Bulk water Supply project, Bhiwandi Nizampur city, Maharashtra	Bhiwandi Nizampur Municipal Corporaton (BNMC)	3,420
O&M contract for water supply system, Mysore	Mysore Municipal Corporation	1,620
O&M contract for water supply system, Madurai	Madurai Municipal Corporation	140
Concession agreement for distribution system, Khandwa, Madhya Pradesh	Khandwa Municipal Corporation and Urban Area development department	930
Concession agreement for distribution system, Shivpuri, Madhya Pradesh	Nagar Palika Parishad, Shivpuri and Urban Area development department	520
Bulk water Supply System, Naya Raipur	Naya Raipur Development Authority (NRDA)	2,000

Source: CRIS, based on primary and secondary data sources.

by its nodal agency for external funding, KUIDFC. The total cost of the project was estimated at about INR 620 million. Financial and technical assistance for the project was provided by the World Bank. The project was implemented for five zones selected from three municipal corporations of Karnataka: Hubli-Dharwad, Belgaum, and Gulbarga municipal corporations. Covering 25,000 connections, the project was developed with the agenda to improve the water supply services in the select zones and to plan for a 24x7 system. The demonstration zones of the three municipal corporations faced an acute problem of unreliable water supply, NRW levels of 50 percent, and so on. A performance-based contract was implemented for the project. The project was structured such that the appointed private operator would be required to undertake rehabilitation works for the existing distribution system for a period of approximately a year followed by O&M for a period of two years. Through a two-stage international bidding process, the contract was awarded in 2005 to an international private operator (Veolia). The contract completed its term in March 2010 and has been since renewed. The KUWASIP project has been a turning point in the case of PPP projects which have been targeting O&M improvements. The project successfully demonstrated the improvements brought into water supply provisioning in the select zones of the three municipal corporations through a performance- based management contract.

- In 2005, KMDA initiated a project for the development of a WTP and distribution system for Sector V of Salt Lake City, Kolkata. The project required the private operator to improve and undertake O&M of the existing and newly created assets. It was intended to make water supply available for the industrial units in the region for a period of 30 years. The project was estimated at INR 700 million, and funded through both public investment and private financing to the extent of INR 450 million. The PPP arrangement for the project required the private operator to undertake limited project financing, carry out the construction works, and manage the O&M of the system for the contract period. The private operator was to levy, collect, and retain the water tariff. The estimated water tariff is INR 25/kilo liter (kl). Funded under JNNURM, the Salt Lake City project was awarded through the tender route in 2007 to a consortium of domestic operators (Jamshedpur Utilities & Services Company Ltd. [JUSCO] and Voltas).
- In the same year, a contract was also awarded for an industrial water supply project in the town of Dewas, Madhya Pradesh. The project planned to supply approximately 15 mld of water in the first phase, gradually increasing to 23 mld. Planned for a concession period of 30 years, the project cost was estimated at INR 770 million. Developed as a Greenfield project, it was initiated by the Madhya Pradesh State Industrial Development Corporation (MPSIDC) in 2003-04. The project was structured such that the capital cost and O&M for the project would be borne fully by the private operator. The private operator was given the right to levy, collect, and retain the water supply charge (INR 26.5/kl) fixed and approved by MPSIDC. Through a domestic competitive bidding process, the project was contracted out in 2005 to a domestic construction firm (MSK Projects). The project is currently operational.
- In 2001, the Chennai Metro Water Supply and Sewerage Board (CMWSSB) initiated a project for the development of a desalination plant on a PPP basis. The project required the construction of a desalination plant for treatment and supply of bulk water supply to CMWSSB. This was the first attempt at developing a desalination plant in the country on a PPP basis. The project cost was estimated initially at INR 4.2 billion, which was later revised to INR 7 billion. The PPP arrangement for the project required the private operator to make available a predefined level of treated bulk water supply at any point of time. A take or pay arrangement has been implemented for the project at a bulk water charge of INR 48/kl. The contract for the project was awarded in 2007 to a consortium of domestic and international private operators (IVRCL and Befesa).

- A bulk water supply and distribution system improvement project has also been implemented in the industrial town of Haldia of West Bengal. The project was initiated in 2005 by the Haldia Development Authority (HDA) for the development of a WTP system. The project included rehabilitation works for the distribution system. The arrangement required the private operator to finance the project, undertake the design and operation of the water supply system, and carry out the O&M activity for a period of 30 years. The bulk water supply project was meant to meet industrial and domestic demand. The total cost of the project was estimated at about INR 1 billion.
- Management contracts for O&M improvements have been implemented for distribution services in the towns of Latur and Nagpur in Maharashtra. Both these contracts were awarded in 2007. Water supply services of the Latur Municipal Corporation are managed by the state water supply utility, MJP, which also implemented the PPP contract for management of water supply services. Executed as a performance-based management contract, the PPP structure required the private operator to manage the O&M activities of the entire water supply system of the town for a period of 10 years and, in turn, pay MJP a fixed monthly sum as license fee. The contract was awarded in 2007 through the tendering route to a consortium of domestic private operators (Subhash Projects & Marketing Ltd., UPL Environmental Engineers Ltd., and Hydro-Comp Enterprises).
- During the same time period, a PPP project was implemented on a pilot basis for Nagpur. The Nagpur Municipal Corporation (NMC) engaged a private operator to undertake O&M activities in a zone covering a population of 165,000. More recently, in 2008, a water PPP contract for O&M activities has also been implemented by the Madurai Municipal Corporation in the state of Tamil Nadu.
- In 2008, the Mysore Municipal Corporation of the state of Karnataka awarded a contract for the rehabilitation and O&M of its distribution system to a private operator. The project was initiated in 2005. It required the private operator to undertake a detailed assessment of the water supply system of the city, prepare a capital investment plan, undertake rehabilitation, and manage the water supply systems for a period of six years. The total cost of the project was estimated at INR 1.6 billion, and the project received capital funding assistance from JNNURM. The PPP structure entails reimbursement of the costs incurred for rehabilitation works by the private operator and a management fee for the O&M works. The contract was awarded through the tendering route to a domestic operator (JUSCO).
- In 2009, two projects were contracted out, which not only required the private operator to undertake the O&M of the system, but also shoulder the responsibility for bearing part of the capital costs of these projects. These projects have been implemented for two municipal corporations in Madhya Pradesh, in Khandwa and Shivpuri. Both these projects have been developed by the respective city governments with technical assistance from Madhya Pradesh's UADD. The projects developed for both these towns were intended to address the issues of acute water supply shortage and highly inefficient water supply service delivery. Projects developed under this route require the private operator to undertake the rehabilitation works and manage the O&M of the water supply system for a concession period of 25 years. The cost for the Khandwa project has been estimated at INR 930 million with the private operator required to invest INR 217 million. In the case of the Shivpuri project, the project cost was estimated to be INR 520 million with private financing of INR 264 million. Public funding for both these projects has been based on the grants received under UIDSSMT. For the implementation of these projects, the system of volumetric tariff has also been implemented. For the Khandwa water supply project, a domestic private operator was appointed (Vishwa Infrastructure Limited). The Shivpuri water supply project has been contracted out to a consortium of domestic and international operators (Doshion and Veolia).

- A contract was also awarded in 2009 for the development of a Greenfield bulk water supply project in the town of Naya Raipur in Chhattisgarh. The project is proposed to be developed by the Naya Raipur Development Authority (NRDA). At an estimated cost of INR 2 billion, the project envisages private financing to the extent of INR 1.2 billion. Private sector participation has been planned for the project to undertake development of the infrastructure, and O&M of the bulk water system for a period of seven years. The PPP arrangement envisaged under this project requires the private operator to part-finance the project, develop the infrastructure, and undertake O&M activities. For the works undertaken by the private operator, NRDA would make payments to the operator. The project was bid in 2009 and a domestic operator (Jindal Aquasource) has been appointed by NRDA.

Annex 3
Profiles of Select PPP Projects

This annexure includes project details of 11 water PPP projects, selected on the basis of information availability on them.

A3.1: SALt LAKe CitY, SeCtoR V, weSt BengAL

Type of PPP model	boT contract
Contract awarded to	SpV of jUSCo (74%) and Voltas (26%) formed for executing the project
Concessioning authority	Kolkata metropolitan development Authority (KmdA)
Scope of work and description	design, construction, o&m, billing and collection, water source augmentation, distribution network, Sewerage treatment plant
Volume of water produced/distributed	15 mld
type of end users: industrial/domestic	industrial
number of connections	5,000
Year of award	2007
duration of contract	30 years
project cost	inR 700 million
Sources of funding	35% grant under jnnURm 65% investment from the private sector
Risk on the operator	demand/construction/ investment/political, etc.
Remuneration to the private operator	through tariff based on water sold
tariff	inR 25/kl
Status	the project has been commissioned
Key features	institutional consumers with high credit quality in a growing area Concessions provided by KmdA such as waiver of lease rentals, permission to levy one-time connection charges @ inR 10 per square foot of built up area of the premises for connection of the premises to the water and sewerage network by the developer Capital subsidy to the developer to the extent of 35% of the capital cost operator takes all commercial risk groundwater usage to be discounted

A3.2: HALdiA pRojeCt, weSt BengAL

Type of PPP model	Concession (lease of existing assets and boT for new assets)
Contract awarded to	SpV formed for executing the project Consortium: jUSCo (60%), Ranhill Utilities Berhard (40%)
Concessioning authority	Haldia development Authority (HAd)
Scope of work and description	Setting up of a new 115 mld wtp on a Bot basis along with o&m of the existing wtp and new water supply system including sewerage system, and billing and collection
Volume of water produced/distributed	230 mld
type of end users: industrial/domestic	industrial and domestic
number of connections	nA
Year of award	2008
duration of contract	25 years
project cost	inR 1,000 million (upfront investment for creation of new wtp and distribution assets)
Sources of funding	100% investment from the private sector
Remuneration to the private operator	through tariff based on volume of water sold
Status	o&m of existing assets leased to SpV since october 2008; construction of new assets underway
Key features	Bidders had the option of bidding for 2 packages: package 1 and package 2. this reduced the risk of not receiving enough bids, as the bidders were able to bid depending upon their capability and experience to take care of inflation, etc., it was provided that the water tariff would be increased by 3% every year

A3.3: MYSORE PROJECT, KARNATAKA

Type of PPP model	O&M contract
Contract awarded to	JUSCO
Concessioning authority	Mysore Municipal Corporation
Scope of work and description	Implementation of 24x7 continuous water supply; project includes construction and O&M of the distribution network, billing and collection
Volume of water produced/distributed	142 MLD
Type of end users: industrial/domestic	Domestic
Number of connections	1,50,000
Year of award	2008
Duration of contract	6 years
Project cost	INR 1,620 million
Sources of funding	80%—JNNURM, 10%—Government of Karnataka, and 10%—Mysore Municipal Corporation
Remuneration to the private operator	Management fees: Lump sum in two parts Fixed fee (50%), paid in 24 equal quarterly installments Performance fee (50%), paid six-monthly on achievement of targets over the project period Operating cost: Lump sum in two parts Fixed fee (30%), paid in 23 equal quarterly installments Performance fee (70%), paid six-monthly on achievement of targets over the project period Rehabilitation cost: Bill of quantities (BOQ) driven Based on Capital investment plan (CIP)
Status	O&M commenced in January 2009; city-wide CIP has been submitted for approval; rehabilitation of distribution network in five areas (14,000 connections) started
Key features	Performance-based fee model for the operator with technical risks borne fully by the contractor

A3.4: HUBLi-dHARwAd, BeLgAUm, And gULBARgA in KARnAtAKA (KUwASip)

Type of PPP model	Management contract for pilot zones
Contract awarded to	Veolia
Concessioning authority	KUidFC
Scope of work and description	Study, design, construct, o&m of distribution systems, metering, billing, and customer services
	private operator responsible for rehabilitation and o&m
	the assets and staff continue to remain with the ULB
	the private operator would improve the performance against a fee-based contract
	tariff revision to be undertaken by the ULB only after demonstration of service improvement in select five zones
	third party technical auditor to monitor the contract
Volume of water produced/distributed	18 mld
type of end users: industrial/domestic	domestic
number of connections	24,000
Year of award	2005
duration of contract	4 years
project cost	inR 62 million (funded by the world Bank to KUwASip through KUidFC)
Sources of funding	Capital investments (managed by the operator) and reimbursed by the world Bank
Remuneration to the private operator	Fixed remuneration (60%) and performance-based remuneration (40%)
	operator fee inclusive of bonus
Status	the project has been implemented successfully. All the performance targets have been met. the contract with the private operator has been renewed
Key features	detailed and good contract designing supported by strong political will
	performance-based fee model for the operator with technical risks borne fully by the contractor

A3.5: nAgpUR, mAHARASHtRA

Type of PPP model	**Management contract for a pilot zone**
Contract awarded to	Veolia
Concessioning authority	nagpur municipal Corporation (nmC)
Scope of work and description	pilot project upgradation and implementation of 24x7 continuous water supply system
□	design the water distribution network
□	Carry out the asset repairs, rehabilitation of the water distribution network
□	Achieve operational performance targets
□	meter replacement for the consumers
Volume of water produced/distributed	15.7 mm^3/year
type of end users: industrial/domestic	domestic
number of connections	10,000 extended to 15,000
Year of award	2007
duration of contract	5 years
project cost	inR 210 million
Sources of funding	no private sector investment
Remuneration to the private operator	performance-based fee from the nmC
Status	pilot study has been successfully completed
□	A private operator has been recently selected for city-wide scale up of continuous water supply

A3.6 tiRUpUR, tAmiL nAdU

Type of PPP model	build own operate Transfer (booT)
Contract awarded to	mahindra water Utilities Ltd., a joint venture with United Utilities, UK new tirupur Area development Corporation Limited (ntAdCL) has been established as a SpV in 1995 to implement the project First water supply project in india to be financed on a limited recourse funding basis
Concessioning authority	government of tamil nadu and tirupur municipality
Scope of work and description	entire water supply system from source to the industrial and domestic consumers ntAdCL contracted out the construction and maintenance of the systems to a Boot consortium of Bechtel, north west water, mahindra infrastructure developers Ltd., and United Utilities
Volume of water produced/distributed	185 mld
type of end users: industrial/domestic	mainly industrial water to a large number of export oriented units in tirupur. Also includes urban and rural domestic supply as bulk supply to the tirupur municipality
number of connections	1,000 industrial connections + 6 villages + 7 locations of bulk supply to the tirupur municipality
Year of award	2005
duration of contract	30 years
project cost	inR 9,360 million
Sources of funding	USAid has provided long-term (30 years) loan guarantees with iL&FS to help finance this project
Bulk water charge	inR 43/kl
investment from the private operator	operator invested 2%
Remuneration to the private operator	take or pay bulk water charges
Status	the project is currently facing issues with low demand (48 mld) for the industrial water

A3.7 LATUR, MAHARASHTRA

Type of PPP model	Lease contract
Contract awarded to	Subash projects and marketing Ltd. (SpmL), UpL-environmental engineers Ltd., and Hydro-comp enterprises, under a SpV
Concessioning authority	maharashtra jeevan pradhikaran (mjp) and Latur municipal Corporation
Scope of work and description	o&m and repairs of Latur water supply
Volume of water produced/distributed	30 mld
type of end users: industrial/domestic	domestic
number of connections	Approximately 40,000 connections
Year of award	2007
duration of contract	10 years
Sources of funding	partial grant from the government of maharashtra
investment from the private operator	inR 430 million
Remuneration to the private operator	the contractor to pay mjp a fixed monthly sum in lieu of the right granted to it during the term of the agreement
Status	operator has taken over part of the assets
Key features	Capital investment completed by the government
□	tariff curve for 10 years fixed before bidding
□	during the first six months (conditions precedent period), mjp would help the contractor to achieve 25,000 metered connections. during this period, the income from water supply operations was to be collected by the contractor and deposited in a designated bank account of mjp. mjp in turn was to bear all operating expenses for water purification and mjp's staff deployed to the contractor. the contractor was to set up a billing system and bear expenses relating to his staff and the cost of water meters
□	the conditions precedent period was extendible by an additional period of three months if mjp and the contractor were not able to achieve 25,000 metered connections
□	As per the contract, mjp undertook the risk of cost of power variation beyond a predetermined range

A3.8: CHennAi deSALinAtion pLAnt, tAmiL nAdU

Type of PPP model	Design build own operate Transfer (DbooT)
Contract awarded to	Chennai water desalination Ltd. (CwdL), a SpV floated by iVRCL infrastructures & projects Ltd., a publicly listed company in india, which owns 75% of the project company. the remaining 25% of the project company is owned by Befesa Construccion tecnologia Ambiental, S.A.U. (Befesa CtA)
Concessioning authority	Chennai metropolitan water Supply and Sewerage Board (CmwSSB)
Scope of work and description	Bulk supply of desalinated sea water to the utility
Volume of water produced/distributed	100 mld
type of end users: industrial/domestic	City utility
number of connections	nA
Year of award	2007
duration of contract	25 years
Sources of funding	100% private financing
investment from the private operator	inR 7,000 million
Remuneration to the private operator	treated bulk water charges at inR 48/kl
Status	project has been commissioned in 2010
Key features	95% of the contracted capacity was to be the minimum off-take quantity every month by CmwSSB CmwSSB guaranteed a take-or-pay at water minimum off-take for each operating year throughout the operating period

A3.9: nAYA RAipUR BULK wAteR SUppLY SYStem, CHHAttiSgARH

Type of PPP model	build own operate Transfer (booT)
Contract awarded to	jindal Aquasource
Concessioning authority	naya Raipur development Authority (nRdA)
type of end users: industrial/domestic	domestic
Year of award	2009
duration of contract	7 years
Sources of funding	100% private financing
investment from the private operator	inR 1,200 million
Status	Construction works underway
Key features	Assured off-take from counterparty

A3.10: SHiVpURi wAteR SUppLY SYStem, mAdHYA pRAdeSH

Type of PPP model	boT+ partial financing
Contract awarded to	Consortium of doshion and Veolia
Concessioning authority	nagar palika parishad, Shivpuri
Scope of work and description	o&m and repairs of water supply system
type of end users: industrial/domestic	domestic
number of connections	17,000 existing connections, expected to increase by 50%
Year of award	2009
duration of contract	25 years
Sources of funding	80% public financing and 20% private financing
investment from the private operator	inR 800 million
Remuneration to the private operator	Volumetric tariff at inR 15/kl
Status	Construction works underway
Key features	Assured bulk water supply source for the city
	Strong state government support through UAdd for project development
	10% escalation in tariff charged every three years

A3.11: KHAndwA 24x7 wAteR SUppLY SYStem, mAdHYA pRAdeSH

Type of PPP model	**boT+ partial financing**
Contract awarded to	Vishwa infrastructure
Concessioning authority	Khandwa municipal Corporation
Scope of work and description	o&m and repairs of water supply system
type of end users: industrial/domestic	domestic
Year of award	2009
duration of contract	25 years
Sources of funding	80% public financing and 20% private financing
investment from the private operator	inR 1,150 million
Remuneration to the private operator	Volumetric tariff at inR 11.95/kl
Status	Rehabilitation works underway
Key features 	Strong state government support through UAdd for project development 10% escalation in tariff charged

Abbreviations and Acronyms

APIIC	Andhra Pradesh Industrial Infrastructure Corporation Limited
BOQ	bill of quantities
BOT	Build Operate Transfer
BOOT	Build Own Operate Transfer
BWSSB	Bangalore Water Supply and Sewerage Board
CAA	Constitution Amendment Act
CDP	City Development Plan
CIP	Capital Investment Plan
CMC	Chandrapur Municipal Council
CMWSSB	Chennai Metro Water Supply and Sewerage Board
CPHEEO	Centre for Public Health and Environmental Engineering Organisation
CRIS	CRISIL Risk and Infrastructure Solutions
CWDL	Chennai Water Desalination Ltd.
DBO	Design Build and Operate
DBOOT	Design Build Own Operate Transfer
DBFOT	Design Build Finance Operate
Transfer DJB	Delhi Jal Board
DPR	Detailed Project Report
DWSS	Department of Water Supply and Sanitation
EPC	engineering procurement construction
FDI	Foreign Direct Investment
FIRE-D	Financial Institutions Reform and Expansion Project-Debt Market
FYP	Five Year Plan
GoI	Government of India
HDA	Haldia Development Authority
HMWSSB	Hyderabad Metro Water Supply and Sewerage Board
HPEC	High Powered Expert Committee
IEC	Information Education and Communication
IDFC	Infrastructure Development and Finance Company
IFC	International Finance Corporation
IL&FS	Infrastructure Leasing and Financial Services
INR	Indian National Rupee
JNNURM	Jawaharlal Nehru National Urban Renewal Mission
JUSCO	Jamshedpur Utilities & Services Company Ltd.
kl	kilo liter
KMDA	Kolkata Metropolitan Development Authority
KUIDFC	Karnataka Urban Infrastructure Development and Finance Corporation
KUWASIP	Karnataka Urban Water Sector Improvement Project

lpcd	liter per capita per day
L&T	Larsen and Tubro
MCBM	Municipal Corporation of Brihan Mumbai
MCC	Mysore City Corporation
MDG	Millennium Development Goal
MJP	Maharashtra Jeevan
Pradhikarna mld	million liters per day
MoUD	Ministry of Urban Development
MPSIDC	Madhya Pradesh State Industrial Development Corporation
MWRRA	Maharashtra Water Resources Regulatory Authority
NEERI	National Environmental Engineering Research Institute
NGO	nongovernmental organization
NIUA	National Institute of Urban Affairs
NMC	Nagpur Municipal Corporation
NRDA	Naya Raipur Development Authority
NRW	Nonrevenue Water
NTADCL	New Tirupur Area Development Corporation Limited
NWP	National Water Policy
O&M	Operation and Maintenance
PHED	Public Health and Engineering Department
PMC	Pune Municipal Corporation
PPP	Public Private Partnership
PWD	Public Works Department
SLB	service level benchmarking
SMC	Sangli Municipal Corporation
SMKC	Sangli Miraj Kupwad Corporation
SPML	Subash Projects and Marketing Ltd.
SPV	Special Purpose Vehicle
sq km	square kilometer
UADD	Urban Administration and Development Department
UK	United Kingdom
UIDDSMT	Urban Infrastructure Development Scheme for Small and Medium Towns
UIG	Urban Infrastructure and Governance
ULB	Urban Local Body
USAID	United States Agency for International Development
WSP	Water and Sanitation Program
WSS	Water Supply and Sanitation
WTP	Water Treatment Plant

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