

Policy and Governance Issues in Urban Water and Sanitation Sector

A review and lessons for Ganga Basin

GRBMP : Ganga River Basin Management Plan

by

Indian Institutes of Technology



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1. Executive Summary

A Consortium of seven Indian Institute of Technology (IIT) which has been given the responsibility of preparing the Ganga River Basin: Environment Management Plan (GRBEMP) has come out with number of reports till date. A few of these have policy suggestions about waste water management in the Ganga Basin, especially the institutional options for realizing the most important 'Zero-Liquid Discharge' (ZLD) concept. These suggestions need expert as well as public consultations in order to clarify issues of implementation. The Policy, Law and Governance (PLG) group consolidates the findings from the earlier reports of GRBEMP in this final report and highlights some recent policy perspectives from that emerged in the last two years, which came after the earlier PLG group reports. The primary task of this report is to bridge the gap in perceptions of issues in UWSS in the country and particularly in the context of river Ganga, organize the main findings of earlier reports and raise questions which need answers for successful presentation of GRBEMP. This report is broadly split into three sections discussing the policy shifts, investments and PPPs in UWSS, critical review of GRBEMP reports and alternate policy debate.

The first section starts with a review of the larger shifts in policy in favor of privatization and later to PPPs with the arguments of state failure. It maps the state facilitation in favor of PPPs in India with an assessment of the ongoing experiences. The section identifies the current thrust for centralized technological solutions that warrants high financial investments and institutional models like Public Private Partnerships (PPPs) in the UWSS. This forms the background for better understanding of the suggested technological solutions like ZLD and institutional models like 'Design Build Finance Operate' (DBFO) in the Ganga Basin. The renewed policy debate on the PPP has two strands: one that argues for huge financial inducement thrust into the sector like there port of the High Powered Expert Committee (HPEC) (HPEC, 2011) and another that cautions the viability of this trajectory and argues for larger governance changes with a more heterodox understanding of technology, investments and institutional structures needed contextually to bring in sustainable and affordable options that reach majority of the population. This section also briefly presents the current investment demand and status of PPP in UWSS.

With this backdrop, the second section presents the critical review of GRBEMP reports from a PLG perspective and comes up with number of questions which needs expert and public consultation. The section starts with the review of

reports on Ganga Action Plan (GAP) and following are the major issues that come out of the review. Since large proportion of pollution load in the river come from the municipal wastewater generated in twenty-five Class I towns¹ located on the banks of the Ganga, emphasis under the GAP was given on interception and diversion of wastewater and its treatment in Sewage Treatment Plants (STPs). There exist different issues and problems in different stretches or segments of the river (viz. upper, middle, and lower) due to different types of natural conditions and human interventions. Institutions with responsibilities of monitoring and evaluation of GAP were created at all levels - the Central Government, the State Governments and local governments. With monitoring of river water quality by different academic as well as public institutions, a loose and vague policy and legal framework, especially the lack of clarity about the roles of various stakeholders involved in the implementation of the GAP, have been important weaknesses of the very design of GAP. The lacunas, gaps and ambiguities in the existing pollution abatement laws allow departmental discretions to play a decisive role in implementation of GAP. The failure of institutional mechanisms created by GAP could be traced to multiplicity of the government agencies (departments, para-statal, government-agencies working at various levels) with overlaps and conflicting jurisdictions (GRBEMP, 2011a).

The Policy, Law and Governance (PLG) group designed an analytical framework for understanding the issues of governance related to UWSS. With introduction to key concepts, norms and tasks in infrastructure governance, it explained the core governance maladies (CGMs) such as gaps, overlaps, inconsistencies, vagueness and inadequacies in governing agencies which affects their functioning (GRBEMP, 2011b). Based on this framework, the group discussed the Kanpur case study in GAP and identified deficiencies in the sectoral responsibilities such as collection, conveyance, interception and diversion of sewage. The two broad failures in performance of the sewerage or sanitation system in the city of Kanpur are (a) inadequacy of infrastructural facilities to collect and treat sewage up to the desired standards, and (b) lack of effective operation and maintenance of the installed infrastructure. (GRBEMP, 2011c) The lacunas in the structural characteristics of governing agencies are gaps in capacities and administrative systems, lacunas in financial arrangements, vagueness in relationship between different stakeholders, misaligned perceptions, interests and norms of stakeholders.

¹ With populations exceeding 100,000 which constitutes around 75% of the pollution from all point-sources and remaining 25% of the pollution from point-sources were mainly due to untreated industrial effluents.

The report² of 'Environmental Quality and Pollution' (EQP) group suggested deploying of DBFO model, a type of PPP, as an institutional solution to the deficient sanitation infrastructure in Class I towns of Ganga River Basin for realizing the 'Zero-Liquid Discharge' (ZLD) concept and to bring in the much needed finances and expertise which are, as cited in the report, inadequate with Urban Local Bodies (ULBs). The PLG group reviewed the report and termed the DBFO model as 'End-of-the-Pipe' and 'Closed-Compound' solution³. It mapped the existing issues with the institutional problems at the levels of Policy Instruments (PIs) and Governing Agencies (GAs). Though the PLG group report suggested the need for more intensive studies, in one of its report it supported the EQP group's suggestion of the DBFO model referring to urgency of problem of pollution affecting river Ganga. A detailed analysis of the DBFO model that insulates itself from the governance maladies of existing institutions was done in this report. This clarified that there is the need for some public/government institutions to decide on tasks such as deciding the capacities of STPs, providing /facilitating land/power, ensuring quality of treated water, fix tariffs, sell/use the tertiary treated water 'bought' from the provider etc. This means that the so-called insulated DBFO model (which in reality is not) will fail if the governance issues discussed are not fairly addressed especially in the context of the political economy of governance, especially corruption in the existing institutions.

The third section revisits the larger policy discussions and clarifies important proposals that support need for heterodox solutions in place of the singular imagination of DBFO model.. The National Ganga River Basin Authority (NGRBA) has proposed a river basin treatment strategy that clearly states, "In river basins, recycle and reuse of sewage is not feasible when STPs are centralized systems to which sewage is conveyed over long distances involving intermediate pumping stations and outfall sewers". With this NGRBA suggested "a decentralized sewage system offers opportunities to efficiently use the treated sewage and hence is recommended" (GoI, 2013: 217). The reform agenda suggested in the XIIth five year plan points at the institutional model(s) for Ganga basin, "first, we will have to reduce the length of the pipeline to bring water to homes, thus reducing costs, including electricity and pumping costs and 'leakage'. This means giving higher priority to reviving local water bodies and recharging groundwater, so that we can source water from as close as possible. Secondly, we must use less, not more water in our homes, so that we have less to treat and less to dispose off. Thirdly, we must also

² Guidelines for Implementation of Sewage Collection, Diversion, Pumping, Treatment, and Reuse (Sewage CDPTR) Infrastructure in Class I Towns (Source: http://gangapedia.iitk.ac.in/sites/default/files/004_EQP_S%26R_3.pdf (Accessed on 17-04-2013))

³ Prevention of River Pollution by Urban Sewage Recommendations from Policy and Governance Perspective based on a Model Case Study (Source: http://gangapedia.iitk.ac.in/sites/default/files/Second%20Set%20of%20Report/010_PLG_Kanpur%20Sanitation%20Study.pdf (Accessed on 17-04-2013))

cut the costs and transportation of sewage—use decentralized networks and use a variety of technologies to treat sewage as locally as possible.” (GoI, 2013: 165) The PLG group recommends that GRBEMP has to seriously debate the institutional models to be proposed for achieving ‘Zero- Liquid Discharge’ (ZLD) before arriving at the DBFO model proposed in the earlier documents. Here, we have to suggest some concrete plans to address the governance maladies like strengthening ULBs to weigh alternate technology and institutional options in a transparent and participatory manner (where people become fully aware of the consequences – financial and others) before aiming at a singular model proposed now.

2. Policy Shifts, Investments and PPPs in UWSS

This section presents the literature review for policy shifts, current demand for investments and PPPs in UWSS. It starts with reasons for state failure, privatization and later discusses the emergence of PPPs. It presents evidences from policy documents of Government of India (GoI) clearly in favor of PPPs in UWSS. Briefly describing the investments requirements, the section also discusses the status, issues and its consequences in UWSS in India.

2.1 Public Utilities in Crisis and Call for privatization

In India, a number of recent studies cite a vicious cycle of non performance in UWSS suggesting a downward spiral of deteriorating assets and declining productivity which has increased the operating costs (GoI, 2002a: 10; GoI, 2009a; Wagle, et. al, 2011; Bhatnagar & Zeug, 2011). The declining service levels have in turn affected citizen’s willingness to pay leading to declining revenues, reduced finances and further investments in infrastructure that ends up with the argument of a vicious cycle of unsustainability- unsustainable utilities, depleting natural resources and increasing demand -supply gap that completes the loop of the perpetual operational and financial distress of public utilities. A dominant explanation to such a cycle of inefficiency is the poor program design and little accountability (WB, 2008: 20; Briscoe and Malik, 2006) Thus, the state failure arguments are seen to have two strands. The first is the perspective of the International Financial Institutions (IFIs) which perceive the failure of public utilities from the point mostly of financial viability of which governance also is a part. The prescription here is mostly reduced to private participation to complement investments as well as increase efficiency. The second set of criticism comes more from the political economy angle of bureaucratic nexus with vested interests, inefficiency/rent seeking which also reflects the lack of accountability and transparency of public utilities (Davis, 2004; Bakker, et.al., 2008).

This argument is more explicit of the consequences of poor service in general and lack of reach to marginalized sections of the population as evidenced by our in-depth case study of Kanpur city. It has pointed out several inadequacies at the level of sewage collection, conveyance, treatment, and disposal because of failure of various government agencies in discharging various generic and cross-sectoral functions which spans from planning, designing, building, operating and maintaining, evaluating and regulating⁴. Whatever are the reasons for the so called 'state failure', last two decades first witnessed radical alternatives like privatization and later boiled-down versions of PPPs as solution.

The arguments of "state failure" invited call for privatization with number of general reasons put forward for private sector participation such as to improve quality, operating efficiency and system performance; reduce subsidies, introduce competition in the sector, inject private investment capital and expand service coverage to more customers including the poor (Dijk, 2008; Prasad, 2006; Alexander, 2005). The global trend got reflected in India's National Water Policy (NWP) 2002 which encourages participation of private sector in planning, development and management of water resources projects with a view to introduce innovative ideas, generate financial resources, and introducing corporate management and improving service efficiency and accountability to users (GoI, 2002b: 6). Following the policy prescription, the position paper of government on the water and sanitation sector clearly spelt out that, "all models of private sector participation, viz. build, own, operate and transfer, are acceptable" (GOI, 2009a: 6). In 2004, the Ministry of Urban Development and Poverty Alleviation (MoUD&PA) came out with guidelines for UWSS reforms and successful PPPs. These Guidelines were designed to sensitize State Governments and ULBs to the policy and procedural issues that need to be addressed as they reform urban water supply and sewerage services. They also seek to embed an evolving role for the private sector into this broader sector reform, facilitate a systematic assessment of the issues and options for successful private sector participation (PSP) and prevent improperly designed and executed PSP transactions (MoUD&PA, 2004: 1). The National Urban Sanitation Policy (NUSP) 2008 envisaged full sanitation coverage under the XIth plan by generating awareness and identifies fragmented institutional roles and responsibilities at the national, state, and city level as one of the key issue to be

⁴ Prevention of River Pollution by Urban Sewage Recommendations from Policy and Governance Perspective based on a Model Case Study (Source: http://oanqapedia.iitk.ac.in/sites/default/files/Second%20Set%20of%20Report/010_PLG_Kanpur%20Sanitation%20Study.pdf (Accessed on 17-04-2013))

addressed in the sanitation sector (GoI, 2008). The High Powered Expert Committee (HPEC) proposal clearly favors PPP as the first option wherever it is feasible. It suggests all projects to be screened for viability and implementation on a PPP basis as a first step before being sanctioned for implementation through the conventional route and recommends that contractual and financial arrangements such as Build-Operate-Transfer (BOT), annuity and viability gap funding (VGF) be more widely used in the delivery of urban services (HPEC, 2011). The Department of Economic Affairs (DEA), in 2009, suggested that the private player be isolated from regulatory risks through “a contract where only interpretations, performance monitoring as per contract, approval of capital expenditure and dispute resolutions come under the regulatory purview” (GoI, 2009a: 23). The new revised draft NWP 2012 suggested that wherever the State Governments or local governing bodies so decide, the private sector can be encouraged to become a service provider in public private partnership model to meet agreed terms of service delivery, including penalties for failure (GoI, 2012a).

Since the government has perceived privatization policies in all its earnestness it has attempted to prove the success of PPP. In a profile of failed projects that were abandoned at an early stage, the government argued that the failure is not because of drawbacks of PPP per se, but because of the limitations of the processes that were followed or the lack of enablers being in place and listed the projects which are operational as successful (GoI, 2009a: 14-16). However, the global trend shows that the private contracts in water sector have failed to deliver investment in new infrastructure as well as earn returns on infrastructure investment in developing countries. The private companies have also failed to show greater efficiency than public sector operations⁵. As a result, there has been less direct privatization of water services since the 1990s, but the commercialization trend continues, largely through the use of PPP (Hall & Lobina, 2006). In the Indian context, the policy documents released in past decade indicate a deliberate push for PPP as a favored model in WSS that calls for an evaluation of the viability of this institutional option.

⁵ In past two decades, only about 600,000 households have been connected as a result of investment by private water operators in sub-Saharan Africa, South Asia, and east Asia (outside China) – representing less than 1% of the people who need to be connected in those regions to meet the UN Millennium Development Goals (MDGs). A World Bank study showed that returns on infrastructure investment in developing countries, including water, fell far short of the cost of capital. Empirical evidence from studies in all continents shows that ownership does not appear to make any significant difference to efficiency. In 2004 the Asian Development Bank conducted a survey of 18 cities in Asia, which included two cities with private sector concessions - Manila and Jakarta. These were performing significantly worse than average on some indicators of coverage for water and sewerage, investment, about the same on six indicators, and relatively well on another five indicators (including revenue collection, and minimizing the number of staff per 1000 connections). A 2004 study by economists, covering 110 African water utilities, found no significant difference between public and private operators in terms of cost efficiency (Hall & Lobina, 2006).

2.2 Demand for Investment in UWSS

India's urban population is expected to reach 600 million by 2031 which would need massive capital and O&M investment in urban infrastructure, as highlighted by various Finance Commissions and expert bodies (Working Group on UWSS, 2011). Hence, the scale of investment needed in UWSS sector is also expected to be substantial as the service provisioning under this sector is conceived as building, operating and maintaining centralized Sewage Treatment Plants (STPs) which involves capital and energy intensive technology solutions. Before looking at the investment demand, it would be helpful to understand the prevailing technology options of STPs and their performance in the Indian context, which is one of the major reasons for seeking increased investments.

As per a CPCB report in 2005, there are 234-Sewage Treatment plants (STPs) in India. Most of these were developed under various river action plans (from 1978-79 onwards) and are located in (just 5% of) cities/ towns along the banks of major rivers. It is found that in class-I cities oxidation pond or Activated sludge process is the most commonly employed technology, covering 59.5% of total installed capacity. This is followed by Up-flow Anaerobic Sludge Blanket technology, covering 26% of total installed capacity. Series of Waste Stabilization Ponds technology is also employed in 28% of the plants, though its combined capacity is only 5.6% (Kaur, Wani, Singh, & Lal, 2011). A performance evaluation of STPs carried out by CPCB in selected cities has indicated that though with high end technology options, out of 92 STPs studied, 26 STPs had not met prescribed standards in respect to BOD thereby making these waters unsuitable for household purpose. As a result, though the waste water treatment capacity in the country has increased by about 2.5 times since 1978-79, hardly 10% of the sewage generated is treated effectively, while the rest is responsible for large-scale pollution of rivers and ground water (Kaur et al., 2011). Since 1980 the central assistance in investments in UWSS have increased drastically from Rs 3700 crore to Rs. 43000 crore in 2005-11 (Working Group on UWSS, 2011). Let us examine some of the projected estimates of investment demand in UWSS from recent policy documents.

The total capital investment estimates for the eight major sectors⁶ of urban infrastructure for the 20-year period from 2012 to 2031 amount to Rs 31 lakh crore at 2009-10 prices. Sectors delivering urban services such as water supply, sewerage,

⁶ Water Supply, Sewerage, Solid Waste Management, Urban Roads, Storm Water Drains, Urban Transport, Traffic Support Infrastructure, Street Lighting

solid waste management, and storm water drains account for 26 per cent (Rs 8 lakh crore) of the total investment requirement. Another Rs 8.2 lakh crore, considering all eight sectors, is estimated for renewal and redevelopment of existing facilities including slums, and capacity building. The total O&M cost⁷ for above period in UWSS sector is estimated to be Rs 8,17,671 crore amounting to a per capita investment needed for capital infrastructure of Rs 13,329 and another Rs 840 annually for operation and maintenance (HPEC, 2011: 69-84)

However, this may be an underestimation, given that the costs of water and sewage treatment,. For instance, the average cost of a comprehensive water supply scheme under JNNURM is roughly Rs 3 crore per mld while of a sewage project is Rs 3.33 crore per mld. However, the cost of building sewage treatment systems and networks under the Union government's revamped Ganga programme averages is over Rs. 5 crore per mld – with small cities like Munger in Bihar getting as much as Rs. 7 crore per mld (Gol, 2013: 165; Working Group on UIWSS, 2011: 10). The Central Pollution Control Board in 2010 estimated the volume of waste water generated in Ganga basin from 179 class I cities/towns as about 11400 mld of waste water (see Table 1). The investment required just to build STPs to treat the currently generated waste water is thus about Rs. 57000 crore (assuming Rs. 5 crore per mld).

**Table 1: Waste water generation in Class I cities/towns
in Ganga Basin**

No. of Class I cities/towns	Waste water Volume (mld)	Disposal Strategy
36	2637.7	Ganga river
113	7841.5	Tributaries
30	907.4	Land
Total = 179	Total = 11386.6	

Source: (CPCB, 2010: 31)

The computed capital investment has not considered the increase in waste water generated in future due to population growth, nor has it taken into the consideration the other social, economic, financial and political factors which would influence the investments in the long run. According to the HPEC estimates, the

⁷ The O&M cost includes the cost of O&M of physical assets, staff, and related administrative cost for the respective sectors. The O&M computation takes into account both the cost of O&M of existing assets as well as of new assets that will be created over the 20-year period. It does not include debt servicing, margins for operators in case of private party involvement, and depreciation.

running cost of such investments for 20 years will be in the tune of about Rs. 8-10 lakh crore which will then inflate the per capita investments need for capital and O&M.

2.3 UWSS PPPs in India

For cash strapped ULBs and parastatal public utilities that are not in a position to afford centralized technological initiative, PPP becomes a solution in the current policy context, especially through centrally sponsored schemes like Jawaharlal Nehru National Urban Renewal Mission (JNNURM) and Urban Infrastructure Development Scheme in Small and Medium Towns (UIDSSMT). In the first sub section, we attempt to understand the status of UWSS PPPs in India and try to consolidate issues and its consequences through case studies in the second ???.

2.3.1 Status of UWSS PPPs in India

PPP is a generic term that can encompass a wide range of institutional arrangements. At a general level, PPP arrangements could be visualized as a continuum of institutional options that runs from a “contribution contract”—which involves a private-sector contribution to a public facility, and minimal risk-transfer at one end to a “buy-build-operate” partnership (BBO) in which the private partner purchases an existing public facility, upgrades it, and owns and operates it in perpetuity at the another end (Allan, 1999). The ‘DBFO’ model fits at the latter end of continuum. As part of facilitating PPPs, Government of India (GoI) has identified several challenges and mitigation measures to promote private investment in the UWSS sector in India as shown in Appendix 1 which clearly shows that most of the concerns are financial such as enhancing viability for the private sector by public sector funding and reducing the private sector’s financial risks. The concern is “citizen” has to be educated into a ‘customer’, who understands water as an economic good and thus shall pay for the services. This shift then has to be ensured by a political commitment by the state through an upfront agreement and clearly a call to commoditize water, particularly to induce a market in waste water that is currently non-existent.

In India, critical studies have identified the visible fruits of this facilitation with several state governments, municipal corporations, water supply boards and other parastatal agencies entering into contracts with various multinational as well as domestic water and infrastructure companies, especially through Jawaharlal Nehru National Urban Renewal Mission or JNNURM. There are number of studies from

donor and multilateral agencies (GoI-ADB, 2010, Prasad, 2006, WB, 2008) viz. Asian Development Bank, World Bank, United Nations, civil society organizations (Dwivedi, 2010, Bhatnagar & Zeug, 2011) viz. Manthan, Centre for Science and Environment⁸, as well as government (GoI, 2009a, MoUD&PA, 2004) viz. Department of Economic Affairs, Ministry of Urban Development that evaluated the performance of the institutional option of PPP in UWSS. The review of these studies helps in understanding and identifying the issues associated with implementation of these models. In sub-sequent section, we try to summarize the issues along with consequences discussed in literature. Through this we intend not to categorize the PPP projects in UWSS as ‘success’ or ‘failure’; but to understand the present scenario for better understanding of the ongoing PPP experiences.

Table 2: Summary of PPP projects in Indian UWSS

P arameters	1990s	2000-2004	2005 Onwards
Number of PPP projects planned	5 (AP-Hyderabad; Goa, Maharashtra-Pune; Karnataka-Bangalore; TN-Tirupur)	8 (Maharashtra -Sangli, Mumbai, Chandrapur; Delhi-21 pilot zones, Sonia vihar; Karnataka-Bangalore, 8 MC; AP)	13(Karnataka-Hubli Dharwad, Mysore; MP-Dewas, Khandwa, Shivpuri; Chattisgarh-Naya Raipur, WB-Salt Lake, Haldia; Maharashtra-Nagpur,Latur, Bhiwandi; TN-Madurai, Chennai)
Contracts Awarded	1	3	13
Current status of contracts awarded	1 Operational (TN-Tirupur)	2 Operational (Delhi-Sonia Vihar; Maharashtra-Chandrapur)	12 projects are in various stages of implementation/operation; 1 project is currently stalled (Maharashtra-Nagpur)
Project funding Share	1 (100% Public funding) ; 4 NA	4 (100% Public funding), 1 (Private Investment envisaged), 3 NA	2 (100% Public funding),3 (90% public funding), 1(35% Public funding),1(Incremental investment from Pvt Operator), 6 NA
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
NA: Information Not Available BOOT: Build Own Operate Transfer; DBFOT: Design Build Finance Operate Transfer.			

(Source: (Bhatnagar & Zeug, 2011))

⁸ Reports on <http://www.cseindia.org/taxonomy/term/20237/menu>

Table 2 summarizes the PPP activities in India's UWSS in 3 distinct time periods. With increase in number of instances of successful contract awards since 2005, it is also observed that there is a shift in the geographic concentration of PPPs from the initial clustering of projects in South India to a wider cross-section of cities/states with later PPPs drawing on public funding available under schemes such as JNNURM. Approximately 60 percent of the PPP projects, since 2005 are focused on improvements of the distribution system while 30 percent are aimed at bulk water supply augmentation which was predominant earlier. The remaining projects include both bulk water supply augmentation and O&M of the entire system. 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. With most urban water supply PPP projects developed with substantial public funding, 50 percent of the ongoing projects have been developed with financial support from the government and 75 percent received funding from the central government-sponsored JNNURM and UIDSSMT schemes. 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. A drop in international private operator's participation is observed since 2000 with increase in domestic/local/regional players from 2005 onwards.(Bhatnagar & Zeug, 2011). This trend clearly indicate the lack of market in the UWSS in India, which is more acute in waste water projects, which cautions against the assumption of large number of players coming to implement the DBFO model currently in consideration in GRBEMP (discussed in detail later).

2.3.2 Issues in UWSS PPPs and its consequences

The specific issues associated with PPPs in UWSS are escalated tariff rates, disconnections and marginalization, vested interests vying for of high profits, problems emerging from cost cutting, public guarantees of private finances and profits, efficiency and efficacy of operation, commercialization of water, control of the resource and natural resource exploitation (Dwivedi, Rehmat, & Dharmadhikary, 2007). A more general issue is that PPPs in WSS are still at the project level with lack of sector-level enablers⁹. Cities (or states, in some cases) have chosen the

⁹ PPPs in other sectors (such as power, highways, and so on) 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.

PPP model for specific projects with no state or country-level approach or enabling framework for water PPPs. 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, they lack technical and monitoring capacity to facilitate, implement and scaling up of PPPs. (Bhatnagar & Zeug, 2011) There are number of case studies (refer Table 3) from which the above issues could be identified and consequences mapped as caution to design and implement future PPPs in WSS.

Table 3: Issues in PPP cases and consequences

Issues	Cases referred	Consequences*
Uncertainty in identifying risks	Tirupur	Loss to NTADCL
Inadequate assessment of the target area	Bangalore	Significant cost escalation later for expansion
Inefficiency and Inefficacy	Chandrapur	Public agitation, shift to bore wells and other options for water
Escalated tariff rates	Khandwa, Shivpuri, Pune, Sangli	Heavy opposition from CSOs and other stakeholders
Lack of Transparency and Accountability	Latur, Pune, Sangli	Failure to resolve conflict, secure legitimacy and acceptance from the citizen
Public funding with least or no private investment	Nagpur, DJB, Khandwa, Shivpuri, Tirupur, Pune	Profit making motive, tariff hike, Neglected Water supply to domestic consumers, Marginalization of those who are unable to pay
Debts due to huge loan	Pune	Siphoning of funds earmarked for other development programs
Complete private investment	Chennai, Khandwa, Shivpuri	Sustainability of finances of public utility, Rise in tariff

Source: (Dwivedi et al., 2007; Bhatnagar & Zeug, 2011; Dwivedi, 2010; GoI, 2009a; Working Group on UIWSS, 2011)

Note: *Refer Annexure II for more details on the cases referred.

Successful implementation of a PPP contract is dependent on how the risks associated with the project are identified, listed and allocated. An illustrative list of 15 risks¹⁰ associated with a project and its consequences is presented in the toolkit for

¹⁰ Risk categories: Commissioning, Construction, Demand (Usage), Design, Environmental, Financial, Unavoidable circumstance, Industrial relation, Latent defect, Operating, Performance, Change in law, Residual value, Technology obsolescence and Upgrade. (For details refer: (GoI, 2009b))

PPPs in Urban water supply for Maharashtra developed by GoI, Government of Maharashtra (GoM) and Asian Development Bank (ADB). The consequences of these risks are discussed completely in a techno-financial viability context and thus only to safeguard the interest of the private sector (GoI, 2009b). A comprehensive analysis and transparent public consultation process for educating citizens and taking them on board, especially for clarity on the current and future private costs (in case such projects are to be undertaken) due to possible rise in tariffs need to be conducted. This is suggested in the 12th report of Second Administrative Reforms Commission which provides a seven step model for citizen centric administration and recommends evaluation of the extent of customer satisfaction by an external agency through Citizen's Report Card (GoI, 2009c). But such initiatives figure least in the priorities in governance.

The commitment of ULBs to water PPP projects is a tactical response at times. 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 (Bhatnagar & Zeug, 2011). The above discussion clearly shows that the PPP contracts have showered heavy liberty on to private sector by providing sufficient public funds and providing facilitative conditions to cost recovery to earn profits as well as neglect social obligations such as equity. There is no evidence of any assessment, either by private or public, of the conditions at ground level considering population, demand supply gap or environmental impact is done before initiating the projects. Hence, for PPPs to succeed, a huge effort is needed on behalf of government (if it choose to be facilitator) to improve its governance structure (for planning, monitoring and regulating) in order to complement the private participation as well as ensure compliance of the terms A new "vicious cycle of high-tech non-performance" of private provisioning in UWSS is emerging that points to the roots of failure in governance and thus again to arguments of state failure that triggered the new idea which brings us back to square one.

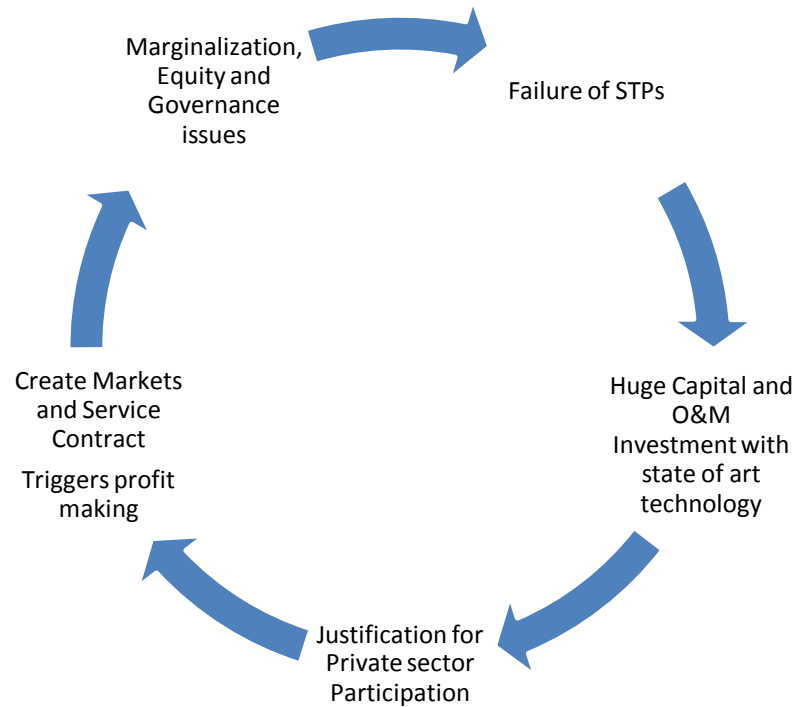


Figure 1: A new vicious cycle of high-tech non-performance

The limitations of the private participation experiments thus point to the fact that the public sector must be the important vehicle for expansion in the future, as in the past. Even the World Bank's infrastructure policy review in July 2003 noted that private finance had accounted for less than 10% of total investment in water in developing countries in the previous decade, and concluded that: "the Bank will need to more strongly promote sustainable public sector investment and service delivery" (Hall & Lobina, 2006: 11). Although this call is to enhance the bank's possibility (business) of funding governments, we have to look at the larger issues, especially the ongoing policy debates to understand the respective roles of various stakeholders in making UWSS not only efficient, but also sustainable and affordable.

With arguments of state failure, this section reviewed the larger shifts in policy in favor of privatization and later to PPPs. It explained state facilitation in favor of PPPs in India with an assessment of the ongoing experiences. The section briefly discussed the current investment demand and status of PPP in UWSS. The main concern was to map the consequences of the issues in PPPs, especially to better understand the suggested technological solutions like ZLD and institutional models like DBFO in Ganga Basin. But before we raise such questions, we need to organize

the main findings from the earlier reports of GRBEMP. A critical review of GRBEMP reports would provide us insights to what is missing in our earlier studies and what necessarily we must focus on for better representation of GRBEMP.

3. Critical Review of GRBEMP reports

This section presents the critical review of GRBEMP reports and comes up with a number of questions which need expert and public consultation. The section starts with the review of reports on GAP and discusses the major issues that come out of the review and in subsequent section, discuss the Kanpur Case study conducted by PLG group. A detail discussion on the DBFO model proposed by EQP group is done in last subsection. The section raises number of questions on characteristics of the model and its economic as well as financial viability.

3.1 Ganga Action Plan (GAP)

The idea of cleaning river Ganga was initiated by GoI in 1979; however the GAP could only be initiated in 1985 after a comprehensive survey of the river Ganga by Central Pollution Control Board (CPCB). CPCB had published few comprehensive reports on the pollution issues in the river since then. These reports formed the basis of intervention activities under GAP. The GAP was aimed at controlling pollution in a systematic and planned manner to improve water quality¹¹. (GRBEMP,2011a). The PLG group conducted a Strengths-Weakness-Opportunities-Threats (SWOT) of GAP and presented a report which gives comprehensive picture of GAP and its issues.

A large proportion of pollution load in the river comes from the municipal wastewater generated in twenty-five Class I towns located on the banks of the Ganga, each with a population exceeding 100,000 which constitutes around 75% of the pollution from all point-sources and remaining 25% of the pollution from point-sources were mainly due to untreated industrial effluents. Therefore, emphasis under the GAP was given on interception and diversion of wastewater and its treatment in STPs, before discharging into river. Development of dedicated and

¹¹ The other objectives were to: (a) conserve biodiversity, (b) developing an integrated river basin management approach, (c) conducting comprehensive research to further these objectives, and (d) gaining experience for implementing similar river clean-up programs in other polluted rivers in India.

specialized institutional structure was one of the deliberate strategies that the GoI implemented, in order to ensure the effective implementation of the GAP. These institutions with responsibilities of monitoring and evaluation of GAP were created at all levels - the Central Government, the State Governments and local governments. Monitoring of river water quality by different academic as well as public institutions was the integral part of monitoring mechanisms of GAP. There exist different issues and problems in different stretches or segments of the river (viz. upper, middle, and lower) which are caused by different types of natural conditions and human interventions. A loose and vague policy and legal framework, especially the lack of clarity about the roles of various stakeholders involved in the implementation of the GAP, have been important weaknesses of the very design of GAP. The lacunas and gaps in the existing pollution abatement laws create many ambiguities and gaps which allow departmental discretions to play a decisive role in the implementation of the program. These ambiguities have also paved the way for many weaknesses of the GAP itself. Similarly, multiplicity of institutions is another result of the lack of clear policy-legal framework. The failure of institutional mechanisms created by Ganga Action Plan could be traced to the overlaps and conflicting jurisdictions of the government agencies (departments, para-statal, government-agencies working at various levels).

The SWOT analysis of GAP points at the different dimensions of the broader problem of governance failure, despite some of its achievements. Issues such as delays in implementation of the program, confusion over funding, selection of technological options, operation and maintenance of the assets indicate not only typical governance failures but also clarify the gaps in policy and program design. These gaps also highlight the weakness in program planning, implementation, monitoring, evaluation, center-state coordination, state-ULB coordination, etc. The multiplicity of institutions at the local level, their conflicting/overlapping roles and low levels of citizen participation pose broader challenges and demand greater transparency. This calls for a detailed analysis of the governance-related factors affecting effectiveness of the GAP both within government agencies as well as outside. Huge amount of water diversion for irrigation purposes in the upper stretches causes intensification of the pollution in the middle-stretch of the Ganga by reducing flows even below the levels of minimum environmental flows in non-monsoon season. The decisions like diverting water seems irreversible considering the political-economy of the basin,. Similar inter-linkages within different stretches needs to be understood properly which calls for evolving a detailed interdisciplinary analysis.

Apart from understanding the inter-linkages among the problems and their social, political, economic and technological aspects, there is a need to understand the institutional aspects of the problems with respect to the GAP. Here, institutions do not signify merely the formal structure of the government agencies (departments and authorities), it is also the ways of functioning by the government and non-government actors using gaps and loopholes in the provisions in a diverse manner that cause interventions to be ineffective. It implies developing an understanding of informal ways of decision-making as well as the interpretation of the existing laws reflected in the functioning of the government agencies as well as implementation of the programs such as GAP.

The PLG group designed a policy and governance perspective and analytical framework for analysis of management of urban sewage after the in-depth analysis of GAP and its issues. With introduction to key concepts, norms and tasks in infrastructure governance, it explained the core governance maladies (CGMs) such as gaps, overlaps, inconsistencies, vagueness and inadequacies in governing agencies which affects its functioning and hence indicated need of serious attention.(GRBEMP, 2011b). Based on this framework, the group discussed the Kanpur case study in the context of GAP and identified deficiencies in the sectoral responsibilities such as collection, conveyance, interception and diversion of sewage. We now present the main findings from Kanpur Case Study relevant in current discussion.

3.2 Issues in Kanpur case study

The two broad failures in performance of the sewerage or sanitation system in the city of Kanpur: (a) inadequacy of infrastructural facilities to collect and treat sewage up to the desired standards, and (b) lack of effective operation and maintenance of the installed infrastructure. The Kanpur case study also showed that each of the generic functions—from survey and design, planning, execution, operation and maintenance, and monitoring and evaluation—were not carried out in an effective and efficient manner by the agencies concerned with governance of the sanitation sector. The lacunas in the structural characteristics of governing agencies are gaps in capacities and administrative systems, lacunas in financial arrangements, vagueness in relationship between different stakeholders, misaligned perceptions, interests and norms of stakeholders. The study identified deficiencies in sectoral responsibilities such as collection and conveyance (viz. inadequacy of sewer network, non connection of households to existing sewerage network, open defecation, inadequate maintenance of sewers), interception and diversion works

(viz. partial coverage, non tapping of nallas in areas where cities expanded, frequent choking and leakage of conveyance system, inadequate treatment facilities, irregular operation and maintenance of treatment capacities) and performing generic functions (viz. deficiencies in planning and designing of sewer network, building sewers and sewage treatment infrastructure, operation and maintenance of the assets, weak monitoring, evaluation and regulation). The crux of this diagnosis could be narrowed down in terms of the four types of core governance maladies: (a) lacunas in Policy Instruments, (b) lacunas in Governing Agencies, (c) distortions in the governance process due to misaligned perceptions and norms of the stakeholders, (d) distortions in the governance process due to misaligned interests of the stakeholders. Thus, in short, the chronic problem of pollution in the river Ganga requires a comprehensive range of solutions that are synergistically supportive of each other. It needs to be noted that the problem essentially is rooted in the governance crisis and no amount of inputs for technical, financial, or capability / knowledge enhancing will be able to reduce these core governance maladies. This is not to deny the need or utility of the technical, financial or knowledge inputs, but to warn against naiveté that prompts a search for simplistic solutions that often serve the vested interests rather than the cause of clean river Ganga.(GRBEMP, 2011c) With this discussion, we now turn our attention to 'DBFO' model as proposed by EQP group.

3.3 Design Build Finance Operate (DBFO) Model

The report¹² of 'Environmental Quality and Pollution' (EQP) group suggested deploying of 'Design-Build-Finance-Operate' (DBFO) model, a type of PPP, as an institutional solution to the deficient sanitation infrastructure in Class I towns of Ganga River Basin (GRB) for realizing the most important 'Zero-Liquid Discharge' (ZLD) concept and to bring in the much needed finances and expertise which are, as cited in the report, inadequate with Urban Local Bodies (ULBs). Box 1 and 2 presents the highlights of the 'DBFO' model and expected advantages of it respectively. organized under different heads such as institutional model and funding source, land requirement and clearance, infrastructure building and operations, power requirements, guarantee and regulation. While analyzing the features of DBFO model, it seems like the entire responsibility and risks are borne by the private service provider. However, on closer look, it is seen that the success of this model rests on a host of tasks to be carried out by the state or particularly the ULBs that is

¹² Guidelines for Implementation of Sewage Collection, Diversion, Pumping, Treatment, and Reuse (Sewage CDPTR) Infrastructure in Class I Towns (Source: http://gangapedia.iitk.ac.in/sites/default/files/004_EQP_S%26R_3.pdf (Accessed on 17-04-2013)

assumed to lack capacities and motivation as seen in the earlier state failure discussions. For example, complete responsibility of land acquisition and its clearance is borne by ULBs, annuity payment to be released after verifying the quantity, quality and disposal of treated sewage etc. .

Box 1
Highlights of the 'DBFO' model (Source: (GRBEMP, 2010: 14-17))

Institutional model and Funding source

1. Special purpose vehicle (SPV) to be set up by service provider and ULB using PPP Model. Income to the service provider will be from two sources, annuity payments and profits (if any), from commercial exploitation of resources generated through sewage treatment. The service provider and ULBs will have joint rights (as stipulated in contract) for commercial exploitation.
2. The period of O&M contract (5-15 years post commissioning) to be offered to service provider to be decided through mutual consultations.
3. Contract between the ULB and service provider will be guaranteed by the state government and counter guaranteed by the central government.
4. Other mechanisms such that the service provider is assured of payment as per the contract.
5. Bids to be invited from empanelled service provider using two bid system. The agency submitting the lowest financial bid is selected amongst the bids that are technically sound as per prescribed criteria.
6. Service provider is expected to invest the entire funds required for initial creation of the sewage pumping and treatment infrastructure as per the approved DPR and also take care of operation and maintenance of the facility throughout the contract period.
7. Funds to be made available by the state and central governments for annual payment to the service provider throughout the contract period

Power

8. Service provider responsible for uninterrupted power supply for the facility.

Land and Clearances

9. Entire land for building the facility is identified by the ULB.
10. Obtaining the associated clearances is responsibility of the ULB. No project will be sanctioned by the NGRBA without these clearances.
11. Construction of the facility must occur in phases as the quantity of sewage available for treatment increases.
12. With approval of Detailed Project Report (DPR), the identified land is leased to the service provider at a nominal rate by the ULB for the duration of the contract period.

Infrastructure building and operation

13. Service provider builds, maintains and operates the facility for the contact period.
14. Any treated sewage, sludge etc. discharged from the sewage treatment facility during the contract period to be disposed off the service provider in a safe manner and as per provisions of the contract.

Regulation

15. Payments will be released each year to the service provider only after verification that the essential contract terms regarding both quantity and quality of sewage treated and disposal of treatment residues is satisfied.
16. Suitable penalty clauses will be included in the contract in case of non-compliance by the service provider.

Box 1 presents the highlights of 'DBFO' model. There are many specific questions to each feature of DBFO which do not have clear explanation in the EQP group report. These questions are presented categorizing according to concerns of private service provider, ULBs, public and governance.

Concerns of Private sector –

(Pt No. 1) Primarily, focusing on the institutional model and funding source, the joint rights of commercial exploitation of the resource generated through sewage treatment are questionable. Are the rights of service provider and ULBs equal and on what basis? The proposed "commercial exploitation" of the products will involve costs (capital costs, operating costs, marketing costs, staff costs etc). Who will bear those? The SPV, as suggested in EQP report, will have to be a registered corporate entity governed by the provisions of the Company's Act. What will be the capital structure, debt to equity ratio etc.? The annuity payment is linked to the quantities treated, but such quantities will be dependent on the sewage available. Whose responsibilities is it to arrange the feed? If it is ULB, why private partner will accept low annuity, without its fault? Private capital will be interested in overall return over a period and any low rate of return in the initial period is expected to be compensated by higher annuities. Are there any other principles, other than "quantity of sewage water" for example like minimum rate of return? The private partners are supposed to earn revenue by selling the products (treated water etc). If annuity be based on "gap of rate of return achieved and the minimum rate of return mutually agreed upon" then it will be much more feasible proposition. Is this the underlying idea behind the proposed model?

The model is hinged on treatment cost presuming that the treatment costs per liter is the basis for putting a price tag, it presupposes that the project/company will be able to sell adequate treated water continuously for years. What is the potential market / customers? What are the existing water arrangements for these potential customers? How the proposed price tag compares with the cost they incur for the existing arrangements? How such massive quantity of the output will be delivered to the potential customers? What is the capital and operating costs involved? Where will it be accommodated for? Higher the volume of treated water higher will be the cost of delivery that enhances price making it lesser attractive to the potential customers. The off take of treated water thus becomes viable when it is either a bulk customer in proximity within an economic radius who will lift the output on own costs.

(Pt No. 2) Looking closely at the model, if it is the proposed contract for O&M is fee

based) it does not involve financial risk. The range of duration of the proposed contract indicated as 5 to 15 years is too wide and the context of viability at these two extremes (i.e. 5 years and 15 years) may not be strictly comparable. The service provider from private sector will also expect some certainty. So it would be reasonable to insert period in terms of “not less than ---- so many years” Actual minimum number of years will have to be determined based on financial analysis, indicators like breakeven point, moratorium approved by the debt providers etc. Ideally, for infrastructure (non-commodity) projects it will have to be longer term. For a capital intensive project with 15 years of operational period, there is need to assess the financial aspects based on discounted cash flows. What is observed in the report is that the operational cost of entire 15 years have been summed up and added to the capital cost, while arriving at the total costs. It is necessary to undertake break even analysis. It is noticed that it will take some time for the project to reach optimum utilization of installed capacity.

(Pt No. 3-4) In one of the features of DBFO, It is said that “entire contract” will be guaranteed by the state government and “counter guaranteed” by the central government. Is it only some clauses like “annuity payments” or the entire contract? So the commitments of the part of the state / central government will be even for the period of 15 years? What will be the terms and estimated scale of such commitments? Any state will like to crystallize its commitments. From private partner's perspective, there will be huge political risk for such a long period of 15 years wherein change of governments at state / center is a routine event. There cannot be any other alternate mechanisms, which will comfort private capital.

(Pt No. 5) It is suggested in one of the clauses that lowest financial bid will be selected through a two bid system. What shall be the criterion of “lowest”? Will it be like lowest annuity asked for or higher profit sharing with ULB?

(Pt No. 6) The proposal of DBFO model also suggests that service provider is expected to invest entire funds required for initial creation of infrastructure. In what form such funds are to be brought in? The capital structure will determine the annuity liabilities. What are the oversight mechanisms? The equal partner like ULB will not be able to discharge this responsibility. It will require some higher level of authority.

(Pt No. 8) Power is essential for operation of the facility. What is the quality of power supply in the city where this project is proposed to be set up? Additionally, what shall be the standby arrangement? Another factor is sensitivity to the interruptions in

power supply will also have to be an input for technology selection which in turn will decide the capital cost. Has the cost of the standby power arrangements been included in the capital cost?

Concerns of ULBs -

(Pt No. 9-12) Land is the crucial component for infrastructure development. It is not clear from the EQP report whether land has to be identified or provided by ULB? It is possible that the land may be owned by ULB. But it may not be the most ideal location for the project and will have impact on the financial aspect of the project. In class I cities identifying proper location with requisite size taking into account the future expansions will be rather difficult. Cost of the land will be higher in class I cities. If ULBs bear the cost, will it be taken into account while computing the capital cost? Then it should be treated as equity contribution by ULB and entitled to earn return on it.

The necessary clearance is the responsibility of the ULB. Keeping in mind the unpredictability of the route, it will have a bearing on the implementation period and has financial costs. Who will bear such costs? It is suggested that actual construction will occur in phases. Is the project components (land, buildings, equipments etc) are modular in nature and amenable to be implemented in phases? Such phased-out implementation proves to be very problematic and non-financial developments vitiate the financial viability and the original assumptions get derailed completely. It seems that lease rental has not been considered in the operating costs. What shall be the basis of such lease rentals? Should they be market determined?

It has to be checked whether the financial analysis could be based on modular approach? In the EQP report which presents some financial analysis¹³, it is observed that the entire viability statements are made for 50 MLD capacity. It is not clear the actual plant, whenever it will be set up, will be how many multiples of 50 MLD units. The financial analysis of a capital intensive project and reasonable fixed costs, changes with the installed capacity. There is a need to undertake analysis based on discounted cash flow.

¹³ Sewage treatment in Class I towns: Recommendations and Guidelines. Source: http://gangapedia.iitk.ac.in/sites/default/files/Second%20Set%20of%20Report/003_EQP_Sewage%20Treatment%20in%20Class%20I%20Towns.pdf

Concerns of Public -

(Pt No. 13-14) One of the important observations is that even though the project is privately operated, it is mostly publicly funded. So the cost enhancements are serious public concerns. In the proposed model, when the service provider is expected to bring initial investments and arrangements involving annuity model / guarantees, the tendency is to over invoice the capital cost. The equity is taken out of the project by indulging into cost overruns, over invoicing etc. These techniques are well established. Typically, such project gets saddled with low quality asset and high capitalized cost since the service provider is assured of the agreed return on the equity. Since the service provider takes out the equity fully or partially, the incentives are lost. This does not happen in a commodity -industrial -wholly private owned project. It is in the best interest of the promoter to set up the project with “high quality assets and low capital cost”. Regarding the disposal of treated sewage, it is expected that service provider will do it in a safe way. However, if operating costs are high (and thus drag on the profits for service provider). it will increase the overall cost. These are public concerns since bloated capital and O&M expenditure will enhance these publicly funded projects.

If DBFO model is almost entirely hinged on the premise that it will attract private capital, the entire exercise will have to be recast. The private capital will not bring entire funds by equity but will have to bring it through loan. Lender will apply all the financial parameters to ensure safeguard of their interest. The assumption that the enterprises run on promised rate of return by annuity (even guaranteed and counter guaranteed by the state or central governments), might not be valid since the enterprises run on cash flows. Cash flows are missing from the analysis of the present model, especially the question of recurring expenditures including salaries.

Concerns of Governance -

(Pt No. 15-16) Payments will be released each year to the service provider only after verification that the essential contract terms regarding both quantity and quality of sewage treated and disposal of treated residues is satisfactory. What is frequency of release of such payments? What cost and quality of supervisory/ certifying mechanism is in place for doing so? Where will these mechanisms be built in the contract?

Looking at the concerns of various stakeholders, there are a number of generic questions about the features of the DBFO model which needs answer. The implementation of DBFO involves number of governing agencies at various levels

such as local, state and central. How do we take care of issues of core governance maladies and multiplicity issues of overlap and conflicting jurisdiction which were discussed in-depth in Kanpur case study? How do we set and define the criteria for performance of the proposed model? How and who will ensure the regulatory framework and its compliance for the model to work? On what terms the funds, guarantee and assurance of payment are to be given by the state and central government and who will decide and negotiate those terms?

From the above discussion, it is evident that there are number of doubts which question the core design of the proposed DBFO model. With number of questions for each clause, it seems that the DBFO model is not well thought of or analyzed with respect to technical, financial and institutional specifications. The EQP report also has stated reasons citing advantages of DBFO model which are listed in box 2.

Box 2 - Expected Advantages of 'DBFO' model with reasons (Source: (GRBEMP, 2010: 16-17))

Proper planning and monitoring

1. ULBs will be involved in the project planning, implementation and monitoring which will inculcate a sense of ownership in ULBs for the developed infrastructure as they will be indirectly answerable for operation and maintenance of project facilities since annual payments will be made to the operator by the ULBs.

Proper operation and maintenance

2. Service provider will be interested in maintaining and operating the facilities throughout the contract period, because that is how the equity invested in the project by the service provider may be recouped and profits made,

Assured Profits

3. Depending on the mutually agreed contract terms, the annuity payments made to the service provider may be sufficient to ensure profits. Over this the service provider could make additional profits by creating a market for treated water, sludge and sludge-derived products obtained through treatment of sewage.
4. ULBs are likely to help the service provider in creating a market, since part of the profit from sale of such product will accrue to ULBs and also the operation and maintenance of the created infrastructure beyond the contract period with the service provider will partially/wholly be sustained through income generated by ULB through this route.

Incremental funding

5. Since the payments to be made by the central and state governments are spread over the contract period in this model, the yearly outgo for a particular project will be lower which allows allocation of the yearly NGRBA budget simultaneously for many projects.
6. The fate of the annuity payments will rely on budgetary provisions for this, which is hugely political and ad-hoc exercise, making this whole scheme privy to the politics of the state at that juncture.
7. In short, the scheme based on annuity will not be insulated from the impacts of governance crisis, which is at the root of the problem in Ganga basin.

The critical analysis of the expected advantages of DBFO model is presented here.

(Pt No.1-2) The important advantages which EQP group finds in bringing in DBFO model in Ganga context are proper planning, monitoring, operation and maintenance, assured profits to service provider and incremental funding. One of the main reasons in failure of the GAP project is the lack of motivation and incentives to the dominant actors in the ULB. Here, the incentives get further curtailed as the 'plum' functions are taken out of the ULB hand viz., construction of plant, while the burdensome functions are dumped on them like land acquisition and securing various clearances. Deciding and adjusting annuity payments would be hugely complex task and would require an independent organization with interdisciplinary capacity would be required to do this. It will also be a politically sensitive issue. This is a near impossibility, in view of the experience of the independent regulators in different sectors in all the northern states. As a result, the annuity payments will be the "Achilles' Heel" in this whole design. This is wishful thinking as ULBs are not known to be driven by the urge to earn funds through such enterprises. There is absolutely no interest from the ULB, other than those in the power to find this as an interesting way to earn an extra income, which will be counter-productive for the scheme.

(Pt No. 3) It is proposed that depending on the mutually agreed contract terms, the annuity payments made to the service provider may be sufficient to ensure profits. However, the term 'sufficient' is a very non-financial term – it will have to be risk-adjusted rate of return. It is said that service provider will be interested in creating market etc. In all probability they will not. As "creating market" will also have concomitant costs, which will erode the profits and expose them to greater risks, particularly if selling treated water involves capital costs (laying pipelines). There is a tricky situation here. If the private party is not assured by way of annuity payments, as enforceable clause in the contract, the private party will not bother to compensate itself by taking trouble (it is compelled) to create market. Simply it will not bid at all. On the other hand, when they are ensured some minimum rate of return, they cannot be compelled to compensate themselves.

(Pt No. 4-7) Statements like "ULBs are likely to help" looks vague. What is binding ULB in this respect? The responsibilities shall not only be clear, but will have to be linked with the financial considerations. The entire supervision is being thrust upon ULBs. The earlier pages of this or other Reports are full of arguments on governance failures which in turn is used as a justification for roping in alternate

models. What is the financial status of ULBs in the areas under consideration? Will the annual budgets of these ULBs take that load? Will not such loose ends put off potential private sector partners?

The PLG group has previously reviewed the EQP report and termed the DBFO model as 'End-of-the-Pipe' and 'Closed-Compound' solution¹⁴. It mapped the existing issues with the institutional problems at the levels of Policy Instruments (PIs) and Governing Agencies (GAs). The PLG strongly believe that even for the neat DBFO model suggested that insulates itself from the governance maladies of existing institutions, there is the need for some public/government institutions to decide on tasks such as deciding the capacities of STPs, providing /facilitating land/power, ensuring quality of supply of water, fixed tariffs, sell/use the tertiary treated water etc. This means that an insulated DBFO model will fail if the governance issues discussed are not fairly addressed especially in the context of the political economy of governance esp. corruption in the existing institutions.

Insights from a similar initiative in the Energy Sector

A case study of Independent power producer (IPP) would be worth referring here. IPP was an effort to create generating capacity in the electricity sector through private sector participation. It involved providing huge economic and financial incentives including the assured revenue through the PPAs, guarantees and counter-guarantees from the state and central governments, escrow accounts. Box 3 presents in brief what was expected out of the policy, what happened and why it failed to achieve its objectives. Understanding this case study bring upon key learning for DBFO model which is summarized as follows. There is a danger of fly-by-night operators. The possibility of the ULBs not able to work out all the clearances and land acquisition with the speed and cleanliness as expected by the private entrepreneurs in the time horizons allowed by their business calculations. The state and central government may not be ready or able to provide guarantees and counter-guarantees especially in the ear of financial and budgetary prudence. The backward linkage of the sewage input would remain in the hands of the ULB, which is as critical as was the forward linkages of IPPs. The possibility of complications of the forward linkage of annuity payment will be a huge deterrence for private player. The lenders to the STPs under DBFO may not get convinced about the annuity payments, especially in the situation of absence of counter

¹⁴ Prevention of River Pollution by Urban Sewage Recommendations from Policy and Governance Perspective based on a Model Case Study (Source: http://gangapedia.iitk.ac.in/sites/default/files/Second%20Set%20of%20Report/010_PLG_Kanpur%20Sanitation%20Study.pdf (Accessed on 17-04-2013))

guarantees from the central government. In absence of an independent regulatory mechanism, the scheme will be victim of usual financial and political wrangling and one-up-man ship between the central and state government. These lessons might be valuable for clarifying the probable risks of DBFO model also.

Box 3 - Independent Power Producer (IPP)

What was IPP Policy?

It was an effort to create generating capacity in the electricity sector through private sector participation. It involved providing huge economic and financial incentives including the assured revenue through the PPAs, guarantees and counter-guarantees from the state and central governments, escrow accounts.

What was expected?

- Significant addition to the generating capacity

What happened?

- Large number of projects were MOUed by fly-by-night operators (related to politicians or politicians themselves) who wanted to make a quick buck by selling the project proposals at some stage
- Most genuine projects never saw the phase of financial closure, Very few projects were completed and started production
- Partially completed projects gave rise to some of the biggest scandals in the history of the states
- Capacity addition was insignificant, State governments got into financial problems
- Policy lock-in for a decade leading to a 'wasted decade'

Why IPP policy failed?

- Financial guarantees and incentives attracted an overwhelming number of non-genuine actors
- Genuine actors met many hurdles in obtaining clearance, despite assurances and efforts by the state and central government
- Backward linkage to fuel remained a critically weak link in the whole design, as it was in the hands of the public bodies which were blamed for corruption and non-competence
- Forward linkage of revenue remained another weak link despite various crafty solutions designed by the governments and the IPPs
- Lenders to these IPPs remained unconvinced despite the assurances and efforts by the state government.
- Central government, alarmed by the demands on its resources, had to restrict counter guarantees only to eight fast-track projects favored by it.
- No independent regulatory mechanisms which can command respect and ensure integrity of the whole scheme

Contributed by Prof. Subodh Wagle (Also refer Dubash, 2002)

4. Contemporary Policy debate and Implications for GRBEMP

This section attempts to understand the larger policy shifts in UWSS currently under debate. Though state failed to address the issues in provisioning of UWSS services in early 1980s-90s, the push for privatization also did not improve the situation. The role of the state as well as private sector was increasingly realized in the last decade and new institutional models such as PPP were formulated and implemented. However, PPPs also failed to meet the expectations and are presently struggling with a host of issues that needs attention in order to succeed in its objectives. As GRBEMP looks forward towards quick implementation of ZLD, with weak parastatals and ULBs, PPP (in particular DBFO) model is looked at as an immediate choice. The weaknesses of the DBFO model examined in detail have thrown up many answered questions. This section attempts to go back to certain strands in the current larger policy debate to understand a way forward.

The renewed policy debate on the PPP has two strands: one that argues for huge financial inducement thrust (like HPEC, 2011) into the sector and another that cautions the viability of this trajectory and argues for larger governance changes with a more heterodox understanding of technology, investments and institutional structures needed contextually to bring in sustainable and affordable options that reach majority of the population. Some suggestions from government like a shift from “PPP” to LB-centric approach (Gol, 2012b: 9) clearly shows that private participation in UWSS merely on the basis of finance and efficiency is not appreciable. Hence this participation has to be limited to certain technical and management services. The working group of Planning Commission has suggested bottom up approach and decentralized solutions and is the key player for ensuring the long term sustainability, efficiency and affordability in UWSS (Working Group on UIWSS, 2011: 44).

Even the World Bank has called for a ‘rethink’ of privatization policies, having recognized the regulatory problems associated with multinational water providers, and having seen the effects of a profit-driven service delivery model on workers, low-income households and the environment (Pigeon, McDonald, Hoedeman, & Kishimoto, 2012). In the last decade cities world over in Paris (France), Dar es Salaam (Tanzania), Buenos Aires (Argentina), Hamilton (Canada) and in a series of Malaysian municipalities, defined as the transfer of water services from private companies to municipal authorities, ‘remunicipalisation’ shows that the public sector can outperform the private sector and can be an effective water provider (Pigeon et al., 2012). The important issue is of governance especially the role of government in public service delivery, either as service provider or as a facilitator. One of the

reasons why the private sector has not been able to meet the high expectations of various stakeholders has been the weak water regulatory capacity of many governments that, in some cases, has resulted in price-hikes and poor water quality and management (Tropp, 2007).

With primary focus on governance issues, the working group of Planning Commission has pointed out dozens of recommendations for careful scrutiny and assessment of PPP projects (Eg. 24X7 projects) in UWSS to ensure affordability and sustainability. The recommendations stress on cost cutting and building institutional capacities for efficient management by setting real and hard targets for affordable recycling and reuse of treated waste water (Working Group on UIWSS, 2011). The policy document suggests that it is necessary to define the governance problems plaguing this sector as lack of participation of the urban water users at various levels from bottom to top and from needs assessment to operation and maintenance. Secondly, there is lack of transparency in the way this sector is governed at various levels and various stages. Thirdly, and related to these two is the issue of institutionalizing accountability norms and mechanisms to ensure that serious problems are identified and those responsible held accountable in a timely manner (Working Group on UIWSS, 2011: 40).

The report discussed the policy and governance issues in UWSS in three broad sections. The first section reviewed the larger shifts in policy in favor of privatization and later to PPPs with the arguments of state failure. With the mapping of the state facilitation in favor of PPPs in India, the section assessed the ongoing experiences which indicated thrust for centralized technological solutions that warrants high financial investments and institutional models like Public Private Partnerships (PPPs) in the UWSS. This presented adequate insights for better understanding of the suggested technological solutions like ZLD and institutional models like DBFO in the Ganga Basin. The second section with the critical review of GRBEMP reports from a PLG perspective present many generic as well as specific questions to the proposed solution. The third section focused on alternative policies currently under debate. With the reform agenda suggested in the XII Five Year Plan points at the alternate institutional model(s) for Ganga basin, the PLG group recommends that GRBEMP has to seriously debate the institutional models to be proposed for achieving 'Zero- Liquid Discharge' (ZLD) before arriving at the 'Design-Build-Finance-Operate' (DBFO) model proposed in the earlier documents. Annuity payment is just like cleaning charges. It does not include intended profits for private party. Annuity model will fail if no incentive to improve or maintain the private sector efficiency which needs markets. But there is no market as such. Therefore, it is not PPP but a management contract. In the absence of a market, the only way out is

regulation. An Alternate model is ring fenced corporate affair where the only players would be private entrepreneur, NGRBA and Centre (eg like IPP case) in which the finance would come from Private in form of equity, NGBRA would play regulator and Centre arrange for funds. However, as seen in IPP case, the model would fail given the conditions in Indian context.

Successful implementation of a PPP contract is dependent on how the risks associated with the project are identified, listed and allocated. consequences of these risks are discussed completely in a techno-financial viability context and thus only to safeguard the interest of the private sector (GoI, 2009b). A comprehensive analysis and transparent public consultation process for educating citizens and taking them on board, especially for clarity on the current and future private costs (in case such projects are to be undertaken) due to possible rise in tariff. Here, the “citizen” has to be educated into a ‘customer’, who understands water as an economic good and thus shall pay for the services. This shift should be ensured by a political commitment by the state through an upfront agreement and clearly a call to commoditize water. These issues are even discussed in the report of working group which says that the system of estimating demand and supply of water in cities is rudimentary and leads to poor accounting and poorer planning. The report, while commenting on the issues of distribution loss, inequity in supply, ground water regulation and public health, point out that the Indian cities with its inadequate sewerage system cannot keep up with the sanitation and pollution challenges (Working Group on UIWSS, 2011). The World Bank’s infrastructure policy review in July 2003 noted that private finance had accounted for less than 10% of total investment in water in developing countries in the previous decade, and concluded that: “the Bank will need to more strongly promote sustainable public sector investment and service delivery”. (Hall & Lobina, 2006: 11) Although this call is to enhance the bank’s possibility (business) of funding governments, we have to look at the larger issues, especially the ongoing policy debates to understand the respective roles of various stakeholders in making UWSS not only efficient, but also sustainable and affordable. It is thus clear that governments will continue to play a critical role in water governance to provide an enabling framework that involve private sector and civil society actors. It is thus time to bring the government back in and re-emphasize its critical role to improve water services and management. This is perhaps most evident in the government’s regulatory authority power, which increasingly embraces new forms of governance, such as multi-stakeholder dialogue and participation, facilitating negotiations and conflict resolution between water users and the decentralization of water decision-making (Tropp, 2007: 12). The larger governance umbrella along with regulatory mechanism cannot be bypassed whether

the service is provided by public or private sector. Without addressing the fundamental governance problems in this sector, any amount of financial resources, technological changes, new infrastructure or any amount of water will have limited usefulness. (Working Group on UIWSS, 2011: 40). This discussion in no way suggests legitimising the current working of government institutions that needs fundamental changes to bring transparency, accountability and participation. Hence it is a call for a more arduous middle path to address the problems in current state and market failures in the UWSS sector.

5. Path Ahead

With the understanding of the trends, issues, consequences and present challenges, we present our remarks and the emerging questions in the context of the institutional model of DBFO proposed for waste water management in the Ganga Basin especially for realizing the most important ZLD concept. The model presumes many things such as the 100% investment and prescribed annuity costs to which private sector will be agreed upon. It is a simple model where the quality tested tertiary treated water is purchased without the government engaging in any of this processes earlier. However, the scale and thus the technology needed (mostly centralised and high technology) by the service provider can raise the cost of water and thus the annuity for private sector. Even if we assume that the 100 % capital investment comes from private sector it is clear that the cost of treatment will be very high. In absence of high tariff, with such a very high price for treated water perceived demand can only come by selling it to high end consumers (the market of which is not yet assessed) that can only be realized with stringent regulation of ground water use. This has been proved impossible in many parts of India.

There are number of questions which need to be answered before we propose the high end technical and institutional models currently perceived in the context of Ganga.

- a. Has there been any assessment of the technical, financial, social, and political viability of this model in the background of socio-economic realities in Ganga basin?
- b. Is there a market for waste water especially in the states of the Ganga basin? Where is the demand going to get created? GAP gives a figure that 75% of waste water is from urban sewage and only 25% is from industries. Will the increasing urban demands get absorbed by the industries that are pursued as probable buyers of the tertiary treated water?

- c. Without stringent regulation of current ground water use, is it possible to generate the waste water market? In the near impossible scenario of ground water regulation will there be a market for the purchased waste water to be used?
- d. Without such a market have we assessed the capital and recurring expenditure for the currently suggested centralized high tech solution?

The purchase of waste water by government has to be financed either through government subsidies or rising tariffs, which becomes unsustainable even in the medium term. Hence, the claim of efficiency through a waste water market by 'DBFO – PPP' has to be reconsidered. It is clear from the discussion that for the proposed DBFO model to function there has to be a very efficient government machinery to function with efficiency (?), transparency, accountability and participation. A huge capacity building exercise has to be undertaken for planning, technical, financial, monitoring capability of ULBs as well as ensure compliance of the services provided by the private provider. If all this can be assured within the current government and governance system, could we really aspire for an efficient public system that can ensure keeping Ganga clean?

The discussions clarify that there are no 'magic bullets' to solve the complex issues in UWSS. We will conclude with the specific issue taken at the beginning of this report - the institutional model for abating pollution in river Ganga. The detailed analysis showed flaws in the present DBFO proposal where the private service provider (PSP) and ULB are partners. Some of the institutional models under discussion are: (1) The PSP brings in capital cost, operates the facility and NGRBA purchases quality-assured water, which the PSP is free to sell in the market. This is an 'end-of-the pipe closed compound' solution. There are numerous challenges to this ideal model of privatization, the most important being the risk perceptions of PSP and the lack of an existing market in waste water treatment; (2) PSP-ULB partnership which is the currently prescribed model, the problems of which have been examined in detail; (3) more heterodox technological and institutional models which have to be thought out in detail.

With the emerging trend of 'remunicipalisation', bottom up LB centric and decentralized approach in UWSS in the current decade, a wholly new and heterodox approach of assessment of more appropriate technologies at local levels can evolve provided adequate capacities are developed with public utilities which need a serious consideration. Such a system can then work with other tiers of government and also facilitate private participation with full knowledge of the process and the

consequences. The final challenge is to develop an independent regulatory system that mediates these different interests ensuring transparency and accountability and making water and sanitation services efficient, affordable and sustainable to all.

References

- Alexander, N. (2005). The Roles of the IMF , the World Bank , and the WTO in Liberalization and Privatization of the Water Services Sector 1 By. *World*, (301).
- Allan, J. (1999). Public Private Partnership - A Review of Literature and Practice. *Public Policy*.
- Bakker, K., & Kooy, M. (2008). Governance Failure : Rethinking the Institutional Dimensions of Urban Water Supply to Poor Households. *World Development*, 36(10), 1891–1915. doi:10.1016/j.worlddev.2007.09.015
- Bhatnagar, V., & Zeug, H. (2011). *Trends in Private Sector Participation in the Indian Water Sector : A Critical Review* (pp. 1–80). Retrieved from http://urbanindia.nic.in/programme/uwss/PSP_IWS_Detailed.pdf
- CPCB. (2010). *STATUS OF WATER SUPPLY , WASTEWATER GENERATION AND TREATMENT IN CLASS-I CITIES & CLASS-II TOWNS OF INDIA* (pp. 1–93).
- Davis, J. (2004). Corruption in Public Service Delivery : Experience from South Asia ' s Water and Sanitation Sector. *World Development*, 32(1), 53–71. doi:10.1016/j.worlddev.2003.07.003
- Dijk, M. P. van. (2008). Public – private partnerships in basic service delivery : impact on the poor , examples from the water sector in India. *Int. J. Water*, 4(3), 216–234.
- Dubash, N. (2002). *Power politics: Equity and Environment in Electricity Reform* (pp. 1–184).
- Dwivedi, G. (2010). *PPP in Water Sector: Partnership or Privatisation?* (pp. 1–148). Manthan. Retrieved from www.manthan-india.org
- Dwivedi, G., Rehmat, & Dharmadhikary, S. (2007). *Water: Private, Limited* (pp. 1–110).
- Gol. (2002a). *India Assessment 2002 - Water and Sanitation - A WHO-UNICEF sponsored study* (pp. 1–71).
- Gol. (2002b). *National water policy* (pp. 1–10).
- Gol. (2008). *National Urban Sanitation Policy* (pp. 1–40).
- Gol. (2009a). *THE WATER AND SANITATION SECTOR IN INDIA* (pp. 1–46).
- Gol. (2009b). *Toolkit for PPPs in Urban Water Supply for Maharashtra* (pp. 1–212).
- Gol. (2009c). *Citizen Centric Administration - 2nd Administrative Reform Commission 12th Report* (Vol. 12th Repor, pp. 1–188).

- Gol. (2010). *Public Private Partnership Projects in India Compendium of Case Studies. Managing* (pp. 1–158). Retrieved from [http://164.100.52.24/NPBCP_images/PDFs/PPP Compendium of Case studies \(3\).pdf](http://164.100.52.24/NPBCP_images/PDFs/PPP%20Compendium%20of%20Case%20studies%20(3).pdf)
- Gol. (2012a). *NATIONAL WATER POLICY* (pp. 1–13).
- Gol. (2012b). *Improving Urban Water Supply & Sanitation Services Advisory Note* (pp. 1–28).
- Gol. (2013). *Twelfth Five Year Plan (2012–2017) - Volume I* (Vol. I, pp. 1–360).
- GRBEMP. (2010). *Guidelines for Implementation of Sewage Collection, Diversion, Pumping, Treatment, and Reuse (Sewage CDPTR) Infrastructure in Class I Towns* (pp. 1–19). Retrieved from http://gangapedia.iitk.ac.in/sites/default/files/004_EQP_S%26R_03.pdf
- GRBEMP. (2011a). *SWOT Analysis of Ganga Action Plan* (pp. 1–34). Retrieved from [http://gangapedia.iitk.ac.in/sites/default/files/Second Set of Report/006_GEN_SWOT of GAP.pdf](http://gangapedia.iitk.ac.in/sites/default/files/Second%20Set%20of%20Report/006_GEN_SWOT%20of%20GAP.pdf)
- GRBEMP. (2011b). *Policy and Governance: Perspectives and Analytical Framework for Management of Urban Sewage* (pp. 1–32). Retrieved from [http://gangapedia.iitk.ac.in/sites/default/files/Second Set of Report/009_PLG_Policy and_Governance_Perspective.pdf](http://gangapedia.iitk.ac.in/sites/default/files/Second%20Set%20of%20Report/009_PLG_Policy%20and%20Governance_Perspective.pdf)
- GRBEMP. (2011c). *Prevention of River Pollution by Urban Sewage: Recommendations from Policy and Governance* (pp. 1–56). Retrieved from [http://gangapedia.iitk.ac.in/sites/default/files/Second Set of Report/010_PLG_Kanpur Sanitation Study.pdf](http://gangapedia.iitk.ac.in/sites/default/files/Second%20Set%20of%20Report/010_PLG_Kanpur%20Sanitation%20Study.pdf)
- Hall, D., & Lobina, E. (2006). *Water as a public service* (pp. 1–52). Retrieved from www.world-psi.org
- HPEC. (2011). *Report on Indian Urban Infrastructure and Services* (pp. 1–284).
- Kaur, R., Wani, S. P., Singh, A. K., & Lal, K. (2011). Wastewater production , treatment and use in India, 1–13.
- MoUD&PA. (2004). *India UWSS: Guidelines for Sectoral Reform and Successful PPPs* (pp. 1–97).
- Pigeon, M., McDonald, D. A., Hoedeman, O., & Kishimoto, S. (2012). *Remunicipalisation: Putting Water Back into Public Hands* (pp. 1–120). Retrieved from http://www.municipalservicesproject.org/sites/municipalservicesproject.org/files/publications/Pigeon-McDonald-Kishimoto-Hoedeman_Remunicipalisation_Putting_Water_Back_in_Public_Hands_2012.pdf
- Prasad, N. (2006). Privatisation Results : Private Sector Participation in Water Services After 15 Years. *Development Policy Review*, 24(6), 669–692.
- WB. (2008). *COUNTRY STRATEGY FOR THE REPUBLIC OF INDIA FOR THE PERIOD FY2009-2012* (pp. 1–190).
- Working Group on UIWSS. (2011). *Report of the Working Group on Urban and Industrial Water Supply and Sanitation for the Twelfth Five-Year- Plan (2012-2017)* (pp. 1–61).

Appendix I - Constraints and Mitigation identified in context of PPP (Source: Gol, 2009a)

Constraint on	Description	Mitigation
Supply Side (Concessioneing Authority)	Capacity of ULBs to fund the asset reconstruction on the face of Operator's reluctance to take investment risk	- The state funds need to be supplemented with private sector funding for asset reconstruction and maintenance - JnNURM funding
	Long term financing	Commercial Borrowing with longer tenure/ takeout financing
	Fear of Transfer of Ownership, Suspicion of Private Developer making 'Super Normal' Profit	Awareness, training on PPP in general and successful case studies in particular
	Capacity to undertake projects on a PPP Basis	Capacity Building
Demand Side (Concessionaire)	Regulatory Risk of assessing the developer on stringent norms	Regulation by Contract defining clear outcomes with performance linked returns
	Tariff Risk: Tariff low or insufficient to support costs and Lack clarity	Tariff rationalisation through a Policy
	Market Risk: lack of financially viable 'bankable' projects with acceptable risk profiles	Entire market risks not be passed and only to the extent the private developers appetite
	Asset requiring large scale investment	Capital cost may be supplemented through VGF or funded entirely by State or Municipal bodies
	Lack of adequate and reliable database	Establish performance metrics based on measurable & transparent data source
	Availability of debt	Funding through IIFCL
Community Side	Water supply considered a 'free good' by the citizens	Customer Education and Communication
	Low willingness to pay	Customer Education

	Not amenable to Metering	To be made mandatory for any connection
Political	User charge for water is a political issue	Strong political commitment upfront through a state support agreement

Appendix II – Case Studies from literature review

S.No.	Case	Type of PSP	Purpose	Features
1	Delhi Water Supply & Sewerage Project, Delhi Jal Board	Management Contract	Domestic & Commercial	Delhi Jal Board had invited pre-qualification bids for management contract for Water Supply & Sanitation in operation zones South II & III on 12 Feb. 2005. The population served in these two zones is respectively, 8,00,000 & 6,00,000. DJB had short listed 4 water companies for management contracts - Suez, SAUR, Bechtel & Veolia. Mass protests, including a campaign lead by Parivartan, including several RWAs, organisations & people led to the stalling of privatisation and withdrawal by the Delhi government of the loan application to the World Bank. The WB website shows the proposal as in pipeline.
2	DJB Sonia Vihar	Not Known	Domestic	Sonia Vihar Water Treatment Plant (WTP) Rs. 200 crores contract to design, build and operate Rs. 700 cr. plant for 10 years. The scheme will supply 140 mgd water to Delhi. Water drawn from Upper Ganga Canal. Plant is ready but could not operate since Uttar Pradesh government has denied water to Delhi from Upper Ganga Canal citing shortage in Bhagirathi river and its farmers requirements. Has a take or pay clause of about Rs. 3 crores per year. Trial operations started in June 2005.
3	Greater Bangalore	Proposed Management Contracts	Urban Water Supply & Sanitation	Project will cover seven City Municipal Councils (CMCs) and one Town Municipal Council (TMC) around Bangalore. BWSSB will implement the project on behalf of the urban local bodies. Privatisation is a part and parcel with the World Bank involved through the IFC. USAID is also involved. However, strong public protests by the Campaign Against Water Privatisation, a forum of many organisation in the city has put BWSSB on the defensive and has slowed the process. (Manthan, 2011) The city has 3610 km of sewage lines, 14 sewage treatment plants – all variations of treatment technologies have been installed in this high-tech city. The rough estimation is that the city generates some 800-1000 mld of sewage, the installed capacity to treat is roughly equivalent – some 721 mld. In other words, on paper, it would be an ideal city. It has high tariff; 100 per cent metered supply, high recovery of its dues; 100 per cent water supply and substantial investment in sewage infrastructure. However, there is significant underutilization of treatment capacity. But there is a missing link – a fatal link. As per the data provided to the Committee by city engineers, Bengaluru's sewage treatment plants only receive some 300 mld of sewage. In other words, less than half the sewage is trapped and half is treated. The city now estimates that it will have to double its current network – build over 4000 km of underground sewage to complete the missing links. This is when the city is also expanding – growing at its seams where more investment is needed to supply water and to take back sewage. (UWSS, 2012)

4	Belgaum, Gulbarga and Hubli-Dharwad - Karnataka	Management Contract	Urban Water Supply	Govt. of India has received a loan of US\$ 39.5 million from the World Bank to finance Karnataka Urban Water Sector Improvement Project (KUWASIP). As a part of this, privatisation of operation and maintenance of selected demonstration zones in the towns of Belgaum, Gulbarga and Hubli-Dharwad. The total project cost is about Rs. 235.10 crores, of which the World Bank contribution is Rs. 181.70 crores and of the Government of Karnataka is Rs. 53.40 crores. Compagnie Generale des Eaux, France, has been chosen as the operator and will have the responsibility in the above cities for 2 years following one year of distribution network rehabilitation. It is expected that the water supply phase will begin by the end of November 2006. It is also intended to apply a portion of the loan proceeds to finance the services of a consultant for Citywide Water Services Planning Engineering & Feasibility Studies.
5	Dewas Industrial Water Supply (Off-take from River Narmada)	BOT	Industrial	First Planned in 1996, 23 MLD Water Supply for Dewas Industrial Estate (DIE), 9 MLD off-take will be guaranteed by MoU with industries in DIE. Estimated Cost Rs. 80 crores, likely to go up (Earlier it was Rs. 65 crores). Water to be taken from Nemawar village on the banks of river Narmada. Likely cost of water Rs. 25/ KL. MSK Pvt. Ltd., Baroda has been selected for executing the BOT project. The construction of the pipeline is underway.
6	Sangli Miraj - Maharashtra	Management Contract	Domestic	Bids had been called, project developed. But strong local protests led to cancellation in late 2002.
7	Municipal Corporation of Greater Mumbai, K-East Ward Water Supply Project	To be decided	Domestic	Privatisation of water supply in the K-East ward. Population in the ward is about 1 million. One of the profitable wards in terms of collection of water supply charges. World Bank, through the PPIAF is giving US\$ 692,500 to design and develop a pilot PSP model for water supply. Castalia (France) has been selected as the official consultant for the project from 6 consultants who had been shortlisted in October 2005. The others were PWC (India), DHV (Netherlands), Mott MacDonald, Scott Babbie (UK) & Fichtner (Germany).
8	Nagpur Municipal Corporation (NMC)	Not Known	Urban Water supply	EOI from service providers in urban water sector with national or international experience in O&M of urban water distribution system. NMC intends to make demonstrative zone with uninterrupted water supply to approximately 10,000 water connections with reduction in Unaccounted For Water and improvement in the level of service to consumers. The works include - rehabilitation of water distribution network including service connections, replacement of consumer meters, implementation of Automated Meter Reading (AMR) system, improvement in billing system, reduction in UFW and improvements in revenue, O&M of the zone for 5 years. On successful implementation of program in the zone, NMC will implement the program in entire city.

9	Tirupur Water Supply Project	BOOT	Multipurpose (Industrial, Urban and Rural Water Supply)	The Rs. 1023 crores new Tirupur Water Supply Project near Coimbatore is the biggest water supply project on BOOT basis in the country so far. Multi-Purpose, mainly industrial water to large number of export oriented industries in Tiruppur. Also includes urban and rural domestic supply. The Tamil Nadu Government, Tiruppur Exporters Association and IL&FS, together designed the Tiruppur Area Development Project (TADP) as a PPP, with technical assistance from the FIRE (D) Project. A special purpose vehicle, New Tiruppur Area Development Corporation Limited (NTADCL) was formed in 1995 to implement the project. It contracted out the construction and maintenance of the systems to a Build, Operate and Transfer (BOT) consortium of Bechtel, United International, North West Water and Mahindra & Mahindra. USAID has provided long term (30 years) loan guarantees for US\$ 25 million with IL&FS to help finance this project. Project has been completed and water supply and distribution started.
10	Chennai Desalinisation Plant	DBOOT	Desalination and Urban water supply	The Chennai Metropolitan Water Supply and Sewerage Board had called for bids on 18 Nov. 2004 for 100/200 MLD sea water desalination plant on BOOT basis. The project has been 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 Construcción y Tecnología Ambiental, S.A.U. (Befesa CTA), which is a wholly-owned subsidiary of Befesa Medio Ambiente S.A (Befesa), a Madrid Stock Exchange-listed engineering and construction company. The total project cost is estimated at US\$ 104 million, and the IFC (World Bank) is investing up to US\$ 25 million in the form of a local currency loan. The project is located at Minjur, about 35 kms north of Chennai. A March 2006 newspaper report says that Chennai Metrowater's 100 MLD desalination plant project is awaiting environmental clearance from the Central Government. (Manthan 2011) Chennai, for instance, has already invested in a 100 mld desalination plant in Minjur, where the agreement with the private operator is on a BOOT basis. The capital cost of Rs 473 crore was borne by the private operator, but with the guarantee that MetroWater, the city's water agency, would pay the company Rs 48.66/kl for the next 25 years. In addition, it would pay for power costs, according to information given to the committee by city engineers. The second plant at Nemmeli, also of 100 mld, is being built also by a private company and with a different arrangement. The contract is to build the plant and to operate it for the next seven years. The water board will own the plant and capital investment has been paid through Central subsidy. This will underwrite the costs of the delivered water—at roughly Rs 20/kl. But the big issue is what these two capital-intensive and expensive plants will do to the sustainability of the city's water board. Chennai MetroWater is an efficient water utility with balanced books—more than many others. But the high capital and operation and maintenance will require the utility to rethink its future finances. The Tamil Nadu government has committed that it will pay for the cost difference. But all this does mean that utilities will continue to have to depend on external funding for their viability. (UWSS, 2012)