

## Tämä on rinnakaistallennettu versio alkuperäisestä julkaisusta.

Tämä on julkaisun kustantajan pdf.

Käytä viittauksessa alkuperäistä lähdettä:

**Sorsa, K.; Nag, T. & Kettunen, J. 2018. Exploring Private Participation in Indian Water Sector: Issues and Options. Teoksessa K. Sorsa & M. R. Chaudhuri (toim.) Sustainable Engagement in the Indian and Finnish Business. Turun ammattikorkeakoulun puheenvuoroja 99. Turku: Turun ammattikorkeakoulu, 6 - 18.**

URL: <http://julkaisut.turkuamk.fi/isbn9789522167040.pdf>

Kaikki julkaisut Turun AMK:n rinnakaistallennettujen julkaisujen kokoelmassa Theseuksessa ovat tekijänoikeussäännösten alaisia. Kokoelman tai sen osien käyttö on sallittu sähköisessä muodossa tai tulosteena vain henkilökohtaiseen, ei-kaupalliseen tutkimus- ja opetuskäyttöön. Muuhun käyttöön on hankittava tekijänoikeuden haltijan lupa.

## This is a self-archived version of the original publication.

The self-archived version is a publisher's pdf of the original publication.

To cite this, use the original publication:

**Sorsa, K.; Nag, T. & Kettunen, J. (eds.) 2018. Exploring Private Participation in Indian Water Sector: Issues and Options. In K. Sorsa & M. R. Chaudhuri (eds.) Sustainable Engagement in the Indian and Finnish Business. Comments from Turku University of Applied Sciences 99. Turku: Turku University of Applied Sciences, 6 - 18.**

URL: <http://julkaisut.turkuamk.fi/isbn9789522167040.pdf>

All material supplied via TUAS self-archived publications collection in Theseus repository is protected by copyright laws. Use of all or part of any of the repository collections is permitted only for personal non-commercial, research or educational purposes in digital and print form. You must obtain permission for any other use.

# Exploring Private Participation in Indian Water Sector: Issues and Options

Dr. Tirthankar Nag

Professor and Dean, International Management Institute, Kolkata, West Bengal, India

Dr. Juha Kettunen

Chancellor & Adjunct Professor, Turku University of Applied Sciences, Turku, Finland

Dr. Kaisa Sorsa

Principal Lecturer, Turku University of Applied Sciences, Turku, Finland

## Abstract

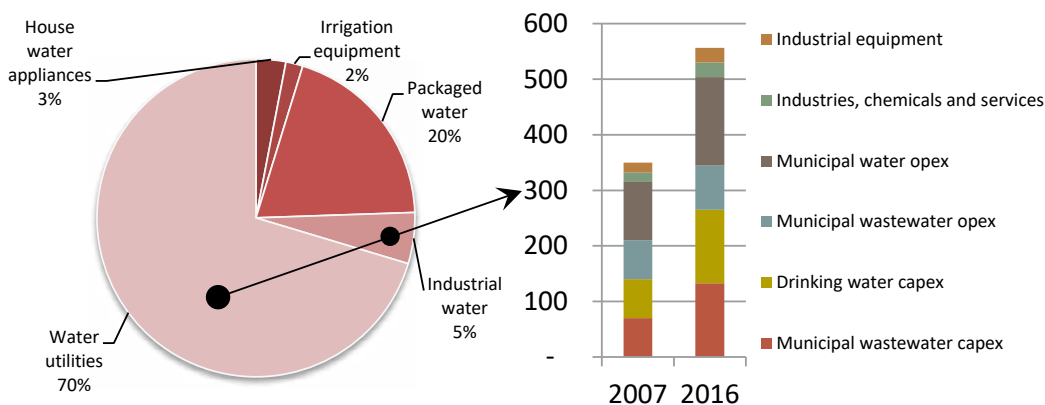
The study examines the issues around private participation in the water treatment and distribution business in India. The study explores these issues through a series of brief case studies and survey of secondary literature. The study finds that there are a number of issues around contracts, pricing, institutions, and property rights, which need to be addressed for this sector to function properly.

**Keywords:** Institutions; Water Markets; Contracts

# 1. Introduction

India and China, with one third of the world’s population, have less than ten percent of the world’s water resources (The Economist, 2010). A freshwater crisis may be in the offing for two thirds of the global population within the next quarter century (Barlow and Clarke, 2003). In addition, countries such as India suffer from huge geographical and seasonal disparities in distribution of water; India’s north-eastern region receives more than a hundred times more rainfall than its western part and that too concentrated mostly during the summer monsoons (The Economist, 2010). By 2025, as per the Planning Commission’s estimate, a considerable part of India’s population will live in urban areas and face issues around water (Planning Commission, 2002).

Globally, the water industry is estimated at USD 463 billion in 2007. Industrial water and water utilities is estimated at USD 350 billion in 2007 with high growth potential.



**Figure 1.** Global Water Industry in 2007. Source: 1) Global water markets 2008; 2) Datamonitor reports.

The growth of the water industry follows a similar growth trend of the now mature Indian power market valued at USD 115 billion in 2008, which was only half in 2004 (valued at USD 54 billion).

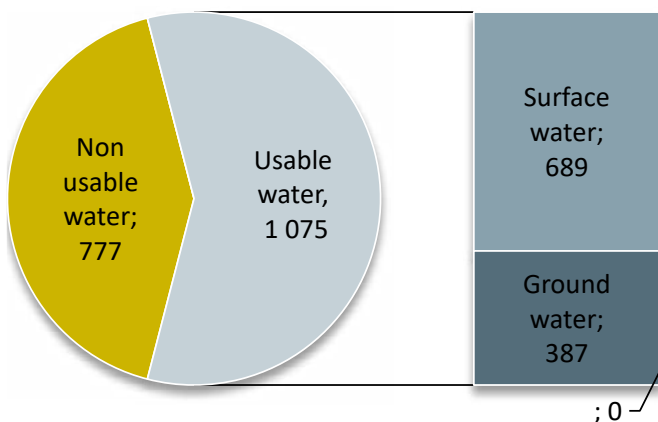
Some authors are of the opinion that public sector has failed to provide water, especially to the poor, in large parts of the developing world (Bhaduri & Kejriwal, 2005). Private participation in the water sector, although a growing phenomenon in India, has been long established in other developed markets. Initiatives for greater private involvement in countries such as the western United States, Europe, Africa, and South America, have resulted in significantly improved water industry performance (Kanazawa, 2006). A global study has also concluded that private participation in electricity and water distribution is associated with stronger gains in productivity and service quality (Gassner, Popov & Pushak, 2009). In many countries, such as in the UK, the private sector plays a major role in developing the water sector supported by strong institutions. In addition to financing, private participation has also improved both coverage and quality of water supply in countries like Chile (Gazmuri & Rosegrant, 1994). Countries like China have also opened their water market to private participation mainly to plug the financing gap with provision for foreign investors eligible to be majority shareholders in joint ventures (Choi, Chung & Lee, 2010). Some studies are of the opinion that the overall expectations of increased investments and improved efficiency to be gained by expanding private sector participation in water services have not been met, which has been formally recognized by institutions such as the World Bank (Hukka & Vinnari, 2007). There has also been discontent about private involvement in developing countries due to the unwillingness of private operators to expand coverage in low-income areas and the associated steep tariff increase leading to agreement termination in many cases (Hukka & Vinnari, 2007). A study of six developed water markets has produced the results presented below in Table 1.

Countries	Status since 1987
USA	Mainly regulated activities, rather than the non-regulated operations and maintenance (O&M) outsourcing contracts which emerged in the 1990s
England & Wales	29 statutory water companies serving 13.8 million people by 1989
France	The private sector share had advanced from 72% in 1987 to 80% by 2010
Italy	11% of the market was served by the private sector and semiprivate companies in 1987
Spain	The private sector share advanced from 35% in 1987 to nearly 50% by 2010
Germany	Gelsenwasser and certain local companies hold approximately 8% of the market through long-term contracts

**Table 1.** Private participation in selected developed countries (GWI, 2010).

### 1.1 Water Market in India: Supply Side

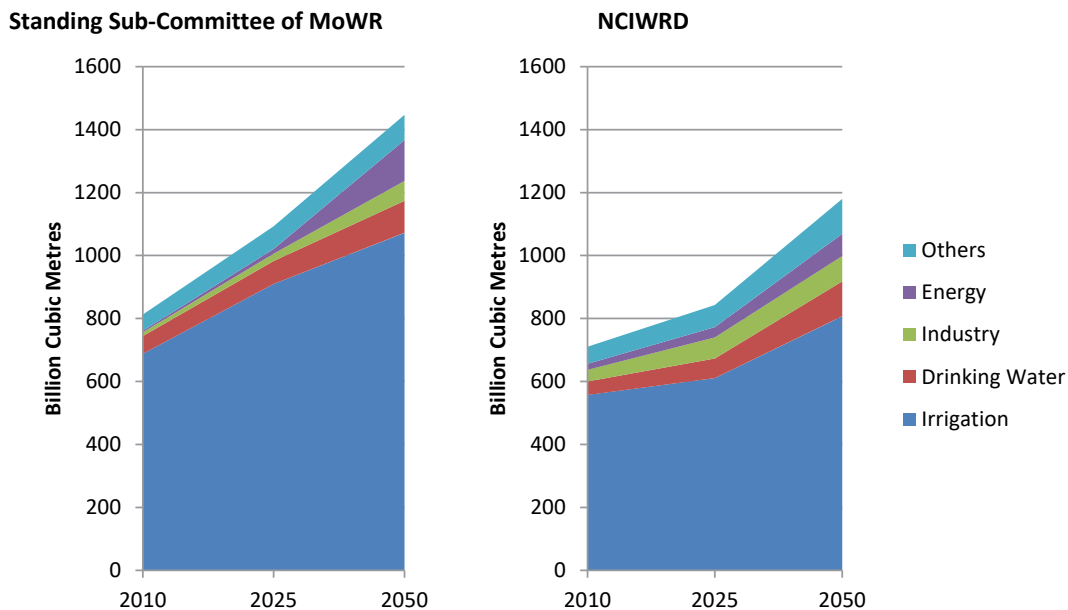
India receives an annual precipitation of 4000 billion m<sup>3</sup> of water, out of which only around 60% is usable. Out of this usable water, around 40% is ground water and the rest is surface water. Out of the water used, only 20% is treated and used and the rest goes waste. India with its large coastline has an abundant supply of sea water. However, treated sea water is expensive due to its high energy requirement and equipment cost.



**Figure 2.** Water supply in India in billion cubic metres (Grail Research, 2009).

## 1.2 Water Market in India: Demand Side

Even if India is able to tap all its available water resources, scarcity is unavoidable, as is evident from the demand of water which will far outstrip the supply as shown in the figures below. Other sources of tapping water supply would be through the treatment of sea water and waste water. Thus it may be necessary to explore other sources of financing to improve the current delivery mechanisms as well as plan for the future by tapping other sources of water.

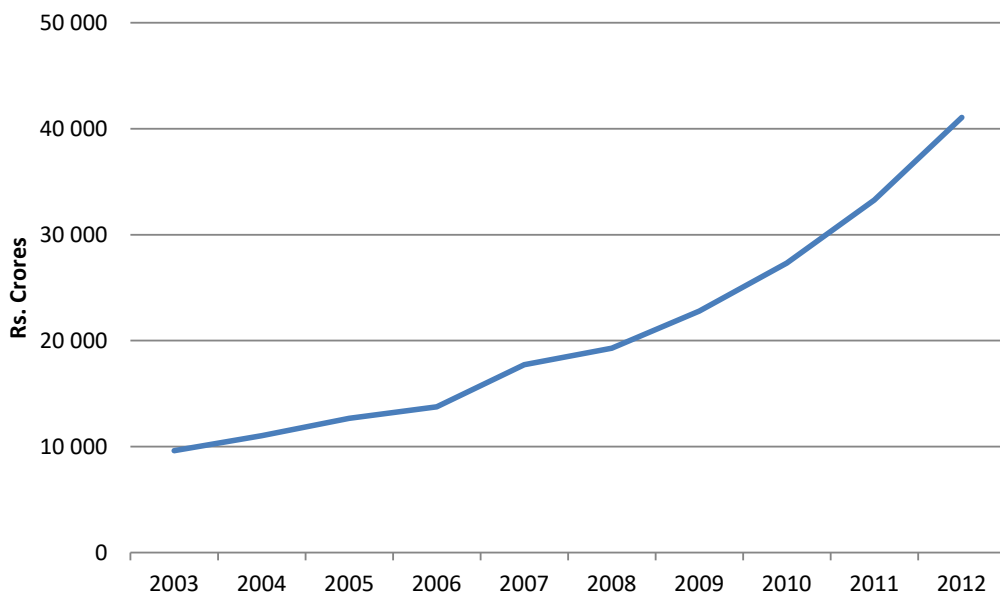


**Figure 3.**

Water requirements across various sectors; MoWR refers to the Ministry of Water Resources, the Government of India; NCIWRD refers to the National Commission on Integrated Water Resources Development, India (CPCB, 2009; 2030 Water Resources Group).

## 2. Need for Private Involvement

Political economy and performance issues in water supply and sanitation have historically slowed the pace of investment in the sector (Planning Commission, 2008). The growing importance of the water sector can be inferred from the increased allocation to the water sector in the eleventh plan (Rs. 143 730 crores in the eleventh plan compared to Rs. 64 803 crores in the tenth plan). This arises from the need to increase coverage of water supply and sanitation services and the necessary finances required for such a venture. Also, some estimates of the enormity of funds requirement can be acquired from India Water Vision 2025 which projected an investment requirement of Rs 5 000 billion in 25 years or Rs 200 billion per year (Iyer, 2001).



**Figure 4.** Actual and projected annual investments in water supply and sanitation (Planning Commission, 2008).

In India, private investments in the water sector have been promoted since long (MoWR, 1995). In the nineties itself, state governments were trying to get private funds directly by inviting bids and indirectly by floating water bonds (Saleth, 1999).

Some of the plans for meeting the investment needs for this sector are covered by the Jawaharlal Nehru National Urban Renewal Mission (JNNURM). JNNURM provides central government investments through urban local municipal organizations. Also, central government investments through JNNURM are supplemented by counterpart financing by the state governments. Apart from JNNURM, there are other schemes such as UIDSSMT and ARWSP. However, the existing provisions for supply are poor in terms of access, quality, and supply duration even with a concerted effort through above mentioned stimulus packages. Also the local bodies managing the water delivery systems are financially weak and mostly dependent on state and central grants for sustenance.

Thus the private sector as a source of financing can be explored to plug this gap. However, a multiplicity of risks around, for example, the allocation of property rights, pricing, cost recovery, demand management, supply provisions, and uncertainties around institutional frameworks may deter private participation.

### **3. Institutions in the Water Sector and Interface with Private Sector**

Water institutions can be conceptualized as comprising three main components and their interactions, i.e., water law, water policy, and water administration (Saleth & Dinar, 2000). However, in developing countries where property rights are imperfectly defined and contractual enforcement is costly, involving the private sector has its own challenges (Kanazawa, 2006). Some studies are of the view that social stakes in water regulation and associated latent political pressures may be greater than in electricity regulation (Dubash, 2008).

The water sector in India is subject to evolving institutions with the linkages between water policies, legislations, and organizations maturing over time. After the National Water Policy 2002, only eight states have got state water policies in place. An independent regulatory authority has been implemented in Maharashtra only (MWRRA), and merely a handful of states have initiated actions for setting them up. The sector is characterized by a multitude of implementing agencies with overlapping responsibilities which are burdened with service provisions with scarce access to finances.



	Law	Policy	Administration
Implications for private players	<ul style="list-style-type: none"> <li>• A move towards independent regulation may increase transparency in pricing</li> <li>• Governed by laws of local bodies with local focus</li> <li>• Prevention of pollution and ground water depletion are issues that are important</li> </ul>	<ul style="list-style-type: none"> <li>• Individual state water policies being shaped up to provide direction</li> <li>• National water policy 2002 mentions encouraging private participation</li> <li>• Central schemes like JNNURM also encourage private sector involvement</li> </ul>	<ul style="list-style-type: none"> <li>• Administration is mostly through contacts and guidelines of concerned organizations</li> <li>• Recent bidding activities for treatment and supply concessions indicate private interest</li> <li>• Administration of most involvements are at the local level</li> </ul>
National Level	<ul style="list-style-type: none"> <li>• 73<sup>rd</sup> and 74<sup>th</sup> Constitutional Amendments</li> <li>• Ground Water Regulation and Control of Development and Management Bill, 2005</li> <li>• Water (Prevention and Control of Pollution) Act, 1974</li> <li>• Water (Prevention and Control of Pollution) Cess Act, 1977</li> <li>• Environment (Protection) Act, 1986</li> </ul>	<ul style="list-style-type: none"> <li>• The National Water Policy, 2002</li> <li>• The National Urban Sanitation Policy, 2008</li> <li>• The National Environment Policy, 2006</li> <li>• The Policy Statement for Abatement of Pollution, 1992</li> <li>• The National Conservation Strategy and Policy Statement on Environment and Development, 1992</li> </ul>	<ul style="list-style-type: none"> <li>• Ministry of Water Resources</li> <li>• Ministry of Environment and Forests</li> </ul>
State Level	<ul style="list-style-type: none"> <li>• State Acts/ Bills for independent regulatory commissions</li> <li>• Water and wastewater reforms bills</li> </ul>	<ul style="list-style-type: none"> <li>• State water policies</li> </ul>	<ul style="list-style-type: none"> <li>• State water boards/ state government ministries and departments</li> </ul>
Local Level	<ul style="list-style-type: none"> <li>• Acts of municipal/ local bodies</li> <li>• Influenced by acts related to pollution control and environment</li> </ul>	<ul style="list-style-type: none"> <li>• To follow central and state policies and guidelines</li> </ul>	<ul style="list-style-type: none"> <li>• City water boards</li> <li>• Municipal corporations and urban local bodies</li> <li>• Public health departments</li> <li>• Other agencies and Panchayati Raj Institutions</li> </ul>

**Table 2.**  
Water institutions and implications for private players.

## 4. Review of Private Interest and Intent in the Water Sector

### 4.1 Generally Followed Models of Private Participation in the Water Sector

Private sector involvement can take place through two contractual arrangements, concessions and affermage or lease contracts (Lobina & Hall, 2007), although in both cases the ownership is retained by the local body. In the former arrangement, the concessionaire assumes the operational responsibility of the asset and is also responsible for capital and operational expenses. In an affermage contract, the involved party is responsible only for operational expenses. A third option may be full or partial divestiture of ownership to private players.

#### **Concessions:**

a) BOT Class of Contracts: In this type of contract, the private operator is expected to finance, construct, operate, and maintain the facility for a specific time period and then transfer it to the owner. There are various variations of this class of contract like BOT (build, operate, transfer), BOO (build, own, operate), BOOT (build, own, operate, transfer), DBOOT (design, build, own, operate, transfer), ROT (rehabilitate, operate, transfer), BROT (build, rehabilitate, operate, transfer), RLT (rehabilitate, lease, transfer) etc.

#### **Affermage:**

b) Service contracts: Contracts to a private party for a specific service like billing, collection etc.

c) Management contracts: In this type of contract, the private party is appointed for managing the facility.

d) Operation and maintenance contract: Contracts in which a private operator is expected to operate and maintain the facility.

#### **Divestitures/ Private Operation:**

e) Partial and full divestiture: In this case, the partial or full ownership of the facility and the resource are transferred to the private operator. The private operator is expected to be responsible for the operation of the system under a regulatory purview. Examples of divestiture include the Rasmada scheme, under which a stretch of the Sheonath River in Chattisgarh was awarded to Radius Water Inc. for a period of 22 years.

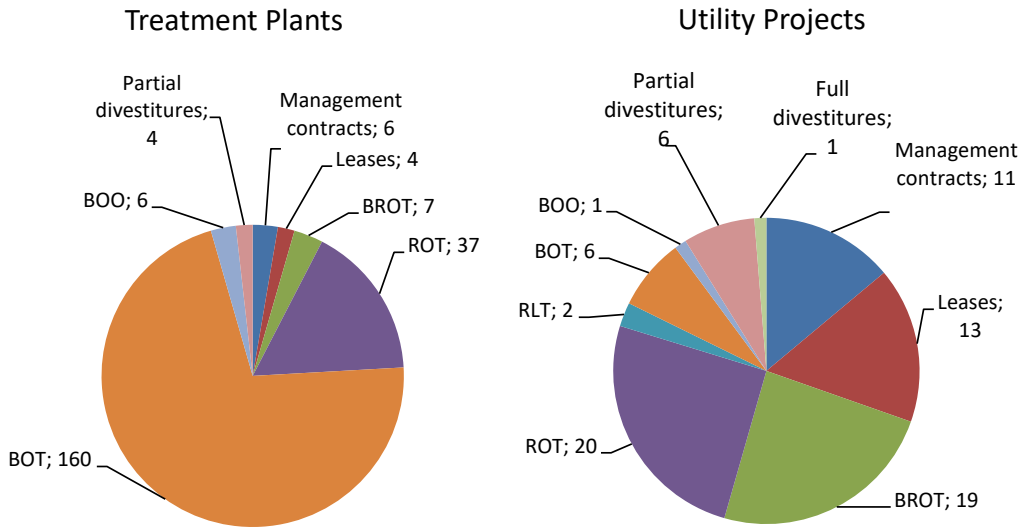
f) Private operation: In this case, the facility is set up, owned and operated by a private player. A single example of this exists in India – the operation of the water utility in Jamshedpur by JUSCO.

A comparison of the various options of private participation is provided below:

Type	Ownership	Capital Investment	Operational Investment	Management	O&M responsibility	Risks borne by
Service Contracts	Public	Public	Public	Public	Public	Public
Management Contracts	Public	Public	Public	Private	Private	Shared
O&M Contracts	Public	Public	Private	Private	Private	Shared
BOT Concessions	Public	Private	Private	Private	Private	Private
Divestiture	Private	Private	Private	Private	Private	Private
Private Operation	Private	Private	Private	Private	Private	Private

**Table 3.**  
Types of private sector participation in the water industry in India.

An analysis of the World Bank’s PPI database across developing countries clearly demonstrates that BOT class of concessions dominate the bulk of the private involvement in water projects. Some of the details of private participation in developing countries are provided below.



**Figure 5.**  
Private participation in a number of water projects in developing countries in 2005–2009 (World Bank and PPIAF, 2010).

## **4.2 Private Participation in the Water Sector in India**

In spite of an evolving institutional landscape, the private sector has been taking keen interest in the water sector, with a few players participating through the public–private participation (PPP) route, i.e. joint participation of public and private organizations. Studies carried out in Hubli-Dharwad in north Karnataka have highlighted the fact there is a need to go beyond the privatization debate and instead focus on the specific functions that private parties can undertake (Sangameswaran, Madhav & D’Rozario, 2008). The water sector can be broadly classified into two segments from the supply perspective: treatment of water and distribution to consumers. Whereas the treatment segment has generated a lot of interest among private players, the distribution segment has been slow to take off due to risks around input quality, metering, billing and collection coupled with low tariffs.

India has a rich experience of private participation in the water sector. In India, private participation in water management started with the Chhattisgarh government’s efforts to attract private involvement for a stretch of the Sheonath River, which resulted in failure. Such arrangement excluded use of an earlier public resource which could not stand up to the pressure by water users. Some of the present private players in India in the water business are JUSCO, Doshion Veolia Water Solutions, Degremont, VA Tech Wabag, Subhash Projects, IVRCL, Jindal Water Infrastructure, Ion Exchange, Mahindra, L&T, and a host of others. There are also many efforts from both the government and corporate side to structure meaningful private public partnerships. Brief case studies of the various models of private participation are discussed below.

### **4.2.1 Service Contracts: Bangalore**

Examples of service contracts include leakage reduction in Bangalore by Thames Water and L&T. The project was launched in 2003 and had an estimated investment of 690 million USD. The total project period was 3 years, the first 1.5 years for implementation and the rest for maintenance.

### **4.2.2 Management Contracts: Latur**

The city of Latur, located in Maharashtra, had been facing a severe shortage of water. The water supply in the city was initially managed by a local body and had been characterized by issues around efficiency and collection. To improve the water supply situation in the city, the Maharashtra Jeevan Pradhikarna (MJP) undertook large capital investments in improving the supply infrastructure. To improve the management of the supply infrastructure, MJP had floated bids for private involvement based on licence fee architecture for a period of 5 years. This involved private firms bidding to get a permission for involvement in the project with a well-defined scope. The bid was won by a consortium of Subhash Projects, UPL-EEL and Hydro Comp Enterprises, who had structured a SPV “Latur Water Management Company Limited” (LWMCL). The scope

of the contract involved metering, billing and collection activities, increasing supply coverage and reducing unauthorized leakages. The standards of performance and tariff were set by MJP and LWMCL was expected to collect and retain the revenues. In return, LWMCL had to pay MJP a fixed licence fee for conducting business in the licensed area.

#### **4.2.3 O&M Contracts: Madurai**

Madurai Municipal Corporation has awarded an O&M contract to Subhash Projects and Marketing Limited for a 24 x 7 water supply system to three wards in Madurai, Tamil Nadu. The project would also entail investment planning and project supervision by the private player.

#### **4.2.4 BOT Concessions: Salt Lake**

Sector-V of Salt Lake, considered to be the IT & ITeS hub of West Bengal, had no organized water supply and sewerage systems in the township. The industrial units in Sector-V depended on ground water based water supply and on-site sanitation at their own costs. The Government of West Bengal wished to end the indiscriminate extraction of underground water to prevent environmental hazards and a combined water supply-cum-sewerage project for the entire township through BOT was invited by the state government. The implementation and management of the project was to be handed over to a competitively selected private sector entity for a period of 30 years initially and renewable for another 30 years. The details of the contracting process are provided below:

#### **Bidding process followed for JUSCO**

- a) Fixation of eligibility criteria for the applicant bidders in terms of past experience in the related field, net worth, annual turnover etc.
- b) Invitation of bids from prospective private sector entities (developers/BOT operators) through insertion in leading national dailies and KMDA website
- c) Technical evaluation and marking of bids by a team of independent experts, including experts from outside KMDA
- d) Setting the cut-off mark (60 on a scale of 1–100) that a bidder has to obtain on technical bid evaluation to be considered as technically qualified
- e) Evaluation of financial parameters (lowest water-cum-sewerage charges per KL) for selection of one from amongst the technically qualified bidder.

The concession agreement was awarded to SPV of JUSCO (74%) and Voltas (26%) for a period of 30 years. The key contractual points are provided below:

Concession Authority (NITA)	Concessionaire (JUSCO-Voltas)	Consumers
<ul style="list-style-type: none"> <li>• Land - free of cost by KMDA</li> <li>• Water - Rs. 5/ KL from KMC</li> <li>• Capital grant of 35% from JNNURM</li> <li>• Groundwater extraction not allowed</li> </ul>	<ul style="list-style-type: none"> <li>• Infrastructure Capex (Rs. 63 Crores)</li> <li>• Tariff of Rs. 25/KL from consumers</li> <li>• Connection charges of Rs. 10/ sq. ft.</li> <li>• Other usage charges</li> </ul>	<ul style="list-style-type: none"> <li>• Industrial, Commercial &amp; Institutional consumers in sector V of Salt Lake City, Kolkata</li> </ul>

#### 4.2.5 Divestiture: Sheonath River in Chattisgarh

The Sheonath River is a tributary of Mahanadi and flows through the state of Chattisgarh. The project was conceived to supply water to the newly developed industrial hub at Borai located in Durg District. Chhattisgarh State Industrial Development Corporation (CSIDC) had been promoting the development of Borai industrial estate. In 2001, the state awarded a BOOT concession to Radius Water (a part of Kailash Engineering, a local company) for construction of a dam across the Sheonath River. The concession included the rights to a stretch of 23.6 km of the water reservoir for supplying water to the industrial estate as well as maintenance of an effluent treatment plant. The total concession period was 22 years.

Part of the demand risk was covered by CSIDC who had signed a take or pay contract with Radius Water for 4 MLD. The total project cost was estimated at 130 million UD dollars for 30 million litres per day (MLD). The project costs and maintenance were on the responsibility of Radius Water but it was decided that Rs. 6.5 crores would be provided to the private form as loan and the rest would be in the form of equity (Das & Pangare, 2006).

The project faced widespread public opposition due to various issues. Firstly, the project impinged upon the fishing rights of local fishermen and the local farmers were not allowed to lift water from that stretch of the river. Secondly, sand mining activities also suffered, villages were affected and there were reports of groundwater depletion. In 2003, a decision to scrap the project was taken.

#### **4.2.6 Private Operation: JUSCO in Jamshedpur**

JUSCO has been managing the municipal services in Jamshedpur for long as a part of Tata Steel. It was only in March 2004 that JUSCO was spun off as an independent subsidiary. The company runs two treatment plants in the city of Jamshedpur, supplies water and power, and collects garbage and waste. The expertise of managing the water supply system of the city of Jamshedpur is being leveraged to expand business in other cities.

#### **4.3 Entry Strategies Used by Private Players in India**

The above cases have amply demonstrated the private sector involvement in the water sector in various forms. As there is enough private interest around this sector, this section explores some of the entry strategies used by private players. Some of the common strategies followed by private players to enter this sector are provided below:

- a) Acquisition: A popular and fast way to enter the water market but strategic fit and price needs to be examined.
- b) Joint venture: A definitive arrangement to access missing competencies.
- c) Strategic alliance: Less durable – may not last the learning curve for competency transfer.
- d) Investment play: Limited to investment in the project
- e) Internal start-up: Almost all water projects require past credentials.

The table below provides names of water companies and their entry modes.

Company Name	Company Type	Focus areas	Route of entry	Alliances
<b>JUSCO Ltd.</b>	Utility and services	Power, water utility and services	Legacy issues, demerger from Tata Steel	Consulting alliance with Veolia for treatment
<b>IVRCL Ltd.</b>	Civil construction & turnkey projects	Water, power transmission, transportation & building infrastructure		Cadagua (for advanced water solutions) and Befesa (for desalination)
<b>Degremont</b>	Equipment and construction	Water treatment	In India since 1954, Indian subsidiary in 1986 though joint venture (JV)	Joint venture with Anand Automotive Ltd.
<b>Ion Exchange</b>	Equipment, construction and chemicals	Water treatment and ion exchange resins	In 1964 as a subsidiary of Permutit UK	Licensing agreements with BMS, ELF Antar, Eutech & Nordic water for plants & filters
<b>Doshion Veolia Water Solutions</b>	Equipment and construction	Water and waste water management	Joint Venture (JV)	JV between Doshion (construction/ fabrication) and Veolia (treatment technology)
<b>Mahindra Water Utilities</b>	Construction	Treatment, supply, network management of water, miscellaneous engineering	Joint Venture (JV)	JV between Mahindra Infra (construction) and Utilities international, UK (technology)
<b>L&amp;T – Water Division</b>	Engineering and construction	Treatment and supply		
<b>Ramky Infrastructure</b>	Engineering and construction	Water treatment & supply, building, transportation	Engineering, procurement, and construction (EPC) in water projects	
<b>SPML water infra limited</b>	Engineering and construction – presently PPP also	Water supply, solid waste, hydro power, transport and industrial infrastructure	Engineering, procurement, and construction (EPC) and public-private partnership (PPP) in water projects	
<b>Pratibha</b>	Engineering and construction	Water supply and other urban infrastructure	In 1994 through JV for fabrication	JV with Coromandal Prescrete for fabrication
<b>Unity Infra</b>	Engineering and construction	Engineering, procurement, and construction (EPC) for water projects	Joint Venture (JV)	JV with various developers
<b>VA Tech Wabag</b>	Equipment and construction	Water treatment incl. desalination	In 1996 through bidding, acquisition in 2007	Acquisition of Wabag Austria in 2007, 25% IPO
<b>Jindal Water Infrastructure Limited</b>	Infrastructure company	EPC/ Build-operate-transfer (BOT) for water projects		

**Table 4.**  
Water companies in India and their entry modes.



## 5. Issues Faced by Private Players

Some of the issues that may be faced by private players are outlined as follows:

**a) Contracts are not standardized:** There have been evidence of increasing private involvement in the water sector. However, while other sectors, such as electricity, roads, and ports, have fairly standardized model agreements and other contractual documents, concession agreements in the water sector are considered on a case by case basis and vary widely in scope.

**b) Unclear pricing rules:** The water sector generally suffers from low tariffs which do not fully recover the cost of supply, although JNNURM recommends the recovery of full cost of supply. The public characteristics of water coupled with unclear tariff setting rules by local bodies may provide uncertain price signals to the private operator to act on. Also tariff revision and its frequency are somewhat sensitive issues with unclear guidelines. Though some states, such as Maharashtra, have set up an independent regulatory authority, similar instances are not present in other parts of the country.

**c) Poor system data:** In many local bodies, service fees for water are not clearly defined and in part clubbed with property taxes. Also the absence of large-scale metering makes it impossible to capture data on unaccounted-for water even though some sample surveys exist. Unaccounted-for water varies from 13% to 60% across major cities in India (ADB, 2007). For private sector to participate actively, it is imperative that baseline data can be ascertained accurately. Also tariff fixation is dependent on the quality of data and accounting rules followed for fixing the cost of supply.

**d) Poorly defined rights:** The property rights for water are poorly defined. Though the provision of water is a state subject, after the implementation of the 74<sup>th</sup> Constitutional Amendment, the responsibility lies with respective local bodies. Allocation of water rights does not follow a formalized process except in cases where specific projects have been identified and structured. In these cases, usually a process of open competitive bidding is followed.

**e) Institutional bottlenecks:** The institutional landscape around the water sector is quite fragmented with each state having its own institutional variations, state water policies having differing priorities, and local bodies having their own acts. Some efforts of standardization at the local level were carried out with the initiation of the model municipal law in 2003. There are a number of implementation organizations with overlapping responsibilities.

**f) Investment:** The local bodies managing water delivery systems are dependent mainly on tax and non-tax revenues supplemented by grants. Thus most local bodies are yet to get full financial autonomy and depend on the state and centre for capital investments. Whereas the investment needs are best understood at the local level, financing for the same is driven externally. Different state finance commissions have different expenditure criteria.

**g) Standards of performance:** There are no well-defined standards of performance unlike in some other sectors like electricity where regulatory commissions publish expected standards of performance to be adhered to by the service providers. The average water availability in major urban centres is 4.3 hours per day according to a study conducted by ADB (ADB, 2007).

## 6. Conclusions and Recommendations

There is a lot of private interest around the water sector but the interest is not getting connected to the infrastructure needs. The following policy recommendations may be of help:

**a) Designing model contracting documents:** It may be useful to design a model concession contract and bidding documents on the lines of other infrastructure sectors, such as electricity, roads, and ports, so that the project risks are shared fairly between the private operator and the project initiator.

**b) Providing certainty around pricing principles:** There is a need to reduce uncertainties around tariff fixation principles to encourage private operators. Independent regulatory commissions should be set up in all states and empower them to set up principles for tariff fixation. Similar arrangements have been carried out in the electricity sector to reduce regulatory uncertainties.

**c) Creating baseline data and accounting systems:** To create and maintain sufficient data about water supply delivery, it is essential to meter connections to enable the assessment of the level of unaccounted-for water, which is till now based on sample surveys and estimates.

**d) Defining property rights and its allocation:** Defining the property rights of water resources and its allocation may be another useful initiative in encouraging private players.

**e) Understanding institutional interplays:** Local organizations need to follow a standardized and well-studied approach for tapping private participation. A structured approach in conduct, systems, and processes for private participation in the water sector is required.

**f) Framing investment guidelines:** Investment norms for improving water related infrastructure may be required as such guidelines do not exist. Such guidelines may make local investment plans stand up to scrutiny and far more acceptable. This may lead to system improvement and make it attractive for private sectors to invest.

**g) Defining standards of performance:** Standards of performance also vary across local bodies and a standardized set of performance parameters may better set the expectations of private operators.

Although the above recommendations may not be comprehensive, it needs to be understood that opportunities for the private needs to be clearly defined with equitable sharing of risks to get more private participation in this sector.

## References

2030 Water Resources Group. *Charting Our Water Future*.

ADB (2007). *2007 Benchmarking and Data Book of Water Utilities in India*.

Bhaduri, A. & Kejriwal, A. (2005, December 31). Urban Water Supply: Reforming the Reformers. *Economic and Political Weekly*.

Choi, J.-H., Chung, J. & Lee, D.-J. (2010). Risk Perception Analysis: Participation in China's water PPP market. *International Journal of Project Management*, 28, 580–592.

CPCB (2009). *Status of Water Supply, Wastewater Generation and Treatment in Class-I Cities & Class-II Towns of India*. New Delhi: Central Pollution Control Board, MoEF, Gol.

Das, B. & Pangare, G. (2006, February 18). In Chhattisgarh, a River Becomes Private Property. *Economic and Political Weekly*.

Datamonitor (2008). *Water Utilities in India: Industry Profile*.

Dubash, N. K. (2008, October 4). Independent Regulatory Agencies: A Theoretical Review with Reference to Electricity and Water in India. *Economic & Political Weekly*.

Gassner, K., Popov, A. & Pushak, N. (2009). *Does Private Sector Participation Improve Performance in Electricity and Water Distribution?* World Bank and PPIAF.

Gazmuri, R. & Rosegrant, M. (1994). *Chilean Water Policy: the Role of Water Rights, Institutions, and Markets*. Washington DC: International Food Policy Research Institute.

Grail Research (2009). *Water – the India Story*.

GWI (2010). The New Crowd at Private Water's Top Table. *Global Water Intelligence*, 11 (11).

Hukka, J. J., & Vinnari, E. M. (2007). Public–public Partnerships in the Finnish Water Services Sector. *Utilities Policy*, 15.

Iyer, R. R. (2001, March 31). Water: Charting a Course for the Future – I. *Economic and Political Weekly*.

Kanazawa, M. (2006). Investment in Private Water Development: Property Rights and Contractual Opportunism during the California Gold Rush. *Explorations in Economic History*, 43.

Lobina, E. & Hall, D. (2007). Experience with private sector participation in Grenoble, France and lessons on strengthening public water operations. *Utilities Policy*, 15.

MoWR (1995). *Report of the High Level Committee on Private Sector Participation in Irrigation and Multi-purpose Projects*. New Delhi: Ministry of Water Resources.

Planning Commission (2008). *Projections in the Eleventh Five Year Plan: Investment in Infrastructure*. The Secretariat for the Committee on Infrastructure. New Delhi: Planning Commission, Gol.

Saleth, M. & Dinar, A. (2000). Institutional Changes in Global Water Sector: Trends, Patterns and Implications. *Water Policy*, 2.

Saleth, R. M. (1999). Irrigation Privatization in India: Options, Issues, and Experience. *Economic and Political Weekly*, 34.

Sangameswaran, P., Madhav, R. & D'Rozario, C. (2008, April 5). 24/7, 'Privatisation' and Water Reform: Insights from Hubli-Dharwad. *Economic & Political Weekly*.

The Economist (2010, May 22). For Want of a Drink: A Special Report on Water. *The Economist*.

World Bank and PPIAF (2010). PPI Project Database.