Privatization of Water in Karnataka:

Special Focus on Bangalore

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1. Introduction

1.1 The Water Supply System

The main surface sources of water for Bangalore are *Arkavathy* and *Cauvery* Rivers. Till 1986, the city was dependent on untreated water from large number of tanks, local wells and *Kalyanis*[1].

***Arkavathy* Water Supply Scheme**:

As the demand for water grew with the rise in population, the utmost source was identified as *Arkavathy (*identified as a water source in 1896) River across which a tank was constructed at a lake called *Hessarghatta* and the water was pumped to the city. The water supply from this source was 36 MLD(Million Litres Per Day). However, over the years it has been considerably reduced. As the city grew rapidly, to meet the rising demand, a larger reservoir called *Chamarajasagar (CRS)* was constructed across the River *Arkavathy* at *Tippagondanahalli* (TG halli), which is downstream of the *Hessarghatta* lake. The water was abstracted from the reservoir and filtered and treated in a conventional water treatment plant and pumped to Bangalore city from the year 1933.The total pumping of water from this source was 140 MLD. After independence Bangalore grew more rapidly in population. With the IT boom and rapid urbanization, the requirement of water for human consumption and industries rose sharply. Hence to meet the immediate requirement and future demands, a large source of water viz. *River Cauvery* was identified for development.

***Cauvery* Water Supply Scheme (CWSS):**

Cauvery, the new source of water, is a perennial river. The Government of Karnataka has allocated about 19 TMC (600 cusecs) of *Cauvery* River water to Bangalore City for utilization to meet the drinking water needs from the states allocation. The main point for tapping the *Cauvery* River is at the *Shiva Anicut*, which is about 90 kms, to the South West of Bangalore City. There is an earlier existing facility erected by Karnataka Electricity Board (now changed to KPTCL, a limited company), in which the water from the *Shiva Anicut* is drawn through an open power channel to the *Forbes* Sagar Balancing

[1] *Kalyanis* are specially built ponds within the city, prominent in and around the area of the *Ulsoor*, *Yediyur* and *Sankey* lakes in Bangalore

Reservoir and finally to the *Netkal Balancing reservoir* about 8.85 km from Anicut, which carries the combined flow from the hydro-power generation station at Shimsha and for the water supply. The *Netkal Balancing Reservoir (NBR*) serves as the head works for drawing the water form River *Cauvery* for water supply to the city. Since 1974, BWSSB[2] fullform! has abstracted water from the *Cauvery* source and augmented the water supply under *Cauvery Water Supply Schemes (CWSS)*, in stages. CWSS Stage I was commissioned in the year 1974 to augment the supply by 135 MLD. CWSS Stage II followed and was commissioned in the year 1982 to further augment the supply by 135 MLD.CWSS Stage III was commissioned subsequently in the year 1994 increasing the supply by an additional 270 MLD. BWSSB have more recently implemented CWSS Stage IV Phase I in the year 2002 adding an additional 270 MLD of treated water to the city supplies.

1.2 The Problem Begins

The recent imbroglio[3] over sharing the *Cauvery* water could be considered indicative of Karnataka's water woes, both existing and anticipated. In 2001, the population of Karnataka stood at 52,733,958. 10% of this population, 5,280,000 people, resided in Bangalore. Water scarcity isn't new to the country but what makes it interesting in Karnataka are the alternatives being presented by legislators and engineers to address the shortage.

Privatization of water has been on the cards since 1999. In a report published by the Prime Minister's Council on Trade and Industry for Infrastructural Development, specific recommendations were made to privatize the Bangalore Water Supply and Sewerages Board to ensure efficiency in water supply;

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[2] BWSSB or the **Bangalore Water Supply and Sewerage Board** is the public entity responsible for managing the water needs of the city

[3] 4 States of India rely on Cauvery as a source of their water supply and the water sharing arrangement has always been under dispute, primarily because demands are high and water available for sharing, limited. In 2006 the Tamil Nadu and Karnataka governments could not agree to an acceptable terms for sharing water and eventually the matter was referred to a tribunal. The verdict of the tribunal laying out a detailed terms of sharing between the states could not resolve the imbroglio satisfactorily. The following link should shed more light on the issue. http://www.hinduonnet.com/fline/fl1924/stories/20021206004203400.htm

"…the first step towards improving the water situation in Bangalore is to privatize the distribution of water and sanitation services through a Concession Contract. An independent Regulatory Authority should be formed to regulate the operation of the privatized utility and set targets for reduction in water losses and improvement in collections…"
(Subject Group on Infrastructure, 1999)

However the Government's assurances of an improved water supply situation 'could not hold much water' against arguments from civil rights groups who claimed that natural resources like water could not be privatized. With each new government the debate revived and now the plan has taken the form of The **'Greater Bangalore Water Supply and Sanitation Project'**, a move that intends to privatize water distribution in 8 municipalities of Bangalore. With the city having taken the first step, the Karnataka Urban Water Supply and Drainage Board (KUWSDB) is also likely to implement the same in the other districts on Karnataka. Voices of dissent have come from all quarters of the city and have raised issues ranging from the past experiences with privatization (Bolivia to cite one e.g.) and the impact this move could have on people who cannot at the moment afford to buy water.

This project is an objective analysis of the impact that privatization of water supply implies in terms of the following:

Improvement in water supply

Continuous, clean and cheap water supply

Efficiency in Supply

Reduction in UAF[4] water

Cost/ Pricing of Water Supply

Comparison of pricing by Private Water tankers, BWSSB supply and Corporate service

Public Opinion

Concerns/issues raised

[4] UAF or Unaccounted Flow is a major source of wastage while transporting water over long distances

2. Water Woes in Karnataka: A Snapshot

The Karnataka Urban water supply and drainage Board (KUWSDB) and the Bangalore Water Supply and Sewerage Board (BWSSB) are responsible for managing water supply to urban areas of 27 districts in Karnataka and Bangalore respectively.

Sources of Water Supply

217 areas across these districts, comprising 11,716,906 people (close to 22% of the total population in Karnataka as per the 2001 census), currently receive water from the Sources mentioned below. The natural sources include Rivers such as the *Cauvery* and its tributaries, *Tungabadra, Kabini* as well as lakes and streams.

Source of Water Supply	No of Areas
Rivers/ Lake/Stream	103
Bore well/Open Wells	53
Canals	17
Other Sources	15
Reservoirs	13
Tanks	11
Dams	2
Recycled Backwash water	3
Grand Total	217

Source: *http://www.kuwsdb.org*

Bangalore City receives its water from the sources specified below. The present withdrawal by the city for supply is at 582 MLD (Million Litres per Day) as opposed to the potential 724 MLD. The distance of the water source from the city is of significance as it impacts the cost incurred in supply. A source that is far away implies higher transportation costs as well as result in a higher share of water loss in the form of leakages etc.

Source of Water Supply

Source	Established	Potential (MLD)	Present

	during		Withdrawal(MLD)
Arkavathi (18, 28 Kms from the City)			
a) Hesarghatta	1896	36	6
b) T.G.Hally	1933	148	36
Cauvery(100Kms from the City)			
a) Stage-1	1974	135	135
b) Stage-2	1982	135	135
c) Stage-3	1993	270	270
d) Stage-4	2002	NA	NA
Total		**724**	**582**

Source: *http://www.bwssb.org* , *http://www.rainwaterharvesting.org*

Owing to the growing population in Bangalore the per capita availability of water had seen a reduction from 86 litres per day in 1900 to about 45 litres per day in 1931. Post these investments were made to tap the potential of the *Akravathi* and since then the per capita availability has improved to 75 litres per capita per day in 2004[5] . However, this is also significantly lesser than the prescribed per capita supply of 150 Litres per day. A significant portion of the water is estimated to be lost as Unaccounted for water. The demand for water in the city stands at 840 MLD implying that the Supply falls short by 258 MLD (for a population of approx. 6 Million, this works out to be a supply 43 Litres less than the per capita per day demand).

Costs of Water: Expenses borne by the Government of Karnataka and Citizens

The water supply component of the proposed GWSSB is slated to cost the exchequer 410 Crores[6]. According to a study it costs the BWSSB Rs.34.25 per Kilolitre to supply water to Bangalore[7].

Revenues

Tariffs charged by the BWSSB are as below:

Domestic Section

[5] Source: www.isec.ac.in

[6] Source: http://www.hindu.com/2006/07/14/stories/2006071425420300.htm. The BWSSB however claims that it is capable of executing the plan at a significantly lesser cost and this is currently under consideration

[7] Source: http://www.indiatogether.org/2006/dec/env-tariff.htm

Slab-wise Consumption of Water (in Kliters)	Water Tariff Per Kilo Litre	Minimum Charges
1). 0-8000	6	48
2). 8001-25000	9	201
3). 25001-50000	15	676
4). 50001-75000	30	1326
5). 75001-100000	36	2226
6). 100000 & above	36	5826
Non Domestic Section		
1). 0-10000	36	360
2). 10001-20000	39	390
3). 20001-40000	44	880
4). 40001-60000	51	1002
5). 60001-100000	57	2280
6). 10000 & above	60	
Industries	60	
Bidadi Industrial Area	51	
Lorry Loads	250.00 (per Load)	
Swimming Pools	60	
Public taps	3000	

The figures reveal that Domestic users in Bangalore pay subsidized rates for their consumption. Tariffs charged by KUWSDB for domestic consumption are much lower. The following are the Minimum Uniform water rates[8] charged outside Bangalore:

- Rs.3 per kilolitre in respect of corporations other than Bangalore City.
- Rs.2.50 per kilolitre in respect of City Municipal Councils.

Rs.2 per kilolitre in respect of Town Municipal Councils and Town *Panchayats*

The issue clearly is with managing the demand and supply situation as well as earning enough to reinvest. Hence any move aimed at privatizing water supply should be considered if it meets expected demand with minimal costs.

[8] Source: http://www.indiatogether.org/2006/dec/env-tariff.htm

Meeting demand expectations would entail the following:

Supply framework to be in place to ensure that each entity has access to water

Minimize water losses from existing resources

Harness/ tap other water resources

Costs/benefits involved in changes to be comparable with present situation

3. Privatization

3.1 The Objective:

Privatization of water supply is expected to bring about the following:[9]

- Increased Resources
- Introduction of New and Improved technologies
- Efficient management of scarce water resources including improved water supply

Initial estimates point to benefits in the following terms:

- Reduction in unaccounted for water
- Improvement in per capita per day water availability in Bangalore
- Improvements in revenue from domestic water consumption

3.2 The Plan:

Privatization is generally brought about through one of the following methods:

Build-Operate-Transfer (BOT)

Build-Operate-Own-Transfer (BOOT)

Build-Operate-Lease-Transfer (BOLT)

Rehabilitate-Operate-Transfer (ROT)

Design-Build-Finance-Operate-Transfer (DBFOT)

Another possibility is to invite private participation on a contractual basis. The pattern would typically be to offer Service/Management Contracts, Lease or concession and then move on to BOT or BOOT.

[9] Source: Innovative Infrastructure Financing, V Suresh, HUDCO

At present the plan clearly rules out privatization of any water source. What is being proposed is a model where water supply is leased out to private players on a contractual basis and the role of the partner will be limited to ensuring 24/7 water supply and to collect fees from households[10]

In Karnataka too, a model similar to the one mentioned above is being proposed. The "Special Subject Group on Infrastructure" has also recommended the use of contracts to privatize BWWSB's roles in water supply and to monitor the activities of the private participant's through a regulatory authority. They expect to set up incentives to attract investment in regions that previously had inadequate water supply. There is also a belief that an appropriate pricing strategy for water supply will help ensure that water is utilized economically.

3.3 Voices of Dissent: Anti- privatization

Protest against privatization has come from citizen groups as well as from officials within the entities under consideration. Some of the objections raised have been:

- Pricing essential goods like water will put water out of reach of the poor
- Private players will not ensure quality of water supply
- Citizens pay taxes towards infrastructure development in the state and hence the boards in existence should be able to handle the situation
- Other more viable and acceptable means of handling the water crises exist.

4. Reality Check

We focus our attention on 2 regions in Karnataka where privatization in water supply has taken place in some form.

- *Mahadevapuram,* Bangalore
- *Belgaum,* Northern Karnataka

A study of Ward 83, *Malleshpallya* in Bangalore has been incorporated to understand the frequency of water supply, costs borne by citizens for the same, top three expectations from water supply and their willingness to pay for the efficient water supply.

[10] Source: Innovative Infrastructure Financing, V Suresh, HUDCO; Executive Director, Finance, KUIDFC

Mahadevapuram

Mahadevapuram in Bangalore implemented a basic model of privatization of water supply when they hired a local supplier on contract to supply water and collect fees from citizens.

Scheme of privatization:

BWSSB provides water in bulk

↓

Private Player buys the water and ensures supply with minimal loss to households

↓

Private Player collects the monthly water cess from households at a margin

Belgaum: Northern Karnataka

Profile of the area of study:

Belgaum is one among the 3 areas selected as a demonstration Zone to showcase, in the words of the KUIDFC, "the feasibility of continuous, pressurized (24/7) water supply in small areas". The plan is being executed under the Karnataka Urban Water Sector Improvement Project (KUWASIP) funded partly by the World Bank. The importance of 24/7 Water, Reduction in wastage though leaks to optimize the utilization of available resources and people's willingness to pay have been the major sources of inspiration behind the scheme.

Scheme of privatization

The project is being implemented by 3 agencies:

KUIDFC : Responsible for financial Management

KUWS&DB: Supervises priority Investments

Operator Consultant: A private operator who designs and manages rehabilitation works for 2 years

A critical component of the scheme is that the private partner will be responsible for the managerial expertise, but ownership of all assets will rest with the Urban Local Bodies.

This is important as there is no private ownership of as asset of critical importance to the Public.

Apart from these, there will be other apex bodies which will assist in various stages of the implementation of the scheme: Empowered Committee (EC) takes all important decisions relating to the project, The Project Management Unit will monitor the progress of the project every day and The Project Implementation Unit providing the necessary resources to implement the project.

Impact on Infrastructure

Based on the assessment of the existing water supply situation in *Belgaum*, the following priority investments were identified:

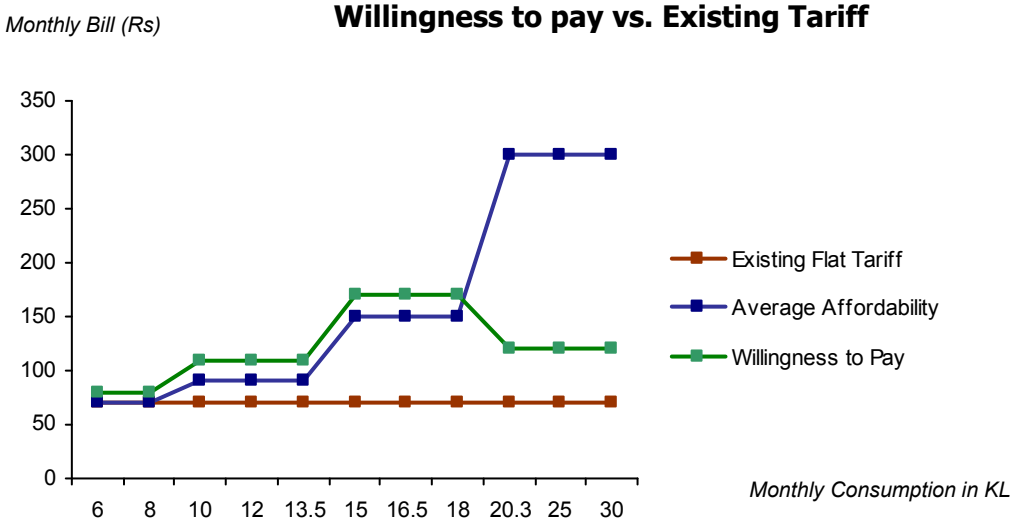
Replacing existing 750 mm Diameter RCC gravity Pipeline with 1100 mm Diameter PSC Pipeline

Erection of Centrifugal pipes to discharge 378 lps water

Construction of 55 lac litres capacity RCC ground level Service Reservoir

Impact on pricing

According to survey done in this demo area citizens were already paying a high price for water. Accordingly willingness to Pay and Affordability survey was done to showcase how much people were willing to pay for continuous supply. The results were indicative of people's preference for continuous over free but ill frequented water supply.



Recommended Water Tariff Framework			
Consumer	**Tariff Slab**	**Belgaum**	**Flat Tariff Per**

Category	Minimum(KL)	Maximum(KL)	Tariff rate	Min Charge Per Connection	Month in Rs (Old)
Domestic Consumer	0	8	6		
	8	15	10		
	15	25	15		
	Above	25	20	48	1000
Non Domestic	0	15	20		
	15	25	30		
	Above	25	40	160	10000 to 15000
Commercial Industrial	0	15	40		
	15	25	60		
	Above	25	80	320	10000 to 25000

Source: KUIDFC

Ward 83: Malleshpallya, Bangalore

Malleshpallya is home to households of diverse economic backgrounds, but one thing is common to all: a perennial water shortage for all purposes. While the economic diversity in the region implies that some families can afford more water than others the critical shortage in water supply has seen people go great lengths to obtain their daily supply of water. While Upper income families could easily pay close to 1000 Rs every month for water, Middle and Lower income families settle for anything between 0 (free water) and Rs. 300. Interestingly enough a majority of the families that we spoke to stated that if the government (BWSSB) were to provide them with water, they would prefer it to be free of cost. However, in the event that this was not to be, there were willing to pay at least as much as they were currently paying for continuous or in the least more frequent water supply.

We surveyed 9 representative families[11] and one 21 family strong Apartment[12]? A consolidation of the results reveals the following:

[11] Representative because each family lived in close proximity to at least 2 other families who shared similar economic backgrounds and water woes

[12] A representative resident of the apartment was interviewed

Source of Water Supply

Our survey revealed that there were primarily the following sources that people depended upon for their daily water requirements:

- Tanker/Private supplier
- BWSSB/*Cauvery* water
- Bore well

There were two BWSSB Tanks meant to provide free water to the residents in the area. Both have not been working for close to 3 months. Every house that we visited also had a pipe meant to carry *Cauvery* water to each house. Incidentally, some houses have never seen any water in those taps.

Drinking		**Other purposes**	
Bore well	2	Bore well	3
Tanker/Private Sources	4	Tanker	3
BWSSB/Cauvery	4	BWSSB/Cauvery	4

In terms of No. of households (9 + 1 Apartment= 10)

Frequency of Water Supply

Drinking and Other purposes	
Bore well	Continuous
Tanker	Once every Week or 2
BWSSB/Cauvery	Procure Manually Daily

Average figures for all households surveyed

Average Consumption/cost per month

Drinking and Other Purposes		
Source	Qty pm	Rs pm
Bore well	2000 – 3000 Ltrs	Free
Tanker/Private Sources	2 to 3000 Ltrs	150 to 225
BWSSB/Cauvery	2250 – 1200 Ltrs	Free

Average figures for all households surveyed

Willingness to pay for continuous water supply

Income Bracket	Willingness to pay per month
Upper	800 to 1000 (Consumption: 2 to 5000cc every week)
Middle	200
Lower	100 to 150

Average figures for all households surveyed

5. Conclusion

As our research revealed, there is more to the issue than meets the eye. Privatization of water supply (as opposed to privatization of a water source) could ensure more efficiency in a system that cannot afford to be lackadaisical about wastage and rising costs involved in providing this service to citizens. The situation in Bangalore is acute in certain areas where people are willing to pay for water but do not have access to it. The families that we spoke to incurred direct and indirect expenses in procuring their daily share of water. Some relied on the neighbourhood supplier who engaged in arbitrary water pricing (prices have been rising rapidly starting with 150 per month and currently standing at 350 pm in some households) while others travelled to the nearest hand pump and transported 35 lts of water (sufficient for a family of four) everyday.

These problems emanated from 3 primary issues:
Inadequate water supply network to cover every area of a rapidly expanding metro
Arbitrary pricing making water progressively inaccessible to some sections and Poor fee collection by government leaving them short of resources to reinvest in improving supply
Wastage incurred while transporting water from *Cauvery* and other natural sources of water

Bruce Yandle made an interesting proposition through his theory "Bootleggers and Baptists in Retrospect"[13] Where in he suggested that since every society has its share of bootleggers and Baptists" one ought to look deeper into the economic forces at work in formulating public policies. Through his examples he makes a case for setting performance standards in order to ensure that larger social goals are satisfied. Doing

[13] Source: http://www.cato.org/pubs/regulation/regv22n3/bootleggers.pdf

this, he says, would ensure that all participants have enough room to innovate and arrive at the most economical option.

By defining performance standards for Private players in water supply the government could achieve the following:

- A wider and more efficient network covering as many citizens as possible
- New and improved supply network employing technology to ensure Minimal water wastage
- Speedy resolution of complaints and grievances
- Timely collection of the monthly fee
- Cheaper water for Public
- Efficient water usage by households as they pay for water

It's about time that the government and citizens weighed the benefits and risks of outsourcing water supply management to private players with expertise in the sector. Any Further delay in considering this as a viable solution to the present water crises is bound to make an already critical shortage worse.

References

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- All the families who took time out to participate in our survey

APPENDIX 1

SURVEY: Status of Water Supply in Bangalore: Malleshpallya

Number of members in Family:

Income Bracket:

What is you source of water supply?

Drinking		**Other purposes**	
Bore well		Bore well	
Tanker		Tanker	
BWSSB/Cauvery		BWSSB/Cauvery	
Other Sources		Other Sources	

What is the frequency of water supply from these sources?

Drinking		**Other purposes**	
Bore well		Bore well	
Tanker		Tanker	
BWSSB/Cauvery		BWSSB/Cauvery	
Other Sources		Other Sources	

How much do you pay every month for water from these sources?

Drinking			**Other purposes**		
Source	Qty pm	Rs pm	Source	Qty pm	Rs pm
Bore well			Bore well		
Tanker			Tanker		
BWSSB/Cauvery			BWSSB/Cauvery		

Other Sources			Other Sources		

How much will you be willing to pay every month for continuous and clean supply of Water?