

# 1 Tracking Scale-Up of Continuous Water Services in 2 Hubli-Dharwad, Karnataka: Discussion on Sustenance Issues

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## 7 **Abstract**

8 Municipal water utilities across the state provide intermittent water services (IWS), with  
9 frequencies ranging from daily to weekly deliveries. To expand supplies, increase coverage and  
10 improve services, municipal bodies are looking for alternative ways to fund drinking water  
11 services. Public-Private Partnerships (PPP) are one of the means being explored by many  
12 municipal bodies to attract private investment in the water sector. In 2008, under a loan from  
13 the World Bank, as part of a scheme administered by the state of Karnataka, Hubli-Dharwad  
14 upgraded eight wards as a demonstration project (demo wards) to continuous water services  
15 (CWS). Hubli-Dharwad upgraded an additional 18 wards to CWS in 2015 (extension wards)  
16 and has plans to scale up CWS to all remaining wards shortly. In this background, we tried to  
17 understand the ongoing affordability issues and water scarcity challenges in the scale-up of  
18 CWS as compared to demo zones of CWS and to discourse on sustenance issues regarding the  
19 management and provision of urban water supply, including planning, the role of the public  
20 and private sector, involvement of stakeholders, availability of water, their sources,  
21 networking, financing, and maintenance, in India. Out of 67 wards, we selected 28 and  
22 collected information from 840 households.

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24 **Index terms**— continuous water services, public-private partnerships, sustenance, stakeholders.

## 25 **1 Introduction**

26 Water is at the core of sustainable development and is critical for socio-economic development, healthy ecosystems,  
27 and for human survival itself (UN Water 2015). Due to population explosion and urbanization, the demand for  
28 water by households and industries has increased tremendously in countries like India. Most of the urban areas  
29 are lacking availability of quality drinking water for domestic and drinking purposes in India. In India, public  
30 sector agencies like city corporations or urban water boards have taken the responsibility for the providing of  
31 water to consumers in urban areas. However, the management of urban water supply has resulted in negligence of  
32 groundwater management, intermittent and insufficient water deliveries, and a general lack of capital maintenance  
33 leading to a water crisis in many urban centres (Iyer 2007; Priya et al. 2008, andMathur 2013). In urban India,  
34 the most of cities deliver water through publicly management water systems; but nearly all of them provide  
35 inadequate service levels, with low coverage and intermittent deliveries. Recently, a few cities in India have  
36 begun piloting continuous (or 24x7) water supplies under a program sponsored by the World Bank and through  
37 the introduction of PPPs. Delhi (the federal capital) has planned a process of privatization of water since the  
38 year 2005 (Singh et al. 2010). In Karnataka, the state government has sanctioned 24x7 through a PPP structure  
39 for 20 cities; four larger (Mysore, Hubli-Dharwad, Gulbarga (Kalaburgi), and Belgaum (Belagavi) and 16 other  
40 smaller.

## 5 OBJECTIVES AND METHODS

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### 41 2 II.

### 42 3 Review of Literature

43 Many Indian cities are opening to reforms in the urban water sector compared to other Asian metropolitan regions  
44 and are set to face some of the political economy involved in the water sector reforms (McKenzie and Ray, 2009).  
45 However, many studies (McKenzie and Ray 2009, Shamsher 2013) have also found that the PPP model has  
46 suffered from a lack of co-ordination, a mismatch between the contract of actual requirements and estimates to  
47 connect pipeline for households, a lack of awareness and involvement of the public, a lack of coordination between  
48 government departments, poor tariff collection rates and controversy among grass-roots advocacy groups. Many  
49 studies have tried to extend the concept of sustainability to urban water management. A study by Larsen  
50 and Gujer (1997) defines urban water systems as including collection, treatment, and distribution of water,  
51 wastewater and stormwater and stated that sustainable development in the urban water supply is only possible  
52 through efficient use of available water resources and adopting new technologies. The Asian Development Bank  
53 estimates a loss of around 29 billion cubic meters of treated water every year in Asia (and resulting in nine  
54 billion dollars of annual revenue losses). The study concluded that by fixing water leakages and addressing water  
55 pilferage, it is possible for water utilities in the region to significantly cut the amount of water lost, freeing up a  
56 significant amount of both revenues and water resources. A few more studies (Liemberger et al. 2007; Dragan et al.  
57 2007) have focused on water losses (non-revenue water) and leakages. These studies suggest that water losses can  
58 be controlled by adopting innovative technologies. Tiwari et al. (2007) has focused on reforming the water sector  
59 in Delhi. The study tried to analyze the life cycle costs and create a multi-criteria analysis based on the opinion  
60 of experts and stakeholders on indicators such as sustainability, equity, efficiency, and overall performance of  
61 water utilities. The authors used a Logit model to estimate an index and considered the following four indicators  
62 for the study; 1. Efficiency (quality, quantity, and reliability of services), 2. Financial aspect, (Adequacy of  
63 cost recovery for operation), 3. Equity aspect, (Affordability, equitable access, and participation and decision  
64 making), 4. Sustainability and environment aspect. The study found that sustainability and management of  
65 resources are the key drivers of governance reforms in water management. Finally, poor service in the provision  
66 of water services, water is treated as a commercial entity rather than a fundamental right, accountability, and  
67 equity in access to water are all serious challenges to urban areas in low-income countries like India. Therefore,  
68 more studies on sustainable management of water supply addressing issues of management, fixing affordable  
69 prices, and improvement in technology are needed.

### 70 4 III. 24 X7 in Hubli-Dharwad Twin Cities

71 As per the Census 2011, Hubli-Dharwad twin cities have a population 9,43,788. Around 19% of the population  
72 constitutes slum dwellers, and the number of houses administered by HDMC exceeds two lakhs. 24x7 in Hubli-  
73 Dharwad twin cities is a project operated and managed by multiple players including, private and public entities.  
74 The scheme is a part of the KUWASIP, implemented in three cities of Karnataka viz. Belgaum, Hubli-Dharwad  
75 and Gulbarga. The agreement for the project was signed in 2005 between Hubli-Dharwad Municipal Corporation  
76 (HDMC), Karnataka Urban Infrastructure Development and Finance Corporation (KUIDFC), KUWSDB, and  
77 the Operator Consultant (OC) or the private operator. The pilot project has been financed through a World  
78 Bank loan routed as a state government grant to HDMC and its share. 24x7 is a bold step in water sector  
79 management as the municipal supply of water to citizens in Hubli-Dharwad was unable to meet even the costs  
80 of O&M, leave alone capital costs. But, the road to 24x7 was not smooth. It received an initial setback when  
81 announcements were made for the installation of pipes in demo zones (wards) in the twin city. The agitations were  
82 led by people who were skeptical about the scheme. However, on the other hand, a study on 24x7 water supply  
83 in Hubli-Dharwad twin cities reveals that the system does not satisfy the assumptions that were expected to be  
84 fulfilled with its implementation in twin cities (Burt and Ray's (2014), Ray et al. (2018). The study finds that  
85 the consumers continue to store water, the reasons being reliability and convenience of storing water. Secondly,  
86 cases of nonpayment of water bills were also found in 24x7 demo zones due to the inability of lower-income groups  
87 to pay water bills and due to lack of trust between water users and providers. Such behavior poses problems to  
88 the sustenance of the program, as 24x7 runs on the principle that supply of water on a commercial basis to cover  
89 O&M, and part of coping costs is feasible and 24x7 reduces coping costs arising from the need to store water.

90 IV.

## 91 5 Objectives and Methods

92 The objectives of the research article are:

- 93 1. To study the household's perception of water quantity, quality, pressure, and scarcity of water provided  
94 by upscaling CWS as compared IWS. 2. To examine the success of scale-up of CWS (extended) to demo zone  
95 wards (piloted wards in 2008). 3. To assess the equity of water supply between Slum and Non-Slum areas. 4.  
96 To analyze sustainable issues in scale-up of CWS (i.e., affordability issues, water scarcity and finance in the up  
97 scaling CWS.

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## 98 6 a) Methods

99 This paper is based on the insights drawn from a sample study carried out in Hubli Dharwad twin cities during  
100 2017-18. We conducted an impact evaluation of the pilot-scale conversion from intermittent to 24x7 water delivery  
101 in Hubli-Dharwad, one of the first cities in India to implement such a conversion. We selected 28 wards for our  
102 household survey, across four categories: i) CWS demo zone =4 wards; ii) CWS eight extension wards (Fully  
103 covered); iii) Eight IWS wards (Not covered 24x7); iv) Eight IWS areas in wards that contained areas with CWS  
104 services (Partially Covered).

105 For all four categories, half of the wards contained slums and Non-Slums and randomly selected 30 households  
106 in each, for a total sample size of 840 households. We collected household perceptions on water access, water  
107 quality, and the water tariff. In V.

## 108 7 Results and Discussion

109 The results from household-level analysis although, they appeared to be in favor of 24x7, did pose many questions  
110 about its sustainability, which we discuss later. We collected customers' perceptions about satisfaction over the  
111 quantity of water supplied, its quality, and the pressure in the pipes supplying water. For all the three parameters,  
112 the level of satisfaction was better in CWS than in IWS wards (see Fig1). Our recent visits to 24x7 demo zones  
113 revealed that several households followed the earlier system of storing water and filled fresh water once in 3  
114 days, reasons. These reasons are uncertainty about continuity, slow flow during peak hours, and the feeling that  
115 the rates may go high if they daily use the water. So the new system has not made any difference to some  
116 of these households. Concerning quality, there was not much difference between the opinions of customers in  
117 CWS and those in IWS as they could not make a clear distinction. A few households who used to get muddy  
118 water during the rainy season under IWS due to leakages in pipes were happy as 24x7 had put an end to it.  
119 Although 24x7 assures high pressure of around 22-40 meters (World Bank 2010) minimum, being 6 meters in  
120 pipes, it was found during the survey that those staying on the first and second floor had slow water flow in the  
121 morning hours, and could fill their overhead tanks only during noon and after that. Only 58% of households  
122 have treated drinking water. We found households in IWS wards treated water compared to CWS. Moreover,  
123 we found slum households are less concerned about the treatment of drinking water than the Non-slum areas  
124 (see fig ??). We have collected household's perception about the water pressure, quantity, and quality of water  
125 accessed differs between the non-slum and slum dwellers in the IWS and CWS areas and found that In IWS  
126 wards, there is differences between a slum and non-slum dwellers with regarding water pressure, quantity and  
127 quality of water (See fig 3a and 3b). Despite being happy with the 24x7 water supply, it should be noted that  
128 35% of the households in 24x7 demo zones had arrears in water bills during the survey period. The share of  
129 defaulters was 23% in non24x7 zones. Slum households had much higher average arrears (almost three times  
130 that of non-slum) in CWS and IWS. We tried to know whether customers had arrears pending for long or were  
131 not punctual in payment of water charges. We asked them some additional questions on the current status of  
132 their water bill to know if the arrears were due to pending bills from the earlier system or occurred after the  
133 installation of 24x7. Regarding of whether the water bill was paid for the previous month, it was found that more  
134 than 50% of the customers in slums and 45-46% in non-slums both under 24x7 and IWS had not paid the water  
135 bills for the previous month. Demo wards are receiving good service, and extended wards face irregular water  
136 supply by HDMC after implementations of 2 years. It is likely that the customers pay the bills later, but these  
137 cases depict irregularity in payment. And, sustenance of the program and efficient implementation depends on  
138 the regular flow of income required to maintain the schemes. As per KII, the failure of CWS in extension, VI.  
139 Up-Scaling 24 X7 for the Entire City-Sustenance Issues

140 The pilot project covering eight wards, which was to be completed in 2008, got the further extension and was  
141 finally completed in 2011, taking almost six years. The scale-up as per initial plans was to be started in 2009 and  
142 completed by 2014. In 2012, when the then Mayor, HDMC, announced that World Bank had agreed to extend  
143 the loan to cover 24/7 in the remaining 59 wards, he also assured that by 2016 the entire city would be covered  
144 with the scheme. But, to date, installation of pipelines and connections to 24x7 is complete in only one layout,  
145 which is just a fraction of award. Why was upscaling not started as per the plan? What lessons can be drawn  
146 from 24x7 in pilot zones for the sustenance of the project? We tried to get answers for some of these issues.

147 Although 24x7 is a successful project in demo zones, one cannot assume similar results in the remaining wards  
148 scale-up. There appear to be missing links and the lack of coordination between the departments. While the  
149 plans for scaling up the project for the remaining 44 wards are being finalized, the installation work taken up in  
150 17 plus are sluggish and stalled due to a lack of planning and cooperation from other government departments.  
151 KUWSDB officials express their helplessness in speeding the work as per plans due to lack of coordination and  
152 clearance from other departments like traffic police, railways, and Public Works Department (PWD). New roads  
153 constructed by spending crores of rupees even after receiving the World Bank approval for the extension of 24x7  
154 to other ward, have been spoilt by re-digging for laying out water pipes. All the departments in the city are  
155 aware that the entire is going to be covered 24x7. Despite this, there is no pre-plan for coordinating the network  
156 for laying pipes in new roads.

157 Secondly, Sustenance is an important factor that needs to be considered for the success of any program  
158 while designing and implementing the program itself. Implementing partial or cost recovery is the first step in  
159 addressing the issue of sustainability in terms of financial implications. The extension of 24/7 to be implemented

## 8 VII. CONCLUSION AND POLICY INITIATIVES

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160 in 6 phases in the entire city requires about Rs.1146 crores, excluding 113 crores already invested by KUWSDB  
161 in laying down HDPE pipes and creating the infrastructure required for 24x7 in around 17 full wards and partly  
162 in 14 in the second phase. Since the upscaling is financed by the World Bank loan, PPP in terms of involvement  
163 of private operator and financial contribution by HDMC as its share is a must for initiating the project. In the  
164 upscaling of 24x7 by KUIDFC to the entire city, HDMC was required to bear around 30% of the cost in the first  
165 phase and 100% of the cost in the second phase towards capital investments, unlike the pilot project wherein  
166 100% of the capital cost was provided as a grant from the State. Out of total estimates of 1146 crores, HDMC's  
167 share as per present estimates is Rs.213 crores in the first phase and Rs. 383 crores in the second phase. As per  
168 the discussions with the officials of KUIDFC, KUWSDB, and HDMC, financial constraint due to HDMC's share  
169 was the main challenge in upscaling the project to the entire city. Until recently, it was doubtful whether HDMC  
170 could contribute its share towards project costs in upscaling the project.

171 In addition to financial stability, in terms of physical requirement the implementation of 24/7 demands a  
172 permanent source of water, which is sufficient to meet the demand of the people throughout the year. One of  
173 the important risk factors in maintaining sustainability is the availability of bulk water from the main sources to  
174 cover the entire city with all legal connections and 24x7 water. As we understand the bulk of the water available  
175 from the main source (Malaprabha River) is entirely being utilized, and there is volatility in the second source  
176 (Neersagar), which is dry during summer. There are concerns about the availability of water in Malaprabha  
177 reservoir to sustain upscaling of 24x7 for the entire city. Any decrease in the water level in Malaprabha reservoir  
178 and Neersagar can lead to a water crisis in twin cities (Anon 2011). Many times, the reservoir has witnessed  
179 water shortage. In 2012 the water level in Malaprabha had gone down for the first time in ten years from 37.04  
180 TMC to 3.15 TMC (Huralimath 2012). So the discussion on how increased demand for water will be sustained  
181 for the existing population is crucial. The present water requirement, including the supplies for upscaling wards  
182 of Hubli-Dharwad town, as per commitments, is 20 to 30 MLD water are shortages as against demands. As per  
183 officials of the water board lack of water storage and fully depending on the private organization for water network  
184 are the main reasons for the delayed project for implementing remaining wards of Hubli-Dharwad. The following  
185 statement made by the Asian Development Bank in its final report on water supply models in India raises doubts  
186 about the sustainability of 24x7 if the project is scaled up in the entire city or is replicated elsewhere; "24/7 water  
187 supply is possible as long as the capital investments are provided as a grant from higherlevel governments, and  
188 as long as the charges for the bulk water supply do not include either capital investments or electricity costs. In  
189 addition, the Operator Consultant is paid for his services through a contract with guaranteed payment without  
190 requiring him to make any capital investments or risk consultant's funds to support the O&M" (ADB 2014:15).

## 191 8 VII. Conclusion and Policy Initiatives

192 The project 24x7 water supply has been completed and is working smoothly, although there are some hurdles  
193 that question its achievement and sustenance. A majority of the customers are satisfied with the quality and  
194 quantity of water and services of the private operator. People have saved time due to collecting and storing water  
195 and are free from disturbances of odd-time supplies. However, based on household surveys and interactions with  
196 customers and other stakeholders, the study finds that households were not satisfied with the quantity, quality,  
197 and pressure of water provided by IWS compared to CWS. Demo wards have continued to provide CWS since  
198 2008. Still, in extension wards, households report regular gaps in service, for example, receiving water only five  
199 days per week or only part of the day. According to our KII, the failure of CWS in extension wards was mostly  
200 due to water shortages. At the same time, slum households had much higher average arrears (almost three times  
201 that of non-slum) in both CWS and IWS. Some groups were advocating for their own discounted water rates as  
202 well: urban farmers practicing animal husbandry claimed greater water needs; sewage workers claimed to need  
203 more water to washcloths and bathe. KII inform us that financial constraints at the HDMC and continued  
204 challenges with insufficient water availability will lead to increases in the water tariff shortly.

205 Proponents of the scale-up of CWS claim success in providing CWS, increasing regular issuance of bills, and  
206 improving revenue collection rates. But, in scaling up CWS to the entire city, the municipal corporation has  
207 yet to deal with pending cases of arrears, sufficient storage of water and networks, calls for subsidized rates, or  
208 insufficient water supplies. PPPs redefine the role of the HDMC and in the long term, could have implications  
209 on whether water services remain accessible and affordable. The pilot/demo project protected by 100% grant  
210 and coordination of enthusiastic stakeholders appears to be successful in continuous supply of water, reduced  
211 nonrevenue water, increased billing and collection. But, in upscaling of the project to the entire city, the municipal  
212 corporation has to deal with cost-sharing, new private operators, pending cases of arrears, subsidized rates, ensure  
213 coordination in implementation and availability of water throughout the year and, redefine its role as well that  
214 of government agencies, which in the long term could have implications on a sustenance of the project. The  
215 main impediment in the sustenance of the project is the mounting of arrears from the earlier and current system.  
216 Waiving off arrears may boost the confidence of the users and make them regularly pay their water charges.  
217 But, this could set a bad example for the consumers in the remaining 44 wards likely to get 24/7 within the  
218 next two-three years. So before connecting households in 44 wards to 24/7, KUWSDB has to ensure that arrears  
219 relating to intermittent water are paid, and there is redressal of grievances, due to errors in billing, faulty meter,  
220 change of ownership, etc. If this issue is left unaddressed, it could keep on bouncing back with mounting arrears  
221 and remain an unresolved issue. Hubli Dharwad Municipality should ensure that it will not fall short of funds

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222 towards developmental activities on account of diversion of regular or special grants towards 24x7 and look for  
223 alternative arrangements and sources, including enhancing its tax base to fill the gap. And, Volume XXII Issue  
224 I Version I 54 ( ) finally, the project should ensure timely availability of funds and water and execute the plans  
as per the designs to meet the requirements for augmentation of water resources. <sup>1 2 3</sup>



12

Figure 1: Figure 1 :Figure 2 :



3a

Figure 2: Figure 3a :



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Figure 3: Figure 4 :

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<sup>1</sup>Tracking Scale-Up of Continuous Water Services in Hubli-Dharwad, Karnataka: Discussion on Sustenance Issues

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