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Domestic water supply in Accra: How physical and social constraints to planning have greater consequences for the poor

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Water supply and distribution in Accra is challenged by a mix of technical, institutional and social constraints. In a complex context, many reasons help explain why water supply is not meeting demand at both the city as well as area level. This paper describes the water situation in Accra and in two distinctive areas, characterised by the presence or absence of piped water distribution infrastructure. Access to domestic water and reliability is much worse in these areas and consumers generally spend between 4 and 18 times the normal tariff that is charged to consumers with direct access to piped water. The social and physical constraints to planning are affecting the poor more than the rich in terms of access and affordability. It is proposed to Accra's water managers that ensuring a small increase in water infrastructure will allow for better access to water for commercialisation by SWE's, breaking the monopoly, and in turn lowering water prices substantially for the poor.

Accra's water supply situation

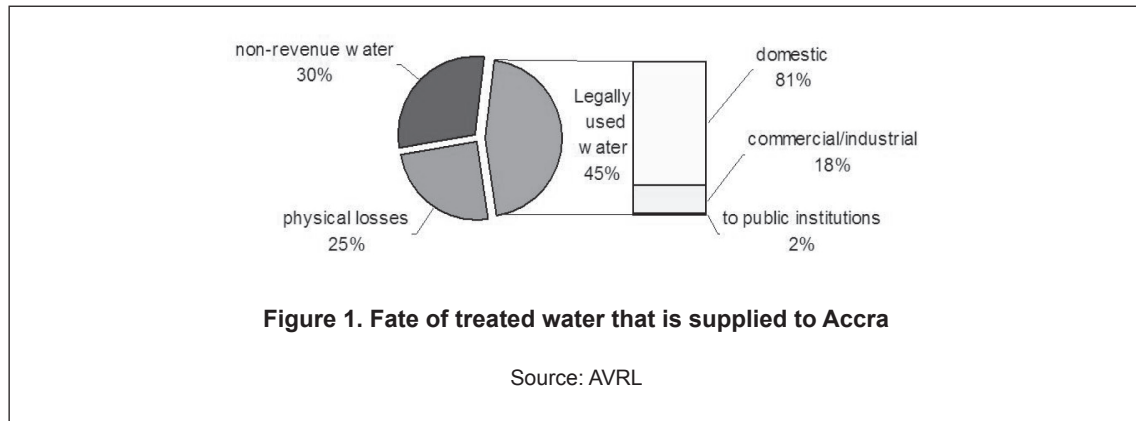
Ghana's capital city Accra is located at the Atlantic Ocean and covers an area of 241 sq km (Abraham et al., 2007). In 2000 it had an estimated population of 1.66 million with a population growth rate of about 3.4 % annually. Beyond the municipal boundary of the Accra Metropolitan Area (AMA), the adjoining districts of Ga and Tema are growing at a much faster rate of 6.4 and 9.2 % respectively leading to urban sprawl and uncontrolled physical expansion. In AMA, except for the few high and medium class residential areas, the bulk of the population (about 60 percent) live in informal settlements or slums within the city. The middle and upper classes have moved to the periphery occupying the many residential satellite towns that have sprung up (Benneh et al., 1993). In addition to the physical expansion mentioned above, there has been increased crowding in existing residential areas with higher occupancy rates in existing housing units.

The total water supplied to Accra is 11.5 million cubic meters per month (inclusive of 30% leakage losses) by the Ghana Water Company Ltd (GWCL). Water supply coverage to the city is said to be 80% but this does not imply a house connection. In reality only 45% of the population has a household or at best a yard connection and this category include the urban rich. The majority who live in the low income settlements depend on water vendors for their daily needs. Water supply to the city is intermittent and the consumption pattern of an average 55 l/cap/day is influenced by this factor. (London Economics, 1999).

Currently Accra's water supply is managed through a dual management arrangement. The GWCL owns the physical assets and are responsible for providing treated water supply. An international consortium Aqua Vitens Rand Limited (AVRL) obtained the contract as the water utility/operator, responsible for managing the distribution and collecting the revenues to make the system profitable.

Domestic water supply to Accra originates mostly from surface water, treated and distributed by the national water company with a minor and fairly unknown part from groundwater, extracted by individuals except in the southern parts of the city, closer to the sea, where groundwater is brackish or salty and thus not suitable for consumption. The GWCL treats and supplies around 61 and 70 million cubic meters per year from respectively the Weija lake and Volta River to the city, bridging a distance of respectively 17 and 110 km. The piped supply network covers only 36% of the 200 km² of the AMA municipal area. A third water source in use by the GWCL is groundwater; a volume of 0.6 million cubic meters per year being pumped from boreholes in Dodowa (Al Hassan, 2007). The remaining area relies on secondary supply from small scale water vendors that (partially) fill up the gap between piped supply and urban demand. Not all of the

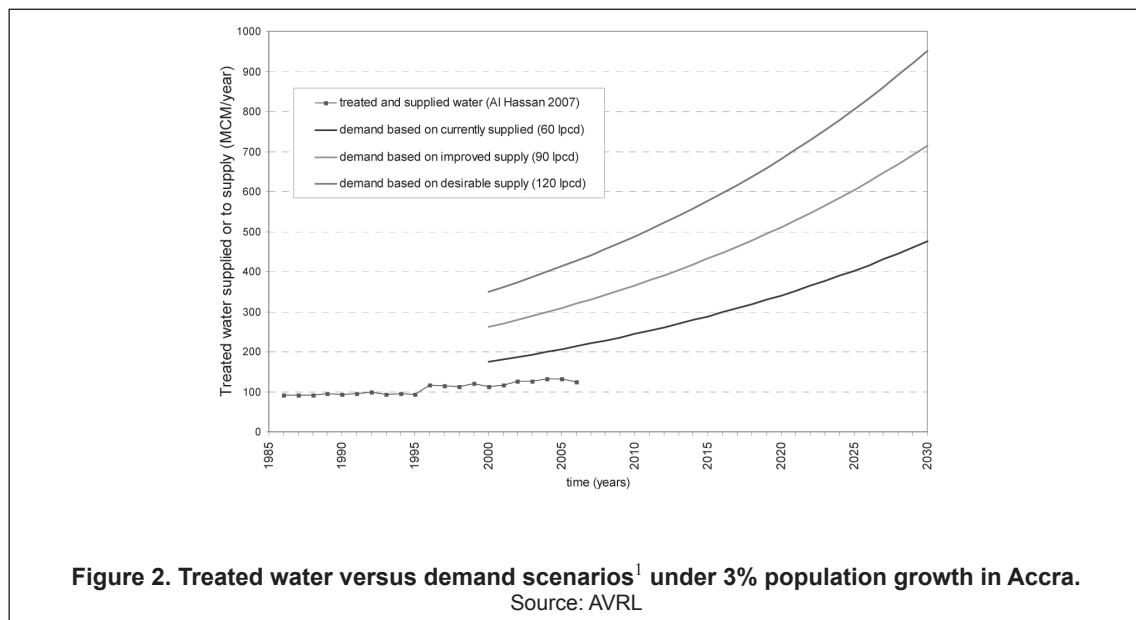
treated water supplied to the city is used for human consumption (Figure 1). There are substantial physical losses within the distribution system, which aggravate the situation of water availability. Non-revenue losses comprise non-revenue water and physical losses, amounting to 55% of total water supplied.



Accra’s water planners have a difficult task as they are facing a major supply-demand gap. Today, AVRL estimates that the supply in Accra meets only 50-60 % of the real demand. The term real demand in itself is unclear – but it is surmised that 60% of the population survive on less than the free basic requirement of 50 l/c/d. In this paper we will show that the social and physical constraints to planning are affecting the poor more than the rich in terms of access and affordability.

Constraints to planning and cost recovery

The average growth for Greater Accra Region (GAR) was 4.4% over the period 1984-2000 (GSS, 2005) and 3.4% for AMA (GSS, 2002). Middle class residential housing is growing rapidly in the northern suburbs of Accra, requiring additional injections of water for residents who have relatively high per capita demands. In the same period water production increased by 1.3% (Figure 2). Despite considerable investments undertaken since 2003, there was a 3% decline in the supply-demand coverage from 59 to 56% between 2003 and 2007 (GWCL, 2007). Figure 3 shows that the current gap between supply and demand is likely to widen under different water demand scenarios for Accra. Whilst supply is easier to calculate, the term demand is more loosely used, leading to miscalculations. Current water use per capita has been shown to be around 55 l/c/d (London Economics, 1999), which implies that the supply curve in figure 2 should be closer to the demand curve of 60l/c/d. The wide gap indicates that in Accra, like in many cities, in spite of studies there is a very poor understanding of populations served and actual water use patterns.



The water sector in Ghana has been subject to several reform attempts during the last years in an effort to improve the situation (Laube et al., 2003; Bohman, 2006). The question remains as to why the investments have been falling behind population growth for such a long time. GWCL has stated a lack of financial means, making it difficult to mobilize more funds for investments. In addition, the water company tends to be influenced by political demands according to many key informants from inside and outside the company. As an example water tariffs in Ghana were always politically set, at a tariff that was thought to be affordable to the user, which did not help to cover the costs, not even the operational ones, let alone the costs of investments. Recent attempts by GWCL to increase the tariff, in order to reach a level that covers operational costs were approved by the Public Utilities Regulatory Commission (PURC), but the government vetoed the implementation of the tariff, by subsidizing the difference, to avoid public repercussions. A household survey revealed that 87% of direct access consumers are well placed officials/individuals in the public service (civil, military, government officials, teachers, doctors etc) or private sector (Owusu & Lundhen, 2006). This is clearly indicative that the poor in informal settlements are not those who have access to the direct and cheaper water supply.

Commercialisation as a response to overcoming inadequacy in supply

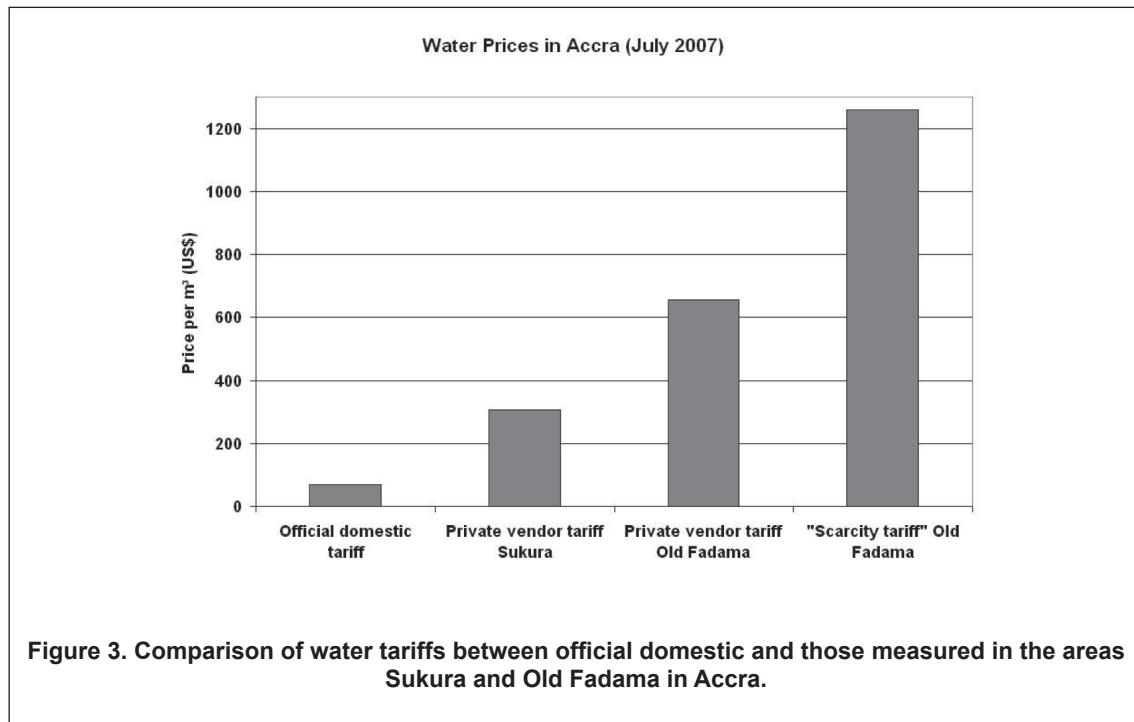
Whilst government believes that the subsidies reach the people who deserve it, the question remains whether a non-targeted subvention like the lower water price does reach the right people (the poor), under the present conditions of inadequate water supply (poor reliability and accessibility). The mere fact that only 45 % of the population in Accra has direct access to tap water (i.e. household connection) and these mainly in the higher income classes, suggests that this is not the case (WHO/UNICEF, 2000). Surveys confirm that even these classes still rely on more expensive water from water vendors, as the piped water supply is unreliable (mostly due to an unavoidable rationing program²). Our own research in low income settlements in Accra confirmed that people who have no household connection are completely dependent on water vendors. Accra's urban dwellers are increasingly relying on Small Scale Water Entrepreneurs (SWE's) in the areas that are not covered by the conventional water supply system provided by GWCL (Kairuki Acolor, 2000; MIME Consult Ltd., 2004; Fuest Haffner, 2006).

A profitable water business has evolved with tanker suppliers, water sachet producers and vendors and small-scale private service providers. This represents a considerable source of income to the households of these vendors (Yeboah, 2006). Those of the SWE's who supply treated water to households, use the same piped water supply from collection points and distribute it to the households. The GWCL/AVRL facilitates this action by developing these collection points as this relieves management partially of the responsibility of getting water to the users. The low level of regulation allows private water vendors to exploit the situation – they can maintain the scarcity conditions artificially by withholding water supply and can charge higher rates resulting in households in slum areas paying up to 8 times the official tariff as set by the GWCL. Water prices are higher during water cuts when water is less available (UNDP, 2006). This form of commercialization can be seen as a valuable alternative for poor people to deal with an unsatisfactory water supply situation, but the role of SWE's in the future supply of water to the poor should be revisited. The following case studies illustrate the points discussed above.

Household surveys were carried out in two study areas; Sukura, a low-income formal settlement in the west of Accra with approximately 30,000 inhabitants and Old Fadama, popularly known as 'Sodom and Gomorra', a poorer informal settlement of roughly the same size³. As a formal settlement, Sukura was entitled to public investment in infrastructure like pipelines and roads, whereas any infrastructure in Old Fadama was due to private investment by the community. The city plans to relocate the inhabitants, for which reason projects for improving water supply are not encouraged by government. Sukura was chosen to be representative of the many low income areas in the city. Here only 16% of the respondents say their primary source of water is their own tap. The majority (80%) rely on private water vendors; but a few (2-4%) also buy from neighbours. Old Fadama is used here as an example of an informal city settlement where there is almost no coverage of city water supply (less than 2% have their own private tap), and more than 98 % are dependent on private water vendors.

Our findings show that the market prices of water were influenced by the presence or absence of water infrastructure. The private water vendors themselves are often members of the community who have access to tap water and who see this as an opportunity to commercialize it. In a community like Sukura, where the main pipelines have been laid and getting a household connection is easier, competition amongst vendors is higher thereby influencing the price. In Old Fadama however, without public water infrastructure, fewer

people can access tap water even to commercialize it, thus pushing up the water prices. Figure five shows the typical price structure in the two areas, compared to the official GWCL tariff.



In Figure 3 we see the price difference between water paid from different sources: the official domestic tariff of GWCL is at 0.70 USD per cubic meter. The price that is paid for water if it is bought from private vendors is more than four times the official tariff in Sukura, at 3 USD per cubic meter, compared to 9 times the price in Old Fadama. There is a monopoly amongst private vendors and price is agreed upon by the water vendors alone. In times of scarcity, which is a couple of times every month in the dry season, the price in Old Fadama goes up to 12 USD, which is 18 times the official price for domestic users. It is clear that water tariff subventions, though perhaps given in good faith by government, benefit only those who have access to a private tap (therefore the richer strata). The majority who have no private tap do not benefit from this.

Discussion

The water distribution system is not functioning as technically designed. Spatial and temporal coverage is inadequate, leading in some cases to extremes in per capita water use and volumetric water prices. For the latter the variation can be between 4 and 18 times the official tariff. These prices are paid by the poor who have no access to direct supply and are reliant on SWE's who "regulate" the water market. Such monopolisation is most evident in areas where piped network coverage is low, and fewer individuals can afford to access water even for purposes of commercialisation. It can be surmised from the case study results, that providing a small increase in coverage (from 1% in Old Fadama to 15% in Sukura) can lower the market prices by 50%. In Accra, non-revenue and physical losses amount to a huge drain in revenue losses which adversely affect profit margins of the utilities with consequences for expansion, operation and maintenance of the system.

Without huge injection of capital investments for infrastructure it is unlikely that the supply demand gap will ever be met. Scenario analysis shows that even at the low current per capita water consumption, to supply the increased population in 2015 (i.e. less than 10 years from now), water production will have to increase threefold from the current value. It is questionable if this will happen.

For better planning the notion of supply-demand gap has to be more clearly understood in developing cities. How demand is calculated remains critical to future projections of water supply. In this paper the supply demand gap was shown to be high, but in spite of this, the urban population has indirect access to the treated water supply. This indicates that in Accra, like in many cities, in spite of studies there is a very poor understanding of populations served and actual water use patterns. These have to be understood to improve access to the urban poor.

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Note/s

- ¹ For the demand scenarios, the total volume of water to be supplied was calculated using given per capita water use rates and fractions of losses (from figure 2) as assumed constant over time. Water demand for institutions and commercial is assumed being proportionate to domestic demand for 90 and 120 lpcd scenarios.
- ² As explained by the Operator.
- ³ It is very difficult to estimate the number of habitants. Fluctuation is very high, as many habitants are temporary migrants from the Northern Region of Ghana. The Centre on Housing Rights and Evictions, estimates 30,000 habitants; this number has been confirmed by a recent study carried out by the Ghanaian NGO People's Dialogue.

Keywords

Accra, water supply, urban poor, urbanisation

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