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Reducing the Burden of Diarrhoea among Urban Households in Uganda

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Globally, about 1.5 million children die from Diarrhoea each year.

Water-borne diseases

Water-borne diseases such as Diarrhoea remain a big challenge to developing countries. According to the World Health Organization (WHO), water-borne diseases—particularly Diarrhoea accounts for about 4 percent of the total global burden of disease, and, worse still, the burden is unevenly distributed. The burden due to Diarrhoea is five times higher in children aged 5 years and below compared to the rest of the population. [1] Apart from child deaths, Diarrhoea illness can lead to long term health consequences such as malnutrition and affected cognitive development.[2] On the other hand, there is extensive evidence to show that Diarrhoea illness is more likely than not to be a result of inadequacies in water, sanitation, and hygiene.[3]

The Diarrhoea burden

Diarrhoea remains a big challenge to attainment of water related Millennium Development Goals (MDGs) in Uganda. This brief examines the cost effectiveness of two water technologies in preventing Diarrhoea illness among urban households in Uganda. We estimate the reduction in the burden of disease arising from accessing either public stand-pipes or boreholes in urban areas. The two water technologies account for about 59 percent of the current water facilities used by urban residents in Uganda. Most important, public stand-pipes can only be provided to geographically concentrated population—a key characteristic of urban households—compared to geographically dispersed population in rural areas. Findings revealed that on average, the public cost per life saved is lower for public stand-pipes than for boreholes.

Funding for water interventions

During the implementation of Poverty Reduction Strategy Papers (PRSPs) programmes, the Government of Uganda (GoU) has earmarked significant resources to the water sector. For example, the annual budget for the water sector increased from US$ 21 million in 2000/2001 to US$ 82 million in 2010/11—a modest change from 1.3 to 3.3 percent of the national budget.[4] Nonetheless, the current levels of spending fall short of the resources required to attain the water related MDGs. For instance, under the current Water Sector Investment Plan (WSIP), it is expected that at least US$

950 million will be earmarked for interventions within the sector over the period 2000-2015 (Table 1). Even then, the above commitments fall short of the resource requirements for Uganda to attain water related MDGs—projected at US$ 1,430 million or US$ 147 million per year.[5] Given that the water spending—of US$ 82 million per year, Uganda appears to be under-spending on water interventions at a tune of US$60 million per year. As such, policy makers in the water sector are concerned with issues of how best to allocate scarce public resources.

Table 1: Uganda's Projected expenditures under the WSIP 2000-2015 (US$ Millions)

Major Program	Financial Years			Total
	2001/ 2005	2005/ 2009	2009/ 2015	
(a) Water Supply	150	190	447	787
(b) Sanitation	10	21	70	102
(c) Environment Assessment, Mitigation and Monitoring	-	7	15	21
(d) Capacity building for Local Governments	15	10	24	49
(e) Institutional Support and Capacity Building for Central Government	3	2	5	10
Total (US$ Millions)	**179**	**240**	**561**	**979**

Source: Revised WSIP (2000-2015) and ADB (2005).

Children worst affected by Diarrhoea

Diarrhoea illness remains a big health challenge for children aged 5 years and below in Uganda. Table 2 shows the incidence of Diarrhoea in Uganda based on the latest national household survey. It is indicated that while overall incidence of the entire population is 20 per 1000 per year, for children below 6 years, the incidence is more than double—51 per 1000 per year. The table also shows that wide geographical variation in Diarrhoea incidence exists with Northern Uganda accounting for a disproportionately high share of Diarrhoea illness. Due to a prolonged exposure to civil war, Northern Uganda faces a number of development challenges—including accessing basic social services. Apart from the actual loss of lives, one of the other key consequences of the civil war has been the displacement of large populations into congested Internally Displaced Person's (IDP) camps. Previous studies show that while households in Northern Uganda have better access to water facilities — especially boreholes, the quantity of water used is lower compared to other areas due to congestion at water facilities.[6]

Table 2: Uganda: Diarrhoea prevalence per 1000, 2009/10

	Region				
	All	Central	Eastern	North-ern	West-ern
All Households	20.3	11.4	28.4	29.4	12.6
Urban	9.1	6.5	12.7	19.1	6.4
Rural	22.4	14.0	29.7	31.1	13.0
By age category					
Infants 0-5 Years	51.5	34.8	64.1	70.6	35.2
Children 6-14 Years	12.5	4.9	18.8	16.4	8.3
Adults 15+ Years	11.1	6.0	16.2	19.6	5.2

Source: Author's calculations from 2009/10 UNHS survey.

Choice of water technologies

In this study, we considered two types of water technologies-boreholes and public stand-pipes. It is worth pointing out that both technologies have high risks of water contamination either at the water source, during transportation or storage at home. Nonetheless, there are important reasons for focusing on the two interventions given the Ugandan context. First, historically, the two technologies have been shown to be relatively inexpensive as they can be shared by a number of households leading to lower per-capita costs compared to household connections.[7] Indeed, household connections despite being subsidized require significant co-payment from households to set up the infrastructure—which payments can only be afforded by the well-to-do, given the level of deprivation in Uganda.

Furthermore, in a country like Uganda, characterized by limited urbanization (only 15 percent of the population is resident in urban areas); it may be very costly to run pipes to all households to benefit from an in-door connection. In addition, in an un-planned urban setting, public stand-pipes may be a first step before eventual in-door house connection. As such, in Uganda, establishment of public stand-pipes is considered part of the pro-poor strategies aimed at improving the lives of people living in poor settlements in the urban areas.[8]

Finally, the overall resources available for water and other social services are low in Uganda and this makes massive roll-out of in-door house connection unfeasible. Also, in-door piped water cannot be considered the most effective technology as highlighted by previous authors who show that providing piped water alone without improved sanitation can still encourage the spread of diseases.[9] Consequently, public stand-pipes and boreholes are low cost alternatives of providing safe water—especially if such facilities are combined with hand washing which has been demonstrated to reduce Diarrhoea prevalence by as much as 48 percent.[10]

Despite the apparent similarities of boreholes and public stand-pipes in terms of the risk of water contamination, the two types of water technologies are different in a number of respects including methods of access. First, public stand-pipes offer significant time savings and are associated with increased water use in developing countries. In addition, to time savings, public stand-pipes are more convenient in use since they do not require hand pumping. Furthermore, boreholes do not require water treatment compared to public stand-pipes which require treatment and energy for distribution to the pipe system. Finally, apart from water committee contributions, in Uganda, water from boreholes is accessed free of charge while public stand-pipes charge depending on the amount of water used. As such, the two technologies have a number of differences.

Cost effectiveness of boreholes and stand-pipes

We investigated the cost effectiveness of boreholes and stand-pipes based on water coverage data from the 2009 Uganda National Household Survey (UNHS). We also considered the costs of setting up the water infrastructure and estimated the burden of Diarrhoea for urban households in 2009/10.

The findings show that while both water technologies reduce cases of Diarrhoea, the reduction in cases of Diarrhoea is over 33 percent higher for public stand-pipes (Table 3). The number of Diarrhoeal deaths avoided per year with increased coverage of public stand-pipes is about 3 times that of deaths avoided if coverage of boreholes increased. Additionally, the burden of attending to infants hospitalised because of Diarrhoea is estimated to be less by 204 cases per year for public stand-pipes than for boreholes.

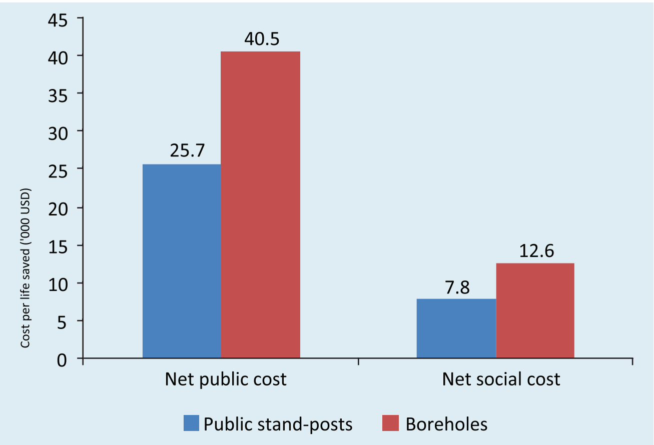
Table 3: Outcome measures of public stand-pipes and boreholes

	Expected number per year	Avoided number per year	
Outcomes	No water intervention	Public stand-pipes	Boreholes
Cases of Diarrhoea	45,698	13,729	9,140
Deaths from Diarrhoea	37	11	4
Hospitalisation because of Diarrhoea	1,018	611	407
Life years saved from Diarrhoea deaths and mortality	1,838	68	63

Source: Authors' calculations based on UNHS data and several related studies.

Looking at the costs of reducing the burden of disease (illness or death), Figure 1 shows some remarkable difference in the effectiveness of the two water technologies. The net cost (public or private) per life saved from death and disability is much lower for public stand-pipes than for boreholes. In particular, the net public cost per life saved from death and disability by public stand-pipes is 36.6% lower than that of boreholes. Similarly, the net private cost per life saved is less by USD 5,104 for public stand-pipes than for boreholes

Figure 1: Costs of avoiding loss of years of life to disability and mortality



The cost of illness avoided is a saving to both the public and private individuals. Figure 2 indicates that greater public and private savings would be generated from the expansion of water coverage using public stand-pipes. By investing in public stand-pipes, the public saves USD 270,600 over a period of 15 years and USD 184,600

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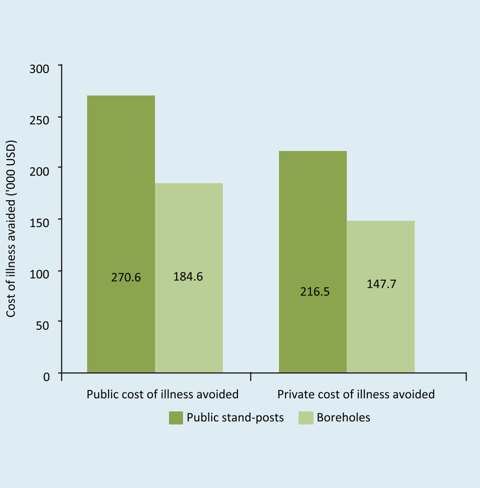
from borehole investments for a period of 12 years. On an annual basis, public savings are more by USD 8,600 from public stand-pipes than from boreholes. Over the durations of the two water technologies, in aggregate terms, public stand-pipes save USD 68,800 more for private individuals than boreholes.

Figure 2: Cost of illness avoided over duration of water technologies



Emerging policy implications

Unless the coverage of public stand-pipes and boreholes is expanded to increase people's access to safe water, Diarrhoea will remain burdensome in terms of hospitalisation and loss of years of good life to disability and mortality. Implementation of the proposed water interventions would reduce the burden of Diarrhoea, but greater reduction is expected from public stand-pipes. Moreover, the unit cost of achieving the anticipated reduction in the burden of Diarrhoea is remarkably lower for public stand-pipes than for boreholes. Thus, given the budgetary constraints often faced in Uganda, if only one water intervention can be implemented at a time, the most preferred one would be to increase coverage of public stand-pipes by at least 10%. According to the Ministry of Water and Environment Sector Performance Report of 2011, it costs about USD 40 per person to establish a public stand-pipe.

Endnotes

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