

## Improving piped water and sewage connections makes economic sense in Bhutanese cities

**Bhutan needs to improve its water and sanitation infrastructure, particularly in urban areas. Research shows that urban households are willing to pay approximately six percent of their monthly household incomes for a sewage connection and the same percentage for piped water. On a monthly basis, on average, an urban household is willing to pay Nu 362 (USD 5.7) for piped water inside the house and Nu 348 (USD 5.5) for a formal sewage connection, while it currently pays a combined charge of Nu 78 (USD 1.2). Thus, there is scope for municipalities in Bhutan to invest in water and sanitation infrastructure, cover necessary costs, and, simultaneously, increase revenues.**

### Background

Bhutan is a growing country that is inadequately served by its existing water and sanitation infrastructure. While some 73 percent of rural households and 87 percent of urban households have access to piped water in their homes, only 26 percent of urban homes are connected to a formal sewage system (rural households remain un-connected). As the country's towns and cities grow, the demand for water and sanitation services will only increase.



Only 40% of the sewage in Thimphu, the growing capital of Bhutan, is currently treated and the city's stabilization pond is at maximum capacity.

Waterborne diseases, such as diarrhea and dysentery, are among the top five diseases in Bhutan. Some 2,368 children per 10,000 of the population (below the age of five) were infected by diarrhea in 2011. These water borne diseases are generally associated with a lack of access to clean water and sanitation.

### Are households willing to pay for improved services?

A good understanding of citizens' interest in paying for public services is vital if policy makers are to make informed water and sanitation investments. To provide this information, Ngawang Dendup and Kuenzang Tshering from the Royal University of Bhutan estimated the value of a connection to piped water and a sewage network.

To identify preferences for public services, researchers used data on 18,766 households from the Bhutan Living Standard Survey (BLSS) (2007 and 2012). The surveys provided information on house rents, structural characteristics, neighborhood characteristics, and connections to piped water and sewage systems. Using statistical analyses and controlling for a number of differences among houses, the researchers were able to estimate the additional rent attributable to having a connection to piped water and a formal sewage system. A hedonic model was used to estimate the value of access to water and sewerage.

## SANDEE

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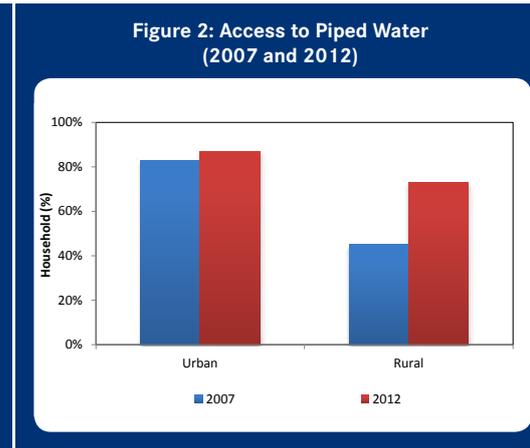
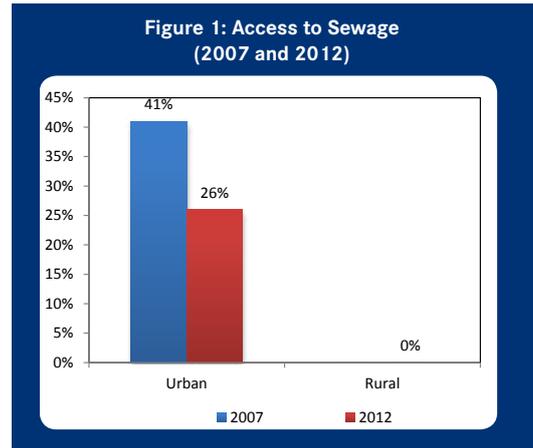
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The Bhutan Living Standards Surveys show that access to sanitation has declined while access to clean water has increased over the years.



### Significant demand exists for sewage and water infrastructure

For urban dwellers, monthly house rent increases by 22 percent if there is piped water inside the dwelling and it increases by about 13 percent if the house is connected to a central sewage system.

Similarly for rural dwellers, the rent of a house increases by about nine percent if the house is connected to piped water. These results show that there is significant demand for sewage and water infrastructure across Bhutan, i.e. households show their preferences by paying more rent for homes with access to public services.

### Revenues by pricing correctly

Currently, municipalities charge Nu 78 for both water and sanitation. This amount is significantly less than the mean willingness to pay (WTP) of an urban household for piped water and sewage connection (Nu 362 and Nu 348 per month). If municipalities in Bhutan based their water and sanitation charges on these WTP values they could increase the revenue they currently receive. For example, Thimphu municipality could potentially see a nine-fold increase in its gross revenues from municipal charges if it charged the WTP estimates of this study.

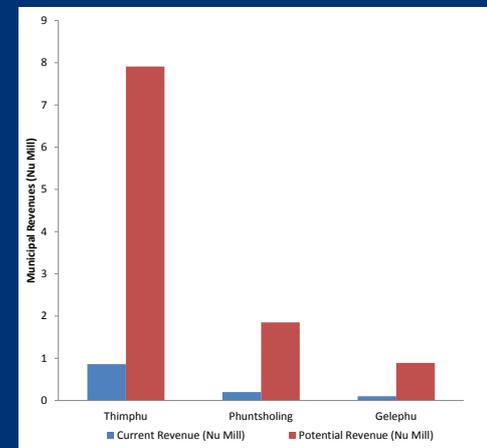
### Recommendations

Households are keen to have water and sewerage connections and are willing to pay for access. They currently show their preference for connections by paying more in rent for homes that are formally connected to sewerage systems and piped water.

Investments in water and sanitation services are called for, particularly in urban areas. The study calculates that additional investments would be economically viable as long as the additional capital cost per household served is less than Nu 85,200.

Bhutanese law also allows for privatizing of water and sanitation services. The findings from this study could be used to inform public decision making if the country decides to go down this route.

**Figure 3: Current and potential municipal revenues with higher water and sanitation charges**



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