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Water Pricing to Promote Equity, Efficiency and Sustainable Development in the Growing City of Faisalabad

About the project

Funded by: International Growth Center (IGC)

Key Counterpart: LEAD Pakistan

Impact: A high-level policy stakeholder dialogue was organized to communicate final research findings to multi-sector mix of government representatives, city municipal organizations, media, private sector organizations, researchers, experts and civil society organizations.

This policy brief has been written by Shehryar Nabi (CDPR), based on the paper, "Water Pricing to Promote Equity, Efficiency and Sustainability in the Growing City of Faisalabad, Pakistan," co-authored by Shabbir Ahmed, Usman Mirza, Saleem Ali and Hina Lotia of LEAD Pakistan.

In brief

- Consumption of filtered water is sensitive to income, price, average household member age and distance to water facilities.
- The overall effect of price on water demand remains fairly stable.
- Water-pricing policies linked to neighbourhood average income can help the government manage demand for water to promote conservation.

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Efficient distribution of water in cities is a key component of their socioeconomic development. Clean drinking water benefits public health and prevents water-borne diseases, which in turn saves money and resources that can be invested in overall productivity. Studies have also shown that as urban populations increase, so too does the demand for water.

But without effective water management policies, urban growth creates imbalances between water demand and supply, contamination in the sources of water and unequal distribution between different income groups. This is of particular concern for Pakistan, where half of the population is expected to live in cities by 2030.

As urban population inflates, the stress on public infrastructure and service delivery increases. These are both key factors in determining the availability and quality of water. The problem becomes even more pronounced in slums, where informal residences and an absence of services creates a segment of the population highly vulnerable to disease.

A useful lens through which to view this problem is the effect of income and water prices on the household consumption of water. Studies on residential water use in developed countries have shown that measuring consumer responses to changes in household income and the price of water has important policy implications for both the distribution and treatment of water.

But water pricing in developing countries is complex because different household groups use multiple sources of water to meet their needs. This context emphasizes the need for well-designed surveys of household water use, and to account for external factors that determine consumption such as the resident's age and the distance to the source of water.

A survey on household water demand in Faisalabad, Pakistan conducted by Leadership for Environment and Development (LEAD) in collaboration with the University of Queensland, Australia (UQ) and supported by the International Growth Centre (IGC) adds an important contribution to the growing body of literature on urban water management in developing countries. The study reports on water consumption patterns and the Willingness-to-Pay (WTP) for water between different income groups in Faisalabad, the third largest city in Pakistan and a major industrial hub. It also analyzes the effect of price and income on demand for both filtered and unfiltered water, as well as the extent other external variables

shape water consumption.

As is the case with most countries, the study found that consumption of water was responsive to changes in income, but did not change significantly among any income group when the price of water increased.

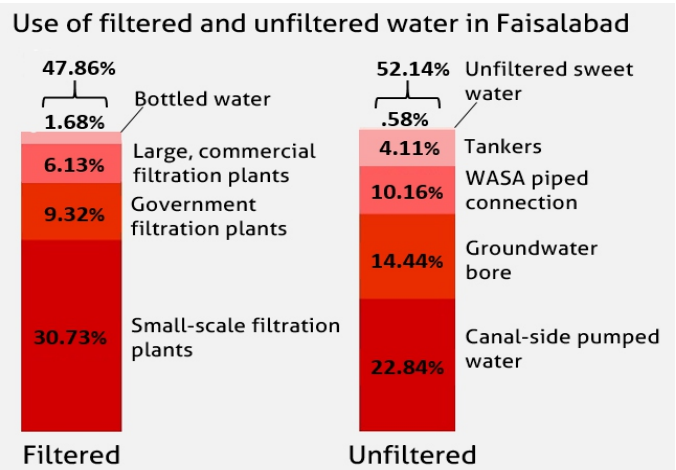
Based on these findings, the report's authors recommend that while addressing Faisalabad's water pricing scheme is important, equitable access to clean water across different households will require separate government interventions to improve public awareness, directly provide clean water and invest in water infrastructure.

Income and education of survey respondents

According to the household survey, urban Faisalabad consumes 48% of its water from filtered sources and 52% from unfiltered sources. Filtered sources include tap water channeled through commercial and government filtration plants and bottled water. Unfiltered water includes water pumped directly from canals, a piped connection from the city's Water and Sanitation Authority (WASA), unfiltered sweet water, water transported on tankers and water bored from the ground. More detail on Faisalabad's water consumption is provided in Figure 1.

Water supply facilities are provided through WASA. Although WASA currently provides enough water to cover 60% of the city's area, its pipelines only connect 30% of households to the water supply. Most of this water is pumped from wells by the Chenab River. To receive water from WASA, households have to pay a one-time installation fee depending on house size. WASA does not charge an aquifer fee for extracting ground water for domestic use. Nor does it impose any limit on how much water is used. Consequently WASA does not charge an aquifer fee for extracting ground water for domestic use. Nor does it impose any limit on how much water is used.

Figure 1



Consequently, many households have installed domestic borings to extract groundwater, giving them an unlimited water supply. This may be a contributing factor to the imbalances between the supply and demand of water, as well as overall inefficiencies in the water market.

According to WASA officials, Faisalabad's water supply is filtered at its source and safe to drink. But most of the city's groundwater is undrinkable because it is contaminated in transit from the city's degraded water infrastructure. WASA has been unable to cover the cost of maintaining its water system, causing pipe leakages and the exposure of water to sewage lines.

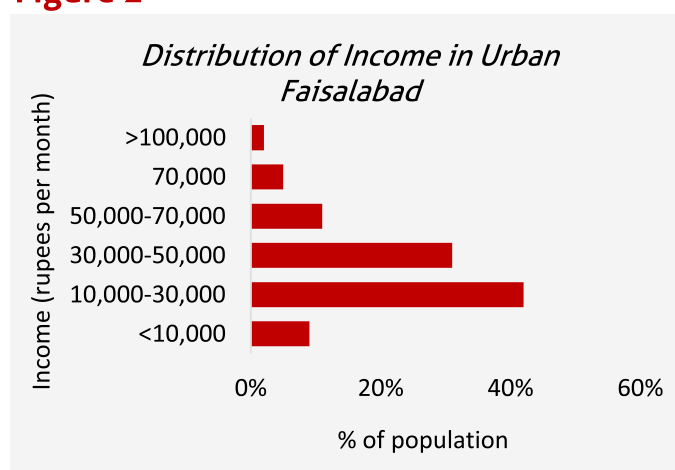
This has resulted in the high prevalence of water-borne illnesses in Faisalabad, such as diarrhea, dehydration, hepatitis, nausea and food poisoning. A 2005 survey in Faisalabad found that more than 20% of respondents either had diarrhea, hepatitis or typhoid, and nearly 10% had cholera – all water-borne diseases.⁶

Income and education of survey respondents

The LEAD-UQ study analyzed water consumption data from 1,200 households in four sub-towns of urban Faisalabad – Iqbal Town, Jinnah Town, Lyallpur Town, Madina Town – where 88% of the urban population resides. Sub-urban areas and slums were included within the survey. The data also reflected multiple sources of water, such as filtered, unfiltered, private and government sources.

The average household income from the sample is 34,000 rupees per month. As seen in Figure 2, the majority of the population can be classified as lower to middle income, with about 82% of households earning less than 50,000 rupees per month. High-income households – those earning more than 100,000 rupees per month – comprise less than 2% of the population.

Figure 2

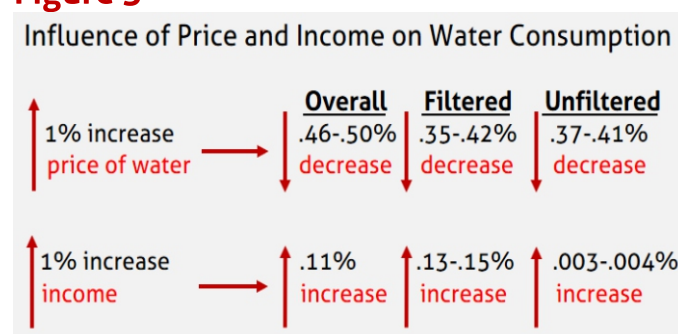


Households on average received ten years of schooling. 50% of sample respondents completed high school, 25% attended university. 10% were illiterate.

Survey analysis: The factors shaping water consumption

The study's analysis of how the price of water and household income shape water consumption focused on the elasticity of demand: quantifying how households respond to changes in price and income. Figure 3 demonstrates how a 1% increase in either the price of water or income affects the demand for filtered and unfiltered water. Filtered and unfiltered water were also found to be consumed by all income groups.

Figure 3



These findings are consistent with many other countries' findings that price and income have a minor effect on the consumption of water. This suggests that water pricing schemes alone cannot make the distribution of water more equitable. It also indicates that household expenditure on water takes a relatively low share of total household spending.

The study also examined the effect other factors had on water consumption, the following of which were most significant.

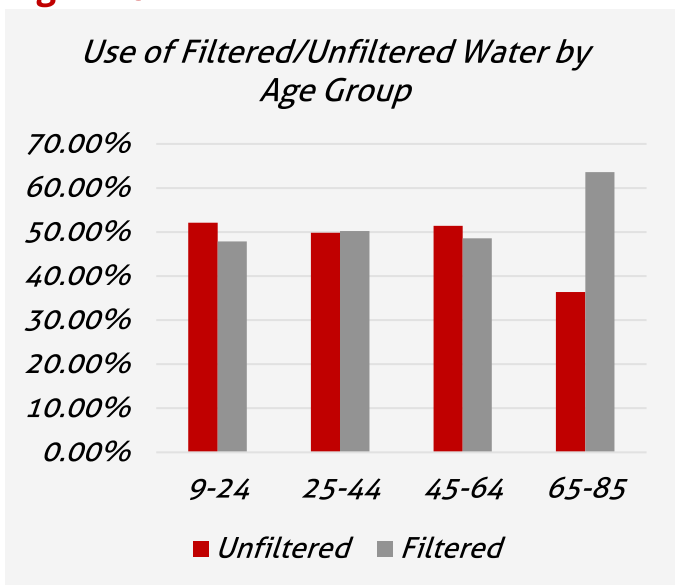
Age: The study shows that age plays a significant role in the demand for water, as older residents were found to consume more filtered water (shown in Figure 4). A possible explanation for this is that health consciousness increases as people age, making them more willing to pay for clean water to prevent illness. Alternatively, older residents may be undergoing care that requires them to only consume clean water.

Water sharing: The presence of a water tank, generally considered an economical and safe drinking source, increases the likelihood that households will consume more water. This is because water sourced from tanks is often shared with other households, which in turn increases overall demand for water.

⁶ Akhtar, N., Jamil, A., Noureen, H., Imran, M., Iqbal, I., and Alam, A. (2005). Impact of Water Pollution on Human Health in Faisalabad City. Pakistan Journal of Agriculture & Social Sciences, 1(1): 43-44.

Distance: Households closer to both filtered and unfiltered sources of water tend to consume more water overall than other households. For many households, there may be significant opportunity costs associated with traveling long distances to fetch water. This means that water demand could increase substantially if policies focused on the supply-side factors of water consumption, such as increasing and properly determining the locations for water supply points in order to minimize costs imposed by distance.

Figure 4



The study also measured how different factors influence the WTP for water, which indicates how much residents would spend on water rather than actual consumption. The most significant determinants for increasing WTP are health and income. In other words, sick and wealthy residents have an increased WTP. People who live in industrial zones and planned settlements, have a fixed source of income and consume unfiltered water are also more willing to pay. Conversely, larger households and households that take more time to fetch water have a significantly decreased WTP.

Policy Recommendations

1. Rationalisation of water pricing policy. Although water consumption is not very responsive to changes in price, better pricing policies still have a role to play in financing other kinds of interventions needed to ensure the equitable distribution of clean water. Increasing the price of water for middle and high income households will allow the government to extract more revenue for public spending without significantly altering their current consumption.

2. Public awareness. Since water-borne diseases are a key determinant in the WTP for filtered water, there is a need for greater public awareness campaigns on the importance of consuming clean water to prevent water-borne diseases. These campaigns must be accommodating for households whose large size or distance from sources of clean water reduce their WTP.

3. Non-pricing instruments. These include such as water conservation awareness through educational campaigns, and encouraging the use of water efficient devices would help to achieve sustainable water consumption goals.

4. Government provision of filtered water. Because both high and low income households have been shown to demand filtered water, equitable distribution appears to be a matter of distance, household size and income level. Government provision of filtered water could help households that demand clean water overcome those barriers.

5. Investment in water infrastructure. Financing the maintenance of Faisalabad's current water infrastructure would lead to less water becoming tainted in transit, a higher willingness to pay for clean water, and a lower prevalence of water-borne disease.