Putting a Price on Water

By Ben Mitchell

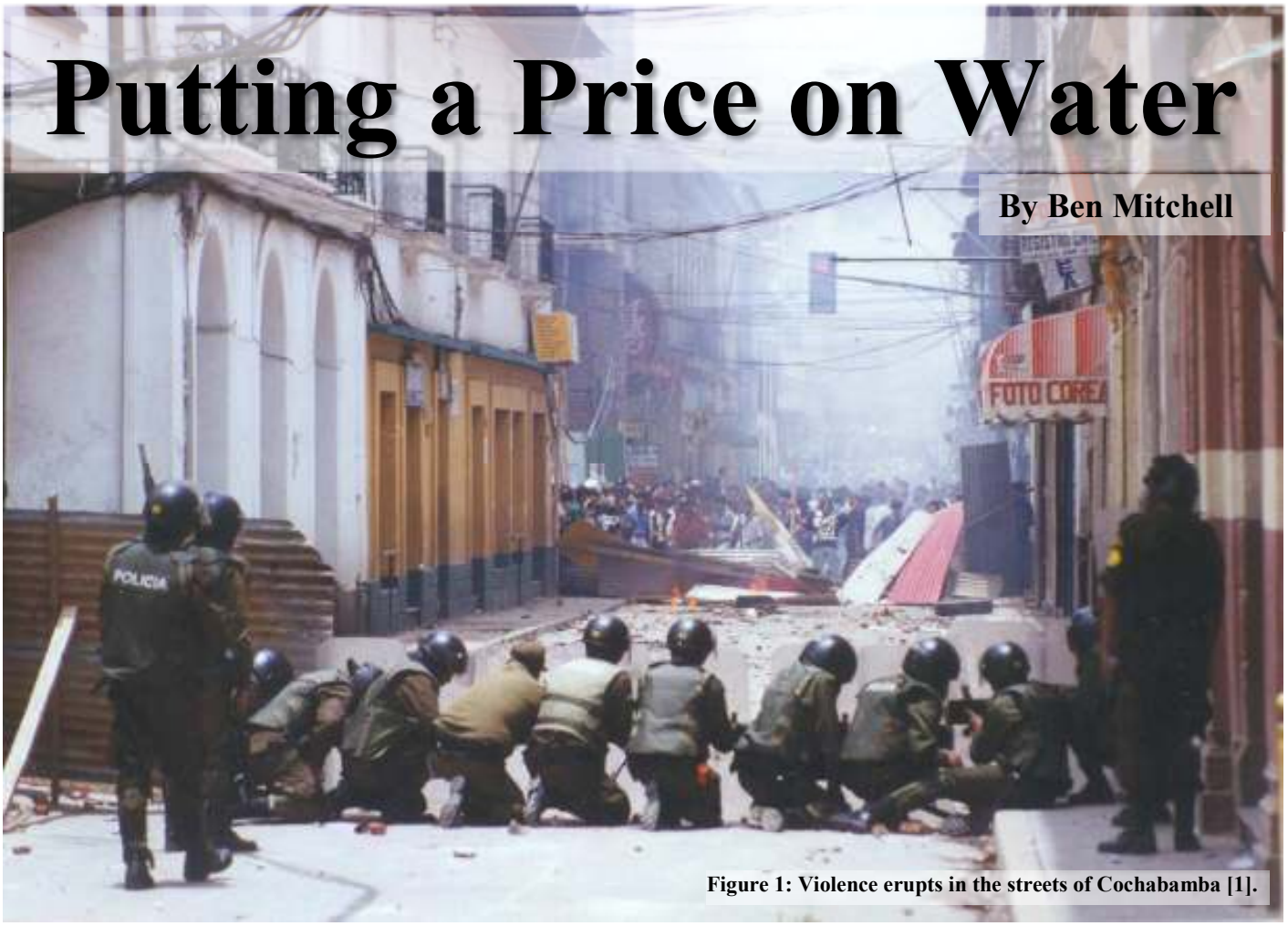

Figure 1: Violence erupts in the streets of Cochabamba [1].

Water is essential for life. We drink it, use it for preparation of food, wash ourselves, our clothes, and our dishes with it, and use it to flush our toilet. In developed countries, we turn on the tap, and have safe, good quality water available. In developing countries, however, many people do not have this luxury. Restrictions in supply due to poor quality infrastructure and insufficient water availability exist in many places, and water can be of questionable quality, containing pathogens which can cause illness. However, regardless of the geographic location, water can be considered a product. As such, it has an associated value; a value that is passed on to consumers through a water bill. But how much should water cost? What is fair? How does the pricing of water influence our water usage behaviour?

Getting the price of water wrong can have serious consequences. Perhaps the most well-known example of this is Cochabamba, Bolivia. See Figure 1. In 1999, a 40 year contract was awarded to the privately owned *Aguas del Tunari*, granting them exclusive rights to water provision and water resources in Cochabamba. With ambitious infrastructure upgrades and expansions planned, a new water tariff structure was introduced, which included an average 35% price increase. Set against the backdrop of existing deep economic discontent across the population, the tariff increases were the spark to set off conflict. Road blocks, strikes, and the shutdown of the city, culminated in riots and a state of emergency being declared in early April 2000 [2]. Scores of people were injured and arrested, and six people died in the ensuing violence. The end result? The private contract with *Aguas del Tunari* was cancelled, and a publicly controlled water supplier was established to manage the water supply [3].

So, how do you put a fair and reasonable price on water? Firstly, it is necessary to stop and think about the characteristics of water as a product. It has been noted that there are five observations that typically hold true for water supply around the world, and these influence price:

1. **Provision of water services for society is a large initiative.** The cost and land requirements for water infrastructure make it one of the largest industries, and it accounts for substantial public sector investment in both developed and developing countries.
2. **Providing network infrastructure for water and sanitation uses a lot of capital.** Because of this large amount of investment required, and the costs of operation and maintenance, water suppliers cannot afford to make mistakes oversizing or building water infrastructure in advance.
3. **Household demand for small amounts of water can be considered separate from price.** Put simply, if no alternative sources of water exist, the amount we will pay is only limited by the proportion of our income available to spend on it. We all need water to live.
4. **Storing water is easy. Transporting water is difficult and expensive.** Water is heavy; a property that distinguishes it from electricity and gas. Hence, moving it around costs a lot of money. This fact can result in service reliability issues in developing countries, especially where inadequate storage has been constructed and drought exists.
5. **Water holds strong cultural, social and environmental value.** For example, as access to water is a human right, many people do argue that we should not pay for it [4].

Upon reflecting on these five observations, you could be forgiven for being concerned. Water supply is a big, expensive, complicated industry, to which society is dependent. We could be forced to pay whatever water suppliers want, and we would have very little alternative. So why, then, is this not the case?

Global Water Intelligence (GWI) completed a survey in 2011 of water and wastewater tariffs, covering 308 cities in 102 countries. David Zetland of Wageningen University in the Netherlands, and Christopher Gasson of GWI have analysed the data gathered during the survey. The results of the analysis indicate that there is not a 'one size fits all' approach to water pricing, both internationally, and even within individual countries. For example, water costs $7.54 per cubic metre in Gent, Belgium and $0.04 per cubic metre in Cairo, Egypt (2011 US Dollars). Egypt's gross domestic profit (GDP) is 14 times less than Belgium's, yet the water tariff in Gent is 188 times more than that of Cairo. Then you can consider Ireland; a wealthier country than Egypt, yet water there is free. Among other things, political pressures, labour costs, age and condition of infrastructure, and water scarcity all have an effect on water pricing [5].

Zetland and Gasson also make the point that water tariffs seem to rarely ever reclaim the full cost of service to supply water to the population. While society may be happy to pay less than the full cost of their water service, this comes with negative consequences. It encourages unsustainable consumption of water, and this in turn can stress water supplies. Also, there is an increased risk of service disruption due to underfunding. This is because water suppliers, if they cannot obtain private funding, may opt to reduce spending on infrastructure construction, operation and maintenance to cover the shortfall. When this happens, outlying and informal communities – those communities which are more likely to be poorer – are the ones which are most likely to suffer [5].

With this in mind, what should water cost? John Hoehn of Michigan State University has explored the principle of what constitutes an efficient water tariff from the viewpoint of water conservation and sustainability. A key requirement of such a tariff is that it provides the required revenue to cover the full cost of service to supply [6]. As such, the costs that should be included in the tariff are:

- A **fixed** financial component, which covers the cost of establishment of the water supply infrastructure, and replacing and expanding the system.
- A **variable** financial component, based on the number of volumetric units of water used by a consumer. This covers chemicals, equipment, energy and labour to treat and distribute water, operate the system, and maintain reliability and quality of service.
- A component for the '**opportunity cost**'. This is the cost of using the water today for human consumption, rather than it being saved for use later on, or used for some other economic purpose, such as industry or agriculture.

The other criterion that needs to be met for an efficient water tariff which encourages water conservation, is that it should be able to be easily communicated to water users, and users should be able to understand it [6]. Water users have to be able to understand how modifications in their behaviour can lead to them saving money on their water bill. A study completed by S. Gaudin of Oberlin College in 2006 demonstrated the responsiveness of the population to modifying behaviour when price information is provided on the water bill. Providing basic price information on a water bill was found to achieve a similar level of water conservation as a 30 to 40% water rate increase [7].

However, the reality is that in many places, efficient water tariffs are not in place. This can be for a variety of political or social reasons. Many other inefficient water tariff structures exist. See Inset Box 1 for details on some of the other tariff structures. As Figure 2 indicates, developing regions of the world are the most vulnerable to inefficient tariff structures. A study completed for the World Bank in Africa in 2008, found that equity objectives associated with water tariffs are often not met,

Inset Box 1 – Inefficient Water Tariffs [6]

Uniform volumetric rate – Users are charged per unit of water used. There is no fixed cost component for the bill. If the unit rate is set too high, users may forego beneficial water usage and this can have health effects. If set too low, the water supplier will not recover their costs, and supply may become financially unsustainable.

Flat rate – The only viable option for non-metered water systems, users pay a fixed charge per connection without a volumetric charge. This discourages efficient water use, as no value is attributed to the quantity of water used. There is no incentive for consumers to implement water saving measures.

Increasing Block Tariff (IBT) – A group of volumetric charges that increase as water use increases. Those using less water pay less per unit volume, and those using more water pay more per unit volume. Common in developing countries, the IBT is often claimed to be based on equity and fairness. Unfortunately in many cases this does not work, as the poor for whom the low tariff block is intended are often not connected to the water supply anyway.

Decreasing Block Tariff (DBT) – As per the IBT, except charges decrease as water use increases. This does not encourage water conservation, as those who use the least water have the highest incentive to conserve, whereas those that use the most water have the lowest incentive.

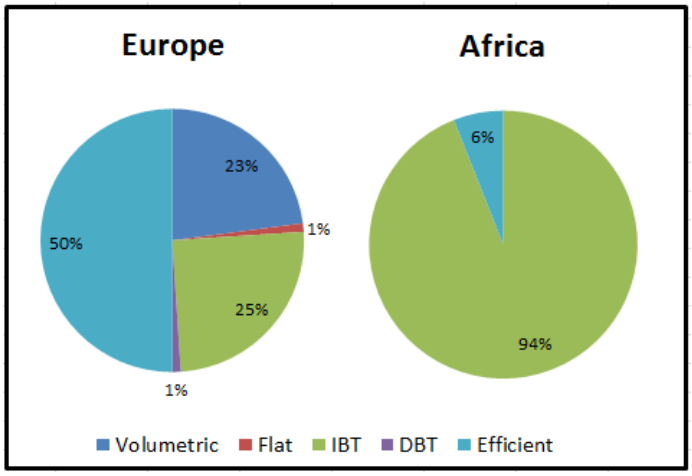

Figure 2: Municipal water tariff structure distribution across the extent of Europe compared to Africa. Adapted from [6].

and subsidies often do not exclusively reach the people that they are intended for [8].

So, what went wrong in Cochabamba, Bolivia? Well, a new IBT tariff structure (see inset box 1) was introduced, which favoured lower use consumers. Although the average tariff increase was 35%, lower use consumers only saw an increase of around 10%, whereas high use consumers saw increases in their water bill of over 100%. This increased to 200% for some consumers due to consumer re-categorisation under the billing structure. Also, improved maintenance of infrastructure resulted in a more reliable supply, so consumers had more water available for their use. Finally, the tariff change was not implemented gradually, but suddenly at the commencement of the concession contract, and hence came as an unpleasant shock to many [2].

The tariff changes in Cochabamba most negatively affected the high use consumers. These were typically the people who held the most powerful positions in society, and hence were capable of publically and vocally opposing the introduction of the new tariff structure. This led to a groundswell of discontent among the population. If the tariff change had been applied in a more gradual manner, and with up-front community consultation which clearly advised how the goals of the tariff change would have benefited poorer water consumers, it is possible that it could have been implemented more successfully.

Perhaps the most important thing to note is that accurate pricing of water yields the best benefits for society. Rates that are too high and not gradually introduced and events such as those in Cochabamba may occur. However, providing concessions for water in developing countries can also have detrimental effects, by inhibiting the ability of the water supplier to extend reliable water supply to those in need. Zetland and Gasson quote the examples of Phnom Penh, capital of Cambodia, and Manila, capital of the Philippines. Residents of these cities now pay less for their water, as money recovered from full cost recovery water services has been used to extend water service areas. Disadvantaged people who previously had to rely on expensive, unsafe, informal water suppliers now have access to a cheaper, safer and more reliable water supply [5]. Efficient, full cost recovery water tariffs do not necessarily harm the poor; as long as the revenue is being used to extend reliable service to those in need.

But even if water suppliers get the rate structure correct, what if people do not pay their water bill? Given that water is a human right, switching off someone's supply when they do not pay their bill is ethically unacceptable and not an option for water suppliers. It is a major issue internationally, as well as here in the UK, and the House of Commons Water White Paper from 2011 examined this issue. While noting that a percentage of water bill bad debts are made up of customers who genuinely cannot afford to pay, a large percentage of this debt is from customer's who choose not to pay. As many of these customer's live in rental properties, and landlords are not required to provide tenant details to water suppliers, recovery of these debts is difficult. Ultimately, this burdens all those customers who do pay their bill,

including low income earners, as bad debts adds on average £15 to each customer's water bill in the UK [9].

So, in conclusion, accurate water pricing is not necessarily a simple thing. Water supply is a large and complicated industry, consisting of numerous fixed and variable costs. The debate as to whether potable water should be considered a human right, and hence it should be free, is likely to continue. However, ensuring accurate calculation of the costs associated with provision of water, and translation of these to efficient water tariffs to achieve full cost recovery, is ultimately for the betterment of society.

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