Charging to enter the water shop? The costs of urban water connections for the poor

R.W.A. Franceys
Institute of Water and Environment, Cranfield University, Silsoe, MK45 2DT, UK (E-mail: r.w.a.franceys@cranfield.ac.uk)

Abstract The cost of new water connections for poor urban dwellers in middle and low-income economies, that is the official fees, costs of pipework and additional costs, is reported from a global survey of water utilities and a four country, two city questionnaire of newly connected households. The objective is to investigate whether directly ‘charging to enter the water shop’ is the most effective means of recovering costs for the water utility whilst ensuring maximum access to the urban poor who benefit most from convenient access to clean, affordable water.

Keywords Connection costs; low-income countries; urban poor; water charging

Water connections
The research described in this paper is designed to assist the urban poor in middle and low-income economies, those living in multi-occupancy tenements or compounds, in slums, shanties, unplanned and illegal settlements, who are presently paying ten to twenty times as much per cubic metre of water as the connected rich. The poorest have to rely upon vendors, presently being unable to access, for example, lifeline block subsidies because they cannot afford the costs and charges of new household water connections. However efficient vendors might be, they will usually have higher costs than a piped supply system, not being able to access the economies of scale of bulk treatment and supply, to the detriment of their customers. This paper seeks to uncover the actual costs of obtaining a new water supply connection, both formal and informal costs, and considers ways in which these costs might be made affordable for the poorest.

The poor benefit most from accessing clean water at an affordable consumption charge, having first achieved household or group water connections through mains extensions and differentiated connection tariffs. The end users typically survive at present on less than 2 US$/d and typically consist of between 20% and 50% of the 2,083 million population urban areas in low and middle income countries. Because of this level of poverty, where cigarettes are bought singly and newspapers are hired out to multiple readers each day rather than sold, the poor are unable to build up any level of capital to invest in one-off major payments for household water connections. The evidence however suggests that the poor are able to pay small on-going charges at a level similar to the cost of supplying water through a pipe network.

The conventional approach to this problem is to assume that public standposts (free or franchised) meet society’s responsibility to serve the poor. However, providing a system in which women have to queue at 3.00 am in the morning to gain their small share of standpost water does not deliver the benefits that justify public investment in a monopoly water supply. Where the poor are enabled to access household connections (with various possible differentiations from a conventional piped supply) the poor benefit significantly from the convenience and cost savings of piped water. The benefits can also be significant in economic terms and in health terms. One study reports that child mortality fell by
24% in the poorest municipalities as a result of increased household connections in Argentina (Galiani et al., 2002). In Asia, focus groups (of women) report the benefits that are achievable as a result of gaining household connections in poor areas, following regulatory facilitation of operators. One householder in Jakarta, Indonesia says that ‘after having a new water supply connection, she opened a small kiosk in her home and sells ice cubes’. Others described how the revenue generated from starting a small boarding house and similar activities outweighs the cost of paying their water bill. One woman resident in Manila, Philippines described ‘spending up to 40 Philippines pesos (P) per day for water bought from a vendor and now pays only 25 P to 50 P per month, a 96% reduction’. The group of women mentioned other benefits: ‘more time available to them which now they can use for other household chores; and even time for leisure such as going to the malls; no more stress from queuing (where rows often occurred when others do not follow the queues leading to so much stress) and waiting for water to become available; no more waking up at 3:00 a.m. to queue; more money for other household needs, and can now take a shower’ (Weitz and Franceys, 2002).

Any discussion relating to water and charging usually runs up against the politicians’ ‘unwillingness to charge’. We have included politicians in our target group for this research to determine whether changes to connection charges might be seen as an opportunity or a threat. Initial discussions with one mayor, the Chairperson of the town of Ramagundam (pop 250,000) in India, who himself has already begun to experiment with altering connection charges with some success, suggests that the willingness to charge appropriate connection tariffs is not nearly as sensitive an issue politically as the willingness to charge viable consumption tariffs. We understand that it is politically advantageous to be able to promote lower connection charges – the longer-term challenge for the water utility is to ensure that the overall costs are still recovered through equitable rebalancing to ensure financial sustainability.

There are clear financial and institutional challenges in getting connection charges ‘correct’ but there are enhanced benefits for utilities in obtaining additional revenue from ‘new’ customers who might have traditionally been using utility water without paying for it (often by means of vendor intermediaries or illegal connections). This additional cash flow should be valuable as utilities invest to expand their service coverage. The international private operators demonstrate how this increased cash flow can be invested in leak detection which in some cases has led to an apparent overcapacity in production which ensures availability of water for the new customers and therefore does not impact on scarce water resources which otherwise might have been seen as a negative environmental impact.

The issue of affordable connection charges has to date been addressed most often where the private sector has become involved (as in the benefits reported above from Manila and Jakarta) and where the urgent needs for increased service coverage, increased revenue and the enhanced awareness of such issues by civil society come to the fore. For example, the water regulator in Buenos Aires agreed that the average connection charge of over 500 US$ for water plus more than 1,000 US$ for sewerage should be reduced to 120 US$ for both services, amortized over several years, supported by a universal charge on all other customers of 2 US$ per month. In Buenos Aires this has led to a significant increase in connections to the poor. There are other cost sharing ideas being experimented with in other parts of the world with the potential of using micro-credit facilities through NGOs for connection costs as is now being achieved for telecoms for the poorest.

The poor in areas worldwide where the private sector is not yet involved also need to benefit in the same way. Governments and their utility providers would gain from having
more information about this issue with clear distinctions made between the need for recovering a development charge, that is the capital cost of the distribution network, recovering a connection charge, that is the marginal cost of connection, metering and billing, needing a deposit for future consumption charges, delegating physical costs to licensed plumbers with competition over costs, allowing urban local bodies to make a return from road-cutting charges, all to be contrasted against the development benefits of making it easy for consumers to access the public health benefits of a convenient water supply, all with easy payment terms to make that possible.

Researching connection charges
The research problem therefore is the lack of verifiable knowledge and understanding amongst government water utilities regarding the specific role of connection charges, which when linked to physical connection costs, make household connections unaffordable to the poor. This is a specific problem which has tended to be lost in the larger issues of tariff policy, public private partnerships and regulation etc. but which has a direct impact on the poor with potential for early benefits.

Connection charges (the fees the utility charges) when necessarily coupled with connection costs (the physical costs households have to pay for pipes, etc.) are often significantly beyond the ability to pay of poor users (assuming that there are water mains to connect to in the vicinity). High connection charges often appear to be designed as a barrier to entry, to limit demand on a precarious water system. An alternative explanation is that they maximise illegal on-selling of water to vendors by utility staff. Addressing the implications of connection charges and costs is therefore critical to enable the poor to acquire the benefits of public investment.

At present there is only a limited available literature on connection charges – as opposed to consumption tariffs where there has been a lot of research. The International Water Association for example, in its ‘Water Pricing as a Key Element in a Sustainable Strategy’ research (Pocock, 2002), considers the role of price subsidy – ‘a complex issue’; price elasticity – ‘a complex topic’; the effect of rising-block and cost reflective tariffs – ‘inconsistent between communities’. However, it does not address the specific problem of connection charges which has become most apparent in the work of the private operators around the world as they have tried to develop new approaches to serving the poor.

There has been earlier work on marginal costing of network connections, usually with a focus on electricity connections. There is useful work on delivering and maintaining utility services to the poor, for example Lovei et al. (2000) and work on the benefits of urban connections to services (Shi, 2000) as well as Galiani et al. (2002) quoted earlier.

There is ongoing work into differentiating service levels in order to ensure affordable ongoing water delivery to the poor as in the work in El Alto, Bolivia reported on by World Bank and WSP as well as Sansom et al. (2004) but these do not focus upon the challenge utilities have in sorting out connection charges. Estache et al. (2000) take an economist’s overview of the costs and benefits of improved and formalised connections to the poor for various types of network utilities in Latin America, referring to the challenge of getting connections costs correct without going into the practical details of that for the water sector.

The literature referred to here and additional references suggest that there has never been any particularly systematic approach to connection charges. Unlike the established methods for consumption charges, connection charges appear to have developed over time in a very location specific manner with no particular underlying theory. It often
appears that the original reasons have been lost in ‘the mists of time’ with occasional increases due to inflation leading to the present charges.

**Investigating actual connection costs and charges**

The research methodology used has been to survey existing connection charges through a global postal survey of water utilities followed up by a survey of actual charges and costs (direct and indirect) paid by a sample of newly connected customers. The detailed survey has been undertaken by international research partners in Asia, ASCI, India and Philippine Centre for Water and Sanitation and Africa, Uganda through WEDC and Ghana through Kwameh Nkrumah University of Science and Technology. Following the global overview of data, and the initial analysis of the key factors, the researchers selected representative towns and cities, generally a metropolitan city and a secondary town where detailed surveys were undertaken of newly connected lower-income customers through questionnaires and focus groups. It is, not surprisingly, difficult to investigate what the poor have paid to connect as, almost by our definition, they cannot afford to connect. The researchers therefore tried to select respondents from the lowest-income level who can afford to connect to find out what they actually paid and how these various costs and charges were financed in order to propose more effective ways for the future.

**The water connection process**

Through a preparatory workshop the researchers were able to map an overview of the connection process, looking at both formal and informal costs and charges, which has been an effective model across different countries and continents. The full description given below is not meant to suggest all these elements are found everywhere. Research to date tends to show that reality is a haphazard selection from this list, varying from location to location.

The starting point of the water connection process is acquiring the Application Form which can require a formal fee, with the potential for an informal request/thank you payment. Completing this form may require a payment to a local councillor to gain their approval, payment to the landlord for proof of land ownership and/or payment for an approval letter from the pipe owner/community water association who may well have paid for an ‘alternative’ mains extension.

Submitting the completed Application Form with its necessary supporting documents can require payment of a Connection Fee which might include a substantial part of the costs of physical connection outlined below or may simply be an administrative fee or a contribution to mains extension costs described earlier. At this stage there is again the possibility of having to pay ‘speed money’ to gain timely acceptance of the application as well as the on-going opportunity costs of the time taken to travel to the appropriate water utility office which may well be in the centre of the city. Submission of the application might well trigger a visit by the utility surveyor to check the location and the proximity to the water main which can require an additional survey fee in addition to associated costs of perhaps paying for transport for the surveyor as well as snacks and encouragement money.

The purpose of describing the process in such detail is not to suggest that the utilities are in any way particularly deficient in their processes but rather to show what a significant hurdle obtaining a water connection can be to a daily paid occasional labourer perhaps renting a room or two on a barely ‘legal’ housing development. But it is precisely these households who can benefit most dramatically from the convenience and lower consumption cost of a suitable connection.
Following the acceptance of the application, which might require ‘speed money’, there is the need to obtain the mains-tapping or ferrule connector, the communication pipe, meter and stop cock, perhaps from an ‘approved’ supplier (where costs will be slightly higher) or perhaps included as part of the connection fee. Then come the labour charges for trench digging, probably including snacks for water utility staff working overtime or at weekends to install the pipework to the satisfaction of any Inspector who might also require transporting or compensating. If the householder is ‘unlucky’, the mains to connect into will be on the other side of the surfaced roadway and therefore the householder will be liable to ‘road-cutting charges’ which include for reinstatement to a suitable standard, which might require approval by a different, roads, inspector. The final meter installation and/or counting of taps to determine tariff levels could also require a final visit with associated informal costs. Or if suitable payment is made this visit can be delayed for a period to allow for unmetered consumption until the meter installer/reader ‘has time to install the meter’.

Some households, though probably not the target lower-income households (‘developing poor households’), will want to add to these costs the actual in-house pipework and sanitary fittings and, depending upon the quality and hours of supply, will consider the additional costs of small pumps to suck the water out of the mains (at the expense of non-pumping neighbours), ground tanks to store the water when it occasionally arrives and potentially an additional pump to a roof level tank to give the convenience of reasonable pressure taps in a variety of household locations. All of the above need financing in some ways which implies additional costs of borrowing for low-income consumers. Is it any wonder that the poor have to rely upon vendors or neighbours charging several times more than the official volumetric lifeline charge?

**Research results – Official charges**

Requesting information from water utilities through a postal survey as well as on-line questionnaire we received 55 responses from middle and low-income utilities. The average of their official connection charges, assuming a ten metre connection to the main, was 184.80 US$ with a median of 94.80 US$. The average for Africa was 185.50 US$ (median 86.20 US$) and for Asia was 168.90 US$ (median 94.20 US$). However reasonable these amounts might appear to be relative to the costs of extending distribution systems and making connections, and however modest they might appear to high-income country residents, they have to be contrasted to the official poverty figures of 1 US$/d, under which level tens of millions of urban dwellers have to survive. These connection charges are also high relative to the Gross National Income (GNI) per capita of 490 US$ for Africa and 795 US$ for Asia.

**Research results – Four country household surveys**

The four country household survey questioned 20 households in each of two cities per country following the pattern of the connection process described above (Table 1). Note was taken of how long the entire connection process took as well as the gender of the respondents (overwhelmingly male). There were significant differences between countries and between cities in particular countries, even in the case of India between cities in the same State. For example, in Hyderabad, India the Hyderabad Metropolitan Water Supply and Sewerage Board has introduced a ‘Green Brigade’ programme whereby prospective customers pay a single fee and all responsibility for completing the connection is undertaken by the Green Brigade, including road-cutting for example. However, in the secondary town of Tirupathi, in the same State, a more conventional approach is followed whereby the householder has to take responsibility to manage each step of the process.
Table 1  Four country household survey – average reported mean costs in US$

<table>
<thead>
<tr>
<th></th>
<th>Ghana metro city</th>
<th>Ghana secondary town</th>
<th>India metro city</th>
<th>India secondary town</th>
<th>Philippines metro city</th>
<th>Philippines secondary city</th>
<th>Uganda metro city</th>
<th>Uganda secondary town</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total application costs</td>
<td>3.89</td>
<td>32.74</td>
<td>0.00</td>
<td>0.00</td>
<td>4.39</td>
<td>1.33</td>
<td>24.48</td>
<td>7.67</td>
</tr>
<tr>
<td>Total official connection charge</td>
<td>97.61</td>
<td>111.48</td>
<td>140.19</td>
<td>121.56</td>
<td>87.11</td>
<td>2.22</td>
<td>32.57</td>
<td>43.58</td>
</tr>
<tr>
<td>Total survey and approval of application costs</td>
<td>3.08</td>
<td>6.79</td>
<td>8.47</td>
<td>0.09</td>
<td>0.00</td>
<td>0.00</td>
<td>24.17</td>
<td>2.24</td>
</tr>
<tr>
<td>Total physical connection costs</td>
<td>222.43</td>
<td>125.32</td>
<td>0.89</td>
<td>4.03</td>
<td>12.98</td>
<td>43.47</td>
<td>589.57</td>
<td>116.44</td>
</tr>
<tr>
<td>Costs of interest to finance connection</td>
<td>3.09</td>
<td>3.61</td>
<td>5.05</td>
<td>9.37</td>
<td>1.24</td>
<td>0.00</td>
<td>74.64</td>
<td>1.21</td>
</tr>
<tr>
<td>Cost of coping strategies for low pressure or intermittent supply</td>
<td>26.03</td>
<td>104.08</td>
<td>131.68</td>
<td>42.62</td>
<td>1.95</td>
<td>0.00</td>
<td>305.72</td>
<td>15.30</td>
</tr>
<tr>
<td>Total water acquisition costs</td>
<td>331.26</td>
<td>358.29</td>
<td>286.28</td>
<td>177.67</td>
<td>107.43</td>
<td>47.03</td>
<td>867.51</td>
<td>180.55</td>
</tr>
</tbody>
</table>

Note: average of total water acquisition costs may differ from sum of average of all component costs due to unrecorded response/non applicable response to component questions rather than ‘zero’ response.
In Ghana, although there is a reported official connection charge, this is actually the amount that Ghana Water Company estimates it will cost to make the connection along with a percentage addition to cover their overhead costs. In the Philippines, the low connection fee in the secondary town has been seen by some to represent a triumph over the high charge of the ‘privatised’ Manila companies. However, it can be seen that although the fee is low, householders have to pay much more for physical connection costs, some of which are included in the higher Manila fee. The secondary town numbers are also influenced by the researcher’s choice of investigating a self-contained water cooperative on the edge of a larger town which may not be recovering sustainable charges for water, volumetric as well as connection charges, in the long-term.

Overall, the highest costs are seen in Uganda. In parallel to the process of undertaking this research National Water and Sewerage Corporation has been reassessing its approach to connection charges and has recently removed its connection charge and now offers to make the physical connection also free of charge to all households within 50 m of the water main. This laudable change in policy has been funded by a 10% increase in volumetric tariffs for all customers. The next step in this policy-change must be to ensure that water mains are within 50 m of low-income households who want to connect, otherwise it will end up as a means to subsidise the middle and high-income groups just as so many volumetric subsidies do at present.

In addition to the connection costs households have had to invest in ‘coping costs’ in order to make use of their new water connection, which usually requires some form of ground storage tanks. Although not strictly part of the argument about water connection charges it illustrates the total cost of acquiring a viable water connection which is necessary if the benefits are to be obtained. With total water acquisition costs ranging from 47 to 867 $ with the majority costing over 100 $, there is a clear challenge to water utilities to make it easier for their customers to access their services.

To give a sense of perspective on these numbers, converting the total water acquisition costs to months of income (again using GNI per capita, World Development Report, 2005), approximately 12 months of income is required in Ghana to obtain a new water connection, between four and six months in India, between 0.5 and 1.2 months in the Philippines and from 9 to a massive 43 months of income in Uganda.

In addition to the quantitative investigation and analysis, the researchers organised focus groups to determine householders’ perceptions of the process of obtaining a new connection and the results of improved access to water. The benefits obtained from a new water connection were described in one city, Kumasi, Ghana as ‘now experiencing convenience’, ‘convenience’, ‘safe water’, ‘treated and safe water is now available’, ‘much more convenient’, ‘no more queuing for water’, ‘now experience a regular water supply’ and ‘constant supply’. In the Philippines, newly connected customers estimated their savings from their new water connection to be 14.3 $ per month (26.7 $ maximum, 0 $ minimum) and commented that: ‘benefits include immediate availability of water’, ‘saves time; no queuing and fetching anymore’, ‘the luxury of taking a bath anytime, water is cheaper, no need for fetching water anymore’, ‘I can control my water expenses now’, ‘benefits include immediate availability of water’, ‘I can take a bath anytime I want. No more queuing; no more water vendors’, ‘easy washing of clothes, no transporting of water anymore’, ‘safe water; improved hygiene of my children’, ‘clean clothes, water is available anytime, saves energy’, ‘water is cheaper now. I used to spend 30 P a day for water’, ‘can now wash clothes and clean house anytime’, ‘before we had to transport water, costing us 100 P per week’, ‘it is almost the same because we are still paying for the monthly instalment for the connection fee, but we are already enjoying the convenience of having water anytime we want it’, ‘no savings, it is almost the same expense as
before but it helps a lot in terms of comfort and convenience, no need to fetch water from the neighbour’. The secondary town newly connected talked of ‘convenience and savings in terms of time and effort’, ‘I can now have a small vegetable garden’, ‘I can also grow some vegetables and orchids plus comfort and convenience’, ‘savings in terms of time and effort’, ‘we are now able to maintain a small garden’, ‘convenience, savings in time and effort’.

Conclusion
The results of the research demonstrate the substantial and unpredictable nature of the costs involved in obtaining a new water connection, costs which are too risky as well as unaffordable as capital sums by the poorest. A mean cost from the four countries, metropolitan and secondary cities, of 295 $ to acquire a functioning piped water connection is not affordable for ‘dollar a day’ households. But it is service to those households which must be the mission as well as the vision for the public management of water supply. It is suggested that many more water utilities need to adjust their new connection policies, reducing any official charges (though perhaps utilising a reasonable deposit against future volumetric charges) and including costs in an ‘all-in’, ‘single window’, ‘one-stop shop’ approach already used by some, with those costs amortised over several years or over the entire customer base. Perhaps the best exemplar to those utilities claiming that networked utilities must necessarily ‘charge to enter the water shop’ is the approach of the cable television and mobile phone operators who have a different view of the costs and benefits of signing up new customers and use all possible techniques to maximise their customer base. It is the role of urban water supply companies to supply water to all, albeit at cost-reflective tariffs to ensure sustainability with targeted subsidies only as necessary, and ensuring that low-income customers can access those services is the crucial first step to achieve that vision.

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