Cranfield UNIVERSITY

Charging to enter the water shop?

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Richard Franceys and Esther Gerlach, Editors, with Lyn Capistrano, Srinivas Chary, Sam Kayaga, Kwabena Nyarko, Andrew Trevett and Andy Narracott

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'Charging to enter the water shop?'

EXECUTIVE SUMMARY

The beneficiaries of this research are designed to be the urban poor, often 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 often have to rely upon expensive vendors, presently being unable to access, for example, lifeline block subsidies because they cannot afford the costs associated with new water supply connections.

The poor benefit most from accessing clean water at an affordable consumption charge, having first achieved household or group water connections through adjusted tariffs and mains extensions. The end users typically survive at present on less than $2 per day and typically comprise between 20% and 50% of the 2,083 million total population living in urban areas in low and middle income countries. Because of this level of poverty the poor are unable to build up any reasonable level of capital to invest in one-off major payments for connections but the evidence suggests that they are able to pay small on-going charges at a level similar to the cost of supplying water. They then benefit significantly from the convenience and cost savings of piped water.

The research results indicate that the total cost of acquiring a functioning household water connection, on average, is approximately 12.9 months average GNI pc in Ghana, 5.3 months in India, 0.9 months in Philippines and 26.2 months in Uganda. These amounts, which include many of the suspected 'add-ons' charged over and above the official fee, are clearly unaffordable for the daily wage-earning poor.

Charging to enter the water shop? **DFID, UK KAR 8319**

	Ghana Metro City	Ghana Secondary Town	India Metro City	India Secondary Town	Philippines Metro City	Philippines Secondary Town	Uganda Metro City	Uganda Secondary Town
	Mean ($)	Mean ($)	Mean ($)	Mean ($)	Mean ($)	Mean ($)	Mean ($)	Mean ($)
Total Application Costs	$3.89	$32.74	$0.00	$0.00	$4.39	$1.33	$24.48	$7.67
Total Official Connection Charge	**$97.61**	**$111.48**	**$140.19**	**$121.56**	**$87.11**	**$2.22**	**$32.57**	**$43.58**
Total Survey and Approval of Application Costs	$3.08	$6.79	$8.47	$0.09	$0.00	$0.00	$24.17	$2.24
Total Physical Connection Costs	$222.43	$125.32	$0.89	$4.03	$12.98	$43.47	$589.57	$116.44
Costs of interest to finance connection	$3.09	$3.61	$5.05	$9.37	$1.24	$0.00	$74.64	$1.21
Cost of coping strategies for low pressure or intermittent supply	$26.03	$104.08	$131.68	$42.62	$1.95	$0.00	$305.72	$15.30
Total Water Acquisition Costs	**$331.26**	**$358.29**	**$286.28**	**$177.67**	**$107.43**	**$47.03**	**$867.51**	**$180.55**
Gross National Income per perso	*$320 GNI pp*		*$530 GNI pp*		*$1,080 GNI pp*		*$240 GNI pp*	
Connection Costs to GNI pc Ratio (in months)	***11.4***	***9.5***	***3.5***	***3.1***	***1.2***	***0.5***	***28.1***	***8.3***
Acquisition Costs to GNI pc Ratio (in months)	***12.4***	***13.4***	***6.5***	***4.0***	***1.2***	***0.5***	***43.4***	***9.0***
Total Water Acquisition Costs *at equivalent Purchasing Power Parities*	$272.77	$295.03	$298.67	$185.36	$140.92	$61.68	$814.79	$169.58
IWE, Cranfield University, UK	*WSESP, KNUST, Ghana*		*ASCI, Hyderabad, India*		*PCWS-ITN, Philippines*		*WEDC, Loughborough, UK*	

The simple averages reported here are distorted in the African examples by some householders paying high amounts to provide their own water main extension to serve their new home in a low-density peripheral urban expansion area. Others have had to pay to access privately laid mains in addition to paying the utility a conventional connection fee.

Households interviewed in the four research locations mostly associate a private water connection with convenience. Even where there are no immediate financial savings (due to instalment payments for connection charges), new utility customers value not having to queue at public tap stands and or having to fetch water from connected neighbours. Interviewees also appreciate the small luxuries connected with having a regular and immediate in-house supply, such being able to take a bath at any time. In a secondary town in the Philippines, small vegetable gardens emerged as a fringe benefit of having a private water supply.

The benefits obtained from a new water connection were clearly evident, described in one city, Kumasi, Ghana as 'now experiencing convenience', 'treated and safe water is now available', 'no more queuing for water' and 'constant supply'. In the Philippines, newly connected customers estimated their savings from their new water connection to average $14.3 per month 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'. 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 P30 a day for water', 'can now wash clothes and clean house anytime', 'before we had to transport water, costing us P100 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'.

This research sought to investigate what are the actual costs of obtaining a new water connection, both formal and informal costs, and considers ways in which these costs can be made more affordable for the poorest. In considering the results of this research, we can conclude that the connection process is generally:

- too expensive;
- too complicated;
- too uncertain/haphazard,

As making a connection

- requires too many additional payments;

The prospective applicants are

- too distant from accessible water mains as well as from utility offices;

And their low income status renders the whole process

- too capital intensive.

It can be argued that a cost reflective connection charge should include the cost of the connection to the main, the cost of a share in that distribution main and arguably a share in the cost of the increased capacity required in bulk distribution mains, treatment and abstraction. However, it can equally well be argued from a marketing viewpoint that all those connection costs, both capital expenditure and operating expenditure, can be subsumed within the overall

costs of the business and included in the overall volumetric consumption charge. In the telecoms industry, companies have had to learn a similar lesson when moving into competitive markets.

The guidelines for connection charges, in summary, are that water utilities must take **a marketing approach to delivering new connections** rather than a supply driven simplistic economic approach. Reviewers have commented that in general utilities respond to external drivers (licences, contracts, regulation, political decisions, incentives for senior staff, opportunities for rent seeking), therefore questioning why utilities would adjust their connection policies unless their incentives are changed. Through advocacy and example during this research it has been noted that both service providers and governments are prepared to change. Depending on the institutional framework for service delivery, water utilities must be encouraged and incentivised to adopt the marketing approach. Capacity-building remains a critical aspect of the reform process. This research aims to strengthen the necessary knowledge base for capacity development.

Therefore, in each situation, although the main water product is necessarily monopolistic, there is a need to think creatively and adapt current practice to promote differentiated household connections to all the urban poor, as if they were trying to win new customers in a competitive market, whilst maintaining commercial viability. Any connection charges and costs have to be tested against the marketing imperative.

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 to 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. Customers need to be encouraged to enter the water shop which best fits their needs, circumstances and aspirations.

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1 INTRODUCTION

Water entities have to recover their costs, including operating expenditure, capital expenditure and the cost of capital, if they are to achieve sustainable service provision. One element of these costs is the construction of the pipework that connects new consumers' taps to the water main. Traditionally this cost has been passed directly to the consumer through a connection charge, plus some direct consumer responsibility for parts of the pipework, whereas the costs of the remainder of the fixed assets are recovered through the consumption charges. Other retailers, admittedly in less capital-intensive lines of business, do not 'charge to enter the shop', recovering all their fixed asset costs through a small percentage added to the product cost. This research asks why water consumers, particularly poor consumers, should be 'charged to enter the water shop?' and investigates the extent to which these charges act as a barrier to the poor obtaining clean water at a reasonable price.

The research described in this report is therefore designed to assist the urban poor, 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 neighbours and 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 city-wide piped supply system, being unable to access the economies of scale of bulk treatment and supply, to the detriment of their customers.

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 connections. The water consumers we are concerned about typically survive on less than $2[1] per day per person and typically comprise between 20% and 50% of the 2,083 million living in 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 many readers rather than sold, the poor are unable to build up any reasonable level of capital to invest in one-off major payments for 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.

This research seeks to uncover the actual costs of obtaining a new water supply connection, including both formal and informal costs incurred by the applicant household, and considers ways in which these costs might be made affordable for the poorest.

[1] Unless indicated otherwise, $ refers to US Dollars throughout the text.

RESEARCH APPROACH

1.1 Reviewing the literature on 'connection charges'

The research problem 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 the potential for early benefits

Connection charges (the fees the utility charges) plus connection costs (the physical costs households have to pay for pipes etc) are often 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 for the poorest which has perhaps become more apparent in the work of the private operators around the world as they have tried to develop new approaches to extend service areas to meet contractual service coverage targets. It has been noted that public utilities have also been facing the same challenge for an even longer time.

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) takes an economists 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. Sometimes it would appear that they have been designed deliberately to act as

a 'barrier to entry', to prevent new consumers threatening scarce water resources or to prevent low-income consumers being unable to consequently pay consumption charges. For others it appears that the original reasons have been lost in 'the mists of time' with occasional increases due to inflation leading to the present charges.

1.2 The Research Fieldwork

The investigation, undertaken over an eighteen month period, has carried out detailed field studies in four countries (Ghana, Uganda, India and Philippines), a global postal survey, an e-survey following the literature review. In addition the researchers have undertaken an analysis of the marginal costs of a distribution network, reflecting on the initial literature review which appeared to indicate that the methodology for setting connection charges was based on these marginal costs.

One of the goals of the research was to deliver comparability between the different country case studies in order to understand the strengths and weaknesses of the various utility approaches to connection costs. To deliver a common questionnaire, the researchers jointly developed their understanding of the connection process in preparation for the household surveys to be undertaken (see appendix A). Country-specific questionnaires and survey forms were then adapted to local circumstances (see appendix B), and subsequently appraised by the economist and sociologist on the research team.

The main focus of this research has been a survey of existing connections charges and costs (direct and indirect), undertaken by our 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, we selected representative towns and cities where our partners undertook detailed surveys of newly connected lower-income customers through questionnaires and focus groups. Not surprisingly, it is difficult to investigate what the poor have paid for a connection as, almost by our definition, they cannot afford to connect.

We therefore selected respondents from the lowest-income level who can afford to connect as the closest possible match to the intended target group, 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. Household surveys have been undertaken in each country; twenty households were interviewed according to the questionnaire in each of two urban areas, a metropolitan/capital city and a secondary town/city. As in some cities road cutting and reinstatement charges are known to add significantly to the cost of a new connection, the otherwise randomly selected survey respondents included a proportion that have had to construct road crossings for their pipe connection.

In addition to discussions with governments and water suppliers, the researchers also arranged for a minimum of two focus groups to be undertaken in each location. The purpose was to bring out the more qualitative aspects of the reality of obtaining a connection, with a deliberate inclusion, wherever possible, of women in the focus group. Separate focus groups were to be held for those recently served as well as those remaining unserved to obtain their perspective on any barriers to connecting. In addition, there was to be an investigation of costs incurred by the respective utilities

for a relatively new extension to the distribution network to assist with the section of the research investigating the marginal costs of connecting.

Being able to cross-check the questionnaire results with the focus groups, we believe that the forty detailed household interviews from each of four countries give us the necessary level of accuracy in understanding the various costs that households actually incur in the process of connecting. The official costs which households report are being cross-checked with the official information obtained from the respective utilities.

In addition to the four country specific fieldwork to survey the 'true costs of connecting' the researchers identified a wider utility network worldwide to begin to engage them in the process as ultimately they are the ones who will have to change or challenge current policy if it is found to be necessary. An additional, simpler, survey was distributed to this utility network (see appendix C). This asked respondents to detail their official connection charges and procedures for connecting. The survey was distributed in English, French, Spanish and Portuguese as appropriate and remains available on the 'Connection' project website for online updating. The project website www.silsoe.cranfield.ac.uk/iwe/projects/connection/ was used to provide early feedback to respondents about the emerging patterns. Developed concurrently to this research, the International Benchmarking Network (IBNet) is another good source of comparative information on connection charges.

1.3 Mapping the 'generic' water connection process

To inform the generic questionnaire the researchers 'mapped' a connection process that attempted to capture all the elements of a typical connection, making allowance for the major possible variations in the process.

The starting point in the connection process is usually 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 obtain their approval. In addition, payment may be required to the landlord to supply 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 on. At this stage there is again the possibility of having to pay 'speed money' to gain timely acceptance of the application. Other cost factors are 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, and the cost of transport.

Submission of the application might well trigger a visit by the utility surveyor to check the location and the proximity to the water main, for which an additional survey fee may be incurred. Informal costs may include 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 again 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 could be slightly higher), unless included as part of the connection fee. Then there must be added the labour charges for trench digging, possibly 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 a surfaced roadway and therefore the householder will be liable to pay 'road-cutting charges' to compensate 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?

Connecting through neighbours

In addition to the complexity of connecting one major aspect which became apparent in the research preparation is the extent to which households often access the mains supply by paying to connect through a neighbours' connection. The (usually richer) neighbour may have invested in their own link to the distribution line, perhaps a connection several hundred metres long and including road-cutting etc., initially for their own convenience. However, with that major investment undertaken, adjacent households see the benefits and ask to connect to the mains through that line. There then arise considerable complications with the utility, such as whether this new customer will be liable to pay a connection fee to the utility provider, or whether this should be waived as effectively the connection becomes part of a group connection. There is also the potential for dispute over how much the new connector should pay the original investor for access. Ultimately, as more and more neighbours take advantage, which might appear to be 'good business' for the original investor, there

are problems over ensuring an adequate flow and pressure and whether the utility should adopt the pipe or duplicate it at a larger size.

2 GLOBAL POSTAL SURVEY

In order to get the best possible overview of connection charges and costs, and to be able to check the eight city field research, a global survey was undertaken. Requesting information from water utilities through a postal survey as well as an on-line questionnaire, we received 55 responses from utilities in middle and low-income countries. The average of their official connection charges, assuming a ten metre connection to the main, was $184.80 with a median of $94.80. The average for Africa was $185.50 (median $86.20) and $168.90 (median $94.20) for Asia. 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 with the official poverty figures of $1 per day, under which level tens of million of urban dwellers have to survive. These connection charges are also very high relative to the annual Gross National Income (GNI) per capita of $490 for Africa and $795 for Asia.

Table 2.1: Global Utility Survey of Connection Charges

Global Average		$184.8
Global Median		$94.8
Africa Average	GNI per capita $490	$185.5
Africa Median		$86.2
Asia Average	GNI per capita $795	$168.9
Asia Median		$94.2

The connection charges are usually based on the size of the connection or meter (67% of all cases). 38% of responses indicate that the fee is also dependent on the distance of the property to the nearest water main, but less than one fifth state that the location of the property, i.e. within or outside of the city limits, has any influence on the connection charges.

Comparisons of basic connection fees (excluding additional charges for materials, labour, etc.) are slightly more difficult to assess as practices differ as to what the "basic" fee comprises. A basic charge of $9.6 can quickly add up to a total connection fee of $509.4. Road cutting charges add considerably to the cost of connection, particularly where roads are paved, and constitute the most significant (and frequently cited) additional charge. Material costs for pipelines similarly add up quickly. Pipes and meters are generally provided by the utilities (and hence included in the connection charge), but customers may be required to purchase their own materials. In some cases, meters are rented from the utility, incurring a monthly charge. As far as administrative charges are concerned, application fees are charged by 21%, whereas deposits and (chargeable) plumbing permits are required by 27% and 11% respectively. Deposits range from $2 - 32.

3 COUNTRY CASE STUDIES RESEARCH

To allow international cross-comparison of connection costs and charges, costs and prices are reported in US Dollars (2004 equivalents). The following exchange rates were used:

Table 3.1: Exchange rates

Country	US Dollar equivalent (2004)
Ghana	¢ 8,994.45 (cedis)
India	Rs. 45.035 (Rupees)
Philippines	P 56.27 (Pesos)
Uganda	Shs.1,870 (Uganda Shilling)

3.1 Ghana: Connection Charges and Costs Research

Lead Researcher: Kwabena Biritwum Nyarko, MSc with Samuel Nii Odai, PhD, WSESP, KNUST, Kumasi, Ghana

In Ghana, only 32.4 % of the urban population have direct access to piped water from a house connection with indoor plumbing or a yard connection (GSS, 2000). An additional forty-eight percent of the urban population receive water from the piped network indirectly through standpipes, vendors and tanker operators. The remaining 19.6 % rely on wells and rivers/springs and collected rain water (ibid).

In 2000, the Public Utilities Regulatory Commission (PURC) conducted a study on water accessibility in the urban areas in Ghana, which revealed that the majority of urban households in areas which are served by piped networks do not have primary access to piped water despite a clear preference for the urban water piped services. The cost of connection to the urban piped water supply was mentioned as a barrier to access. The study also reported that the majority of those without services can be found in the low-income, informal settlements and the peri-urban areas (PURC, 2000).

The Ghana connection research targeted the urban poor and low-income dwellers in the two largest cities, Accra (with a population of 1.7m) and Kumasi (0.7m), and two small towns, Bekwai and Juaben. Accra and Kumasi are served by Ghana Water Company Limited (GWCL), unlike Bekwai and Juaben, which are served by institutionally separate small town water systems, defined as a piped system serving communities of between 2,000 and 50,000 inhabitants who are prepared to own and manage their water system (CWSA, 2003). Typically, small towns' water systems consist of a number of standpipes and a limited number of house connections (usually 10% of the households).

A total of 40 households (20 each in Accra and Kumasi) were interviewed between January and July 2004. The household survey focused on GWCL districts with a significant proportion of low-income settlements and households without connections to GWCL network. Survey respondents included recently connected customers (who had obtained a GWCL connection in 2003) and potential future GWCL customers (currently without direct access).

Focus group discussions were facilitated in the two cities and two small towns. Additional interviews were conducted with key informants from PURC and GWCL, and consultations held with low-income households in the informal areas in Accra and Kumasi. Fieldwork results were discussed in workshops in Accra and Kumasi to validate the results and to consult with stakeholders on ways to improve direct access to piped networks for low-income households.

3.1.1 Summary of fieldwork results

A summary of the responses on the connection cost covering formal and informal as well as official and unofficial cost are shown in Table 3.1.

The major point to note from Ghana is that Ghana Water Company is not charging a connection fee but rather an estimated cost of connection for each household with a percentage mark-up for overheads. In this sense they are not 'charging to enter the water shop' but rather charging the customer to transport the purchases to the household at the customer's own cost. Stretching the analogy though, the often excessive distance to the water mains could be likened to charging the customer the transport costs where there is no road access to the store. However, many of the excessive pipe lengths were caused by new houses being built in new developments where land was relatively cheap and where, due to low housing density, it was unrealistic to expect the utility to make the connection. Regarding piped service to the poor, the focus of this research, the challenge is to deliver water mains close enough by the house to facilitate low costs for connecting and even considering whether to subsidise that connection.

The mean total cost of getting a water connection was US $345 and the range was from US $88 to US $1,301.

Table 3.2: Cost items of connection process to private networked water supply, Ghana

	Ghana Metro City Mean ($)	Ghana Metro City Minimum ($)	Ghana Metro City Maximum ($)	Ghana Secondary Town Mean ($)	Ghana Secondary Town Minimum ($)	Ghana Secondary Town Maximum ($)
Application Costs						
Costs of Application Forms etc prior to making an application						
Cost of obtaining necessary approvals to support application	$3.89	$0.00	$44.47	$32.74	$0.00	$94.50
Total Application Costs	***$3.89***	***$0.00***	***$44.47***	***$32.74***	***$0.00***	***$94.50***
Formal Connection Fee						
Official connection charge set by the utility, acknowledged by receipt?	$86.38	$33.35	$294.63	$110.81	$50.03	$200.12
Additional fee for ferrule connection etc	$11.23	$0.00	$38.91	$0.67	$0.00	$13.34
Total Official Connection Charge	***$97.61***	***$33.35***	***$333.54***	***$111.48***	***$50.03***	***$213.46***
Survey and Approval of Application Costs						
Official fee charged by the surveyor?	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Provision of transport, meals, drinks, etc. to the surveyor	$0.92	$0.00	$11.12	$1.11	$0.00	$7.78
Informal payments for survey	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Cost of survey in terms of lost earnings etc	$1.61	$0.00	$11.12	$4.51	$0.00	$26.68
Payments to ensure application approval	$0.56	$0.00	$11.12	$1.17	$0.00	$22.24
Payments to move the date of connection to an earlier/more convenient date						
Total Survey and Approval of Application Costs	***$3.08***	***$0.00***	***$33.35***	***$6.79***	***$0.00***	***$56.70***
Connection Process						
Road cutting charges	$0.00	$0.00	$0.00	$5.56	$0.00	$111.18
Cost of labourers for trench excavation	$23.46	$0.00	$88.94	$21.96	$0.00	$72.27
Cost of transport, meals, drinks and snacks for trench excavation	$3.36	$0.00	$11.12	$2.90	$0.00	$27.79
Lost earnings for self trench excavation						
Cost of materials (pipes, meters, etc.)	$158.74	$0.00	$478.07	$75.54	$0.00	$533.66
Cost of acquiring correct materials	$4.91	$0.00	$11.12	$8.46	$0.00	$55.59
Cost of labour for actual connection	$29.67	$0.00	$100.06	$6.84	$0.00	$44.47
Cost of transport, provide meals, drinks and snacks for physical connection	$1.59	$0.00	$11.12	$2.61	$0.00	$22.24
Lost earnings for self connection	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Costs of meter installation	$0.69	$0.00	$11.12	$1.46	$0.00	$22.24
Informal payments for connection approval	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total Physical Connection Costs	***$222.43***	***$0.00***	***$711.55***	***$125.32***	***$0.00***	***$889.44***
Financing arrangements						
Costs of interest to finance connection	***$3.09***	***$0.00***	***$55.59***	***$3.61***	***$0.00***	***$33.35***
Coping mechanisms						
Cost of coping strategies for low pressure or intermittent supply	***$26.03***	***$0.00***	***$333.54***	***$104.08***	***$0.00***	***$389.13***
TOTALS	**$331.26**	**$87.83**	**$685.98**	**$358.29**	**$104.14**	**$1,300.80**

3.1.2 Qualitative results

GWCL services – Accra and Kumasi

From 2003 onwards, obtaining a new water service connection (NWC) from GWCL has involved the following procedure([1]):

- Prospective customer obtains an NSC application form for ¢10,000.00 ($1.1) from the from the District Manager/District commercial officer at responsible GWCL District Office
- Applicant submits the completed form along with a copy of the site plan (showing ownership and location of the property to be connected) and authority note from the landlord for GWCL to process the form to the District Office

- GWCL officials inspect the premises to verify suitability for the new service
- GWCL prepares a cost estimate for the connection (including materials and labour)
- Where applicable, the prospective customer obtains approval from the road authority and pays the road cutting charges to the Department of Urban Roads
- Where applicable, the applicant obtains written approval and makes payment to alternative mains extension providers([2])
- Upon receipt of full payment for the applicable connection charges, GWCL or private contractors extend the service main, which GWCL connects to the main and installs a meter

([1]) This old connection procedure, under which the customer was responsible for acquiring materials and laying the new service pipe to the point of connection and GWCL simply charged a connection fee for tapping the mains and installing a meter, is gradually being phased out. A number of the surveyed customers (21) had been connected using the old procedure. These customers would have paid for materials, which are included in the connection charge under the new procedure. However, 11 of the 19 survey respondents connected under the new procedure reportedly still paid for materials and/or labour.

([2]) Though GWCL is responsible for providing the pipe mains in urban areas, the company has been unable to cope with the rate of city expansion. To complement GWCL's efforts, individuals, estate developers and resident associations are permitted to extend the mains and then surcharge the cost to all others who seek to connect to the GWCL network through their line. A significant proportion (32.5 %) of the applicants paid for the mains extension before paying the GWCL charges.

Customer Survey

Costs incurred

The GWCL official charges represent the physical connection cost, which is the cost of the materials (pipes and fittings), labour for excavation and pipe laying, plus 15% as GWCL overheads. The physical connection cost is a function of distance between the applicant's house and the GWCL pipe mains. The minimum connection fee charged was ¢ 300,000 whilst the maximum was ¢ 2,650,000, with a mean connection charge of ¢ 886,805. Of those who connected through an existing mains extension (13), the minimum charged was ¢150,000, whilst the maximum was ¢850,000. Two respondents actually paid to two separate entities, the community association that provided the mains as well as the neighbour that provided the sub-mains.

Only four out of the forty customers that participated in the survey experienced road cutting. All of them were lucky since the roads were untarred and hence were not faced with very high charges for the road cutting. In Kumasi a customer could not connect because the road cutting charges was estimated as ¢3,058,000 (US$340).

GWCL's new connection procedure does not require the applicant to purchase materials. However, ten out of the nineteen applicants using the new procedure ended up buying some of the materials, which had already been paid for. Closer examination of the times taken to install a connection reveals that speed money payments appeared to have no effect.

Financing and coping mechanisms

The majority of respondents (85 %) were able to finance the cost of connecting through personal savings. Three respondents financed the new connection wholly with loans whilst two respondents partly financed the connection with loans. One respondent financed the new connection with a donation from a family member. Loans were secured from commercial banks (1 respondent) and friends (4 respondents), with payable interest varying between ¢150,000 and ¢500,000 per year. Two respondents borrowing from friends were not paying interest. Most (87.5 %) of the respondents did not experience financial difficulties as a result of delays in the connection process. Five respondents indicated experiencing financial difficulties because of the lengthy procedures as well as the need to make unofficial payments to facilitate the process. A small minority planned to recover part of the costs by engaging in other activities arising from the water connection as an alternate source of financing. One respondent indicated that he started water on-selling but abandoned it because the water bills were high.

Many of the respondents (62.5 %) have not invested in additional storage tanks and do not have the intention to do so immediately. However, 9 respondents have invested in storage tanks to compensate for intermittent supply and low-pressure problems and 6 other respondents have plans to do that. The range of investment is between ¢980,000 and ¢20,000,000. Out of the nine respondents, 8 spent less than 4 million cedis, whilst the remaining person spent an unusually high amount of 20 million cedis. In Kumasi, 60 % of the customers are considering building water tanks due to low pressures. They have not yet constructed but are estimating an average of ¢2,500,000.00 for such a project.

Perceived benefits of individual connection
The benefits indicated by the new utility customers surveyed included convenience, reliability, public health and reduction in household water expenditure.

Focus Group Discussions

Connection process
The interviews with key informants and the focus group discussions (FGDs) confirmed the connection procedures found from the survey for the urban water supply sub-sector. Some applicants paid as much as $100 to the alternative mains extension provider to obtain the required approval. For example, people paid ¢1,000,000 (US$110) in Tantra Hill, and up to about ¢700,000 in other places (US$80). Some potential customers, especially in the low incomes area were not aware of the procedure and thought there was the need to get a contact person or middleman to have it on time.

The focus group discussions in Accra highlighted the problem associated with the lack of water distribution mains. The respondents revealed that the activities of the "alternative mains extension providers" are not regulated and that they charge whatever amount they want. In addition there are instances where a potential customer would have to pay to more than one person before starting the GWCL procedure.

Access barriers
The focus group discussion revealed some of the reasons why only a few households have direct access to the piped network. Some of the reasons in the cities were:

- High cost of the connection charges
- High cost of water bills since some of them used to have such connections
- Perception that one needs to have a contact person in order to get connected
- Difficulties in sharing the water bill in multi occupancy building where the land lord is also a water consumer

For the small towns most of the unconnected customers were very close to the network. The main reasons why they do not have direct connection to the network were:

- The cost involved deterred them from getting connected.
- Majority of them also had the public stand-pipe very close to their houses.
- Lack of credit facilities as the main source was the rural bank, but the interest rate and the requirement for guarantors was a major banner in the process.

Preferences and perceptions of the unconnected

A few respondents from the low-income groups in the urban areas indicated that their preference was for public standpipes because of its flexible payments system. Most of the low-income groups having clear preference for a house connection reported that they do not have house connection because of the:

- high cost of the connection charges;
- high cost of water bills since some of them used to have such connections;
- perception that one needs to have a contact person in order to get connected;
- difficulties in sharing the water bill in multi-occupancy building where the landlord is also a water consumer.

Small towns – Bekwai and Juaben

For the small towns water systems under community ownership and management a different arrangement was in place. The process for connection is as follows.

- Customers buy an application form for ¢5000 and fill it.
- On submission the applicant is required to pay a connection fee.
    - In Bekwai this was ¢950,000 (¢200,000 as advance payment of consumption, ¢585,000 to District Assembly for mains extension and ¢165,000 to the operator) as connection fee.
    - In Juaben this was ¢1,200,000
- The water system operator then conducts a survey and estimates materials needed for the connection to be bought by the customer. The customer pays for the materials and lays the pipes to the point of connection.
- The water system operators then connects the pipe to the network
- In the case of road cutting, customers are charged by the Ghana Highway Company.

Discussions with fifteen technical managers revealed that the connection fees ranges from ¢ 200,000 to ¢ 1,200,000. It was also revealed that a significant component was a major source of funds for maintenance and a fraction was deposit against non payment of bills.

The small towns' policy stipulates that customers shall bear 100% of the physical connection cost. Most of the Water and Sanitation Development Boards (WSDBs),

which is the community representative for the management of the water system, do charge 100 % physical connection charges plus connection fee which has been a major source of income for the water system. The fee, which is charged in addition to the physical connection charges, varies from system to system and appears to be set arbitrary by the WSDBs and the District assembly. This fee has become a barrier preventing most households from having house connections in the small towns.

In most of the systems, local political interference has been significant in providing free connection for some influential personalities, e.g. the Chief, WSDB members etc. Others were exempted from the connection fee meant for increasing revenue for maintenance.

3.1.3 Ghana Conclusions and Recommendations

The procedure for accessing water connection and the cost of water connection in Ghana is not pro-poor oriented. The official cost of new service connection for potential GWCL customers is primarily the physical connection cost. However, in areas where GWCL mains are not available potential customers have to rely on "alternative service providers", usually neighbours, who also charge a fee to recoup their investment. In areas where pipes would have to cross the road the potential customer would have to bear the cost for road cutting charges (road cutting and re-instating the road to its original condition).

The cost of getting a water connection is relatively high for the urban poor. As at 1998, 38 % of the Ghanaian population were living below US $1 a day and 75 % of the population below US $2 a day (World Bank, 2002). This means the average connection charge of US $340 has significant implications for the urban poor. The annual expenditure for a poor person (living below US $1 a day) on his/her livelihood is what is needed to have a water connection. This is also equivalent to 12 years 7 months of billing for a low-income household of five people having a piped water connection and consuming 50 litres per person per day.

Quite different from the urban water supply systems, the small towns' sub-sector lacks clear guidelines that would enable the Water and Sanitation Development Boards (WSDB) to set appropriate charges for new service connection. The general practice is that in most of the small towns WSDB charge a special connection fee in addition to the physical connection to generate additional funds for the water system. This makes the cost of connection relatively high and deters most potential customers from accessing house connection. Other barriers preventing easy household access were the lack of credit facilities to make the payment terms flexible.

The reasons contributing to the low number of water connections for both the urban water supply and the small towns' water supply as cited by the respondents were:

- High charges for getting a water connection.
- Lack of credit facilities to facilitate the payment of the connection cost
- Inadequate mains extension
- Perception that one needs to have a contact person in order to have a connection

Based on the findings, the following recommendations are made:

- GWCL should introduce a development tax/levy (in addition to the existing volumetric tariff) purposely for main extension and road-cutting charges for all users to contribute to this part of the capital cost for all users.
- Further to this GWCL should liaise with the roads authority so that during construction large diameter pipes are used for housing mains pipes that need to cross the road. In this case there will be no need for cutting and restoration but the cost will be reduced to only the pipe (for housing) cost.
- Until adequate funds become available, GWCL should deliver both "mains extension" and "road crossing of pipe"
- GWCL should regulate the activities of the alternative providers in terms of the quality of the works and the charges passed unto the new customers.
- GWCL should explore mechanisms to allow customers flexibility to spread the connection fee over a period.
- The Community Water and Sanitation Agency (CWSA), the agency responsible for the small towns' water supply has provided a number of guidelines and could prepare one for setting new service charges

3.2 India: Connection Charges and Costs Research

Lead Researcher: Srinivas Chary, ASCI, Hyderabad, India

India is undergoing an economic, social and political transformation brought about by urbanization and globalization. City dwellers currently account for approximately 28.5% of the country's total population, with the proportion predicted to rise to 50% by 2020. The ongoing transition will put further pressure on the already strained centralized water supply systems of urban areas, where water supply is a mandatory function of urban local bodies, and utilities are already unable to serve all residents within their jurisdiction. Problems range from lack of funds, inadequate infrastructure, inefficiency, high levels of unaccounted for water to pollution and depletion of sources, all amplified by population growth. As a result the poor tend to be neglected by the formal system, whilst connected customers receive a highly erratic and unreliable supply.

The India connection research examines the costs of connecting to the water supply system in the cities of Hyderabad and Tirupati in the state of Andhra Pradesh. The capital city Hyderabad, sixth largest city in India with a population of 5.75m in 2001, is one of the fastest growing urban conglomerations in India (5.34% during 1981-91). Tirupathi Municipality, with a population of 227,000 in 2001, experiences high temporary influxes as a site of religious importance (180,000 visitors annually). Access to private water connections is reported at 25% for Tirupati and 71% for Hyderabad, where water is supplied for two hours on alternate days.

Official costs of connecting were established through meetings with officials of Hyderabad Metropolitan Water Supply and Sewerage Board and Tirupati Municipality. This review was followed by a 20-household survey in each city and focus group discussions in selected slum areas.

3.2.4 Summary of fieldwork results

A summary of the responses on the connection costs covering formal and informal as well as official and unofficial costs are shown in Table 3.1.

The mean total cost of getting a water connection was found to be $232 and the range was from $44 to $1,332. Aside from the official connection charge, a large proportion of the total cost was attributed to mandatory coping mechanisms. The requirement to dig a rainwater-harvesting pit to complement the fixed connection was considered a major obstacle by many of the respondents, contributing to around 358% of the mean total connection cost.

Table 3.3: Cost items of connection process to private networked water supply, India

	India Metro City Mean ($)	India Metro City Minimum ($)	India Metro City Maximum ($)	India Secondary Town Mean ($)	India Secondary Town Minimum ($)	India Secondary Town Maximum ($)
Application Costs						
Costs of Application Forms etc prior to making an application	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Cost of obtaining necessary approvals to support application						
Total Application Costs	***$0.00***	***$0.00***	***$0.00***	***$0.00***	***$0.00***	***$0.00***
Formal Connection Fee						
Official connection charge set by the utility, acknowledged by receipt?	$140.19	$44.41	$377.48	$121.56	$77.72	$188.96
Additional fee for ferrule connection etc	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total Official Connection Charge	***$140.19***	***$44.41***	***$377.48***	***$121.56***	***$77.72***	***$188.96***
Survey and Approval of Application Costs						
Official fee charged by the surveyor?						
Provision of transport, meals, drinks, etc. to the surveyor						
Informal payments for survey						
Cost of survey in terms of lost earnings etc						
Payments to ensure application approval	$8.47	$0.00	$66.61	$0.09	$0.00	$2.22
Payments to move the date of connection to an earlier/more convenient date						
Total Survey and Approval of Application Costs	***$8.47***	***$0.00***	***$66.61***	***$0.09***	***$0.00***	***$2.22***
Connection Process						
Road cutting charges						
Cost of labourers for trench excavation						
Cost of transport, meals, drinks and snacks for trench excavation						
Lost earnings for self trench excavation						
Cost of materials (pipes, meters, etc.)						
Cost of acquiring correct materials						
Cost of labour for actual connection	$0.00	$0.00	$0.00	$3.84	$0.00	$11.10
Cost of transport, provide meals, drinks and snacks for physical connection						
Lost earnings for self connection						
Costs of meter installation						
Informal payments for connection approval	$0.89	$0.00	$6.66	$0.19	$0.00	$2.66
Total Physical Connection Costs	***$0.89***	***$0.00***	***$6.66***	***$4.03***	***$0.00***	***$13.77***
Financing arrangements						
Costs of interest to finance connection	***$5.05***	***$0.00***	***$28.87***	***$9.37***	***$0.00***	***$37.75***
Coping mechanisms						
Cost of coping strategies for low pressure or intermittent supply	***$131.68***	***$0.00***	***$888.20***	***$42.62***	***$0.00***	***$222.05***
TOTALS	**$286.28**	**$44.41**	**$1,332.30**	**$177.67**	**$79.94**	**$401.91**

3.2.5 Qualitative results

Metropolitan City Survey – Hyderabad

The average costs for obtaining a water supply connection through the Hyderabad Metropolitan Water Supply and Sewerage Board (HMWSSB) are detailed in table 3.3:

Table 3.4: Average connection costs, India - Hyderabad

Cost item	Costs
Application cost	Rs. 10 ($0.23)
Connection charges (fixed fee)	Rs. 8250 ($190) (if plot area is between 80-200m^2) Rs. 2500 ($57) if plot area is <80 m^2
Green Brigade charges[2]	Rs. 1500 ($33) exempted for taps in slum areas
ISO meter	Rs. 480 ($11)
Two months water charges	Rs. 180 ($4)
Transport (3 visits)	Rs. 80 ($1.80)

The official process involved in getting new water supply connection is as follows:

- Prospective customer obtains an application form for Rs.10 ($0.23) from cash collection counters or the Single Window Cell (SWC)[3] at the utility office.
- Completed application, processing fee, and required documents (sale deed, MCH tax receipt, MCH approved plan, slum patta certificate and site location plan) are to be submitted at the SWC.
- The Deputy General Manager (DGM) will inspect the premises and submit a report including technical feasibility to the General Manager (Engg) for approval/ disapproval.
- A sanction/rejection letter is generated by the pre-programmed system. The applicant is notified of the outcome of the application and any applicable charges by post.
- On the receipt of the sanction order from SWC, the applicant will pay the connection charges at the SWC offices or bank and collect the acknowledgement.
- The DGM will send a release order to the area Section Officer who will then provide the required connection from the main pipeline.

The data of customers for new connections, fee details, and overall trends of connections over the past year was collected from the water board and analyzed. It was found that 21% of successful applicants got connected within 30 days from the date of submission of the application in line with the Customer Charter. A further 37% of applicants were connected within 30 – 60 days and 42% after more than 60 days.

[2] The "Green Brigade" is the workforce authorised to carry out physical connection works as part of an improved connection procedure for domestic customers.

[3] SWC was launched by Hyderabad Metropolitan Water Supply and Sewerage Board to minimize delays, discourage corruption (speed money) and gain customer loyalty by offering "one stop shop" connections. As per the Board's Customer Charter, SWC takes a minimum of 15 days and a maximum of 30 days to sanction and issue orders or reject the application.

Figure 3.1: The Green Brigade – a specially trained workforce to connect domestic customers

The efficiency of the board in processing the applications within the specified 30 day period varies between divisions and ranges from 7% to 52%. On average, 40% of applications were rejected. In the majority of these cases, applications had been filed longer than 3 months prior to notification of the outcome. However, the delay is attributed not only to the utilities but also the applicants, who find it difficult to pay the high amounts involved in obtaining a connection.

HMWSSB has no separate policy or preference for providing services to the poor. However, the Board, with the encouragement/support of Government has initiated a number of measures to improve service levels, which has induced a number of slum residents to apply for individual connections:

- Subsidized water tariff
- Concessionary connection charges for the poor under the National Slum Development Programme (NSDP) which aims to provide basic amenities to slum dwellers: Rs. 2500 / $56 for water connection
- Instalment payment optional for slum residents
- Consumer awareness programs through media
- Conversion of public standposts into group connections (five households)
- Centralized counters established for application and sanction (approval)
- Single window cell at Hyderabad Metro Board (see note 3 on previous page)

Customer Survey

Situation before connection

Before connecting to the system, the majority of respondents were dependent on borehole wells (52%), with the remainder using group connections and public stand posts. The average amount spent on water was around Rs.135 ($3) per month which is relatively low, though opportunity costs were high as they had to go far to fetch water.

Costs incurred

The official cost of connection ranged between Rs.8,000 ($178) to Rs.17,000 ($377) depending on the size of the plot. Around 33% of respondents had paid an average of Rs.600 ($13) as speed money to get connected to the system. In the case of slum households connected under the National Slum Development Programme (NSDP) scheme, the respondents had paid around Rs.3000 ($67) for getting the connection and no speed money. The majority of respondents had invested money for connection charges from their own sources and very few had borrowed money from lenders. Opportunity costs incurred in association with the connection process were reportedly negligible.

Importance of documentation

As a general requirement for a new water supply connection, applicants have to submit one of the following: a property tax receipt, a land patta[4] copy, a site location plan, a sale of deed copy, a ration card copy or an electricity bill. Around 86% of respondents had submitted a property tax receipt or land patta copy, and 43% submitted copies of the sale deed. Even though the majority of respondents felt that the documentation is not very costly, it involves indirect expenses.

Coping mechanisms

As the supply is intermittent, the majority of respondents had to invest in coping mechanisms (underground tank 67%, overhead tank 33%, pumping equipment 50%), requiring large investments. Moreover, digging a rainwater-harvesting pit costing around Rs. 3500 ($78) per household has been made a mandatory requirement for a new connection by the Board. This was considered a major obstacle from the respondents' point of view. On average, each household had invested around Rs. 9600 ($213) in coping mechanisms.

Benefits of individual connection

With the new water connections, the respondents reported that they can manage their time more efficiently (freeing up time for higher value-added or rewarding activities), reduce expenditures for coping with the poor quality water services, reduce health risks posed by intermittent supply, mitigate negative environmental impacts by reducing unregulated recourse to boreholes and improve their relationship with the service provider (and their willingness to pay for better services). Around 60% of respondents felt that the money spent on the new water supply connection is reasonable and were satisfied with the overall experiences they had with the water agency.

[4] The land patta is the legal document establishing land ownership.

Secondary Town – Tirupati

The average connection costs in Tirupati are as follows:

Table 3.5: Average connection costs, India - Tirupati

Cost item	Costs	
	NSDP	**General**
Donation (fixed fee decided by Govt.)	Rs. 3500 ($78)	Rs. 8000 ($178)
Application form and cost of Plan	Rs. 100 ($2.2)	Rs. 100 ($2.2)
Road cutting charges	Rs. 750 ($17)	Rs. 750 ($17)
Supervision charges	Rs. 750 ($17)	Rs. 750 ($17)
Materials (pipes etc.)	Rs. 1500 ($33)	Rs. 1500 ($33)
Labour charges (licensed plumber)	Rs. 1500 ($33)	Rs. 1500 ($33)
Transport to visit municipal office	Rs. 100 ($2.2)	Rs. 100 ($2.2)

NSDP = National Slum Development Programme

The process involved in getting a new water supply is as follows:

- Applicant pays Rs. 10 for a standard application form from municipal office.
- Completed application is submitted at the Citizens Charter (CC) for a fee of Rs. 10 ($0.22) with the required enclosures (property tax receipt, Rs.20 ($0.44) Spl. adhesive stamp/ court fee stamp, key plan showing the house location).
- The registered application is processed and if approved, a sanction letter is sent to the applicant specifying the charges to be paid.
- The applicant pays the connection charges and then purchases the pipe materials from the local market as per the list provided.
- When connection charges are paid a formal approval is requested taking around 10-30 days for the final process to be completed.
- Once approval is received, a licensed plumber is hired by the applicant. A compliance report is then submitted to the Municipal Commissioner / Senior level Engineer.

Figure 3.2: A new connection being made in Tirupathi Municipality

Customer Survey

Situation before Connection

Around 96% of the respondents used public standposts or boreholes/open wells to get water before they got a piped connection. Of these, only 38% paid water charges. The average amount spent on water by these households was around Rs.65 ($1.4) per month. The very low expense compared to regular water charges may be an explanation for households not opting for individual water connections.

Costs incurred
The average official amount paid for a new water connection is around Rs.8400 ($187), though in reality an extra 5% was paid on all costs. Those connected under the NSDP scheme had to pay an extra 18% to get connected. Most felt that supplying documentation was not costly and speed money was negligible.

Importance of documentation
The majority felt that the connection process is not very tedious. Around 96% of the respondents had submitted only the house tax receipt and 8% submitted a copy of the ration card along with this.

Financing and coping mechanisms
In order to finance the high connection charges, the majority of respondents had to borrow at a medium interest rate. Most had to invest in coping mechanisms, with around 57% investing in an underground tank and 36% in a tub. The average amount spent on the coping mechanisms was Rs.2000 ($44) per household.

Benefits of individual connection
Even though majority of the respondents agreed that their standard of living has improved and have experienced financial and health benefits on having a piped water connection, they feel that the amount spent on the new water connection is not reasonable. Otherwise, all new customers indicated that the performance of the water utility was satisfactory.

Focus Group Discussions

The focus group discussion held in slum areas in both cities revealed that prior to connection the respondents depended on public standposts, which supply water free of charge. Out of those respondents who had taken a connection in the last year, the majority had only paid official costs of around Rs. 3300 ($73) which included connection charges, other charges, caution deposit, and meter costs. No other additional costs were incurred except for opportunity costs which were around Rs.100 ($2.2), and in some cases repeated visits to the utility offices. These figures differ from the survey results which show mean costs of Rs.10,121 (US $232), though the respondents from the slums were likely to have participated in the National Slum Development Programme *which charges around Rs. 3000 (US $69) to Rs. 3500 per connection*.

The majority of respondents felt that individual water connections saved them time and enhanced their health and living standards. Connection charges were described as high but reasonable, and the process involved little additional costs and bureaucracy. However, the group was not satisfied with the quantity of water supplied and made a suggestion to the utility to phase out all the public standposts in their area which would in turn increase the water pressure at their points. They even emphasized that they would convince their neighbours to take individual connections.

3.2.6 India Conclusions and Recommendations

The following **conclusions** can be drawn from the research:

- High initial costs for new water supply connections act as a major barrier to those wishing to get connected.
- The need to invest in a rain-water harvesting pit and underground tanks acts as a major financial barrier in getting connected.
- Even though the process of getting new water supply connection has been simplified, there are certain loop-holes within the formal utility procedures that are acting as barriers for 'entering into the water shop'.
- The need to submit enclosures like copies of sale deed, tax receipt, approved plan, slum/patta certificate and site location plan all act as a major hindrance in applying for a new connection.
- The lack of a proper customer database, covering the details of applicants, the costs incurred, time taken for the connection etc. with the utilities contributes to the inefficiency of the application process.

The study also revealed a lack of awareness of the benefits of a private water supply connection amongst prospective applicants, as well as a lack of awareness regarding connection procedures and any assistance offered by the utility or under national programmes. The apparent lack of interest may be compounded by the current practice of dispensing free water via public standposts. It was also noted that connection charges are inequitable as they bear no fixed relationship to property values. Low-income buyers are particularly affected as developers seek to pass on connection costs to prospective home owners.

Based on these findings, the following **recommendations** are made:

1. Introduce proper (economic) regulatory mechanisms and honest dialogue with customers to get more households connected to the system
2. Follow the basic strategy of lowering the entry barrier by charging a nominal fee and ensuring a well-balanced programme of cost recovery through economies of scale, paired with an effective tariff system based on consumption
3. Adopt realistic costs which reflect willingness to pay (to be determined through popular participation in assessing needs and resources)
4. Educate the unconnected poor on different financing options that are available, such as micro-crediting, NSDP schemes, group connections etc.
5. Incentivise the poor should by encouraging payments in instalments for new connections
6. Regularise illegal connections, perhaps achievable by collecting the payments on an instalment basis; gradually phase out (or develop a charging scheme for) public standposts to increase the attractiveness of private connections
7. Overcome the challenge of lack of security of tenure through careful cross-sectoral networking.
8. Increase transparency and accountability of the utility by setting up of Single Window Cell (avoid hidden costs and speed money phenomenon)

9. Introduce a Management Information System (MIS) to increase the transparency, accountability and efficiency of utilities
10. Adopt participatory approaches for planning, implementation and monitoring to ensure that improvements to the connection process and charging structure reflect consumers' preferences and economic ability; this should include consumer education programmes to raise awareness about water pricing rationales.

3.3 The Philippines: Connection Charges and Costs Research

Lead Researchers: Lyn Capistrano and PCWS-ITN, Manila, The Philippines

According to the law on urban water services, local government units in the Philippines assume responsibilities for water supply and sanitation systems through water districts. A nationwide water crisis in the mid-1990s triggered the privatisation of water services in the capital city. A 25-year concession agreement was signed between the Metropolitan Waterworks and Sewerage System (MWSS) and the two concessionaires Manila Water Corporation, Incorporated (MWCI) and Maynilad Water Services Incorporated (MWSI), who are operating in Metropolitan Manila and in nearby towns.

The Philippines connection research team interviewed 20 newly connected households in Metropolitan Manila (ten each with MWCI and MWSI service areas). A further twenty interviews were held with urban poor households in secondary towns served by public providers or cooperatives (Binangonan Water Works, under the local government of the town of Binangonan, and Yakat and BuloBulo communities, Pillilla town, both in the adjacent Rizal Province).

Four separate focus group discussions (FGDs) were also conducted among those newly connected to the four water utilities. The results and findings from the interviews and the FGDs were presented in a workshop attended by the interviewees and representatives from the water utilities. PCWS-ITNF researchers and some representatives from civil society organizations also attended the workshop. Aside from the sharing, discussion, and validation of data, the workshop also produced some guidelines and recommendations on how to better connect the poor.

3.3.7 Summary of fieldwork results

A summary of the responses on the connection costs covering formal and informal as well as official and unofficial costs are shown in table 3.5.

The mean total cost of getting a water connection was found to be $77 and the range was from $10.13 to $174.01.

Table 3.6: Cost items of connection process to private networked water supply, Philippines

	Philippines Metro City Mean ($)	Philippines Metro City Minimum ($)	Philippines Metro City Maximum ($)	Philippines Secondary Town Mean ($)	Philippines Secondary Town Minimum ($)	Philippines Secondary Town Maximum ($)
Application Costs						
Costs of Application Forms etc prior to making an application	$4.39	$0.00	$46.56	$1.33	$0.00	$7.11
Cost of obtaining necessary approvals to support application						
Total Application Costs	***$4.39***	***$0.00***	***$46.56***	***$1.33***	***$0.00***	***$7.11***
Formal Connection Fee						
Official connection charge set by the utility, acknowledged by receipt?	$87.11	$3.55	$108.25	$2.22	$1.78	$2.67
Additional fee for ferrule connection etc						
Total Official Connection Charge	***$87.11***	***$3.55***	***$108.25***	***$2.22***	***$1.78***	***$2.67***
Survey and Approval of Application Costs						
Official fee charged by the surveyor?	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Provision of transport, meals, drinks, etc. to the surveyor	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Informal payments for survey	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Cost of survey in terms of lost earnings etc	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Payments to ensure application approval	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Payments to move the date of connection to an earlier/more convenient date	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total Survey and Approval of Application Costs	***$0.00***	***$0.00***	***$0.00***	***$0.00***	***$0.00***	***$0.00***
Connection Process						
Road cutting charges	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Cost of labourers for trench excavation	$0.93	$0.00	$5.33	$1.11	$0.00	$6.22
Cost of transport, meals, drinks and snacks for trench excavation	$1.56	$0.00	$8.89	$2.65	$0.00	$8.74
Lost earnings for self trench excavation	$2.18	$0.00	$9.77	$0.27	$0.00	$5.33
Cost of materials (pipes, meters, etc.)	$3.60	$0.00	$21.33	$29.50	$1.78	$90.28
Cost of acquiring correct materials	$0.10	$0.00	$0.89	$0.83	$0.00	$2.67
Cost of labour for actual connection	$1.11	$0.00	$5.33	$5.06	$0.00	$8.89
Cost of transport, provide meals, drinks and snacks for physical connection	$1.61	$0.00	$8.89	$2.28	$0.00	$8.89
Lost earnings for self connection	$1.89	$0.00	$9.77	$1.78	$0.00	$8.89
Costs of meter installation						
Informal payments for connection approval						
Total Physical Connection Costs	***$12.98***	***$0.00***	***$70.20***	***$43.47***	***$1.78***	***$139.90***
Financing arrangements						
Costs of interest to finance connection	***$1.24***	***$0.00***	***$10.66***	***$0.00***	***$0.00***	***$0.00***
Coping mechanisms						
Cost of coping strategies for low pressure or intermittent supply	***$1.95***	***$0.00***	***$12.44***	***$0.00***	***$0.00***	***$0.00***
TOTALS	**$107.43**	**$16.71**	**$174.01**	**$47.03**	**$10.13**	**$110.36**

3.3.8 Qualitative results

Metropolitan City Survey - Manila Water Company, Inc.

Group connection schemes

Under its *Tubig Para sa Barangay* ("Water for your Barangay"[5]) Programme, MWCI extended the main distribution pipeline to Pasig City, one of the poor neighbourhoods

[5] A barangay is the smallest local government unit.

of Metro Manila, installing meter clusters from where poor urban households were able to connect to this line. The application process was carried out with assistance of community associations. Endorsement of the application form by the community associations substituted for the usual application requirements, such that proof of ownership or residency, rental agreement, occupancy permit and Barangay clearance were no longer necessary. The respondents regarded this as a significant factor in accessing a water connection.

Figure 3.3: Manila Water meter cluster

Connection charge payments were also handled by the community associations. The official connection fee, set at P6,091.34 ($108.36), includes the installation charge, 10% value added tax, a guarantee deposit and meter deposit. Following an initial down payment of P2,000 ($36), considered the application fee, the balance was payable within five monthly instalments of P818.27 ($14.50), and the household meter would normally be installed one week to one month from the date of application.

Household experiences

To be able to make the down-payment of the connection fee, two respondents had to borrow money from a loan shark while one respondent borrowed money from family. Aside from the connection fee, the respondents incurred additional expenses for the food and wages of the labourers and for the purchase of additional materials like a hosepipe for connecting from the meter located at the main road to their property, taps, adaptors, etc. These additional costs ranged from P350 ($6) to almost P2,000 ($35) if the interest payable to loan sharks were to be included.

According to the respondents, the estimated monthly savings for being connected to Manila Water ranged from P400 ($7) to P1,500 ($27). Savings and convenience in terms of time and effort were also cited as benefits. However, it is difficult for an urban poor family to get connected to Manila Water because the initial down-payment is unaffordable due to low income, lack of employment and no access to credit. Though most respondents were able to make the down-payment out of their own savings, some sacrifices had to be made.

The recurring recommendation was for Manila Water to reduce the connection fee and extend the period over which it can be repaid. Other recommendations included: to place water meter closer to the household premises; set aside service area or boundaries of jurisdiction and to consider the nearest main distribution line, which may be located within a different administrative district.

Metropolitan City Survey - Maynilad Water Services, Inc.

Amnesty Program and 'regular' connections

Respondents living in the Western zone served by the other metro city utility were offered an Amnesty Program in early 2003 for connection to the utility. The offer was available for a period of one month only. Under this program, the applicant paid only P200 ($3.5) as a down payment, entitling him/her to household meter installation. Additional requirements included Barangay clearance from the local government unit and an excavation permit. The remainder of the P4,730 ($84) connection fee was to be paid in monthly instalments over a period of two years. This was soon increased to P5,171 ($92). This amount already included installation charge for sewer and water, 10% value added tax, and a guarantee deposit. By 16 March 2004, the connection fee had increased to P5,316 ($95).

New customers connected under the Amnesty Program were connected between one week and one month after having made the down payment and completing the application process. Aside from the connection fee, additional expenses included: P100 ($1.8) for Barangay clearance, P500 ($8.9) for excavation permit, P50 ($0.9) as token to the landowner for allowing the pipe connection of the applicant to pass by the landowner's property, P450 ($8) to P750 ($13) for the purchase of PE pipes, and P50-P150 ($0.9-$2.7) voluntary contribution for snacks. Neighbours and household members volunteered labour during non-working days and on weekends to avoid loss of income.

The respondents who were not able to take advantage of the one-month Amnesty Program paid a down-payment of P2,500 ($44), representing 50% of the total connection fee. The balance, payable within three months, was charged to the households' monthly water bill. While the connection process was described as relatively straightforward, all respondents incurred additional expenses to cover the cost of labour, materials, snacks, meals, transport and other related matters. One respondent spent P200 ($3.5) while another spent P1,050 ($19).

Household experiences

Four out of ten respondents said that they do not have savings yet from being connected to the water utility due to the fact that they are still paying the connection fee in monthly instalments. The most frequently cited benefits were comfort and convenience as well as improved hygiene and sanitation.

The respondents recommended to Maynilad to implement a group application program with easy instalment payment schemes. Other suggestions were to implement the Amnesty Program again, reduce the connection fee, have some general schemes affordable to the poor, credit and financing schemes, low-cost and long-term instalment payments.

Secondary towns – Water Service Cooperative

Yakat-BuloBulo Water Cooperative has kept its connection fee, which serves as membership fee to the cooperative, constant at P100 ($1.8) for many years. According to the surveyed respondents, there were no pre-application requirements and costs.

The applicant is instructed to purchase the materials needed as indicated in the checklist provided by the cooperative. The applicant also pays for the cost of labour and other connection-related expenses. A connection would be made by authorised personnel to the cooperative's main on the same day or the following day after payment of connection fee. A hosepipe connected to a pipe above ground along the roadside acts as the customer's service pipe. Road cutting was not required by any of the respondents.

Overall connection costs ranged from P952 ($17) to P2,156 ($38). The expenses included the cost of a water meter (P580, $10), labour (P150-P300, $2.7-5.3), food (P50-P400, $0.9-7), transport (P10-P150, $0.2-2.7) and the prescribed materials for household water connection, which amounted to just P160 ($2.8) for one household but as much as P1,126 ($20) for another household. Estimated monthly savings of the respondents ranged from P500 ($9) to over P1,000 ($18). Other benefits ranged from extra comfort and convenience (although intermittent supply necessitates household-level storage), savings in time and effort, and having a garden. All respondents were able to finance the connection from personal savings.

The main problems preventing the poor from connecting to the water cooperative were the lack of livelihood and income to pay the charges. Lack of resources prevents the cooperative from improving its operations and expanding services. Capacity building, institutional strengthening and fund raising (including through improved cost recovery) were identified as necessary for service improvements. In addition, financing schemes, grants and credit programmes were recommended to enable more consumers to join the system.

Secondary towns – Local Government-Operated Utility

Binangonan Water Works (BWW) is headed by the town engineer, who also serves as the municipal planning and development officer. As the town has many water cooperatives, which are actively encouraged and promoted by local government, a number of respondents were instructed to pay a clearance fee to a water cooperative operating in the area before connecting to the utility network. Apart from one respondent who had to obtain written consent from the landowner, no other pre-application requirements were reported.

The connection process is similar to the one described for the Water Cooperative. After paying the official connection fee of P150 ($2.7), the applicant buys the required materials as advised by BWW personnel authorised to undertake the connection process. In addition to the connection fee, an applicant could incur expenses ranging from P600 ($11) to over P5,700 ($101), depending on the location of the household, the condition of the terrain, the length of hosepipe needed, etc. The water meter (P450-P650, $8-12) and other prescribed materials (P150-P4,500, $2.7-80) make up the bulk of the additional costs, to which labour costs (P300-500, $5-9), meals and snacks (P50-P150, $0.9-2.7), and transportation costs (P15-P120, $0.3-2.1)

need to be added. Road-cutting was required in only a minority of cases, as most pipes are laid above ground over tertiary roads. The connection is usually made within two days of paying the connection fee. All respondent households were able to raise the necessary funds from within the family.

The estimated monthly savings as a result of being connected ranged from P1,000 ($18) to P1,500 ($27). Other benefits cited included comfort, convenience, and savings in terms of time and effort. Household-level storage is required to compensate for intermittent supply.

The problems preventing the poor from connecting to BWW services are very similar to those cited above in the case of the water cooperative.

3.3.9 Philippines Conclusions and Recommendations

The survey findings can be summarised as follows:

- While the formal connection fee is P6,091.34 ($108), the actual cost of connecting to Manila Water can amount to P7,445 ($132).
- Similarly, to connect to the other city utility, Maynilad, the cost of connecting can be as much as P6,366 ($113), higher than the formal cost of P5,316.16 ($95).
- *Note:* A survey of the National Statistics Office on family income and expenditure revealed that the official poverty threshold for Metro Manila for 2000 was based on a household income of P9,450 a month, or approximately US$170.
- To connect to a secondary town water cooperative means paying the P100 ($2) connection fee plus almost P1,000 ($20)in related expenses. Additional expenses depend heavily on the terrain, the location of the property in relation to the main pipe, etc.
- To connect to a secondary town water utility run by the local government means paying the P150 connection fee, though taking into account additional expenses the real cost is in the range of P600 ($11) to P5,700 ($101).

The research findings suggest that in secondary towns in the Philippines it is cheapest and fastest to get connected to a water cooperative, followed by a local government-run water utility. In Metropolitan Manila, households in Manila Water's service area paid slightly more than those in Maynilad's zone. Connecting to Manila Water involves spending almost an urban poor family's whole income for one month, based on a daily wage of P300 ($5). However, it is not clear whether the lower cost of connecting in the secondary towns is due to lower costs of installing the new connection, a deliberate policy to facilitate connections, or a failure to recognise costs. In any case, high connection costs significantly hinder poor families from accessing networked water supply services.

Based on the findings, the following **recommendations** were made to the utilities by the national review workshop:

- Improve service efficiencies; undertake leakage control and management to reduce the costs of supplying water. Explore cooperatives as a management model.

- Rationalize the price of water for poor customers in terms of access, customer satisfaction, and affordability.
- Improve information dissemination. Provide a checklist of materials needed for connection to avoid opportunities for corruption.
- Have regular consultation with consumers. Any increase in connection fee and water tariff should have prior consultation with urban poor communities. A *Hinaing Forum* (Grievance) should be recognized and supported by water utilities. Allow consumers to represent themselves in the local government units (LGUs) undertaking water services, as well as in privatized water companies.
- Poor communities should have lower connection fees.
- Implement easy instalment payment of connection costs.
- Have a service pipe ready for clusters of urban poor households
- No disconnection
- Remove the reconnection fee.

The following recommendations are made to the urban poor:

- Build upon indigenous ways of savings and financing schemes like paluwagan.
- Urge water utilities to always undertake pre-consultation meetings with prospective customers/consumers prior to installation, increases in water tariff, etc. to discuss would-be problems and other related issues.
- Be vigilant and take appropriate action on the vested interests of politicians and privatized water companies.

The following recommendations are made to the Government:

- Fight corruption.
- Control the vested interests of politicians and privatized water companies
- The national and local governments must provide pro-poor water supply facilities.
- Prioritize the welfare of the people and generate employment opportunities. If people have good income and employment, they can afford high connection fees and tariffs.
- Finance, subsidize and facilitate the legal connection of the poor to water utilities. Make connection fees affordable to the poor through government subsidies and price control schemes.
- Develop livelihood opportunities and provide government support for small enterprises.

3.4 Uganda: Connection Charges and Costs Research

Lead Researcher: Dr Sam Kayaga, WEDC, Loughborough University

Although Uganda is a low-income country, in recent years the Government and its providers of infrastructure services have proactively pursued new public management approaches such as public private partnerships, improved accountability, and transparency. In the urban water sector the National Water and Sewerage Corporation (NWSC) manages 15 of the largest towns and has achieved recent successes in its commercial performance. These include an increase in the number of active pipe connections in urban Uganda from 43,000 in 2000 to 70,000 in 2003. However, only 19% of households (8% by WHO survey) have their own pipe connections, and 6% of the poorest forty percent of the urban population have their own connection.

The Uganda connection survey was carried out among 43 recently connected customers of NWSC (within the previous six months) in the capital city Kampala, which houses approximately 40% of the total urban population (1.2m), and Uganda's second commercial centre, Jinja, with a population of around 100,000. Interviews were also held with several applicants who had failed to get the water connection. Four focus group discussions (two in each town) were facilitated in low-income settlements to shed light on the connection process and the total expense. Participants without a household water connection shared their experiences regarding connection barriers. Finally, the perceptions and plans of the water utility senior staff were elicited through semi-structured interviews.

3.4.10 Summary of fieldwork results

The survey results shown in Table 3.7 highly correlate with information gathered from focus group discussions, which give costs spent on new connection by previous applicants within the range of. US $26 - US $6,329. The survey results show that the mean capital contribution for a water connection, for a household in Uganda is US$524. At the recognised Uganda government poverty level of US$1 per capita per day, it would require at least 11 months for a poor person to save what he/she spends on his/her livelihood. Put another way, the mean connection cost is equivalent to 150.6 months of billing at the current utility tariff rates, for a low-income household of five people, at a consumption rate of 40 litres per person per day.

Table 3.7: Descriptive statistics of cost items related to the various steps involved in the process of connecting a private household to networked water supply, Uganda

	Uganda Metro City Mean ($)	Uganda Metro City Minimum ($)	Uganda Metro City Maximum ($)	Uganda Secondary Town Mean ($)	Uganda Secondary Town Minimum ($)	Uganda Secondary Town Maximum ($)
Application Costs						
Costs of Application Forms etc prior to making an application	$1.42	$0.00	$28.46	$0.00	$0.00	$0.00
Cost of obtaining necessary approvals to support application	$23.05	$1.14	$103.59	$7.67	$0.85	$113.83
Total Application Costs	***$24.48***	***$1.14***	***$132.04***	***$7.67***	***$0.85***	***$113.83***
Formal Connection Fee						
Official connection charge set by the utility, acknowledged by receipt?	$32.57	$0.00	$45.53	$43.58	$30.17	$90.21
Additional fee for ferrule connection etc	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total Official Connection Charge	***$32.57***	***$0.00***	***$45.53***	***$43.58***	***$30.17***	***$90.21***
Survey and Approval of Application Costs						
Official fee charged by the surveyor?	$0.30	$0.00	$5.69	$0.00	$0.00	$0.00
Provision of transport, meals, drinks, etc. to the surveyor	$2.49	$0.00	$17.07	$0.29	$0.00	$2.85
Informal payments for survey	$3.35	$0.00	$28.46	$0.10	$0.00	$1.71
Cost of survey in terms of lost earnings etc	$17.46	$0.00	$170.75	$0.51	$0.00	$2.85
Payments to ensure application approval	$0.00	$0.00	$0.00	$1.33	$0.00	$19.92
Payments to move the date of connection to an earlier/more convenient date	$0.57	$0.00	$11.38	$0.00	$0.00	$0.00
Total Survey and Approval of Application Costs	***$24.17***	***$0.00***	***$233.35***	***$2.24***	***$0.00***	***$27.32***
Connection Process						
Road cutting charges	$9.68	$0.00	$113.83	$2.47	$0.00	$56.92
Cost of labourers for trench excavation	$24.96	$0.00	$102.45	$6.58	$0.00	$59.76
Cost of transport, meals, drinks and snacks for trench excavation	$73.16	$0.00	$1,422.88	$1.14	$0.00	$6.83
Lost earnings for self trench excavation	$6.26	$0.00	$51.22	$3.39	$0.00	$22.77
Cost of materials (pipes, meters, etc.)	$257.09	$0.00	$3,301.08	$77.40	$0.00	$291.12
Cost of acquiring correct materials	$6.94	$0.00	$34.15	$2.68	$0.00	$28.46
Cost of labour for actual connection	$159.36	$5.69	$1,422.88	$2.23	$0.00	$22.77
Cost of transport, provide meals, drinks and snacks for physical connection	$2.13	$0.00	$19.35	$1.14	$0.00	$6.83
Lost earnings for self connection	$47.12	$0.00	$136.60	$18.81	$0.00	$82.53
Costs of meter installation	$2.28	$0.00	$22.77	$0.00	$0.00	$0.00
Informal payments for connection approval	$0.60	$0.00	$11.38	$0.61	$0.00	$7.17
Total Physical Connection Costs	***$589.57***	***$5.69***	***$6,638.59***	***$116.44***	***$0.00***	***$585.15***
Financing arrangements						
Costs of interest to finance connection	***$74.64***	***$0.00***	***$1,492.89***	***$1.21***	***$0.00***	***$15.94***
Coping mechanisms						
Cost of coping strategies for low pressure or intermittent supply	***$305.72***	***$5.69***	***$2,731.93***	***$15.30***	***$2.73***	***$68.30***
TOTALS	**$867.51**	**$26.18**	**$6,329.03**	**$180.55**	**$45.25**	**$528.74**

3.4.11 Qualitative results

The official process of obtaining a new water services connection is set out in box 1.

Textbox 3.1: NWSC's published procedures for applying for a new connection. Source: http://www.nwsc.co.ug/news.php?storyId=60 , accessed on 20 March 2004.

How to get connected to our services:

· Obtain new connection forms from any NWSC offices.

· Complete the forms and return to the office with the following:- . Two passport size photographs for individuals or a Corporate stamp. A proof of ownership of the property or a letter of consent from the landlord. Consent letter from owner of service line if connection is not from NWSC mains.

· The returned forms are processed and a surveyor sent to the customer's premise to determine the material requirements.

· A detailed list of the requirements is made available to the customer.

· The customer purchases the materials and brings them over for inspection by NWSC staff.

· The customer is required to do the plumbing work and pipe laying.

· The customer pays new connection fees, an amount that depends on the size of the service.

· When all the above has been done the customer is connected to NWSC service(s) by staff in charge. NEVER CONNECT YOURSELF.

Customer Survey

Situation before connecting

Many respondents (46%) said they got water from their neighbours before their households were connected onto the piped water distribution system. Respondents living in peri-urban areas used to fetch water for household use from protected springs (19%); from boreholes (16%) or other sources (19%). Other sources include hand-dug wells, streams, harvested rainwater, public standpipes and water tankers.

Households reportedly spent up to Shs. 60,000 on non-piped water, with the majority (56%) indicating they spent not more than Shs. 20,000 per month on household water bills prior to being connected onto the water network.

Costs incurred

The household survey highlighted some additional requirements, payments or irregularities in the connection process. A few respondents (19%) were required to provide additional documentation (a letter authorising them to connect their service lines onto the tertiary mains or service line laid either by a community-based organisation, or an individual). Whilst most respondents (65%) reported to have paid an official connection fee of Uganda Shs. 58,500, 13 respondents (30%) reported to have paid an extra amount of Shs 30,000 as a deposit for consumption charges, bringing the total official amount required for connection charges to Shs. 88,500. One

respondent reported to have paid a deposit of Shs. 100,000. Most of the respondents who were asked to pay the deposit were in Jinja Area. There, the majority of respondents delegated the purchasing of materials to NWSC staff, for fear of buying the wrong type or quality.

Although according to NWSC policy the water meter is owned and provided by the utility, some unscrupulous staff have in the past taken advantage of the scarcity of meters in NWSC stocks (leading to delays in the connecting process) to extort money from customers. Three respondents (5%), all from Kampala water supply area, fell victim to this illegal practice despite NWSC having stepped up publicity about the responsibility of the customer. Speed money payments were also reported from the Kampala area. These results highlight lack of consistency on the part of NWSC in provision of new connections to its new customers, which could manifest a general organisational failure to follow standardised procedures in provision of services.

However, although some respondents provided facilitation for NWSC staff carrying out the actual connection work, they objected to attaching costs to such expenses, pointing out that it was part of the African culture of hospitality accorded to visitors. 13 respondents (30%) reported to have provided facilitation to the workers who laid the service line. The facilitation was in form of the following of transport, physical meals, simple snacks and/or drinks.

Financing and coping mechanisms
Most respondents (77%) financed the new water connection costs using personal savings. Only five respondents financed the costs wholly through loans, while three obtained loans to finance part of the costs. These respondents obtained loans from micro-finance institutions (2 respondents); banks (2 respondents); a company (1 respondent) or from friends (three respondents). Of the eight respondents who got some loan facilities, only three of them obtained loans that attracted interest, ranging between Shs. 4,800 to Shs. 28,000. These results lend credence to the anecdotal evidence that the borrowing culture in Uganda is not well developed.

Most respondents (86%) had already invested in coping strategies, or were planning to do so. The majority had already purchased jerry-cans, and some had constructed overhead tanks. The costs for the coping strategies varied from Shs. 48,000 to Shs. 4,800,000, depending on the type of facility or structure. However, half of the respondents spent less than Shs. 100,000, and six respondents (14%) had no intentions of investing in coping strategies, mainly because they considered the service levels to be adequate.

Benefits of individual connection
The large variations in water expenditure prior to connecting to NWSC supply explain variations in savings made since connecting. Some respondents experienced drastically increased consumption rates, such that any savings were difficult to evaluate. In addition to any financial benefits, all respondents thought that an on-plot connection to piped water reticulation generated one or more intangible benefits to the household. One respondent likened the newly connected water tap to 'a sister around the home'. The most frequently cited benefit was convenience. Others included time savings, easy access in terms of distance and extra effort against static head (i.e. carrying water uphill), reduced burdens, particularly for women and children, reduced

family conflicts due to denial of a gossiping environment at a public water point, increased affluence as a result of in-house amenities such as kitchen taps, toilets and showers, increased reliability of water supply, satisfaction as a result of ownership of a water supply system and acknowledgement of self-reliance, better water quality, use of piped water for creating extra income to the household, e.g. through cattle rearing, poultry, crop-gardening, flower-gardening, improved hygiene owing to increased availability of good quality water and the opportunity to serve neighbours by on-selling water to them.

Focus Group Discussions and key informant interviews

Findings from all the focus group discussions (FGDs) indicate that members were aware of the official procedure of getting a domestic water connection, as indicated in the utility's documents. The differences in how applicants were reportedly treated, however highlight an absence of uniform procedures for connecting onto the NWSC water distribution network.

The major points captured in the focus group discussions, concerning new connection procedures are summarized below:

- Applicants need to get a letter of introduction from the local council officials, who normally require payment of a non-standard fee. For example, one participant was asked to pay Shs.2,000 ($1.1).
- Applicants were also required to provide proof of ownership of property, or letter of authority from the landlord, in case of tenants. Some landlords asked for a fee before issuing the letter of authority.
- Water distribution primary, secondary and tertiary mains are usually laid along the main roads. There is hardly any formal road infrastructure in low-income settlements. Therefore, new applicants in these settlements require covering long distances of service lines, which is an expensive venture.

A strategy adopted to cope with long distances is to negotiate with the nearest person(s) who has/have a water service connection for permission to obtain a 'sub-connection'. This alternative is officially recognized by NWSC, who require a letter of consent from the owner of the connection. This could be an individual household or a community based organization. The compensation fee paid to the owner of the connection depends on the outcome of the negotiation process. The fees quoted by participants ranged from Shs. 30,000 ($17) to Shs. 150,000 ($85).

Some people do not allow laying of pipes across their land. The applicant may have to pay a fee. If the service line is to cross a local authority road, the applicant is required to pay a reinstatement fee. This fee varies, depending on whether the road is paved or gravel, as well as which department maintains the road. In Jinja, the participants mentioned a fee of Shs. 150,000 ($85). In Kampala, the figure quoted was Shs. 500,000 ($285) for laying across the whole width of the road, and Shs. 250,000 ($142) for laying across half of the width.

The procedures for getting a new connection are unpredictable and complicated by requirement of payment of 'speed money' to various officers of the utility, at almost all stages such as surveying, materials inspection, actual connection, and meter installation. Payment of 'speed money' was reportedly more rampant in Kampala than Jinja.

Out of 56 people who participated in the focus group discussions in four locations, 22 of them reported to have water connection. Seven participants, who volunteered information on costs incurred on the connection process, estimated to have spent between Shs. 200,000 ($114) to Shs. 780,000 ($444). Participants reported to have incurred costs on the following items:

- Payment to neighbours or community based organizations, in exchange of a consent letter to connect on his/her service line, if applicable
- Payment for consent to lay line across one's land, if applicable
- Road instatement fee, payable to local authority

- 'Speed money' to see zone manager
- 'Speed money' for the surveyor
- 'Facilitation money' for inspection of materials
- Taxi money to bring utility officials to site
- Official connection fee of Shs. 58,500 ($33)
- Deposit, particularly for public stand pipes of Shs. 100,000 ($57)
- Purchase of materials
- Labour charges

The participants who did not have a water connection mentioned the following main barriers:

- the connection fee is high;
- the cost of materials is high,
- particularly if the water distribution pipe is far from the household;
- the procedures for inspecting the materials are cumbersome.

3.4.12 Uganda Conclusions and Recommendations

The survey results and focus group discussions highlight the following important issues:

- There is inadequate flow of information between the utility and the customers and consumers, particularly concerning new connection procedures
- The process for new water connection is not standardised: It differs from one service area to another. It may also differ from one customer to another. Hence, the period for processing a new connection was found to vary from one day to about 48 months.
- The requirements and costs for connection may also differ from one customer to the other. The factor with the largest effect on the connection costs is the length of the service line, which in turn depends on the distance from the utility distribution pipeline.
- The costs for connection are beyond the ability to pay of most urban poor. The costs are higher if an applicant has to pay charges to the local council for laying a service line across the road.
- The customers acknowledge several tangible and intangible benefits that a private water connection brings to the household.

In view of the above findings, the utility may need to take on board the following recommendations:

- The utility should simplify and standardize the new connection procedures, and carry out quality assurance procedures in the new connection process. This could be communicated through a customer charter.
- The utility should improve the information flow with the customers. This could be done through brochures translated in major local languages, radio talks and community meetings. This information should cover new connection procedures.
- The utility should ensure that before connection charges are accepted from the applicants, all the connection materials, including the customer meter, are at hand.
- As has already is already in progress, the utility should endeavour to extend the distribution pipelines in a demand-driven, rational manner. The extension should be within the financial capacity of utility, at a quoted rate of Shs. 15,000 ($8.5) per metre of 75 millimetre tertiary pipeline of poly-ethylene. The costs could be

reduced by contracting out the beneficiary communities, if they could be well organised.

- The distribution pipes could be laid on both sides of the road to minimise the need for the customers to lay service lines across the roads.
- In the short term, with such the high connection costs (equivalent to about 150 monthly bills or a poor household, or 11 per capita monthly expenses at national poverty levels), the utility may be obliged to provide a partial subsidy. The rest of the cost could be provided by the applicant, through instalments spread over a reasonable period of time, depending on the utility's cash flow.
- It is commendable that NWSC is already working out a policy for subsidising connections to the urban poor. This policy should be wholesome to deal with all aspects of providing services to the urban poor.
- The high correlation between survey results and focus group discussions shows that focus group discussions, which are a low-cost and fast qualitative research method, could be used by the utilities to accurately elicit reasonably valid and reliable data to inform policy formulation.
- The implementation could be done in stages, starting with a pilot project, and scaling up as lessons are learnt and adopted.
- The utility could organise and provide incentives to property developers in green-field areas, so that they work with the utility to extend suitably designed water distribution mains, instead of 'spaghetti' service lines. The incentives could be in terms of refund of the costs through an equivalent billing 'holiday'.

It should be noted that following this research NWSC has dramatically reduced its connection charge for households within a certain distance of their water mains - but we understand the Corporation it has yet to address the issue of ensuring closeness of mains to the poorest areas.

4 INVESTIGATION: Marginal Costs of Connecting

Dr Andrew Trevett, IWE, Cranfield University

As shown above, the overall cost of connecting to an official water supply network can represent several multiples of the monthly income of households surviving on the official poverty line. While there is a view that connection charges and costs are justified on the basis of cost recovery, it may be unreasonable to expect low-income households to be able to pay the often substantial sums involved in the conventional manner. As this and other research shows, it is the poor who stand to gain most through access to piped water supplies. The challenge is to develop a win-win policy that enables the urban poor to connect to piped supplies at an affordable cost but also ensures that the water utility can significantly extend the distribution network and remain commercially viable.

As part of the overall research, having collated data from around the world on connection charges and costs, we investigated whether these amounts bear any relation to the marginal cost of extending the network, the most usual justification given (if any) of having such charges. This section examines the Ugandan case in more detail. Examples of actual marginal costs of new connections are analysed based on data collected from NWSC and Kampala Water. It also considers how connection costs might be reduced, and goes on to discuss how these costs might be shared equitably among stakeholders.

4.5 Research Method

Field-based research took place in Uganda in July 2004. Semi-structured interviews were held with senior staff at the NWSC and also with Kampala Water. The aim of the interviews was to obtain background information on the NWSC policy for providing services to low-income residents, in particular with regard to connection charges. It also provided an opportunity to present this specific research task and explain the relationship with the household survey of actual connection costs and charges carried out in January 2004 (see section 3.4, above).

Two low-income neighbourhoods, Kawaala and Kamwokya, and one middle-income neighbourhood, Bunamwaya, in Kampala were visited in order to become familiar with the existing service levels and pipeline routing, as well as the general socio-economic environment.

A substantial quantity of documentation concerning the costs of mains extensions in the form of bills of quantity, material quotations, and capital budgets was provided by NWSC for the purpose of calculating the marginal cost to Kampala Water of providing a new connection. We express our appreciation for the openness and willingness to share information exhibited by NWSC under the leadership of Dr William Muhairwe. Additionally, policy related documents such as the Corporate Plan (2003-06), the new policy on provision and maintenance of service lines to customers, and tariff tables were reviewed to put the research in context (NWSC 2003, 2004).

Kampala Water provided digital maps of the three neighbourhoods visited. These comprehensive maps detailed the pipeline route, diameter and material, identified alternative water sources such as springs, indicated road layout, and housing location. Typical housing densities were estimated from the maps. This information formed the basis for calculating the theoretical connection costs in a low-income neighbourhood of Kampala. The pipeline specification and cost was calculated using the software package "Branch"[6].

4.5.13 Results

The NWSC capital budget for 2004-05 includes the estimated cost of planned mains extensions to the water distribution network for each of the 15 towns and cities served. Cost estimates are provided on an individual project basis, which may be for an entire or partial urban area. The same unit cost estimate is applied equally to all urban areas. The unit cost per metre extension is considered by NWSC to be an inclusive cost, namely the pipe, fittings and installation. However, it does not include overheads such as surveying, procurement, and warehousing. The precise means by which the cost estimates for mains extensions were calculated in the capital budget is not known. A selection of unit cost estimates for water mains extensions contained in the capital budget are given in table 4.1. These were used in the calculation of example marginal costs.

Table 4.1: A selection of cost estimates for water mains extension from the NWSC capital budget 2004-05

Pipe specification	Shs/m	$/m
DN32, PN10 HDPE	4,500	$2.65
DN40, PN10 HDPE	6,000	$3.53
DN50, PN10 HDPE	8,000	$4.71
DN80, PN10 HDPE	13,850	$8.15
DN100, PN10 HDPE	14,850	$8.74
DN150, PN10, UPVC	28,850	$16.97

Examples of bills of quantity and cost estimates provided by contractors for pipe supply, fittings and installation of mains extension were also examined to identify the principal cost components. The two major costs involved are the mains pipe itself (53-65% of total cost), and the trenching and installation (19-29%). While it is unlikely that the pipe cost can be reduced significantly, community contribution of labour could substantially lower trenching costs. In monetary terms the trenching and installation cost for a 50mm diameter pipe is between $1,470 and $2,060 per kilometre.

Given the research focus on the urban poor, the marginal cost calculation took as an example an area of densely built land in Kamwokya. Typically, the most densely populated areas of large cities are home to the lowest-income residents. A 100m by 100m frame (10,000m^2) was superimposed on the map adjacent to an existing main of 100mm diameter. The number of houses/buildings inside this frame was found to be 40, and this number was used as the basis for modelling a mains extension. The following assumptions and parameters were used in the calculation.

[6] A computer program in BASIC for the least-cost design of branched water distribution networks. UNDP Interregional Project INT/81/047, December 1985.

- Flow to each of the 40 household connections/yard taps is based on an assumed demand of 500 litres per day per household. On a per capita basis this would provide for 125 litres in a four person household, 83 litres in a six person household, and 63 litres for an eight person household
- The 40 household block is sited adjacent to an existing main of 100mm diameter
- Peak hour factor is set at 3 – considered adequate for trunk mains serving populations of less than 5,000 (Khanna, 1990)
- Mains pressure at the start of the new extension is 30m head, and the minimum allowable pressure head at any point in the mains extension is 5m
- The terrain is relatively flat and the same elevation as the primary mains (as is the case in Kamwokya), and houses occupy an area of not less than $25m^2$
- Possible pipe diameters entered in the programme for mains extension are: 15, 20, 32, 40, 50, 80, and 100mm
- Unit costs per meter length of each pipe diameter are those used in the NWSC capital budget 2004-05

The output from the 'Branch' software for the 40-household scenario is summarised in Table 4.2.

Table 4.2: Theoretical pipe specification and cost estimate for a mains extension to 40 households consuming 500 litres per household per day in a densely populated area of Kamwokya sub-parish, Kampala

Total cost	Per household cost	Quantity required of each pipe diameter
US$926.25	US$23.16	25m of 40mm diameter 75m of 32mm diameter 320m of 20mm diameter

Sensitivity analysis on the above 40-household scenario was carried out to determine to what extent the mains extension cost would vary under different topographic, demand, and demographic conditions. Hence, an important consideration was to calculate the household cost for the mains extension with different housing densities.

The first variation on the original scenario was to compare tertiary mains costs where the housing block was sited at increasing distance from the primary mains, and with different housing densities. It was found that for each 100m increase in distance from the primary main the cost increases by $350 (between 100m to 500m). The second scenario was where an annex or second floor was added to accommodate extended family or tenants, since the household water consumption would increase. Therefore, the tertiary mains cost was re-calculated for the 40-household block by running the software with a household consumption of 1,000 litres per day. This increases the cost of the tertiary main by approximately one third because of increased pipe diameters, giving a total cost of $1237.25 or $30.93 per household.

The third scenario tested was one of low pressure whereby only 10m of available pressure head was entered into the design software. The total cost and pipe specification was identical to the original scenario, namely $926.25. Similarly, another scenario tested by the software was where the 40-household block was sited 20m uphill and 200m from the primary mains. Once again the total cost and pipe specification was unchanged to the scenario of 40-housholds sited 200m from the

mains but at the same elevation. Finally, a larger block of 120 households was tested to determine whether there would be economies of scale. The total cost of the tertiary main was $2869.92, giving a household cost of $23.92 which is very similar to the $23.16 cost per household in the original 40 household scenario. Thus, it appears that economies of scale will not result from larger extensions.

In the planning of the new connection policy of the NWSC, the area offices were required to submit cost estimates for making household connections up to 50m from a mains supply. Using these cost estimates, an overall connection cost, including the domestic meter, was calculated for the theoretical mains extension to 40 households in Kamwokya. Using the digital maps provided, it was calculated that average distance of between households and the mains extension would be 7.5m. Thus a service pipe of 7.5m (on average) plus the associated fittings would be required to complete the connection. An overall connection cost disaggregated into its individual components is valuable for analysing the different options for cost sharing between the customer and the utility (Table 4.3).

Table 4.3: Estimated overall connection cost for a theoretical mains extension to 40 households in Kamwokya sub-parish, Kampala

Cost component per connection	Cost Ush	Cost US$
Mains extension	39,372	$23.16
Service pipe – 7.5m of ½ inch HDPE	7,500	$4.40
Fittings	90,030	$53.00
Meter	58,500	$34.40
Trenching	7,500	$4.40
Total connection cost	Ush 202,902	$119.36

The cost of fittings represents 44% of the total connection cost and warrants closer examination to determine whether economies could be made. A detailed breakdown of these costs reveals the relative complexity of the household connections with the need to use numerous fittings.

4.5.14 Discussion

Accelerating the rate at which the urban poor can obtain connections to piped water supply is undoubtedly a challenge for urban planners and water utility managers. There are, however, significant public health, economic, and social benefits to be gained through achieving full coverage. The main barrier to achieving a universal service obligation for water supply is largely due to the substantial investment required. Therefore, we need to examine the means to reducing connection costs to a level whereby it becomes the most attractive option from a cost-benefit analysis perspective to all stakeholders. Secondly, we need to consider a wide range of cost sharing approaches to getting poor urban households connected.

There are several options to reducing the overall connection cost as examined in this Ugandan case study. For example, trenching costs for the mains and even the service pipe are met by the NWSC. In the theoretical example given of a 40-housheold block it is quite conceivable that community labour could be organised to excavate trenches and bury the pipeline as a contribution to the overall cost. In the analysis trenching was found to represent between 19 and 29% of the cost of a mains extension.

Our analysis shows that the greatest proportion of the overall cost for a household connection is taken up by the service pipe fittings and meter. In our 40-household scenario these components represent 44% and 29% respectively. The meter costs $34.40 and is the fairest means of charging households for their water consumption where there is the likelihood of on-selling to unserved neighbours. However, if an entire neighbourhood was connected then it is very unlikely that on-selling of water would continue. This would allow for the installation of a single meter for the purpose of monitoring overall consumption and detecting leakage. Apartment blocks in many cities around the world have a single meter, with charges being equally shared by individual apartments, as arranged by the landlord or residents group. In Kampala perhaps a more appropriate approach for single dwelling households would be to set a flat rate tariff. It could be adjusted up or down according the number of inhabitants, size of the property, number of floors and even the area of the dwelling. Such approaches are used in other parts of the world. It might be considered that meters may often pay for themselves in terms of efficiency of use and therefore a stronger argument is that the utility rather than the consumer should bear this cost. Indeed - this is another strong argument for scrapping connection fees since, if the utility charges cost-recovering tariffs, then it should want more customers.

The cost of the meter itself while not untypical could probably be substantially reduced. It is our understanding that UK water companies are currently able to access reasonable quality meters manufactured in China at a cost of approximately $11. This is less than a third of the cost of the meters used in Uganda.

The breakdown of the fittings used in the service pipe connection reveals that they are numerous and as would be expected are designed according to conservative engineering standards. Although there is a valid argument that household connections should be designed for a long useful life, it is conceivable to design a low-cost installation that would be quite acceptable to the customer and suitably robust. We would propose that through careful selection of fittings this cost could be reduced to under $30.

Our original overall connection cost based on the 40-household block was $119.36 per household. Through community labour the tertiary mains cost of $23.16 could be reduced by around 20% to $18.76. The meter cost can be reduced completely or at least by two-thirds through purchasing Chinese manufactured meters, and the cost of fittings reduced from $53 to $30 through careful design. Household labour used for the service pipe trenching would save a further $4.40. These cost savings would lower the overall connection cost to $64.16, if a Chinese manufactured meter was used, or $53.16 if an individual household meter was dispensed with altogether.

An overall household connection cost of between $50 and $60 clearly is a much more attractive proposition to all stakeholders. However, imaginative approaches to cost sharing still need to be found and evaluated. One possibility is that the utility provides the connection and then the cost is amortised over a period of years through regular billing of consumption plus the connection cost. Alternatively, governments could look to international aid to partially or fully cover the connection cost. This may be attractive to aid agencies as the outcome should be 100% coverage. There is also the possibility of establishing or promoting the use of microfinance. There are several

examples where microfinance has been successful in facilitating access to water and sanitation infrastructure. For example, the SEWA Bank in India claims to have successfully used microfinance for helping the urban poor access sanitation facilities. Microfinance has also been used in Bolivia to enable families to connect to condominial sewers. Although microfinance may not represent a complete financing solution it does appear to be a promising approach to facilitating access to water and sanitation infrastructure that has still to be fully explored.

The new connection policy of the NWSC is an important step to creating the conditions necessary to make connecting to the network an attractive proposition for many households. It will certainly enable some of the poorer inhabitants to obtain a household connection. However, for the lowest-income group the continued requirement to pay the official connection fee of Ush.58,500 ($33) is likely to remain a barrier to enter the 'water shop'. One possible solution is to carry out a poverty mapping exercise to identify where the poorest neighbourhoods are located. These could then be targeted for some kind of 'special connection assistance'. The new connection policy of NWSC cannot yet be described as pro-poor because the new connection fund is intended to be of benefit to all new customers regardless of their income level. The identification of income levels within Kampala and other cities would permit the NWSC to offer such special connection assistance to the poorest of the poor, the existing connection subsidy to other low-income sectors with perhaps an amortisation facility, and charge a connection fee to middle and high-income groups based on property size. Subsidising connections may be appropriate but only if (i) the utility proves it can't recover the costs through the tariff and therefore will be disincentivised to connect the poor and (ii) if the subsidies are paid on the basis of outputs (working and used connections) - many countries have been 'subsidising' phoney pro-poor connections for years.

4.5.15 Conclusions

NWSC has shown considerable initiative with the implementation of its new connection policy. The Corporation forecasts an accelerated provision and demand for domestic connections. In Kampala at least the NWSC is confident that it can meet that demand with the increased capacity that will result when the Gaba III water treatment plant is completed. Although the new connection policy is not directed at the poorest of the poor it will facilitate the connection of many households to the network. After a reasonable period to evaluate the impact of new policy, it would be opportune to incorporate modifications that are more specifically pro-poor.

The connection fee charged by NWSC at the time of the fieldwork bore little relation to the actual marginal costs of extending the network. This should come as no surprise to most water utility experts. Our aim in carrying out the marginal cost analysis was justified because of absence in the literature of this analysis. We have also shown that the overall connection cost can be reduced to very modest sums if community labour is involved and traditional, conservative approaches to engineering are moderated. What is important is getting households connected at the lowest possible cost so that they may enjoy the benefits of piped water, and the utility can maximise its revenue potential. Cost-sharing approaches need to be further researched to learn how different methods can be used that satisfies the needs of all stakeholders. We urge that the NWSC and similar water utilities be given the necessary support and

encouragement to take even bolder steps in experimenting with policies that will accelerate the access by the urban poor to piped water supplies.

5 RECOMMENDATIONS FOR IMPROVING ACCESS TO THE WATER SHOP

5.6 Summary of results

The research results indicate that the total cost of acquiring a functioning household water connection, on average, is approximately 12.9 months' average GNI pc in Ghana, 5.3 months' in India, 0.9 months' in Philippines and 26.2 months' in Uganda. These amounts, which include many of the suspected 'add-ons' over and above the official fee, are clearly unaffordable by the daily wage-earning poor.

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Charging to enter the water shop? **DFID, UK KAR 8319**

	Ghana Metro City	Ghana Secondary Town	India Metro City	India Secondary Town	Philippines Metro City	Philippines Secondary Town	Uganda Metro City	Uganda Secondary Town
	Mean ($)	Mean ($)	Mean ($)	Mean ($)	Mean ($)	Mean ($)	Mean ($)	Mean ($)
Total Application Costs	$3.89	$32.74	$0.00	$0.00	$4.39	$1.33	$24.48	$7.67
Total Official Connection Charge	**$97.61**	**$111.48**	**$140.19**	**$121.56**	**$87.11**	**$2.22**	**$32.57**	**$43.58**
Total Survey and Approval of Application Costs	$3.08	$6.79	$8.47	$0.09	$0.00	$0.00	$24.17	$2.24
Total Physical Connection Costs	$222.43	$125.32	$0.89	$4.03	$12.98	$43.47	$589.57	$116.44
Costs of interest to finance connection	$3.09	$3.61	$5.05	$9.37	$1.24	$0.00	$74.64	$1.21
Cost of coping strategies for low pressure or intermittent supply	$26.03	$104.08	$131.68	$42.62	$1.95	$0.00	$305.72	$15.30
Total Water Acquisition Costs	**$331.26**	**$358.29**	**$286.28**	**$177.67**	**$107.43**	**$47.03**	**$867.51**	**$180.55**
Gross National Income per perso	*$320 GNI pp*		*$530 GNI pp*		*$1,080 GNI pp*		*$240 GNI pp*	
Connection Costs to GNI pc Ratio (in months)	***11.4***	***9.5***	***3.5***	***3.1***	***1.2***	***0.5***	***28.1***	***8.3***
Acquisition Costs to GNI pc Ratio (in months)	***12.4***	***13.4***	***6.5***	***4.0***	***1.2***	***0.5***	***43.4***	***9.0***
Total Water Acquisition Costs *at equivalent Purchasing Power Parities*	$272.77	$295.03	$298.67	$185.36	$140.92	$61.68	$814.79	$169.58
IWE, Cranfield University, UK	*WSESP, KNUST, Ghana*		*ASCI, Hyderabad, India*		*PCWS-ITN, Philippines*		*WEDC, Loughborough, UK*	

Monopoly utilities have the overwhelming responsibility to deliver public health and public health externalities for all - as well as promoting economic growth through economies of scale in infrastructure provision, along with necessary and desirable environmental protection; otherwise what is the point of them?

A sustainable utility (financially, economically, environmentally and socially sustainable), like any business, will want to fulfil the needs of its customers/consumers at a price that ensures commercial sustainability, taking into account any subsidies from taxation or donors that society chooses. The presumption therefore is that cost reflective tariffs should be determined before allowing those subsidies that are absolutely necessary and which are made available for the right reasons. Any such subsidies must also be targeted at those who most need them and not the average (domestic) customer.

Additionally, utilities must not presume that by *charging a volumetric tariff subsidy* (ie below cost tariffs per volume of water supplied) they are fulfilling public policy goals of improving public health and poverty alleviation. If the poor cannot afford to connect to the formal piped supply in the first place, significant health and economic benefits are being missed.

Research clearly illustrates that the poor are usually paying a higher price per litre of water than wealthier residents many cities where the poor are not connected or have shared connections, and no free alternatives can be accessed (i.e. no wells etc.). Relying on alternative providers for their water needs demonstrates that the poor are willing to pay reasonable volumetric tariffs for convenience and for cost-saving reasons - as long as they can get a connection to the water supply.

This research sought to examine the actual costs of obtaining a new water connection (as incurred by the prospective customer), both formal and informal costs. It considers ways in which these costs can be made more affordable for the poorest. In considering the results of this research, we can conclude that new water service connections are generally:

- too expensive;
- too complicated;
- too uncertain/haphazard;

As making a connection

- requires too many additional payments;

The prospective customers are

- too distant from accessible water mains as well as from utility offices;

And their low income status renders the whole process

- too capital intensive.

It can be argued that a cost reflective connection charge should include the cost of the connection to the main, the cost of a share in that distribution main and arguably a share in the cost of the increased capacity required in bulk distribution mains, treatment and abstraction. However, it can equally well be argued from a marketing viewpoint that all those connection costs, both capital expenditure and operating expenditure, can be subsumed within the overall costs of the business and included in the overall volumetric consumption charge. In the telecoms industry, companies have had to learn a similar lesson when moving into competitive markets.

The standpost solution is a tax on the poor, particularly women, who either have to pay the waiting time or the vendor/alternative supplier at an inflated price.

The alternative presumption is that there should be no charges to enter the water shop. This 'free entry' could be limited to those within the urban centre who can easily be absorbed into the existing network, excluding at first the low density peripheral areas that have sprung from rapid urban expansion. Everywhere else should be within reasonable range of the existing mains, allowing investment in capital works to wait until the increased revenue begins to accumulate.

6 GUIDELINES

A key aspect of this research is the recommendations for governments (as policy-makers and regulators) and utilities so they have the understanding they need to change the common policy of 'charging to enter the water shop.'

The most common recommendation to come out of the country case studies is that charges for the poor should be reduced/subsidised with flexible repayments for the remaining charge, all this with differentiated service provisions such as group connections and developer incentives.

A clear message has emerged about simplifying and standardising connection procedures with improved customer involvement and consultation.

The main reasons given for not connecting were the cost of connection, the absence of network mains and a preference for (cheaper) yard connections/standpipes with flexible payment.

Therefore it is recommended that:

Simplifying and standardising procedures:

- the utility should simplify and standardise the new connection procedures, and carry out quality assurance procedures in the new connection process; standardizing will minimize opportunities for corrupt tendencies among some of the utility staff;
- a 'Single Window' approach to arranging new connections helps to avoid hidden costs and speed money phenomenon and increase transparency and accountability of the utility;
- a checklist of materials needed for connection should be provided to avoid opportunities for corruption;
- the utility should ensure that before connection charges are accepted from applicants all the connection materials, including the customer meter, are at hand to minimise delays;
- a Grievance Forum should be recognized and supported by the water utilities; consumers should be allowed to represent themselves in the local government units undertaking water services, as well as in water companies;
- there needs to be a policy of regularizing illegal connections and overcoming the challenge of lack of security of tenure through careful cross-sectoral networking;

Planning for ease of connections:

- mains extensions should be planned to make pipes accessible for clusters of poor urban households;
- the utility should endeavour to extend/increase the density of the distribution pipelines in a demand-driven, rational manner to minimise connection costs for the poor, minimising the aggravation caused by long lengths of service lines;

- the utility should take advantage of property development by organising and providing incentives to property developers in green-field areas, so that they work with the utility to extend suitably designed water distribution mains, instead of 'spaghetti' service lines; the incentives could be in terms of refund of the costs through an equivalent billing 'holiday'.
- the distribution pipes could be laid on both sides of the road to minimise the need for the customers to lay service lines across the roads;
- the utility should liaise with the roads authority so that during construction large diameter pipes might be provided to accommodate road-crossings; in this case there will be no need for cutting and restoration but the cost will be reduced to the pipe only;

Reducing, removing and facilitating connection costs:

- the utility must offer a range of differentiated connections, yard taps, street/group meters, edge of site meter banks, metered and meterless fixed volume connections etc
- connection costs for the poor could be reduced by contracting-out work to the beneficiary communities.
- the water company should introduce a development tax/levy (in addition to the existing volumetric tariff) purposely for mains extension and road-cutting charges for all users to contribute to this as part of the capital cost for all users;
- the water company should explore mechanisms to allow customers flexibility to spread the connection fee over a period;
- there is a need to build upon indigenous ways of savings and financing schemes
- the utility may be obliged to provide a partial subsidy to the connection costs for the urban poor, requiring
    - objective criteria for identifying the urban poor;
    - incentives and subsidies inbuilt in tariff structure targeted at the urban poor;
    - perhaps financed by an additional development tax/levy on all users (over and above mains extension levy)
- the rest of any cost could be provided by the applicant, through easy instalments spread over a reasonable period of time, as part of the volumetric tariff or any fixed standing charge;
- the use of a deposit against future volumetric charges might well be required at an appropriate level as a sign of commitment and future ability to pay;

Communicating with customers

- there needs to be a continual process of 'educating the poor' or rather enabling the poor to access the information on the different options that are available to them, whether differentiated connections and/or payment plans and/or community solutions and/or micro-credit;
- the utility therefore should improve the information flow with the customers; this could be communicated through a customer charter and brochures translated in major local languages, radio talks and community meetings;

- there should be regular consultation with consumers; any increase in connection fee and water tariff should have prior consultation with urban poor communities;
- poor customers need to be kept informed and enabled to understand their responsibilities as customers as well as their rights.

The guidelines, in summary, are that water utilities must take **a marketing approach to delivering new connections** rather than a supply driven simplistic economic approach. That is, in each situation, although the main water produce is necessarily monopolistic, there is a need to think creatively and adapt current practice to promote differentiated household connections to all the urban poor, as if they were trying to win new customers in a competitive market, whilst maintaining commercial viability. Any connection charges and costs have to be tested against the marketing imperative.

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. Customers need to be encouraged to enter the water shop which best fits their needs, circumstances and aspirations.

Taking a 'marketing approach' therefore means that, in the same way as the cable TV and telecoms companies, water utilities need to strive to 'capture market share', even though there is no competition in this market for networked water supplies. The companies need to have a mindset that their goal is universal service coverage. They must be prepared to use all the techniques of marketing, in particular market segmentation (recognising different groups of customers with different characteristics) and product and pricing differentiation, to best match those segments. The National Water and Sewerage Corporation in Uganda have shown the way forward, by first cutting connection charges and then reducing them to $28.5 for those within 50 metres of a water main which has led to a two thirds increase in monthly connections in Uganda – though in this case it is not clear to what extent the poor have benefited. Their next challenge, therefore, is to ensure the proximity of water mains to the urban poorest.

Similarly, a 'Government Order' in Andhra Pradesh has led to a reported increase of 54,300 connections for the poor in 2004-05 following the much reduced water connection charge required by government following interactions with our researchers.

The challenge for all water utilities is to find their own solution to removing any barriers to entering their water shops.

Appendix A: Literature Review

A.1 Introduction

An estimated 114,000 people were infected with Cholera during the first eighteen months of the 2000/01 outbreak in the South African province KwaZulu-Natal, and several hundred died as a result from the disease. A report released jointly by two NGO networks clearly linked the "most serious epidemic yet experienced" with the government's strict enforcement of cost recovery and 'user pays' policies: A traditionally free standpipe water service was discontinued, and the consumers asked to pay an upfront connection fee to receive access to communal taps fitted with prepaid meters or private house connections. As financial hardship forced households to resort to traditional, contaminated water sources, the disease spread quickly amongst the poorest families in the community (Cottle and Deedat, undated).

The impact of life without a piped water connection supplying treated water directly into the house or yard may not be quite as dramatic as in this particular incidence, but poor families around the world are suffering the consequences of not being able to access the safety and convenience of formal water services. There is a growing literature on water vending, often the only option for low-income households in slum and squatter settlements, particularly in South Asian, African and Latin American countries. Disproportionately high prices paid to a string of middlemen and a higher risk of infection as vended water is more likely to be contaminated are just two of the commonly reported problems (e.g. Zaroff and Okun, 1984; Espinosa and López Rivera, 1994; Vézina, 2002, McIntosh 2003). The problem of connecting to the system or becoming disconnected is spreading across the borders of the countries where incidences like this are traditionally expected. Moriary (2004) recounts evidence of the 'connection charge barrier' encountered on an IRC project visit to Palestine. Although a supply line ran at ten metres from their house, a poor family had to rely on tankered water and a private storage tank because they could not afford the 800 Shekel connection fee to the municipal supply. The projected savings of 41 Shekels per month (9 instead of 50 Shekels currently paid for $3m^3$ used in a fortnight) clearly demonstrate that obtaining a connection is stopping consumers from accessing the subsidies granted through low tariffs.

The link between connections and water pricing is internationally known. OECD reports that water utilities in the New Independent States of the former USSR are discontinuing low-revenue connections (OECD, 2004), leaving whole sectors of the population with the "obvious" difficulties "from such frequent disconnection". Meantime municipalities in the richest countries are now offering their residents subsidised water connections in order to safeguard public health. For example, the city of Melbourne operates a Water Sewerage Hardship Relief Grant Scheme designed to assist "eligible low-income households who are experiencing financial hardship with cost of connection of their water and sewerage services" (State Government of Victoria, 2001). Likewise, low-income residents of Columbus, Ohio, can apply for funding to switch from on-site water supply to the city water network (City of Columbus, 2004). In view of these many and varied experiences, it is interesting to note that the subject has attracted relatively little attention amongst the research community to date.

In response to the obvious problem, this section aims to review the available literature related to connection charges. Although it is clear that the issue cannot be considered in isolation, the absence of literature dealing directly with connection fees is remarkable. A problem is being recognised, but it generally receives only peripheral mention in the literature on tariff design and water pricing or any technical guides on urban water supply. This stands in contrast to the extensive documentation of the challenge involved in providing water and sanitation services to the urban poor in low and middle-income countries. The literature review therefore aims to consider the issue of connection charges in relation to the related aspects of water pricing and potential obstacles to including poor households in conventional supply systems.

A.2 Benefits for low-income households

It is an undisputed fact that access to good water and sanitation services provides benefits to poor households and society as a whole. There is no shortage of references in the literature to the potential improvements in public health. Further reported benefits include the improvement in quality of life of women in particular, poverty reduction and community empowerment (e.g. Weitz and Franceys, 2002). Llorente and Zérah (2003) demonstrate that "for slum dwellers, the inadequate supply results mostly in a time opportunity cost". Safe water delivered directly into the house frees women and children from wasting precious time in queues or fetching water from multiple sources, allowing children to go to school and women to take up employment.

A paper reporting on the PROSANEAR pilot project which connected close to one million Brazilians living in *favelas* to the water supply network stresses the less tangible benefits of connections, which went far beyond only improving the actual level of service: The first water bill sent to a previously mere squatter residence served as an emblem of citizenship. Many residents were inspired to continue efforts to improve their neighbourhoods. Whilst most people found their perceived identity within society had changed, women in particular gained respect through their involvement in the project (Katakura and Bakalian, 1998). Similar participatory projects in Bolivia also described benefits "in the form of increased social capital and improved leadership". By placing women in positions central to the success of the project, this improved their social standing and even encouraged them to become involved in education and social work in neighbouring communities (Hilderbrand, undated).

A.3 Extra costs of connections for low-income households

Slums have been described as the "water engineer's nightmare" (Katakura and Bakalian, 1998). The first challenge lies in their geographical location and haphazard layout, which can frequently render them inaccessible. Huddled together on any available land, which more often than not was left unoccupied or even declared inhabitable for good reasons, slum residences create significant engineering difficulties with cannot always be surmounted with conventional technologies. The second major challenge is related to a perceived financial insecurity. Reporting on

Morocco's second largest city, Rabat, McPhail (1993a) quotes the most frequently mentioned reasons for not providing individual water connections in shantytowns: Household connections are mistakenly deemed unaffordable for slum dwellers, whose properties are mostly located on publicly owned land. The water company is reluctant to install distribution lines without the security of legal land titles, as there is a perceived risk of losing revenue and assets when temporary residences might be abandoned. Furthermore, only few households are expected to connect, and low consumption rates would lead to low revenues per connection, raising concerns that network expansion in those areas would not be a profitable undertaking. Finally, it is argued that individual water connections would intensify wastewater flows such that sewerage connections would also have to be provided. Although it is explicitly mentioned that Rabat's shantytowns differ from the typical developing country city situation, the reasons stated neatly summarise commonly cited obstacles to piped water provision in slums. Sometimes fears on the part of utilities are of a far more immediate nature than simply financial concerns resulting from non-payment. Katakura and Bakalian (1998) report that Brazilian water companies have to fear for the employees' safety as drug-related violence is commonplace in Brazilian *favelas*. Combined with a lack of strong local organisations, this threat makes system maintenance and bill collection impossible.

A.4 Utility costs of providing connections

It is widely acknowledged in the literature that water, although arguably a free and public good, becomes a relatively costly product, having undergone a series of collection, transportation, storage, treatment and purification processes when it is delivered to water customers via a networked household connection. With the principle of cost recovery so widely promulgated, it comes at no surprise that utilities will need to recoup the considerable expenses incurred in connecting new customers. This section will examine the costs involved on the provider side, which include connection costs, distribution and/or development costs and the costs of increasing productive capacity.

OFWAT: What work does a new connection involve?

- "laying a service pipe or drain and making the connection to the water main or sewer (service connections
- laying a new water main or sewer if there is none nearby (requisitions and self-lay)
- upgrading the local distribution network or sewerage network including local service reservoirs or local pumping stations
- developing resources, if water resources are already fully committed (including bulk mains and treatment plants) or increasing the capacity of the sewage treatments works" (OFWAT, 2003)

Arguments in support of connection charges have been included in textbook manuals dealing with water supply. For example, in the series of 'Water Practice Manuals' compiled by the Institution of Water Engineers and Scientists it is suggested that there are discrete elements in both water supply and sewerage projects which can and should be financed by the direct beneficiaries. The costs of residential plumbing and house connection to the street water should be borne by the householder. Also, the costs of the street main sewer can be charged to the abutting properties on the

basis of the front footage. Nevertheless, it is recognised that the combination of such costs may be considerable, and in the case of the poorer sections of urban communities it could impose an unreasonable financial burden (Dangerfield, 1983).

Bahl and Linn (1992) distinguish between two types of connection costs. First, there is the infrastructure cost which includes the material and labour costs of extending the network, recurrent maintenance, metering equipment, and even the costs of billing customers that can be directly attributable to newly connected users. *"All of these cost are related to an individual consumer's decision to connect to the service but do not vary with the amount of water consumed."* There is also the cost to the service provider which may be described as *"…a requirement of 'readiness to serve' whatever the amount of the service the customer demands."* This means that it may be necessary to invest in productive capacity to match the number and type of connections (Bahl and Linn, 1992).

The Manual of British Water Engineering Practice
Works rechargeable to owners or occupiers includes the cost of laying service pipes. However, there is a diversity of practices. Some undertakers lay such pipes free of charge, others make a fixed nominal charge and therefore balance of cost to themselves or recharge the actual full cost of the work.

The City of **Redding, CA, Water Utility** informs:
"The connection fee is related to the hydraulic capacity of the water system. The connection charge represents the contributive share of the cost to expand existing facilities, or construct new water facilities. In other words, the amount of water we need to supply to our customers is directly related to their demand on the system. Customers placing a greater burden on the water system should bear a greater share of the costs. As development occurs, population increases, and there is a larger demand for water. Connection fees are the only funding source we have to build new facilities that will ensure fire protection and a continuing supply of potable water for our customers."
(City of Redding Water Utility, 2004)

At this point it is appropriate to mention the costs to the utilities of *not* addressing the problem. From Jakarta, losses of more than US$ 170,000 per month were reported in 2000. These substantial financial losses were attributed to illegal connections performed by corrupt utility staff, exploiting the impatience of new customers wishing to avoid the lengthy connection process (reported in the Jakarta Post, 2002). Lovei and Whittington (1993) report that the official connection fee in Jakarta varied from $100 to $200 but actual prices paid were much higher. The unofficial fee was rumoured to be as much as $600 in some parts of Jakarta. It is speculated that rent-extracting behaviour of distributing vendors, public tap operators and water utility staff is the primary reason for the low numbers of household connections and public taps in Jakarta. Whatever the reasons for maintaining the status quo, fact is that a proportion of the monies paid for new connections never reach the intended beneficiary, i.e. the utility.

A.5 Household costs of accessing connections

WUP Africa demonstrates the disparity between connection charges and the incomes of poor urban households by comparing connection costs with the average GDP in seven sub-Saharan countries. Connection charges, which can amount to several months GDP, put household water connections completely out of reach of the average low-income household with an income of significantly less than average GDP (Plummer, 2003). Tynan and Kingdom (**2002**) established that in selected developing countries connection fees can exceed 60% of per capita GDP using a similar approximation. Sohail (2004) explains that high initial charges for a new connection can take a variety of forms, such as a non-returnable security deposit, a connection fee charged at a fixed rate or according to the length of newly-laid pipe, meter costs, administration fees or infrastructure development charges related to the additional system capacity required. This section aims to uncover the true costs (for the household) of obtaining a connection to the municipal water supply or sewerage system, which is by far not as straightforward as simply paying the official charge and waiting for the connection to be installed.

Experiences from Kampala (**Sansom**):

- "Installation process taken very long, up to more than 6 months. The officials are not straightforward.
- High connection costs. One pays 58,500/= to water office, official needs 20,000/= to recommend one, the official needs another 20,000/=. Then one buys materials which include pipes at 1000/= per metre. The inspector of the materials wants 5000/=. If the connection is across the road, one has to pay 250,000/= to K.C.C. Lastly one pays 20,000/= for a water meter and to install the meter, the official needs 30,000/= as labour. These charges are very prohibitive."

Quotes from a focus group discussion held with poor people in Kampala, Uganda (see text box above), illustrate the complicated process involved in connecting to the municipal water supply service, which can entail paying substantial sums of money over and above those due as an official connection fee. Sansom uses this to argue that in addition to the newly reduced Ushs 50,000 connection charge, poor households still require assistance with the connection procedure. Other official requirements, such as proof of land or property ownership, letters of consent from landlords or owners of existing service lines and authorisation for road crossing also represent barriers to connection for low income households.

Brocklehurst et al. (2002) indicate that additional payments are required on top of the official connection fee levied by the utility. These include materials (e.g. pipes to connect to the main and, in some cases, the meter) or labour costs related to the installation (e.g. re-establishment of surfaces where road cutting was necessary). Households in Kathmandu are required to deposit a sum equivalent to 25 months' consumption (at current low tariff levels), which they argue is never recovered, after having paid for the meter, meter box and pipes. For a standard connection (within 100ft from the nearest main), this amounts to US$57. However, as poor households tend to be located further away from the existing network, the pipe costs, which are charged per additional foot, soon add up to the sizeable sum of US$147-200.

Clarke and Wallston (2002) draw attention to the divergence between connection prices paid by new customers and the officially listed fees and charges. The allegation that often bribes need to be paid in order to gain access to the water supply network finds confirmation in other studies. Dryhurst (2003) references a number of surveys

which prove that so-called 'speed money', payments to 'help' the application process on the way, were commonplace in Indian towns. Although customer interviews held during investigations in 2003 did not elicit responses regarding the payment of speed money, anecdotal evidence was found in the form of plumber 'bonuses' far in excess of the official fitting fee. The fact that cumbersome bureaucratic procedures, which impede the timely processing of new applications, are not only a cause of harassment and inconvenience for applicants but also breed corruption is beginning to be recognised from official side, as The Hindu reported in the case of Delhi (2003).

Also citing the example of Delhi, Llorente and Zérah (2003) demonstrate that 'coping costs' of households for strategies aimed at compensating for the frequent supply shortages are 6.5 times higher than any direct payments to the municipal water company. Almost a third of all connected households opted for groundwater wells. Other coping strategies included storage facilities and electric pumps, and home treatment with filters may also be required. Not surprisingly, poorer households have to devote a higher share of their income to coping costs. It could be argued that there is a clear indication for ability to pay for water services. However, as a study conducted by Singh et al. (1993) in Kerala, India, shows, there may be other reasons still why households find it difficult to connect: The researchers argue that although 58% of respondents indicate that connection cost is the main impediment to connecting, it is the cost of credit that is the real obstacle. This is echoed in Sohail's guidance notes (2004), where he argues that the poor households' meagre capital resources and lack of access to credit can render large one-off payments into insurmountable barriers. He points out that household level credit is more expensive than the cost of capital available to large companies.

A.6 Utility charges for providing connections

In 1992, Thackeray claimed that charging for water, and piped water services in particular, "is the current vogue in the UK and in many other places" (Thackeray, 1992, p.505), attracting much research, consultation and analysis. Although charges in the form of various tariff options are discussed at length, the initial cost of connection is not referred to in this particular paper. This apparent omission has been noted in much of the literature on water pricing and tariff setting. Cardone and Fonseca's collection of Thematic Overview Papers entitled "Financing and Cost Recovery" is just one example of many: Whilst the costs of new customer connections are duly listed and upfront charges acknowledged as a barrier to entry for poor householders, there is no further reference to this in the discussion of tariff options and subsidy allocation (Cardone and Fonseca, 2003). Specific references to connection fees are more likely to be found in the literature relating to subsidies and the poor as subsidies, which according to van Ryneveld (1995), are the mechanism of choice to resolve conflicts between the interrelated aspects of cost, price and affordability.

In 2002/2003, the Public Private Infrastructure Advisory Facility published a series of papers on tariff and subsidy issues that emphasised the need to prioritise new connections and rethink the currently commonplace subsidy schemes that focus on consumption. Raghupati and Foster (2002), concluded that the extremely affordable water tariffs found in India mostly benefited households already connected to the

municipal water supply. Although new connections are not charged at full cost recovery levels (Foster, Patanayak et al. (2003) estimate a return of 10%), the current subsidy system does not adequately address the issue of connection charges, which "may represent an economic barrier to the poorest of households" (Raghupati and Foster, 2002, p.8).

A.6.1 Willingness to Pay

With the realisation that that demand influences (or should influence) the design of new systems, willingness to pay (WTP) studies became an increasingly popular research topic, often in conjunction with water utilities wishing to establish appropriate tariff levels. In earlier studies the emphasis lay mainly on ongoing payments for consumption charges, with only occasional references to the costs incurred by the provider in extending the network for the benefit of new customers. For example, an often-quoted study by Whittington et al. (1989), which tries to establish households' WTP for individual connections, does not refer to the actual cost of connecting, i.e. the initial payment for connection charges levied by the utility. Similarly, Walker et al. (2000) although acknowledging that "one-off connection charges may impede access", in their discussion of WTP and targeted subsidies go no further than suggesting to recover the cost of connecting new customers through monthly charges instead of requesting an upfront payment. McPhail's WTP surveys in various locations included a financed connection charge to be repaid over several years in WTP bids (e.g. McPhail, 1993a, McPhail, 1993b). His investigation of the 5% "rule of thumb", which is commonly assumed to be an appropriate percentage of household expenditure to be dedicated to water services, entirely focuses on tariff levels. However, the WTP study conducted amongst 460 households in five Moroccan cities sought to estimate appropriate monthly charges, which would incorporate a financed connection charge spread over five years. For the purposes of the study, households were quoted an estimated cost of 450 Dirhams (US$53.44) to cover contributions to pipe installation works and in-house accessories. Although connections were investigated in a slightly different context, the results illustrate a high willingness to connect: Around 70% of households were prepared to dedicate more than 5% of household income to a water connection and nearly a third signalled a WTP of 10% or more (McPhail, 1993b).

However, WTP studies are still open to criticism. It has been noted that many early enquiries tended to confound WTP and affordability. Katko (1990) draws attention to the fact that WTP studies often fail to realise that connection fees represent a reliable measure of willingness to *connect*, which he asserts is the decisive factor in assessing water supply options. "It is essential to distinguish between access to a service and its actual consumption", warns Mehta (2003). Whilst stressing the importance of cost recovery as a key requirement for sustainable development of water services, Katko (ibid) fails to address the issue of how the connection fees he referred to should be incorporated into a tariff system.

A.6.2 Utility charges

The mismatch between water supply prices and marginal cost is often discussed or alluded to in the tariff design literature. Recommendations regarding how the various cost elements should be appropriated in user charges including connection fees are rarely very specific in the literature reporting on case studies around the world. This section will give selected examples of the 'cost vs. charge' debate and indicate how various authors believe this issue should be addressed.

Van Rynefeld (1995) exemplifies the wide gap between costs incurred by utilities and monies recovered through user charges using detailed financial data from South African urban areas. The various definitions of "cost" are explored and distinctions made between historical and recurrent as well as capital and operating costs. It is concluded that initial customer contributions, represent a significantly smaller share of the actual cost of providing the service (estimated <50%) compared to ongoing tariffs, which cover 85% of operating costs.

A.6.2.1 Pricing mechanisms - Marginal cost pricing

Albouy (1997) affirms that marginal cost pricing has attracted increasing attention and is inseparable from decision-making in production and supply planning. Having shown how inadequate fiscal policy instruments have in many countries led to authorities choosing to directly incorporate social considerations into pricing strategies instead of relying on fiscal funds to maximise social welfare and achieve income fairness objectives, he does not raise this issue in his brief discussion of connection fees. Instead, the issue of connection fees is considered from a purely economical perspective: "Ensuring a basic consistency between the ways to recover the costs of connection and the tariff is unquestionably one of the most difficult problems."

With reference to electrification in developing countries, Albouy (ibid) cites the high connection cost to future revenue ratio to be expected from new small users as a major deterrent to network expansion. It can be assumed that this principle equally applies to the networked water industry, where the costs of capital are higher still. The challenge, so Albouy, lies in apportioning connection fees, tariff rates and monthly charges for reinforcements. With regard to connection fees, he identifies three principles that can be used to determine the appropriate charge:

1. Only the individualised portion of the costs should be allocated outside the tariff, bearing in mind that the value of the connection will be associated with the building rather than the customer, to whom the connection is worthless upon leaving.
2. Increased costs associated with contracting out should not be reflected in the utility's billing to the customer.
3. To some extent it will be inevitable to level connection charges as the location of new applicants is not necessarily determined by choice. It may then be necessary to consider different technical options in order to achieve a somewhat near adequate coverage of expenditures.

If the second principle proves impossible to adhere to, he suggests that incorporating connection charges into ongoing tariffs may be the better option. He presents a

marginal expansion cost calculation which allocates a connection fee to all new customers whilst the remainder of the connection cost, reflecting the increase in demand, is shared across the entire customer base.

In their discussion of setting the price of public services equal to marginal cost, Bahl and Linn (1992) take the view that tariffs should be all-inclusive in order that resources are allocated efficiently, *"…beneficiaries with the option to hook up to water service by way of an area trunk-line could pay (a) an area-specific property tax or development charge, designed to recoup the cost of trunk-line construction and other system-wide capital costs; (b) a recurrent monthly fee to cover the costs of access – the connection from the trunk-line to individual properties, as well as metering and billing; and (c) a water-use charge related to actual consumption to cover the marginal cost of supplying water to the user."*

A.6.2.2 Development charges

Several authors emphasize the importance of system development charges as a means to allocate a fair proportion of the cost of new or existing infrastructure onto customers wishing to join the system. Grigg (1986) argues that a development fee effectively allows new users to pay for their share of a water supply system that had been designed to compensate for additional (future) demands on its capacity. To ensure that the fee is shared out amongst all property owners, it would have to be absorbed into higher land costs for property buyers, or else it would have to be retrieved through direct payments if and when purchases are made. Bahl and Linn (1992) suggest that if the development charge were collected as part of the connection fee it may adversely affect the connection decision. Development charges should be levied on all property owners at the time the network is built. They also point out that development or access charges incurred during the installation of the network vary according to such factors as population density and geology. A recent OECD report, in contrast, states that "the economic efficiency criterion suggests that this [connection] charge should not be used to recover general system development costs" (OECD, 2004). According to the report, connection charges refer to the non-recurring and normally up-front charges levied on new customers and, in most OECD countries, differs from other (recurring) fixed charges.

A.6.2.3 Lump-sum connection charges

A 1984 WHO publication recommends that a standard, fixed charge would be preferable from an administrative point of view, "if the point of connection is within a certain distance of the main distribution system" (p.44). The guiding principle for determining appropriate charges, in any case, should be cost recovery (WHO, 1984).

Where costs are directly related to the capital cost of installation, then a lump-sum connection charge is appropriate (Bahl & Linn, 1992). According to Bahl and Linn, connection fees may refer to both a lump-sum connection charge and a periodic fixed payment. The lump-sum connection charge may be determined according to the size of the connection or type of consumer; the periodic fixed payment is *"…determined by consumer characteristics related or unrelated to, but not varying directly with,*

water use." Fixed monthly fees have been used widely but are often supplemented by other fees such as meter rental fees. Fixed fees may vary according to meter size, pipe diameter or property value as in the case of Colombia. Bahl and Linn give examples of historical connection charges and fixed monthly fees, though no explanation is given for the lack of more recent examples. Generally, lump-sum connection fees consist of a flat charge based on the cost of installation. In Colombia further charges applied when a property was connected. n Bangkok and Jakarta the connection fee was determined by the diameter of the connecting pipe. In Nairobi a returnable deposit was also charged together with the connection fee. As might be expected (because of the social welfare value of water) it is generally seen that industrial and commercial customers pay higher connection fees than domestic users. From an efficiency standpoint, Bahl and Linn argue that costs relating to network extension should be charged to each connection as a fixed periodic fee.

A.7 The Way Forward: Approaches to connecting low-income households

Borrowing the words of Clarke and Wallsten, it is a fact that as long as the connection charge barrier is not addressed, "extremely high connection charges" will continue to "make a mockery of any policy intended to connect the poor" (Clarke and Wallsten, 2002). The UNDP (2004) proposes some solutions to removing this obstacle, such as reducing the initial connection charge, facilitating access through favourable payment options and developing service options which respond to the needs of the poor. Sohail (2004) suggests a number of practical reforms to the present practice of charging initial connection fees:

- abolition of infrastructure charges and deposits (retaining the connection charge)
- offering discounted connection charges to legalise connections
- applying fixed rate connection charges irrespective of cost involved
- offering discounts in exchange for households contributing labour to new installations
- facilitating repayment through instalment plans or micro credit options
- clearly establishing ownership of the meter (with the utility) to avoid removal or tampering
- establishing quality assurance mechanisms to guarantee the quality of the connection itself

This final section reviews documented practice and theoretical recommendations on how the practice of "charging to enter the water shop" can be discontinued and low-income families enabled to access the convenience of a household water connection with all its associated advantages.

A.7.1 Lowering the cost of connection

A number of authors have called for the radical abolition of connection charges. Historically this has been observed where several water providers had to compete for customers with promises of better or cheaper service. Graham-Leigh (2000) recounts that in 17th century London connection fee waivers were used as bait to persuade new

customers to choose one company over another. As networked water supply and sewerage services have developed into centralised monopolies over the last centuries and following the current trends towards cost recovery, a complete elimination of connection charges seems impractical. Tynan and Kingdom (2002) suggest establishing an upper limit for connection fees analogous to the 5% of household income rule of thumb generally accepted as appropriate threshold for water bills.

> The New River Company, established 1613, London
> "Within two years of opening the company had 384 customers and reached 1,000 by the year 1619. These probably represented the wealthiest residents because the cost to a household of connecting would have presented a barrier to many families. As more companies entered the water supply sector competition led to promises of cheaper and better service and often the connection fee was waived." (Graham-Leigh, 2000)

Meanwhile there is evidence that utilities have successfully lowered the cost of connecting to the network by experimenting with simpler, innovative technologies. PROSANEAR, the Brazilian project mentioned previously, dismissed expensive, high-tech, 'first-world' systems in favour of solutions that would remain affordable for low-income households and provide environmental benefits. Starting with an investment ceiling of US$98 and US$140 respectively for water and sewerage, by the end of the project actual costs had dropped to US$84 and US$104 through creative technical designs. In some locations, water supply costs could be reduced simply by lowering the design capacity of the system from 150 litres per capita per day (lpcd) to 120 lpcd. Low-cost sewerage systems were built using the condominial approach developed in Brazil in the early 1980s (Katakura and Bakalian, 1998). This approach was successfully replicated in El Alto, where the private company Aguas del Illimani connected nearly 3000 households for approximately half the price of a conventional system. Connection costs were reduced from US$229 to US$112 for water supply and US$276 to US$142 for sewerage. Routing sewer lines through private plots or underneath sidewalks eliminated some of the cost for materials and labour, and further reductions were offered in return for labour contributions from the communities (Hilderbrand, undated). Similar experiences were reported from pilot projects in Buenos Aires, where community groups receive reduced connection charges in exchange for trench digging and pipe installation work under the supervision of company engineers. Here it was found that the popular approach of labour exchange worked best in smaller communities of up to 2500 residents, but was less practical in larger communities, where complex and expensive capital investments are required (Constance, 1999). Hilderbrand (undated) pointed out that whilst making monetary savings, under these arrangements new customer instead incurred an opportunity cost.

In some cities, authorities attempt to differentiate connection charges based on the plot size of the house to be connected. In the city of Hyderabad, where plot sizes of up to $100m^2$ are liable for US$ 19.15, compared with US$ 74.47 for 100 – $200m^2$ plots and a staggering US$ 340.43 for plots of greater than $500m^2$, this can be viewed as an effort to target subsidies to the poorest households, which presumably own the least land (Brocklehurst, 2002).

A.7.2 Facilitating payment

An examination of the effectiveness of cross-subsidies leads Yepes (1999) to conclude that subsidies should be used to facilitate access for the poor. High connection fees should either be abolished, incorporating them into volumetric water charges, or long-term financing options made available in order to end the ongoing discrimination against the poor. Under McIntosh's (2003) proposed drastic reform of tariff policy, customers should be given the option to repay connection fees over a number of years. Bundling connection fees with tariffs would avoid the need for households to secure micro-credit to finance a connection, and development loans for new systems could include connection costs as part of the overall loan package. The top priority of eliminating the access barrier should go hand in hand with a general tariff increase, which in turn would fund the development of new water supplies.

The WUP Africa report (Plummer, 2003) offers a list of recommendations regarding credit facilities which, it is argued, could be extended to households by either the supplier or alternative financing agencies. Where credit is granted by the utility, this could be repaid in two ways – as a standing charge on top of the monthly consumption bill, or as a special 'tax'. The latter is described as a levy proportional to the volume consumed, to be paid over an agreed period of time or until the costs of connection have been repaid. The report describes micro-credit schemes in operation in India (cf. below) and suggests that similar mechanisms can be found in most African cities, although these are not commonly used to finance household water connections. In the context of urban development projects it may also be possible to allow new users to save up for the cost of connecting. Informal payment plans have been used in Côte d'Ivoire, where advance payments were made over a period of several months and the connection work carried out as soon as the total fee had been paid.

The WHO publication referred to previously in this review suggest that to ease the financial impact on low-income households, loan packages should be offered to assist with connection charge payments. It is suggested that connection charge loans may then be included in regular user charges (i.e. tariffs) and repaid in instalments. It is acknowledged that even with available targeted loans, some low-income households may not be able to afford a water connection. Group connections would then prove a viable option as it allows full cost recovery of connection and water supply whilst sharing the financial burden between several households. This option, it is suggested, prevents introducing a divide between poorer households, who cannot afford an individual connection and who would then have to rely on sometimes not very easily accessible public standpipes, and wealthier households, whose willingness to pay might in turn be affected in the light of freely available water from standpipes (WHO, 1984).

Although Sohail (2004) cautions that household level credit is more expensive, there is evidence that credit facilities for connection charges are being offered and have worked in various places. Water companies in Campo Grande and Ceará, Brazil, recovered material costs of connection via monthly fees, which were collected in addition to tariffs (Katakura and Bakalian, 1998). The El-Alto condominium project enlisted the cooperation of a local bank, and loans were made available to households through a local microfinance institution on the condition that the household was in good financial standing, able to produce evidence of an adequate income and guarantees (Hilderbrand, undated). In the case of Buenos Aires, households were

provided with an interest-free loan from the municipality, which had to be repaid over a five-year period (Constance, 1999). Born out of women's collectives and an early savings institution, the Indian micro-credit facility Mahila Milan provides essential credit for up-front payments required for infrastructure projects in Mumbai's low-income communities. With funding from donor grants and interest collected on Mahila Milan's own savings, a centralised 'bridge fund' was created. Any lump-sum payments made by the facility to authorities to accelerate the connection to essential services including water supply are returned to the fund by members of the community who have benefited (Plummer, 2003).

As indicated in the introduction to this review, even developed countries offer financial assistance. In Columbus, Ohio, this support takes the form of "a 0% interest deferred or a low interest loan (3%) for the costs associated with the connection to the City of Columbus water supply". There are strict eligibility criteria, such that the programme normally targets families earning no more than 80% of area median income. Property taxes and any other loans granted by the municipality must be current and applicants must provide proof of having arranged payment plans with the county auditor (City of Columbus, 2004).

A.7.2.1 Subsidies

According to Mehta (2003), there is a general tendency in the available literature on pro-poor subsidies to favour *access* subsidies over consumption subsidies. This is based on the understanding that by increasing access, particularly in areas with low service coverage, much higher social benefits can be achieved and subsidies are better targeted at poor households. McIntosh (2003) also relates subsidy payments to connection fees, insisting that a fundamental fact goes ignored: The unconnected poor cannot benefit from low tariffs as by definition they have no means of tapping into the subsidy system. The advance payments in form of a connection fee, he argues, present a barrier to entry for low-income households.

Mehta (2003) recommends providing partial capital grants, which can be linked with slum upgrading schemes. She cites successful outreach projects in Côte d'Ivoire and Senegal, where private utilities are providing subsidised connections to the poor under government-funded social connection programmes. The Côte d'Ivoire case has been highly successful, with a drastic increase in water customers since the introduction of the policy. However, many poor households are denied access, as they are located outside of the reach of the network or in unauthorised settlements. At present applicants must reside within 12 metres of the nearest water main and hold legal tenure to be eligible for a subsidised connection. In India, the government of Andra Pradesh in cooperation with local authorities facilitated 57,000 new connections over a three-year period, by providing a 50% subsidy on the US$73-146 connection charge.

A.7.3 Other mechanisms

A.7.3.1 Simplifying procedures

Some municipalities have begun to address the inconvenience involved in obtaining a new connection by simplifying previously cumbersome procedures. Officials in Delhi are now obligated to approve new applications for water supply connections within 24 hours of receipt of the application (The Hindu, 2003). Swift planning approval was another aspect of the water supply programme in Andra Pradesh, which received positive mention in Mehta's report (2003).

More could be done with respect to administrative and legal barriers that ignore the reality of life in informal settlements. The WUP Africa report (Plummer, 2003) here cites the lack of access to formal documentation, a frequent obstacle to connect to the networked services. A relaxation of requirements and a less stringent approach regarding paperwork has reportedly produced no adverse effects in Ghana, Ethiopia and Tanzania. The importance of minimising administrative procedures is stressed, and the mismatch between existing regulations, which take a too narrow definition of acceptable practices and the capabilities of poor households, further highlighted. Another example given is the reluctance of utilities to provide shared connections in spite of the fact that these can provide an opportunity for households to afford a household level connection.

A.7.3.2 Community involvement

The remarkable success of the PROSANEAR project was also due to the close cooperation with the beneficiaries. Community participation had been made a prerequisite for work in every project location, with the result that the project delivered what people wanted, needed and were willing to support. By involving the target communities from the beginning (or indeed before the project started), the project produced longer term results: "With all of these innovative elements at work, PROSANEAR projects became more than just infrastructure projects; they became neighbourhood projects, fuelled by the creative energy of fully informed and involved local residents." Existing local organisations ranging from sports clubs to religious groups were enlisted to educate others about the importance of sanitation. Local people were involved in the construction of systems and trained in operation and maintenance (Katakura and Bakalian, 1998). A number of authors reporting on community involvement in the provision of networked water services stressed the lasting impact on women, which went beyond immediate improvements in water supply, but included new skills and improved social standing.

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Appendix B: The connection process

Tentative outline of connection process indicating researchers' understanding prior to commencing fieldwork

Step	Formal cost	Informal cost	Notes
Application	Application form fee	Payment to councillor Payment to landlord (proof of ownership) Letter from service pipe owner OC (1)	Fraudsters?
Survey	Surveyor fee	"associated" inspection costs (transport, snacks, speed money, …) OC (1)	Process may be repeated x times…
Approval of application		Speed money	
Formal connection	Connection fee Future Deposit		What is included?
Road cutting	Charge	OC (1)?	where applicable
Getting approved materials	Cost of pipes (communication, service), meter, stop cock	Cuts taken by shop? Approving… OC (1)	Double charging? (cf. connection fee)
Digging trench	Labour cost (if applicable)	Snacks, … OC (2)	
Date set for connection		Speed money (move to earlier date)	
Ferrule connection	Connection cost		
Connection work/pipe laying	Labour cost (if applicable)	Transport, … OC (2)	
Meter installation			
Approval of connection/counting taps, etc.		Transport, snacks, beer (?!), speed money OC (1)	
Financing mechanisms	Cost of borrowing	Opportunity cost of delays	Consider alternative financing strategies (e.g. by on-selling)?
"Coping mechanisms"	Storage tanks, mains/upper floors pumps etc.		Depending on reliability of supply

OC (1): opportunity cost to applicant (time, travel, etc.)
OC (2): opportunity cost to applicant if work is carried out by himself

Appendix C: Country household questionnaires

C.1 Ghana questionnaire

Personal Information
Name: Date: District: Region:
Gender:

Application

- Date of application for new service connection: …./…./…. (dd/mm/yy)
- Date of connection: …./…./…. (dd/mm/yy)
- Cost of application form:
- Did you incur any costs prior to making an application for a formal water connection with the utility?
- Did you have to obtain written consent from anyone (e.g. landlord, etc.) or did any other aspect of the formal application process involve direct costs to you in the form of lost earnings, etc.?

Formal Connection Fee

- What was the official connection fee charged by the utility, which was acknowledged by receipt?
- According to the utility, what was included in this official connection fee?
- Did you have to pay an additional fee for the ferrule connection?
- If so, how much?

Connection Process

- Did the road need to be cut in order to lay pipes to your home?
- Were you charged for road cutting costs?
- Were you able to share these charges with neighbours connecting at the same time as your household?
- If you hired labourers to dig trenches for your household connection, how much did you pay them (in total)?
- Did you have to pay for transport, provide meals, drinks and snacks?
- Could you estimate how much you spent on this?
- Could you estimate how much you or another member of your household spent in lost earnings due to time spent accommodating and/or supervising labourers?
- If you carried the work out yourself, could you estimate what the cost was in terms of lost earnings during the time spent digging that trench?
- Did you have to buy any materials (pipes, meters, etc.) prescribed by the utility? How much did you spend on materials?
- Did you end up buying materials that officially were included in the connection fee?
- Did you have to make unofficial payments to the shop in order to receive the materials quickly, etc.? . If so, how much?

- Could you estimate how much it cost you to travel and take time off to shop around for materials?
- How many times did you visit GWCL before you got connected?

Survey and approval of application

- What was the official fee charged by the surveyor?
- Did you have to provide transport, meals, drinks, etc. to the surveyor?
- How much did you spend on this?
- Did you make any informal payments to speed up the process?
- Did the surveyor have to return once or several times? How much did this cost you?
- In total, how much do you estimate the survey cost you in terms of lost earnings due to spending time getting the survey done?
- Did you have to make any informal payments to have your application approved
- Did you make any informal payments to move the date of connection to an earlier/more convenient date?
- How long would you have had to wait otherwise?

Connection and installation

- How much (in total) did you pay labourers who carried out the connection work?
- Did you have to pay for transport, provide meals, drinks and snacks?
- Could you estimate how much you spent on this?
- Could you estimate how much you or another member of your household spent in lost earnings due to time spent accommodating and/or supervising labourers?
- If you were able to carry out (part of) the work yourself, could you estimate what the cost to you was in terms of lost earnings during the time spent working on your households connection?
- Were there any separate charges for having a meter installed?
- Did you incur any (formal or informal) costs or charges to finally have the connection approved, taps and appliances counted etc.?

Financing arrangements

- Are you paying for the connection out of your earnings/savings?
- Did you have to borrow money to afford the connection?
- Could you estimate how much you will have spent on interest by the time you have repaid the loan?
- Did you experience financing problems due to lengthy delays in the application/connection process?
- Are you considering alternative ways of financing (e.g. water on-selling to neighbours)?

Coping mechanisms

- Are you investing in storage tanks, additional pumps, etc. to compensate for intermittent supply, low pressure etc.?
- How much are you spending on such "coping strategies"?

- How much do households estimate they are going to save on water once they are connected?
- What other benefits do they see in having a piped water connection?

Questionnaire administered by…….

C.2 India questionnaire

C.3 Philippines questionnaire

Date: Respondent: Gender: Occupation: Address:
Gender of Household Head:
Water Utility Connected to: Date of Application: Date of Connection:

Application

- Did you incur any costs prior to making an application for a formal water connection with the utility?
- Did you have to obtain written consent from anyone (e.g. landlord, etc.) or did any other aspect of the formal application process involve direct payments or costs to you in the form of lost earnings, etc.?

Formal Connection Fee

- What was the official connection fee charged by the utility, which was acknowledged by a receipt?
- Did you have to pay an additional fee for the ferrule connection?

Connection Process

- Did the road need to be cut in order to lay pipes to your home?
- Were you charged for road cutting costs?
- Were you able to share these charges with neighbors connecting at the same time as your household?
- If you hired laborers to dig trenches for your household connection, how much did you pay them (in total)?
- Did you have to pay for transport, provide meals, drinks and snacks? Could you estimate how much you spent on this? Could you estimate how much you or another member of your household spent in lost earnings due to time spent accommodating and/or supervising laborers?
- If you carried the work out yourself, what was the estimated cost in terms of lost earnings during the time spent digging that trench?
- Did you have to buy any materials (pipes, meters, etc.) prescribed by the utility? How much did you spend on materials? Did you end up buying materials that officially were included in the connection fee?
  Did you have to make unofficial payments to the shop in order to receive the materials quickly, etc.?
- How much did it cost you to travel and take time off to shop around for materials?

Survey and approval of application

- What was the official fee charged by the surveyor?
- Did you have to provide transport, meals, drinks, etc. to the surveyor? How much did you spend on this?
- Did you make any informal payments to speed up the process? Did the surveyor have to return once or several times? How much did this cost you?
- All in all, how much do you estimate the survey cost you in terms of lost earnings due to spending time getting the survey done?

- Did you have to make any (informal) payments to have your application approved? How much?
- Did you make any (informal) payments to move the date of connection to an earlier or more convenient date? How long would you have had to wait otherwise?

Connection and installation

- How much (in total) did you pay laborers who carried out the connection work?
- Did you have to pay for transport, provide meals, drinks and snacks? How much did you spend on this? How much did you or another member of your household spend in lost earnings due to time spent accommodating and/or supervising laborers?
- If you were able to carry out (part of) the work yourself, how much would have been the cost to you in terms of lost earnings during the time spent working on your households connection?
- Were there any separate charges for having a meter installed? How much?
- Did you incur any (formal or informal) costs or charges to finally have the connection approved, taps and appliances counted, etc.?

Financing arrangements

- Are you paying for the connection out of your earnings/savings or did you have to borrow money to afford the connection?
- If you did, how much will you have spent on interest by the time you have repaid the loan?
- Did you experience financing problems due to lengthy delays in the application/connection process?
- Are you considering alternative ways of financing (e.g. water on-selling to neighbors)?

Coping mechanisms

- Are you investing in storage tanks, additional pumps, etc. to compensate for intermittent supply, low pressure etc.?
- How much are you spending on such "coping strategies"?

Sewerage

- Is it required to connect to any sewerage system at the same time as connecting to the water network?
- What are the charges and costs of connecting to the sewerage system?

Disconnection and Reconnection

- What are the official (and unofficial, where experienced) costs and charges of being disconnected for non-payment and being reconnected?

Benefits

- How much savings to your household do you estimate once you are connected to the water utility? What other benefits do you see in having a piped water connection?

Consolidation

- How much is the "official" connection fee to the water utility?
- What are the causes and problems (economic, social, technical, institutional) preventing a household's connecting to the water utility?
- What are your recommendations to facilitate the process of connecting to the water utility?

What do you think are the effective ways and means of financing the various costs and charges of connecting to the water utility?

C.4 Uganda questionnaire

My name is …….and I am conducting a survey study on behalf of National Water and Sewerage Corporation (NWSC) and Water Engineering and Development Centre (WEDC), a research institution in the UK on total costs incurred in the process of getting water connected to consumers' houses. NWSC records show that your household is one of those that were connected recently.
One of the barriers to provision of water services are the high costs that customers incur prior to gaining access to the service. The purpose of this research is to assess all the costs involved in getting a water connection. We hope that the results of this study will be used to inform the policies of NWSC and government on water service provision.
You are one of the few newly-connected NWSC customers who have randomly been selected to participate in this survey. Your experiences are very important. You will be asked questions on the various categories of all costs you incurred in the process of connecting piped water to your house. Your responses are confidential. All information you provide will be published ONLY in summary, statistical form.

Thank you for your cooperation.

SECTION A: Application

- What date did you start the whole process of applying for a new water connection? Where did you get your application form from? Did you have to pay in order to get it? If so how much?

- How many times did you have to go to NWSC office(s) before your application was officially accepted and recorded? How much did it cost you for transport etc (roughly)?

- What were the requirements before the application was accepted? Did you have to obtain written consent from anyone (e.g. landlord, etc.)? What costs did you incur in order to fulfil these requirements, if at all?

- Did you incur any other costs (at NWSC or elsewhere) before the application was formally accepted? If so, how much?

SECTION B: Survey and approval of application

- How many times did you have to travel to see the surveyor (s) before he/she finally went to the field to survey? How much could it have costed in terms of transport and other incidentals? (Time… etc.)
- Were you charged an official fee by the surveyor(s)? If so how much?
- Did you have to provide transport, meals, drinks, etc. to the surveyor(s)? If so, how much did you spend on this?
- Did you make any informal payments to speed up the process? Did the surveyor(s) have to return once or several times? How much did this cost you?

- All in all, how much do you estimate the surveying process cost you in terms of lost earnings due to spending time getting the survey done?

SECTION C: Formal Connection Fee

- What was the official connection fee charged by the utility (NWSC), which was acknowledged by receipt?
- According to the utility (NWSC), what was included in this official connection fee?
- Did you have to make any (informal?) payments to have your application approved? If so how much?
- Did you have to provide any materials (e.g. ferrule, saddle etc) before the connection was approved? If so, what were they? Please list them, along with the cost of each material
- Did you make any (informal?) payments to move the date of connection to an earlier/more convenient date? If so, how much? How long would you have had to wait otherwise?

SECTION D: Other requirements & connection process

- Did the road need to be cut in order to lay pipes to your home?
- Did you pay any charges to the Local Authority for laying a service line across the road? If so, what is the total amount that you paid? How much of this was receipted?
- Were you able to share these charges with neighbours connecting at the same time as your household?
- Did you have to buy any other materials (pipes, fittings, etc.) apart from those you had to show before the connection was approved? If so, list them, where you purchased them from and how much each cost.
- Did you have to make unofficial payments before you got the right material e.g. someone to direct you to the shop, or in order to receive the materials quickly, or in order to have the materials approved etc.? If so, list the payments made and to whom.
- Could you estimate how much it cost you to travel and take time off to shop around for materials?
- Did you hire labourers to dig trenches and plumbers to make the house connection? If so, how much did you pay each category?
- Did you have to pay for transport, provide meals, drinks and snacks for the labourers and the plumbers? If so, could you estimate how much you spent on this? Could you also estimate how much you or another member of your household spent in lost earnings due to time spent accommodating, feeding and/or supervising labourers/plumbers?
- If you carried any part of the work out yourself, could you estimate what the cost was in terms of lost earnings during the time spent digging that trench and/or plumbing?
- Were there any separate charges for having a meter installed? If so how much were the charges?
- Did you incur any other (formal or informal) costs or charges to finally have the connection approved, taps and appliances counted etc.? Please mention them
- What date did you actually start receiving water through the new connection?

SECTION E: Financing arrangements

- Are you paying for the connection out of your earnings/savings or did you have to borrow money to afford the connection? If so how much did you borrow and what are the terms of the loan?
- Could you estimate how much you will have spent on interest by the time you have repaid the loan?
- Did you experience financing problems due to lengthy delays in the application/connection process? Specify…
- Are you considering alternative ways of financing (e.g. water on-selling to neighbours)? Please mention them

SECTION F: PERCEIVED BENEFITS

- Where you getting water for household use prior to getting connected onto the distribution network? How much was it costing you per week or per month (estimated)?
- On average, how much do you now spend on water bills to NWSC monthly? Is there a saving?
- What are other benefits are you receiving from having your personal water connection?

SECTION G: Coping mechanisms

- Are you investing in storage tanks, additional pumps, etc. to compensate for intermittent supply, low pressure etc.?
- How much are you spending on such "coping strategies"?
- Finally, ask the respondent if he/she wants to mention any other points concerned with connection process and costs. Note the points on the reverse side.

SECTION H: Classification Questions

Gender	Highest level of education	Occupation
Size of household	Tenure status :	Estimated household expenditure:

Owner-occupied/Rented/Government-Allocated/Other ……

Food (weekly)	Rent (monthly)	Other utilities (monthly)
Education (per term)	Development activities (monthly)	
Entertainment (weekly)		Others (monthly)

This is the End. Thank you for your cooperation and patience.

Appendix D: Global survey questionnaire

International Survey of Domestic Water Connection Charges

The International Survey of Water Connection Charges is being undertaken to determine the extent to which connection charges form a deterrent to low-income households gaining the public health and economic benefits of a household water connection. The results of the survey, aggregated by region and anonymous, will be available on the 'Charging to enter the water shop?' website within two months and we will send a paper copy of the results to you within six months. Thank you for assisting in this survey which is being undertaken by Cranfield University, UK as part of a Department for International Development Knowledge and Research Project. .

Company/Utility Name: **Date:**

1. The **Fee charged** by the utility for a new **domestic water connection** is:
   ……. (Please specify currency)

The connection fee is based on

- □ Size of connection/Meter size (½" 12mm……., ¾" 20mm ……., 1"25mm……pipe, etc.)
- □ Location of property (within/outside city limits)
- □ Distance to nearest water main

There are additional fees/charges for:

2. Physical facilities
   - ☐ Ferrules/mains tapping tees *Average/typical amount if yes:* ……
   - ☐ Pipelines from the water main to the individual meter/property line/house (Please delete as appropriate) *Average/typical amount if yes:* ……
   - ☐ Meters *Average/typical amount if yes:* ……
   - ☐ Stop Taps and appurtenances *Average/typical amount if yes:* ……
   - ☐ Other (please specify): …… *Average/typical amount if yes:* ……..
3. Labour costs
   - ☐ Pre-installation inspection/survey *Average/typical amount if yes:* ……
   - ☐ Road cutting charges: *Average/typical amount if yes:* ……
   - ☐ Connection work, plumbing *Average/typical amount if yes:* ……
   - ☐ Installation surveying/inspection work *Average/typical amount if yes:* ……
   - ☐ Other (please specify): …… *Average/typical amount if yes:* ……..
4. Administrative fees
   - ☐ Application fee *Average/typical amount if yes:* ……..
   - ☐ Availability fee *Average/typical amount if yes:* ……..
   - ☐ Plumbing permits *Average/typical amount if yes:* ……..
   - ☐ Deposit against future volumetric charges *Average/typical amount if yes:* ……..
   - ☐ Other (please specify): …… *Average/typical amount if yes:* ……..

5. The **Fee** charged by the utility for **reconnecting** a 1/2" (12mm) domestic water connection after disconnection due to non-payment of bills is: ……
   (Please specify currency)

These surveys were also distributed in French, Spanish and Portuguese.

Appendix E: Interviews with Top Managers of NWSC

A brief interview was held with the Chief Manager of Engineering Services for NWSC on January 31, 2004. Another interview was carried out with the Managing Director of NWSC on April 1, 2004. The focus of the interview was to find out what were the perceptions of NWSC top management on the costs of connection, and their implication on services to the urban poor. A brief telephone interview was conducted with NWSC Corporate Planner at the time of compiling the report (May 22, 2004) to validate some of the issues. The major points extracted from the interviews are listed below:

- NWSC acknowledges the burden faced by new applicants, especially for those whose properties are far from the water distribution main.
- NWSC recognises that the burden is bigger for low-income consumers in two ways: in terms of affordability, as well as the fact that they most likely live in low-income settlements where the density of the reticulation network is much lower.
- Currently, NWSC is developing a new policy on new connection that aims at addressing the issues mentioned in the first two bullet points.
- The following alternatives are being studied:
    - Provision of new connections to all applicants free at no cost to the applicants, up to a certain distance from the water distribution main. Beyond a certain length of the service line, the customer would have to provide the costs.

- The cost of the new connection could be recovered over a considerable period of time
- The subsidies could be targeted only to low-income applicants

• The policy need to address the following questions, among other issues:

- What are the implications of the policy on the utility's cash flow and revenue?
- What length of the service line should be subsidised?
- How could the costs be recovered? Could they be recovered through gradual and small increments of the tariff?
- What criteria could be used to target the subsidies to low-income households?

• In the meantime, NWSC is increasing the density of the distribution network, in order to reduce the burden of applicants. The cost of laying a 75 inch tertiary distribution pipeline was quoted as Shs. 15,000 per metre of high-density poly-ethylene material when the work is carried out by NWSC staff, but increases by about three times if it is carried out by contractors (Johnson Amayo, Operations Manager, NWSC; personal communication, May 2004).

It is expected that the new policy on new connections will be in place in the next financial year.

Appendix F: Lao Research Review Workshop - considerations & recommendations

A Review Workshop was undertaken with water utilities and other interested stakeholders as part of the WEDC 2004 Conference held in Vientiane, Lao PDR.

The international research partners shared their particular country findings to introduce the topic to the participants and to demonstrate the size of the challenge facing low-income households wanting to enter the formal water shop.

Of particular interest was the involvement of NWSC, Uganda, which the research revealed had the highest connection charges and costs of all the utilities studied. However, in parallel with the research NWSC had already radically changed its approach to connection charges and the workshop benefited from a report on their experience before considering the overall findings of the research. NWSC made a presentation on their new approach.

National Water and Sewerage Corporation, Uganda, Report

- The water sector in Uganda is undergoing reform
- The main reform objective is to have all Ugandans accessing safe water by 2015
- In line with overall sector reforms, NWSC has undertaken a number of reform initiatives
- Management contracts with multi-national companies
- Implementation of a number of change management and performance improvement programs since 1998 to date
- Tariff reforms e.g. approval of tariff indexation policy in 2002
- NWSC's reforms have had a positive impact on the technical, commercial and financial performance of NWSC
    - Reliable water supply(24 hour service)
    - The Corporation fully covers all O & M costs including depreciation costs and makes some surplus
    - Significant improvement in customer service and corporate image
    - Undertaken intensive mains extensions (>700km in last 3 years) using internally generated funds
- In spite of the good performance, access to water services has still been a problem with current service coverage of only 65%
    - High connection costs (Materials, Labour, Road reinstatement costs etc.)
    - Inadequate awareness of procedures for new connections
    - Middle men escalate the cost of new connections and create a false impression of lengthy procedures
- The Urban Poor pay more for water services at Public Stand Posts

- Replacement and repair costs of existing service connections have been a high burden to consumers
- Concerns over material quality and workmanship in laying of service lines by customers

The *new connection and consumer service maintenance policy* has been approved, effective from July 2004.

- Under the policy NWSC meets full cost of installation of consumer connections up to 50m of service line
    - Material and labour costs
    - Water meter
    - Road reinstatement costs
- Consumers pay for new connection fees and any cost in excess of 50m of service line
- NWSC meets full costs of replacement or repair of service pipes
- All major development projects include consumer connections
- The Corporation has streamlined the new connection procedures in line with the new policy
- Ongoing consumer sensitization to create awareness
- The estimated cost of the project based on 14,000 new connections per annum is US$ 2.7million (Excluding cost of water meters)

Financing

- The Policy is designed to be self financing through a 10% tariff increment across the board

Challenges

- Additional financial requirements arising from an overwhelming response, greater than had been projected
- Restrictive GoU procurement regulations that impact negatively on timely procurement of materials
- Price escalation of materials in local market mainly attributed to global economic trends
- Effective sensitization and communication of the policy in a diverse market segment and profile
- Providing services to informal settlements (???? Land tenure, property rights, access, mobility etc)
- Staff have to cope up with addition workload

Conclusions

- The new connection and consumer service pipe maintenance policy recently introduced by NWSC is already showing positive signs of increased access
- The Policy is a step towards attainment of GoU water sector and MDG goals

Charging to Enter Review Workshop Discussion
The researchers first consulted with the workshop participants asking *'How valid is the data presented?'*
Comments:

- Yes, a fair reflection of situation
- Physical connection costs are sometimes higher, sometimes lower relative to the charge
- Recognising the need for equipment and labour – what are the charges from utility?
- East Timor $55 – only $1 or $2 more for the salesman
- In Ethiopia there is a rental system for the meter
- Some managements of water utilities are using charges to limit demand – perhaps also to exclude the poor who they see as potentially bad payers
- Equipment consideration – e.g. small and big towns….there are different costs which should be recognised
- Uganda – largely valid…some are paying much more - $200 to $1,500 through middle-men… or one was promised free and ended up paying $500!
- In Vietnam the connection cost is relative to distance

Having consulted on validity the researchers asked what should be done about utility connection charges? Should they be made affordable through *credit arrangements, should they be partially absorbed, or simply scrapped?*

- Mix… what about those who have already paid? NWSC is aware of that challenge and so offering free repairs to service line to balance those who have already paid
- There should be a revolving fund through NGO-managed systems
- Somebody has to pay – it costs money... Through consumption-subsidy from government for poor – micro credit where good social capital – not Uganda – bartering – chickens and goats?
- Shouldn't be scrapped – paying for the connection shows commitment… a guarantee of future payments – supplying water cannot be compared to a shop – because people are using the product before paying – use a marketing driver – using credit for connection charges is good… but utilities want advance payments by instalments

Government to subsidise? Yes, but must be targeted effectively - according to type of consumer

The researchers also consulted on the large problem of delivering improved connections in peri-urban areas. *Where should the boundary of utility responsibility lie?*

- City Limits?
    - Problems of poor on city fringes where it is not economic to extend pipes
    - Should be using decentralised systems in fringes?
    - Perhaps it is the middle income who are building on urban fringes and therefore only should be served when it is economic to do so..
- Along the supply pipe?
    - At the meter on the plot boundary – then it is up to the householder
- Should there be a 'differentiated' connection policy for the urban poor? How defined?
    - Yes! But how to define the poor? – suggested it should be through using a participatory approach – but who should do that? Answer was that Ministry should do it
    - Very strange idea – it would complicate the issue – introducing more layers….it would complicate targeting services at the poor –
    - Remember land ownership type – we should legalise informal settlements – and then use NGOs assistance to get the service to the people

The researchers would like to express their appreciation to the workshop participants for their inputs.