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## The 5% 'Rule': Fact or Fiction?

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The policy context surrounding water resources has changed profoundly over the past decade. The United Nations' International Drinking Water and Sanitation Decade of the 1980s failed to live up to its ambitious aim of achieving universal access to water and sanitation. The World Bank and other major donors are now calling for integrated water resource management (World Bank, 1993), and it is generally accepted that water has been undervalued as an economic resource and has a significant real supply cost in terms of provision, opportunity, environmental and depletion costs (Winpenny, 1994). There is a greater acceptance that market forces are necessary for efficient and equitable solutions: 'The goal of universal access to water supply and sanitation cannot be met without efficiency and effectiveness in resource use; additional resource allocation; and use of alternative financing mechanisms' (Nigam and Ghosh, 1995: 194). This means more than just setting economic charges; it means also providing enabling conditions, incentives and direct interventions. The declaration of the New Delhi Global Consultation (UNDP, 1990) states that it is critical to ensure the sustainability of water and sanitation systems by improving the recovery of the recurrent costs of operation and maintenance. In short, the idea of water as a basic human need is being replaced by the notion of water as an economic good.

Increasingly, the provision of water and sanitation systems is being subjected to cost-benefit analysis, and willingness to pay is being used as a tool in this analysis (Klumper, 1995). It is argued that there has been a supply-led approach to water provision with accompanying problems regarding the use of appropriate technology, acceptability by consumers and cost recovery. In order to overcome these problems and to maintain the sustainability of systems it is claimed that more emphasis needs to be placed on a proper analysis of demand.

The amount households are willing to pay for their water is often used as a measure of this demand and as a means of estimating the likelihood of connection and the revenues generated from the provision of various upgraded services in order to help determine whether the provision of such services would be sustainable. As the primary concern is to ensure that the water system

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remains operative, it is not surprising that sustainability criteria are usually based on *financial* sustainability (whereby total revenue earned balances costs), rather than using *economic* considerations so that the net benefit to the community as a whole is maximised.

### Measures of willingness to pay

Willingness-to-pay studies are now an integral part of many project planning exercises, and a huge literature has become devoted to mechanisms of the measurement of willingness to pay. The 'willingness to pay' is simply the maximum amount which the user of a water supply or sanitation facility is willing to pay, rather than to go without its use. The notion of what the *maximum* is that an individual is willing to pay is clearly a problematic one. A respondent in a World Bank study in Haiti asked an interviewer, 'What do you mean, the maximum I would be willing to pay? You mean when someone puts a gun to my head?'

There are three main ways of measuring willingness to pay: the direct approach, the indirect approach and the use of a proxy measure. The 5% 'rule' — namely, that households may be willing to pay 5% of their income — may be seen as an alternative, providing an indicative measure for planning purposes, without the need to undertake the detailed surveys implicit in the use of the other three methodologies.

The direct approach (i.e. that based on a hypothetical choice) involves asking people who do not have an 'improved' water source whether they would use a new source if it were provided under specified conditions, and how much they would be willing to pay for it. This method is also known as the 'contingent valuation' method, as the respondent is asked what he or she would do in a hypothetical (or contingent) situation. A 'bidding game' is used, whereby households are given a description of all the relevant characteristics of a specified option and are asked whether they would like to connect to the service at a certain price. Depending upon the response, the price is raised or lowered and the household is asked to reply again, until a level is reached at which the household expresses willingness to pay at a particular amount and no more. A comparative study of different regions in Rural Punjab, Pakistan (UNDP, 1992) used this method and found mean bids as a percentage of household income to range from 1.1% in the Sweetwater Region, to 2.4% in the Brackish Region, and 3.5% in the Arid Region. However, McPhail (1993) found that, in five small Moroccan cities, households were willing to pay 7–10% of their total income for improved water and sanitation.

The indirect approach (i.e. that based on observation of actual choices) is possible in areas where an improved water source is already available. It involves analysing the behaviour of a comparable group of people (perhaps in

a nearby village) and seeing what they are paying, or the time and energy they will spend in order to obtain water from preferred sources.

The third approach often used when assessing willingness to pay for water is to use a proxy measure. One commonly used is the amount that households pay to water vendors. This should indicate the value people place on water and set an upper limit on their willingness to pay. Many of these studies show that the amount already paid to vendors is far greater than the amount needed to provide a much improved water service (Klumper, 1995). Whittington and his colleagues (1989) reported that households in Ukanda, Kenya were already paying water vendors and kiosks about 9% of their income. In a similar study in Onitsha, Nigeria (1991), they found that during the rainy season 25% of households spent 5% or more of their income on water, and during the dry season, 49% spent 5% or more of their income on water, while 33% spent 10% or more.

The World Bank Water Demand Research Team (1993: 51) found that 'the percentage of income that a household is willing to pay (for improved water services) may vary widely'. They quoted figures from the Chihota District of Zimbabwe, where villagers are willing to pay less than 0.5% of their income for access to an improved well, and Parana State, South Brazil, where people will pay 'virtually nothing' for public taps but 2% of their income for yard taps. This may be contrasted with estimates of willingness to pay 6–8% of income for reliable service from public taps in Tanzania and the Anambra State in Nigeria, where many households pay water vendors 10% of their income in the dry season.

Munasinghe (1992: 214–15) mentions three types of bias that may be present in willingness-to-pay analyses. *Strategic bias* occurs when the respondents may think they can influence the provision of a service in their favour by not answering truthfully. *Compliance bias* occurs when individuals may desire to please the interviewer. And *hypothetical bias* arises where individuals either may not understand the characteristics of the good or do not take the exercise seriously and give the first figure that comes to mind. An interesting point to arise from willingness-to-pay bids in the Punjab, Pakistan (UNDP, 1992) is that respondents bid strategically in those areas where an improved water supply was scheduled. It is thought that they saw the bidding games as an attempt to set the monthly tariff and therefore bid lower than was expected. As pointed out by Yacoub (1990: 359), it is important to remember that 'social and behavioural sciences have demonstrated that actual human behaviour is often quite different from that indicated by responses to hypothetical questions'.

Increasingly, the 5% rule has been adopted by important donors, agencies and development banks as a measure of basically what proportion of their income people are willing to pay for water. This is not surprising, given the attractiveness of a simple numerical indicator for use in project planning. Use of this rule bypasses the need for any of the often complex and lengthy

techniques to determine a numerical value for willingness to pay as outlined above. Table 1 shows, however, how broadly this 'rule of thumb' has been applied. Are we talking about what people are able to pay, willing to pay or what they should pay? Are we talking about 'average' households (whatever they may be) or poor households? At first glance, it appears that the rule has been generally adopted without due consideration to its applicability in specific conditions.

**Table 1**  
Examples of the use of the 5% rule

Reference most commonly referred to:

Saunders and Warford (1976: 187) 'A frequently used rule of thumb is that a rural near-subsistence family should never have to spend more than about 5 per cent of its income for water.'

Other examples of usage:

*Willing to pay*

Briscoe, J. and de Ferranti, D. (1988: 13) 'development banks . . . frequently assume that rural people are willing to pay a fixed proportion of their income (usually 3 to 5 per cent) for an improved water supply.'

World Bank Water Demand Research Team (1993: 51) 'The World Bank . . . contend that people can and will pay at least 3 to 5 per cent of their income for improved water services.'

*Able to pay*

Lauger (1987: 459) 'Most poor people are unable to pay the full cost of water if it exceeds roughly five per cent of their family budget.'

Katko (1991: 42) 'The ability to pay has traditionally been evaluated by the criterion that households should not be obliged to pay more than five per cent of their income for water.'

McPhail (1993: 963) 'Most utilities and donors assume that as long as the cost of potable water to the household falls below 5 per cent of household income, then it is "affordable" and the household will make a connection to the system and be able to pay the subsequent recurrent charges.'

Clearly, this 'rule' is being applied fairly loosely, with little distinction made between willingness and ability to pay and such concepts as affordability and equity.

Indeed, the way in which this rule has been embraced reflects some of the shortcomings of the willingness-to-pay approach in general. There is excessive generalisation and attempts at spurious numerical accuracy. It insufficiently models the complexities of household and livelihood interactions in developing countries and makes no distinction between rural and urban households. In addition, there are still many inherent weaknesses in the technique, in addition to the biases referred to by Munasinghe. These are to do with the neglect of people's subjective perceptions and valuations of health benefits, the difference between willingness and ability to pay, and the complexities of prioritising livelihood strategies within households.

### Inherent weaknesses in the technique

The valuation of the health benefits resulting from improved water and sanitation facilities is acknowledged to be a difficult area. Whilst it is the *public* health benefits derived from the widespread provision of improved facilities (rather than benefits to individual households) that have justified investment in the past, *individuals* are now being asked to place a value on such benefits. Those using willingness-to-pay techniques adopt the 'rational choice' assumption that equates expressed preference with welfare (Sen, 1979). This assumes a hypothetical congruence between individual preferences and public health interests that is not necessarily sustained in practice. Any individual's expressed willingness to pay is likely to underestimate the health benefits that would accrue to the community as a whole as a result of improved supply.

Related to this point is the necessary assumption within the technique that the individuals possess sufficient knowledge upon which to make their decisions. Valuing the potential benefits of improved water supply would presuppose their understanding the linkages between the two and their being able to place a numerical value on this. It is not our intention to suggest that people are incapable of making informed judgements about conditions which affect their lives. However, health is clearly an area in which people's perceived preferences may show a marked dissonance with professional perceptions and priorities. In a community in Ecuador where slum upgrading involved the provision of protected running water to replace the tidal water previously used, the residents commonly held the view that life was healthier prior to the provision of running water, the cleansing effects of tidal water being perceived as superior in a number of ways to tap water (Moser and Sollis, 1991). In a dry district of Zimbabwe people were prepared to travel further for river water which they rated as clean rather than using for drinking protected borehole water which was considered at best distasteful and at worst unhealthy (Cleaver, 1994).

The policy implication of the extension of willingness-to-pay principles to situations where people do not express their need in this way is to 'do nothing'

despite the potentially adverse effects on public health (World Bank, 1993: 68). Indeed, much policy suggests that because of the difficulty of ascertaining health benefits these should be sidelined. For instance, Churchill and his colleagues (1987: 22) argue that 'health effects are frequently impossible to identify and quantify with any accuracy'. They recommend that it is best to start by assessing the non-health benefits and then deal with the problem of identifying health benefits only if and when necessary to 'resolve an ambiguity'. The current deprioritising of health in favour of financial considerations is not confined to willingness-to-pay studies but is illustrative of the neglect in willingness-to-pay techniques of factors where quantification is difficult and causal relations complex.

It appears, then, that willingness-to-pay techniques are blunt and insensitive instruments for determining people's priorities. They can work only by abstracting simple hierarchies of preferences based on direct causality and numerical valuation from the complex interlinked web of perceived needs, priorities and relationships with facilities and resources that makes up people's lives. The complexity of people's perceptions of a variety of water sources well illustrates this point.

In a dry district of Zimbabwe preferences for water were determined by the taste, softness and smell of water from a particular source as well as by its convenience and cleanliness. Reliability and ease of access were strong factors of preference, with unprotected sources generally perceived as more reliable than protected ones and distant sources sometimes offering more assured access than nearby ones. As a precaution against drought, people relied on one source alone but maintained access to different supplies, often through reciprocal social networks. Perceptions and priorities in relation to different sources changed seasonally, according to the demands placed on users by agricultural activities and environmental conditions. These complexities, the changeability of preferences over time and the use of multiple sources would make it difficult to construct a simple hierarchy of preferences and to place a numerical value on these as demanded by willingness-to-pay techniques (Cleaver, 1994, 1995).

There is some looseness in the terminology employed in translating such techniques into policy, *willingness* often being taken as an indicator of *ability* to pay. We have already mentioned the biases which might impede the translation of responses to hypothetical questions into actual payments. There are also the technicalities of actually securing payments, which are not necessarily facilitated by an expressed willingness to pay. Compliance with fee schedules and control of defaulters are complex issues, particularly when they are to be applied at community level. Research from Zimbabwe suggests that agreement in principle with rules and regulations relating to water supply may not lead to absolute compliance in all circumstances (Cleaver, 1995). The application of sanctions to non-compliers or non-payers is a highly contentious

issue not considered in the formulation of tariffs based on willingness-to-pay studies.

The World Bank Water Demand Research Team (1993: 58) found that 'the sense of entitlement and equity of many households may be a significant obstacle to charging realistic prices for water'. In addition, a study of the demand for selected water and sewerage services in the UK (Flood Research Centre, 1993) concluded that individuals' preferences and willingness to pay are influenced not only by self-interest but also by moral and ethical principles. This is confirmed by the perceptions of many people being charged for water by meter in Britain; they may well be willing and able to pay but perceive themselves to be unfairly charged compared with those who pay on a non-metered basis (*Bradford Telegraph & Argus*, 1995). Unfortunately the greater part of the literature makes no attempt to clarify the relationship between willingness and ability to pay.

The third major problem area in the use of this technique and its translation into policy is the oversimplification of the concept of the household and the tendency to generalise on the basis of 'average' willingness and ability to pay. We shall consider two aspects of the inadequate modelling of households here: the partial blindness to gender differences in perceptions and priorities, and the neglect of constraints operating on the poorest households.

#### *Gender differences in priorities*

Although the importance of women's role in water management, collection and use is generally recognised in the literature and in policy, for the purposes of willingness-to-pay studies the household is treated as a single unit of analysis. Studies refer to interviewing 'heads of household' or 'respondents' to determine willingness to pay (UNDP, 1992; Whittington et al., 1991) and frequently attribute agency to the household unit. Where differences are recognised within the households, they are referred to only vaguely. There is some recognition in the literature of gender differentials in willingness to pay for water. Women in Zimbabwe were found to be willing to pay 40% more than men for an improved domestic water supply (Briscoe and de Ferranti, 1989). This is probably because the responsibility for fetching water is seen as 'women's work'. However, this willingness of women to pay may not be matched by ability to pay, because of their lack of control over household income (Cleaver and Elson, 1995; Nigam and Ghosh, 1995).

There is also little recognition of the possibility of divergent perceptions and conflict within households over resource use, despite the literature on household economy which suggests this to be central to household dynamics (Sen, 1990; Kabeer, 1991). In Zimbabwe, women were found to be covertly using the proceeds from grain production to fund latrine building and the education of

girls, activities which did not coincide with their husbands' priorities for expenditure or allocation of resources (Cleaver, 1995).

If willingness-to-pay techniques are to be a useful instrument for planning they need to model more effectively the dynamics of household resource use and budgeting, disaggregated on the basis of gender. They also need to be as concerned with qualitative dimensions as with quantitative ones; the current focus on fixing a figure for willingness to pay allows little scope for changing circumstances over time or differences between and within households. It would be useful, then, to analyse the household budget in terms of the income and expenditure generated and controlled by men and women and to ascertain who is responsible for water payments in the long term and what effect this has on other expenditures. If women are found to be largely responsible for water payments, what proportion of their budgets does this involve and what are the implications for other welfare expenditures? More detailed knowledge of these matters would seem to be vital if willingness- and ability-to-pay studies are to be of any practical use.

#### *Constraints on poorest households*

The assertion of the importance of women's involvement, coupled with a lack of detailed understanding of their role in the household economy, is mirrored in the application of willingness-to-pay techniques to the poorest people. There is a recognition that, where charges are made, those with low incomes already pay a greater proportion of their income for a poor service than do high-income groups who get a better service. It is suggested that 'Studies on water demand have generally found that poor people are willing to pay a higher proportion of their incomes for their improved supplies than are their richer neighbours' (Briscoe and de Ferranti, 1988: 13). However, this view does not appear to be based on a detailed analysis of the constraints operating on poor households nor the high opportunity costs they may face in paying for services. A reason for this omission could be the fact that the model is essentially urban-derived and based on the availability of cash incomes. The 5% rule is difficult to apply to seasonally variable incomes; indeed, there is little agreement as to whether it refers to annual, monthly or weekly income. The fluctuating nature of rural incomes, not just throughout a year but over years (dry and wet years, years in the lifecycle of the family when income and demands on expenditure may differ dramatically owing to the availability of able-bodied labour, educational expenses, income and expenditure associated with marriage, etc.) is not well accounted for by the 5% rule.

The assumption is that even the poorest can pay through labour and time.

Even very poor households have *some* resources, in particular, their own time. And a small portion of those resources can almost always be devoted to water supply and sanitation services (Churchill et al., 1987: 7)

There are undoubtedly some rural areas where cash is simply not available, but even in these areas very poor households usually have some resources — in particular their own time — to contribute to constructing and maintaining service improvements. (Briscoe and de Ferranti, 1989: 13)

They are thus assumed to be able to place a monetary value on improved supplies. This, however, ignores the fact that labour and time are often the major resources available to poor people in securing a livelihood, and that the demands on these resources may be intense. In Zimbabwe and Lesotho the poorest women in villages studied were unable to participate in communal activities including labouring on water supply projects because they only just survived by hiring themselves out as casual labour. As this was their only source of income for securing basic needs, they were unable to 'pay' in labour for improved water supplies and would be equally unable to pay cash (Cleaver, 1995). Any expressed willingness to pay on their part would be a broad expression of intent, unlikely to be realised except at serious cost to the well-being of their households (ODA, 1994). Moreover, problems in comparing the values of cash and labour contributions are often not tackled in the literature; for example, how much time devoted to water-supply development is a substitute for paying 5% of cash income? The broad assumption that such matters can be left to communities to decide, and evidence that this process may reinforce existing inequalities (IRC, 1992/93), further weakens the case for general applicability of a 5% 'rule'.

The integrated nature of poverty (Chambers, 1983) is thus ignored in the willingness-to-pay literature, poverty being simply equated with low income. The lack of command over both material and non-material resources and the effect that this has on livelihood strategies is ill reflected in a model which confuses willingness with ability to pay and favours single preferences and simple causal links. An example is the assumption that by expressing a willingness to pay for water, people are also expressing a felt need and a willingness subsequently to maintain water supplies (ODA, 1994). However, the poorest people may suffer a lack of choice over the services to which they can have access; they may experience obstacles to expressing their needs and preferences and a lack of material ability to commit scarce and unpredictable resources in advance, even if they are theoretically willing to do so.

Despite the fact that current international policy in the water sector upholds the need to cater for marginalised people in order to balance their inequitable access to services, willingness-to-pay studies are surprisingly blind to the fate of the poorest. Common reporting of results refers to findings that 'most households' or the 'majority of households' are willing or able to pay. The

prospects for those who can not or will not pay and the consequences of the application of a 5% rule across households of varying status are not considered in detail.

It would be comforting to think that willingness-to-pay studies could be used in the design of measures for poverty alleviation and redistribution, in order to justify subsidies to provide facilities to the poorest and to design lifeline tariffs to ensure that all have their basic needs for clean water supplies met. The tendency to apply general and dubious quantitative 'rules' in policy-making for cost recovery does little to facilitate this. Rather, in practice, they seem far more likely to lead to a further neglect or marginalisation of those who cannot be satisfactorily integrated into water markets.

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