Workshop on
Willingness to Pay
for Drinking Water Supply and Sanitation

REPORT

Department for International Development
Regional Water and Sanitation Group – South Asia
Workshop on
Willingness To Pay
for Drinking Water Supply and Sanitation

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Without exception, most infrastructure in South Asia including water supply and sanitation, is constructed and maintained by government agencies using government funds. But most of this infrastructure is either poorly operated or badly maintained. Consequently, government faces a growing challenge to not only invest in rehabilitation of such dilapidated infrastructure but finance new investments in the sector as well. In the water and sanitation sector alone, recurrent costs on operation and maintenance of existing facilities turn out to be a costly proposition for the government. The net result is that the services are not only unreliable but inadequate too.

Since financing of infrastructure in the social sector by the government is unlikely to go away, studies have tried to focus on the factors that ensure its proper usage and maintenance. Current school of thought suggests that water supply and sanitation facilities can only be properly maintained and used where the community participates in the decision making process and pays for the services too. Willingness to pay all or part of the costs therefore, appears to be a critical factor for system sustainability. Interestingly, however, a growing body of evidence suggests that many communities are willing to pay for both water and sanitation services (either wholly or in part) to ensure a better or more reliable service.

‘Willingness to pay’ assumes significance as there is a marked shift in the government’s traditional role too - from provider to that of a facilitator. In fact, the government agencies have now started seeking new ways of working in partnership with the communities. As a result, financial contributions from communities are becoming a reality. But given the complexity of assessing the economics of water supply and sanitation, willingness to pay as a concept is easy in theory than in actual practice. It is, therefore, imperative to identify new planning tools for assessing willingness to pay for successful planning and implementation of projects in future.

INTRODUCTION

To further discuss this intriguing subject, a workshop on ‘willingness to pay’ in the water and sanitation sector was held in New Delhi.
The prime objective of the workshop was to provide a forum for review and discussion of the concept, and plan for dissemination of experiences related to willingness to pay for water and sanitation services as observed and studied in some selected projects which were presented as case studies during the workshop.

The workshop heard and discussed presentations on 7 water and sanitation studies where contingent valuation or other similar demand assessment methods had been used. It also discussed presentations on investment policies adopted at the federal level in Punjab; and on investment lending to the sector by the Housing and Urban Development Corporation (HUDCO).

**What Determines Willingness to Pay?**

Consumers' willingness to pay for improved water supplies can be influenced by several factors. Recent surveys on willingness to pay have added data from which several general conclusions can now be drawn.

**Perceived Benefits**

Convenience, amenity and economic benefits are important for users in surveys throughout the developing world. Water quality is important, too, but it is judged by taste, odour, colour, and tradition - not by bacteriological quality. In the Republic of Korea, for example, shallow well water was preferred to chlorinated piped water, and in Thailand many people, even those with private connections, would not drink chlorinated water.

**Income**

In Colombia, Kenya, Korea and Thailand, surveys confirmed that families with higher incomes were more willing than poorer families to pay for connection to an improved water supply. In Chile, for every 10 per cent increase in income, families consume 4 per cent more water per capita. In Malawi, in areas where users have to pay for water from standpipes the use of the standpipes increases following the sale of cash crops.

**Water Charges**

In Colombia, Indonesia and Panama, use of the improved service was higher when the price charged was lower. In rural Chile, a 10 per cent increase in price was associated with a 3 per cent drop in consumption.

**Other Prices**

In rural Indonesia, electricity is considered a higher priority than water connection and users are unwilling to pay more per month for water than they pay for electricity.

**Women's Time**

In Korea, connection rates are higher for families where women are educated and employed because the value of their time is higher. In Kenya, pastoralists were not prepared to pay for improved domestic water supply schemes, in part because the male decision makers believed that there was no value to freeing time for women, because they did not help to care for cattle.

**Level of Service**

In Thailand and Tunisia, users were not prepared to make relatively low payments for standpipes, but they did pay substantially more for house connections. In Egypt, villagers were prepared to pay only 1 per cent of income for standpipes. In Indonesia, where flow restrictors are used, willingness to pay for house connections is greater when flow rates are greater. The recent surveys in Haiti and Zimbabwe revealed that willingness to pay for yard-taps was 1.3 times and 2.3 times higher, respectively, than willingness to pay for standpipes.

**Existing Source**

Where traditional supplies are deemed acceptable (such as private wells in Korea and Mali, reliable springs in Peru, wells and springs in Indonesia, and surface water supplies in areas of Tunisia), willingness to pay for improved services is relatively low. In areas of Kenya where water is scarce, villagers organise and pay for operation and maintenance of bore-holes, but in areas with surface water, people are reluctant to pay for water. In the Haiti and Zimbabwe surveys, willingness to pay rose as the distance to existing sources increased.

**Productive Activities**

Where water can be used to increase the home production of crops and small animals, willingness to pay is likely to be higher. In Kenya, for instance, those with home gardens are willing to pay for improved domestic water supplies, while those who raise cattle are not.

**Credibility**

Experience in Colombia, Malawi and elsewhere shows that willingness to pay is relatively high when agencies have proved that they can deliver what people want. In El Salvador, Guatemala, Haiti and Lesotho, however, people were less willing to collaborate and to pay because of bad past experiences.
The workshop was co-sponsored by the UNDP-World Bank Regional Water and Sanitation Group-South Asia (RWSG-SA) and the UK Department for International Development (DFID, formerly ODA). Participants at the workshop included senior officials from the Ministry of Urban Affairs and Employment, the Ministry of Environment and Forests and the Ministry of Rural Areas and Employment. It also included representatives from the Planning Commission, the state of Punjab and Maharashtra, National Rivers Conservation Directorate, research agencies, consultancy services, RWSG-SA, DFID, international organisations and NGOs.

METHODOLOGICAL ASPECTS

Methodology of assessing willingness to pay featured prominently in the discussions. A variety of techniques are available to assess economic demand and evaluate willingness to pay (WTP) for water and sanitation services. However, different situations may demand use of different techniques, in isolation or in combination.

Contingent valuation method (CVM) remains most frequently quoted direct method of assessing economic demand. If carefully conducted, CVM can elicit reliable information on what people will willing pay for - for instance, a reliable water supply which they may not have access to at present. Other methods which are being used for eliciting similar feedback from communities include participatory rural appraisals and associated methods.

There are indirect methods of measuring WTP as well. This includes the hedonic method that measures the expenditures incurred by households to cope with the lack of a particular service. There is, however, lack of consensus on what constitutes a good technique for measuring WTP. Although CVM is the most widely used technique, it may not necessarily be the best way of eliciting WTP; it all depends on what kind of loss or gain in service delivery is being valued.

The workshop identified a number of key points about how CVM should be used and how its application could be made more effective and reliable. Some of these observations were classified under general category whereas others were more specific.

General Comments

- The context in which WTP study is being conducted has to be made clear to the respondents. This includes details of the policy being adopted, the type of service being offered, the level of service being assured and the quantity and quality of water to be delivered (e.g. number of hours a day, whether there will be any meetings etc.). On top of it, the policy directive must emphasise the underlining assumption that public will have to pay for the service.

- Given the above considerations, the survey should not only be simple but should not be time-consuming as well. Since it might not be possible to cover too many issues in one CVM, the time needed to complete an interview should be restricted to less than an hour.

- Being a time-consuming exercise, the size of the study should be limited such that it is conducted without unnecessary hurry and yet gets completed in about 8 weeks time, if not less.

- The need for greater consistency across studies was emphasised. To make that happen, differences in the basic objectives and approaches need to be kept as low as possible.

- The study must address gender concerns. Women should be interviewed in numbers reflecting their importance in the use of the service being provided. The economic benefit to women may not be reflected in financial willingness to pay but their role in using the service and subsequent operation and maintenance far outsmart the contributions men may make in the household expenditure.

- The credibility of a service has to be ascertained and pre-tested before assessment. The service being offered has to be credible; answers will not be valid if people do not believe that the provider will be able to deliver what is being proposed.

- Capacity building for conducting appraisal of CVM and other WTP methods need to be provided to project staff.

Specific Comments

- Rigorous pre-testing of questionnaire in focused groups should be
made essential, although there is a risk that the focus groups may provide bias results. Care must be made to offset such deviations by including general respondents as well.

- Use vernacular language(s) in preparing questionnaires, wherever required.
- Sampling should be stratified to reflect the heterogeneity of the population targeted to receive the service.
- The cost of a study will vary, however, rural studies ought to be little expensive. Actual differences in cost in the studies presented at the workshop were rather large but no definite reasons were assigned to these variations. In this context, the technique must be designed to cater to low income communities. In some cases WTP may have to be expressed in kind.
- Although there is no reason for results of different studies of the WTP for a particular service to be the same, a comparison with previous studies is useful and should be conducted.

Why Users Should Pay For Water And Sanitation?

- Available capital and public funds are inadequate to meet costs.
- State intervention and control has proven to be inefficient and ineffective.
- Socio-economic benefits of improved water and sanitation service justify payment.
- Subsidies disempower users by denying them choice.
- Subsidies discourage cost-effectiveness and the development of low-cost solutions.
- Evidence of willingness to pay is strong as many poor people are already paying for services.
- Properly regulated user charges would mean the poor would pay less and get better service.
- Payments increase sense of value and commitment among users. Payments maximise the use of available resources and improve quality/standard of service.

POLICY IMPERATIVE

The water and sanitation sector in India faces a series of problems. A central challenge has been the fact that water has been regarded as a free good; its provision is government-funded and managed; and, the involvement of local communities is at its bare minimal. However,

- water demand is growing at a much greater rate than the growth in population;
- the efficiency, effectiveness and integrity of systems are being subverted by people’s private efforts to meet their water and sanitation demands;
- the quality of supplies is falling reflecting environmental constraints and competition (especially from agriculture); and
- there is a widening gap between fiscal resources available and the financial requirement for system operation and maintenance, and expansion.

The key problem in the water and sanitation sector in India is the near absence of its linkage with investment decision making and pricing. Most finance for water and sanitation systems come from State Governments, who have kept the tariff level much below the desired level. Although State Governments are now permitted to delegate tariff setting to local bodies, in some States uniform tariffs are still set at the State level only. Under such diverse institutional arrangements, achieving financial sustainability for water and sanitation utilities becomes difficult. In the absence of political will to change the system, willingness to change remains the greater obstacle than willingness to pay.

DEMAND RESPONSIVE

Establishing demand responsive water and sanitation systems will require the following considerations:

(a) implementing policy and institutional reforms to improve cost recovery and responsiveness of service providers to beneficiaries.
(b) treating water as a economic as well as a social good.
(c) modifying project planning processes to make them interdisciplinary and participatory.

Demand assessment studies can help to promote acceptance of a demand driven approach to investment planning and can promote dialogue between representatives of users on the one hand and those of utilities and politicians on the other. They can do this by demonstrating people's willingness to pay for different types and levels of water and sanitation services.

In many cases, the poor will benefit from a demand driven approach. A number of studies have found that many households are spending a lot of money on different coping strategies (e.g. water storage, private handpumps, water vendors etc) to compensate for unreliable public water supplies. And at several places poor people are already paying several times more for a kilolitre of water as opposed to what others pay for the piped connections. Households with private connections do, however, invest in storage, treatment and alternative arrangements to improve reliability.

Participants recognised that the federal-state governmental system in India has created a wide range of opportunities for the government and the donors to work creatively in selected states and municipalities with leaders who wish to take a lead in sector reforms. The political climate seems open to policy experimentation and learning and it also seems that a demand-driven planning framework for water and sanitation investment could be implemented at several locations.

In general, workshop participants expressed enthusiasm about the use of demand assessment tools such as contingent valuation to help move towards a demand-driven approach in planning water and sanitation investment. However, some reservations were expressed regarding the use of the CVM for measuring the health benefits of improved water and sanitation projects. Furthermore, the participants expressed their concern regarding poor reflection of the benefits accrued to women in the current demand-responsive assessment.

CONCLUSIONS

Faced with ever-worsening financial, operational and environmental crisis, water and sanitation systems in the Indian Sub-continent need to change radically. The planning process need to address the following key recommendations of the workshop:

1. Treat water as an economic as well as a social good. This means aiming for service provision with the following features:
   - enabling local communities and local institutions to meet their demands on a sustainable basis.
   - ensure financial sustainability of service providers. This requires full cost recovery. Subsidies, if and where provided, should be transparent and targeted on poor people and those in remote areas.
   - reliable supply and full service.¹
   - incentives for conservation of water, for instance through metering and appropriate tariffs.
   - incentives to reduce unaccounted flow of water.

2. Integrate water and sanitation planning where they are interdependent.

3. Promote interdisciplinary approaches from the outset by integrating economic, social, health and environmental considerations with engineering designs.

Factors Influencing Willingness To Pay

<table>
<thead>
<tr>
<th>Service level</th>
<th>Characteristics of existing sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service standard</td>
<td>Reputation of service agency</td>
</tr>
<tr>
<td>Perceived benefits</td>
<td>Community cohesion</td>
</tr>
<tr>
<td>Relationship to production</td>
<td>Policy environment</td>
</tr>
<tr>
<td>Level of income</td>
<td>Socio-cultural factors</td>
</tr>
<tr>
<td>Price</td>
<td>Perception of ownership &amp; responsibility</td>
</tr>
<tr>
<td>Relative cost</td>
<td>Transparency of financial management</td>
</tr>
<tr>
<td>Opportunity cost of time</td>
<td>Institutional framework</td>
</tr>
</tbody>
</table>

¹ Including continuous supply

² Including wastewater, solid waste disposal and surface water drainage
4. Involve key stakeholder groups, including beneficiaries, at all stages in an iterative planning process.

5. Base local level investment decisions on:
   - demand assessment\(^3\) (including willingness to pay techniques) to find out and value what level and type of services people want and are willing to pay for.\(^4\) In some situations, it will be appropriate to link this work to information, education and communication (IEC) programmes.
   - participatory planning and ensuring that all user groups are involved and are willing, where appropriate, to participate in implementation and management process.
   - taking careful account of the views of women on the values of services to them, and on the roles they could play in design, implementation and management of services.

6. Set demand assessment and participatory planning within a strategic plan which sets broad parameters for investment choice, to reflect key financing, social, health, economic and environmental objectives and constraints.

7. Explore options for possible future participation in the planning, development and management of the system at different levels, by:
   - the private sector, for instance through public private partnerships.
   - other institutions including community-based institutions.
   - ensuring that a range of physical, institutional and financial options are considered by project partners, engineers, social development advisors and economists at an early stage in the project and in addition ensure that the community/clients also play a role in their development and selection.

8. Develop strong monitoring and impact assessment capacity.

9. Recognising users’ willingness to pay for the operations and maintenance costs of water and sanitation projects is a first step in a staged process leading towards the final objective of user’s contributing to the capital costs.

10. In addition to the case studies reviewed at the workshop, relevant experience of using demand assessment to influence investment planning is emerging elsewhere in South Asia.

11. Official and political attitude is beginning to show some signs of transformation. For instance,
   - The Ministry of Rural Areas and Employment is now seeking to give more emphasis to community participation in water supply. Some States are beginning to do this but few had time to make progress in identifying, planning and implementing schemes where local communities are given choices and are then expected to meet a share of investment with full operation and maintenance responsibilities.
   - Government’s changed perception was reflected by participants representing government departments who urged revision of tariff rates for providing water supply and sanitation facilities. Since the present rates do not meet the O&M costs in most cities and rural areas, rates should be revised periodically with the aim to meet not only the operation and maintenance costs but a part of capital cost as well. The subsidies should be targeted to the most needy sections of the society.
   - Some local bodies and municipalities are accepting financial assistance for water and sanitation investment from HUDCO and other institutions. These institutions insist on full cost recovery by various mechanisms.

12. Governments, donors and other agencies interested in supporting a shift to this new planning approach should consider the following actions:
   - Support the documentation of experience and expertise gained in India and elsewhere in using demand assessment\(^3\)
• techniques, including contingent valuation, to influence sector policy and investment planning. Lessons from Indian case studies should be presented in easily digestible form.

• Commission the preparation of guidelines on good practices in demand assessment for water supply and sanitation sector, including revealed preference and contingent valuation methods. Specifically, guidelines should address:
  • How demand assessment techniques can be used, for instance, for assessing choices and predicting behaviour; for estimating economic benefits; for informing tariff-setting; and for influencing sector policy.
  • Which demand assessment technique should be used under which condition and which location.
  • How to conduct contingent valuation and other demand assessment techniques.
  • What are the minimum quality characteristics of an acceptable study using contingent valuation or other demand assessment techniques.
  • How to write terms of reference for consultants conducting demand assessments, how to assess the quality of their output and how to use their findings.

• Support capacity building, including training of consultants, officials, members of research institutions and NGOs to use demand assessment techniques in influencing policy and project planning. Training could draw on the case studies and guidelines referred here.

• Commission case studies, in a variety of locations, using demand assessment techniques where water and sanitation improvements are envisaged and to increase the information available on willingness to pay for such improvements.

• Seek and exploit opportunities to apply the new planning approach or its elements and document them carefully, in order to learn lessons, and create demonstration projects.

• Engage in policy dialogue with state and local governments, and utility agencies, to promote the new planning approach.

This might be facilitated by State-level workshops, or study tours to demonstration projects.

• Explore opportunities for networking, improving information dissemination by establishing resource centres to support the use of demand assessment techniques. The first step could be the production of an information brief which sets out the concept of demand assessment, the current use of demand assessment within South Asia and where more information on the technique is available.

• Exploit opportunities to use the media to influence public opinion about the merits of new approach in water supply and sanitation investments, drawing on findings from research and demonstration projects.

• Collaborate in action research with institutions in India and other countries working towards similar objectives.
Case Study I

Study on Willingness To Pay for Improved Water Supply, Sanitary Latrines & Sewage System for Rural Households – Punjab, India*

The issue of investment planning and appropriate pricing for water supply and sanitation services has become very important. In the context of “user pays” principle, a major concern relates to an understanding of the users’ willingness to pay for these services.

BACKGROUND

The Green Revolution in Punjab has been successful in raising both urban and rural income levels but has also effected over-exploitation of ground water resources. Further, despite high rural income levels, the State is yet to extend rural drainage and sanitation facilities to all villages. With this in mind, the Government of Punjab with financial support from the World Bank is keen on executing an Integrated Rural Water Supply and Sanitation Project (IRWSSP) for 2360 villages. Since beneficiaries’ contribution towards capital (CC) and Operation and Maintenance (O&M) costs is a crucial component of IRWSSP, an assessment of the beneficiary’s “willingness to pay” was needed before the project was initiated. This section summarises the survey work undertaken by Asian Information Marketing & Social Research during September-October 1996.

OBJECTIVES

The objectives of the study were to estimate:

1. The households’ willingness to contribute in cash and kind (labour and materials) towards the capital cost of the household piped water connection, household latrine, village and household drainage system.

2. The households’ willingness to contribute in cash and kind (labour and materials) towards the O&M cost of the household

* Study prepared by Asian Information Marketing & Social (AIMS) Research (P) Ltd.
piped water connection, household latrine, village and household drainage system.

3. The determinants of the willingness to pay for the above (household income, available skills, perception of benefits etc.)

SCOPE OF THE STUDY

A survey of households' willingness to pay covering 151 households in 6 villages spread over four districts was undertaken. Of the 6 villages chosen, two will be covered by a new water supply based on ground water sources, two by an upgradation scheme based on surface water sources and two by an upgradation scheme based on ground water sources. In each of the above villages, 24 households were selected, 6 from below the poverty line upper castes, 6 from below the poverty line backward and scheduled castes, 6 from above the poverty line upper castes and 6 from above the poverty line backward and scheduled castes.

METHODOLOGY

The study used the contingent valuation and revealed preference methods for questionnaire design and analyses. Structured questionnaires including both open and close-ended questions were used to carry out the field survey.

Both qualitative and quantitative techniques were used to seek answers to the relevant questions. The database of those who were willing to pay (Non-zero responses) was segregated from those who were unwilling to pay (Zero responses) for the facilities. Based on the responses of those willing to pay, the statistically significant explanatory variables in the relevant models were determined and then applied to the zero responses to estimate the likelihood of these households to contribute to the facilities.

FINDINGS

The response of households was quite poor on the question of payment for water and sanitation facilities. The figures below reveal this weak response:

<table>
<thead>
<tr>
<th></th>
<th>Total non-zero response for CC of household water connection</th>
<th>Total non-zero response for CC of household latrine</th>
<th>Total non-zero response for CC of village and household drain</th>
<th>Total non-zero response for O&amp;M of water supply</th>
<th>Total non-zero response for O&amp;M of household latrine</th>
<th>Total non-zero response for O&amp;M of village and household drain</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>36.42%</td>
<td>35.10%</td>
<td>15.23%</td>
<td>30.46%</td>
<td>33.77%</td>
<td>19.87%</td>
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</tbody>
</table>

Most of the non-zero responses in the Upper Caste Category came from the Upper Income households and in the Lower Caste Category from the lower Income Households. The figures for costs for the high income households are higher than those of the low income households.

The average O&M costs that households are willing to pay are highest for water connections while that for capital costs are highest for latrine.

The survey indicated that 71 per cent of the households had handpumps, 4 per cent both handpumps and piped connection while 9 per cent had only piped water connection. As far as their satisfaction with the current supply, out of 151 households, 67 were not satisfied, 16 found it hard, 15 turbid, 3 to be spreading water borne diseases and the about 6 complained about other problems.

The survey showed that the 85 per cent of the households with piped connections belonged to the higher castes, with better literacy and awareness in the households.

Water supply from a ground water source positively influenced the decision to pay for water and sanitary facilities.

Other factors that contributed to the non-zero responses are the distance of the village from the block HQ, the coverage under new schemes, higher income and higher castes.

The factors that produced non-zero responses for CC of village and household drain included distance from the Block HQ, coverage...
under an upgradation scheme, higher income and higher castes. For O&M cost of drainage, villages which will be supplied from a ground water source responded favourably.

A Comparison of the willingness to pay as per the survey and calculations using Ordinary Least Squares (OLS) Models

For Capital Costs (CC) of Water Connection: (i) Reported 22 per cent will be willing to pay Rs 250. 11 per cent will be willing to pay Rs 1000. (ii) Estimated 61 per cent are likely to pay Rs 401-700. 28 per cent are likely to pay Rs 1001-1300.

For O&M of Water Connection: (i) Reported 19 per cent will be willing to pay Rs 20 per month 7 per cent will be willing to pay Rs 50 per month. (ii) Estimated 87 per cent are likely to pay Rs 26 - 40.

For CC of Household Latrine: (i) Reported 19 per cent will be willing to pay Rs 600. 16 per cent will be willing to pay Rs 1000. (ii) Estimated 66 per cent are likely to pay Rs 401 - 700. 20 per cent are likely to pay Rs 1001 - 1300.

For O&M of Household Latrine: (i) Reported 25 per cent will be willing to pay Rs 15 per month. 4 per cent will be willing to pay Rs 30 per month. (ii) Estimated 20 per cent are likely to pay Rs 26 - 50 per month. 3 per cent are likely to pay Rs 51 - 75 per month.

For CC of Drainage: (i) Reported 10 per cent will be willing to pay Rs 200. 6 per cent will be willing to pay Rs 500. (ii) Estimated 97 per cent are likely to pay Rs 101 - 400. 15 per cent are likely to pay Rs 701 - 1000.

For O&M of Drainage: (i) Reported 12 per cent will be willing to pay Rs 10 per month. 5 per cent will be willing to pay Rs 15 per month. (ii) Estimated 56 per cent are likely to pay Rs 16 - 30 per month. 8 per cent will be willing to pay Rs 31 - 45 per month.

RECOMMENDATIONS & SUGGESTIONS

1. The estimated maximum contribution for capital costs of:
   
   Household Water Connection: (i) Rs 37,188 from 44 per cent of households of all castes if the connection charge is fixed between Rs 701-1000. (ii) Rs 57,432 from 68 per cent of upper caste households if the connection charge is fixed between Rs 701-1000. (iii) Rs 24,237 from 44 per cent of lower caste households if the connection charge is fixed between Rs 401-700.

   Household Latrine: (i) Rs 36,277 from 66 per cent of households of all castes if the connection charge is fixed between Rs 401-700. (ii) Rs 44,306 from 81 per cent of upper caste households if the connection charge is fixed between Rs 401-700. Rs 31,293 from 57 per cent of lower caste households if the connection charge is fixed between Rs 401-700.

   Village & Household Drainage: (i) Rs 24,219 from 97 per cent of households of all castes if the connection charge is fixed between Rs 101-400. (ii) Rs 26,889 from 49 per cent of upper caste households if the connection charge is fixed between Rs 401-700. (iii) Rs 24,699 from 99 per cent of lower caste households if the connection charge is fixed between Rs 101-400.

2. The data reveal substantial variance (9- 57 lt/cap per day) in water consumption across households. It is therefore necessary to introduce water meters to record individual consumption. If meters are not introduced at the beginning, the technical design of the system should enable meter incorporation later.

3. For increased beneficiary contributions intensive awareness campaigns may be important.

4. A number of household latrine designs with a number of cost options should be provided for the households to choose from. This may also increase the number of household’s paying for new latrines.

5. More time and effort be given for fieldwork related to willingness to pay studies. Questionnaires to be short. Female and male members to be interviewed separately.
In each region two type of sites were chosen - Type A, where a functioning improved water supply system was being used by 30 per cent - 70 per cent of the population and Type B, where no such system was available. An overall sample size of 200 households was adopted.

The household surveys included a series of structured questions designed to determine the maximum amount of money the household is willing to pay for the service. While actual observations were used for Type A sites, the CVM was adopted for Type B sites. Comparisons between the results obtained from Type A and B sites should help to validate the method.

The overall research framework proposed was tailored to the needs of the specific conditions in Punjab, the largest province in Pakistan with 57 per cent of the rural population. Within Punjab, three environmental zones were identified based on groundwater characteristics: the sweet water zone where good quality water is easily accessible, the brackish water zone where water is easily accessible but of poor quality and the arid zone where water is not easily accessible though of good quality. In consideration with the policy of household connections only in villages with population exceeding 5000, larger villages closer to major cities and presenting immediate policy problems were chosen. However, in the arid zone, where the policy is not being enforced, smaller villages were included in the sample.

FINDINGS

1. The percentage of households connected to piped systems at the current tariff was highest (96%) in the arid zone, 75 per cent in the brackish water zone and lowest (55%) in the sweet water zone.

2. The mean monthly tariffs that households in villages without piped water were willing to pay for piped systems were Rs 50 in the arid zone, Rs 40 in the brackish water zone and Rs 20 in the sweet water zone.

3. There has been a qualitative change in the nature of household demand in the sweet and brackish water zones from one for
water to one for water-based amenities like indoor plumbing, flush toilets etc. In the absence of piped systems, households, all of which have private pumps and tanks, are providing their own individual services. 60 per cent of households in the brackish water zone and 30 per cent in the sweet water zone have installed systems.

4. It was estimated that in the brackish water zone in a typical village of 5000 people without piped water, households had already invested one million rupees in capital and were spending approximately Rs 10000 per month in operation and maintenance costs. This level of actual expenditure is of the same magnitude as the total cost of a public piped water system serving the entire population. The aggregate willingness to pay for piped systems is also of the same magnitude, thus indicating that cost recovery of a piped system would be possible.

5. Piped systems are considered a substitute for electric pumps. In villages with piped systems, the percentage of households with pumps dropped to 33 per cent in the brackish water zone and 11 per cent in the sweet water zone. However, a considerable number of households continued to invest in multiple systems because of the poor reliability of piped systems. It is the richer and more educated households that demand and are willing to pay for reliability.

6. Higher service levels in the sweet water zone suggests that a review of the policy of not providing piped systems is needed. This is necessary because the current coping strategies are socially inefficient and result in almost two-and-a-half times more monthly operation and maintenance costs.

7. The revealed level of actual expenditure also indicates that piped systems do not need to be subsidised. It is suggested that institutional mechanisms be explored to facilitate private construction and management of collective water supply systems.

8. In the arid zone, demand was largely for water for personal use and households were satisfied with a lower reliability of service, (which was still qualitatively superior to the alternatives in the form of public wells and surface water). However, although the willingness to pay is high, the small village size means that the capital costs cannot be recovered because of the absence of economies of scale.

9. In the smaller villages, variants of systems with public stand-pipes need to be explored. Households in the survey were willing to pay Rs 35 per month and 84 per cent of the households indicated that they would subscribe to such a service at a tariff of Rs 15 per month.

10. In the survey, a majority of households were in favour of metering and were willing to pay higher tariffs than those who favoured flat rates.

11. Village households displayed great reluctance to take on any managerial or operational responsibility.

CONCLUSIONS

Piped systems will not become economically viable or be able to compete effectively with private options unless their reliability is improved. This is not possible without metering because the demand for water in this region is immense. Without metering, water must be rationed, thus reducing reliability. People then tend to develop and utilize other sources and their willingness to pay for piped supply decreases. The utility then fails to collect sufficient resources to run the system using economies of scale.

In the smaller villages, more acceptable and manageable variants of the system with public standpipes need to be explored. As this study indicates, households are willing to pay a reasonable amount of money for even such systems.

The institutional efforts needed to encourage private collective systems are likely to be very difficult and require much motivation. In the deeply fractionalised villages as in Punjab, it is perhaps a lesser evil to leave the system in the hands of a neutral government agency uninvolved in local politics.
Case Study III

Environmental Health Project coping with Intermittent Water Supply: Problems and Prospects, Dehra Dun, Uttar Pradesh, India*

The investment required to rehabilitate and expand India's water supply services is well beyond the public sector's financial capacity. Therefore, the public sector must devise innovative strategies to utilise debt markets or private sector participation as viable financial alternatives to recover the costs of these services. Consumer's demand for water supply services is therefore an essential criteria to sustain water supply services.

As a means of measuring consumers' willingness to pay for water, the Environmental Health Project (EHP) in collaboration with the local NGO Academy for Mountain Environics, undertook this study in Dehra Dun, U.P., India in 1994. The client for the study was the Regional Housing and Urban Development Office (RHUDO)/USAID/New Delhi.

BACKGROUND

Indian cities have no full-service water supply utilities. Currently municipal utilities provide water to households on a partial-service basis. Most low-income city dwellers are not connected to main supplies, and those who receive piped service, receive it intermittently, at low pressures and often in a non-potable condition. Because the service is unsatisfactory, the consumers are reluctant to pay their water bills and delinquency is high. As a result, municipal water utilities cannot collect enough revenue for the system operation and maintenance and the quality of service deteriorates still further. Water planners often misinterpret this poor cost recovery as an indication that prices are too high rather than as an indication of unmet demand and dissatisfaction.

OBJECTIVES

The study was mainly designed to test the hypothesis that the consumer demand is sufficient to support a full-service water supply system without any subsidy. It includes four sub-hypotheses:

1. The willingness to pay for reliable supplies exceeds the current level of payments to the water works department;
2. The current coping costs of intermittent water supply alone are as great as the amount paid in tariffs to the water works;
3. A full-service water supply system is commercially viable;
4. The poor currently pay more for water than the rich.

METHODOLOGY

A large-scale survey method was adopted and executed in order to accomplish the main objectives of the study. The following two estimation methods are used to estimate demand for improved water supply.

1. Indirect Approach: Water consumers in Dehra Dun developed their own strategies to cope with the current intermittent water supply condition. By observing how much people have spent, and what kind of behavioural changes were accompanied to cope with unreliable water supply conditions, the consumer's demand for improved water supply services can be indirectly estimated. For this, detailed water consumption data from individual households, including their capital investment, types of coping strategies and behavioural changes were observed and collected during the field survey.

2. Direct Approach: Consumers' demand for improved water service can be estimated by asking individual households how much they value the improved service. Based on consumer theory and contingent valuation methods (CVM), carefully designed market scenarios are explained to respondents in order to determine their maximum willingness to pay for the improved water supply. Since consumers' demand is directly revealed through a structured series of questions the method is classified

as the direct approach. In order to determine all the factors affecting the demand for improved water service, other relevant socio-economic data were collected from each individual during the survey.

FINDINGS

The findings of the study supported the hypotheses and are listed as:

1. Consumers' willingness to pay for a continuous water supply exceeds the revenues currently received by the Dehra Dun water works. Current payments to the water works averaged Rs 2/m3 while both CVM and coping cost methods indicate a further WTP of Rs 2-2.5/m3.

2. Current coping costs including investment in storage and time costs are at least as great as the amount paid to the water works from water bills. It was estimated that the average coping cost was Rs 10/m3 consumed for the whole sample while the bills only showed a price of Rs 2/m3. For consumers with household connections, total costs including bills and capital investments for storage but excluding time and inconvenience costs, were Rs 4/m3. For public tap uses, the only cost estimated was that of time spent in procuring water, which was as high as Rs 50/m3 during the dry season.

3. Full-service water supply is a commercially viable proposition. Preliminary analyses of an upgrading action plan (providing additional public taps, upgrading treatment facilities, reducing leakages, repairing meters and upgrading collection procedures) indicate that a commercial return could be earned on capital (less than Rs 20 million) and that consumers would not be required to pay more for water in real terms than they do already.

4. The poor, who use public taps, currently pay higher real costs for water than those who are connected. Average costs for households connected are Rs 4-5/m3, while for the poor the costs are over Rs 40/m3. The most powerful rationing mechanism for these public tap users is finding the time to queue and wait for water to come on, and then waiting up to half an hour to fill two 15-litre buckets.

5. To provide an adequate supply of water for the whole city at reasonable rates, the total amount of water does not need to be much greater than the current amount if water is treated as a scarce commodity and conserved.

CONCLUSIONS

The study demonstrates that the real problem with the public water supply in Dehra Dun is not one of affordability. Based on the willingness to pay study, even increased tariffs are affordable. The survey found that the amount that households are willing to pay as a surcharge for a better service is Rs 3.6/m3 on an average.

The population at large preferred metering and a more equal distribution of water by making everyone pay for the amount of water they use.

One important conclusion from the survey was that those respondents who were aware of the health consequences of poor water supply had a higher WTP than those who did not.

The study also confirms the usefulness of the contingent valuation method for describing demand for water supply by showing that the results are consistent with revealed demand as evidenced by the costs of coping. However, as the CVM approach is rather expensive, determining actual coping costs can provide a good estimate of demand.

RECOMMENDATIONS

1. To verify the accuracy of the coping costs approach, a follow-up study should be conducted in the dry season and in a larger town.

2. To describe the total demand for water services, a study of institutional use and the incorporation of their needs in a system design require careful investigation. Survey methods such as those applied for the households are not suitable for that purpose.
3. To improve the urban environment in Dehra Dun, a participative health survey is recommended to be conducted as part of a broader campaign. Such a survey is to be undertaken in the dry season to coincide with the period of maximum water shortage and poor health conditions of those most severely affected.

4. To institutionalise the expertise and methodology which were acquired during this project further studies and research should be supported by external assistance.

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**Case Study IV**

**Gomti River Pollution Control Project**

**INTRODUCTION**

The Gomti River Pollution Control project (GRPCP-I) has the primary objective of reducing river pollution and health hazards in Lucknow and downstream from Lucknow through improving basic services of sewerage, sanitation, surface drainage and solid waste disposal. The project is currently in the planning phase. As a part of this project, the Management Services Group were commissioned by the Department For International Development (DFID), formerly Overseas Development Administration (ODA), to undertake a financial and economic analysis of the project. As an input to the economic analysis the Social and Rural Research Institute was commissioned to undertake a city-wide survey to assess the distribution of various facilities and the willingness to pay for these and the environmental benefits that could accrue from the project.

**OBJECTIVES**

The main objectives are as follows:

1. To estimate the variety, types and costs of various sanitation systems, surface drainage and solid waste disposal facilities that exist in Lucknow;
2. To assess the user and environmental costs of flooding and therefore the expected benefits of reducing flooding;
3. To assess the health costs of diseases related with poor sanitation, water and waste disposal facilities;
4. To ascertain the perceived environmental benefits of improved service delivery and a cleaner river and city;
5. To estimate the willingness to pay for upgraded systems of sanitation, sewerage, solid waste disposal and environmental cleanliness.

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*Report on Economic Appraisal Management Services Group Contingent Valuation Study prepared by Social and Rural Research Institute, Delhi*
METHODOLOGY

To start with, all respondents were categorised by three socio-economic classes (SEC) and according to whether they lived in the core or periphery areas of Lucknow. Furthermore, the present sanitation arrangement in the household was used as a parameter to select the WTP survey sample. The respondents had been asked about their current service arrangements. It was assumed that those households with covered pucca nali or pipelines for drainage, a latrine connected to a sewer for sanitation and a jamadar collecting their garbage or households which threw their garbage in a collection point was considered to be adequately served and were not asked for their willingness to pay.

For determining the WTP for upgraded services, the respondents were given alternative options and told about the benefits from these options. They were then asked if they were willing to pay the estimated cost for this option. Those who were willing to pay this price, were asked if they were willing to pay more for better quality. Those who were not willing to pay this price were asked if they could pay it in instalments. Finally, they were asked the maximum amount that they would be willing to pay for this service.

The questioning procedure relied upon a spontaneous response rather than a given figure for the cost. If the response was less than the estimated cost of this service, then they were told this cost and asked if they were willing to pay this amount. If they agreed to pay, the price was further increased. If they did not agree, the price was decreased by some fixed amount and checked for their willingness to pay. If the spontaneous response was more than the estimated cost, the amount was further increased by some fixed amount. The last price agreed was recorded as the willingness to pay for the option selected.

For assessing flood prevention and health benefits, "Savings in Costs", an indirect method was used. Savings in cost include only material costs that are relatively easy to put a monetary value on. For flooding costs, the costs do not include non-material costs which are difficult to quantify such as the loss of life, accidents and ill health caused by flooding, drudgery of cleaning up after a flood and having to live in fear of being flooded every monsoon season. For health costs only those related to diarrhoeal disease were considered.

FINDINGS

WTP for Drainage Arrangements

1. Only about 12 per cent of households were willing to invest in a drainage upgrade. The current arrangement that the household had very little bearing on the desire to upgrade. Ownership of houses had a greater significance in influencing willing to invest in upgrading works.

2. The option preferred mostly was the most expensive, covered pucca nalas.

3. In terms of capital cost, people were prepared to pay substantial amounts. The average maximum willingness to pay range from Rs 1440 to Rs 3000.

4. The respondents were willing to pay between Rs 10 to Rs 22, with the average monthly amount of Rs 16 for maintenance of installed drains.

WTP for Sanitation Arrangements

1. 39.2 per cent of the households already have sewer connections. The rest have the potential for improving their facilities. The options offered were community latrine, individual septic tank, shared septic tank, and rehabilitated or new sewer.

2. The option selected depended on technical suitability and affordability. A higher percentage of households with unacceptable facilities like those defecating in the open, service latrines and discharging into nalas were willing to invest compared to households with onsite sanitation.

3. The amounts households were willing to pay on average range from Rs 2100 to Rs 3000 for a one-time investment with an average of Rs 2473.

4. The WTP for lower SECs improved substantially when the alternative scenario of paying by instalments was offered.
5. Land ownership came out as the main reason for not wanting to invest in an upgrade. This was followed by ability to pay amongst the lower SECs.

WTP for Solid Waste Disposal
1. Nearly 65 per cent of the households presently disposed their waste indiscriminately either outside the house or in to the nalas. 2. 80 per cent of the households currently throwing waste indiscriminately were willing to pay for a jamadar to collect the waste. 3. The average maximum willingness to pay was Rs 264.

FLOODING COSTS
1. About 18 per cent of respondents in the core area and 16 per cent in the peripheral area said they had suffered a loss of earnings. Average loss of earnings was estimated as Rs 407 per household in core areas and Rs 295 in the peripheral area. 2. 3.5 per cent of the respondents in the core area and 4 per cent in the peripheral area reported that they had to incur expenditure for flood damage repair. The labour and the material costs paid per household averaged Rs 447 and Rs 2426 in the core area and Rs 895 and Rs 3045 in the peripheral area. 3. 6 per cent of households in the core area and 4 per cent in the peripheral areas had suffered damage to household items. The cost of repair of these items averaged Rs 261 and Rs 302 per affected household respectively. 4. 7 per cent of respondents had taken preventive measures to protect their properties against floods and had spent Rs 2483 and Rs 1440 on average in the core and peripheral areas respectively. 5. The average flooding costs for the core area was Rs 245.5 lakhs, and for peripheral areas Rs 1702.7 lakhs.

HEALTH COSTS
1. 13 per cent of the households reported at least one case of diarrhoea in the last 15 days from the day of the survey. 6.3 per cent of the total affected households consulted a doctor and spent Rs 30 on consultation fees and 4.2 per cent had spent an average Rs 64 to visit the doctor using various modes of transport. 7.7 per cent had spent an average Rs 156 further buying medication to treat the illness. 2. 2.3 per cent of the households lost earnings either from staying off work due to sickness or to tend a patient and on an average 8.8 working mandays per household were lost. The average earnings per working day lost was Rs 21.40. 3. 70 per cent of the households used some method to control mosquitoes. Houses in lower SECs used cheaper methods like smoke, kerosene or fans while higher SECs used more expensive coils, mats and repellent creams. 4. The total cost at the household level on diarrhoeal diseases per year is Rs 543.6. Total savings in costs associated with diarrhoeal diseases with the project were 131 lakhs. 5. The above total estimated savings in health costs that have been quantified in monetary terms, to reflect health benefits from the project, are likely to be understated as only diarrhoeal diseases were considered and the intangible benefits like suffering and pain were left out.

WTP FOR ENVIRONMENTAL BENEFITS
A. For Cleaning The Gomti
1. Almost all respondents when asked, if they felt that the river was polluted felt strongly that it was polluted. 2. The factor that received the highest ranking in the causes of pollution was the condition of nalas. Polluting industries were considered to be the next important factor. Apathy of government bodies and poor drainage followed. 3. The majority of respondents said that benefits of river cleaning would be safer drinking water and improved health. 4. Over 68 per cent of respondents were willing to pay for cleaning up the Gomti River. The average amount respondents were willing to pay was Rs 209 per household per year. Over 74
percent of the respondents felt that their responses would affect government policy. The respondents who were not willing to pay felt that it was the responsibility of the government to take up this work or they could not afford so much money or were unsure of the credibility of the organisation undertaking it.

B. For Cleaning The City

1. Improper solid waste disposal was also assigned to be one of the major causes of pollution in the city. Of the three services, the role of solid waste disposal received the highest ranking in terms of making the city clean.

2. As to the perceived benefits of cleaning up the city, common responses revolved around improved health conditions and a cleaner environment.

3. About 68 per cent of the respondents said that they were willing to pay for city cleaning. The average amount that the households were willing to pay was Rs 188.5 per year. The WTP in the core area was almost 30 per cent more than that in the periphery. This may be due to the fact that the problems in the core area were more severe than in the periphery.

CONCLUSIONS

The WTP study or "Contingent Valuation Survey" was an important aspect of the economic appraisal. The user benefits were aggregated on the basis of WTP findings and the total benefits from the project were estimated. Since the user benefits form the major proportion of the total they can significantly influence the benefit stream.

Case Study V

The Efficacy of Improved Supply Systems in Meeting Rural Water Demand for Domestic Needs: Evidence from Northern Kerala*

INTRODUCTION

Large quantities of financial and human resources have been devoted to improving rural water supply system over the past two years. Many projects in this direction have been successful but many have also failed to meet the needs of the beneficiaries. Evidence of failures lie in the unused and poorly maintained systems that are scattered throughout rural areas. Now with the severe resource constraints in developing countries and more policy decisions which insist upon beneficiary contributions even for public services, it is more important to understand the behaviour of users, which determines the final demand, use and maintenance of the systems. It is within this context that this study was undertaken to explore user choices, understand their willingness to pay for the water supply and the impact of the socio-economic characteristics of rural households on the sustainability and improvement of the water supply services.

OBJECTIVES

The principal objectives of this study are:

1. To ascertain the role of the improved systems under different environmental conditions in meeting domestic needs for water by developing an empirical base on water source choice, water source characteristics, consumption levels and source contribution;

2. To understand how rural households in different socio-economic and environmental settings respond to different levels of improved service at different prices;

* Prepared by Radhika Ramasubban, Bhanwar Singh Centre for Social and Technological Change, Bombay
To assess the consequence of this information for key policy variables such as the level of service, the option of yard taps and stand posts, resource mobilisation through beneficiary contribution and beneficiary participation in operation and maintenance of the system.

COVERAGE

The study has covered three socio-economic and environmental settings in northern Kerala:

Area I with access to good quality and traditional sources of water.

Area II where water scarcity has become a constant feature over the years

Area III with abundant quantities of water through traditional sources but of poor quality due to saline intrusion.

In each of the three areas, two sites were studied - one, where improved water supply has been in existence for a few years and two, where an improved service is still to be provided.

METHODOLOGY

Sample selection included three categories of households -

1. Those with yard taps already (connectors-only about 7-11 per cent so far).

2. Those without yard taps although there is provision available (non-connectors).

3. Those who will probably get connected when the provision is made (probable connectors).

The field investigation was carried out with the help of pre-designed questionnaires, structured to collect detailed information on a) demographic, social and economic characteristics of the households; b) "revealed behaviour" of the households related to the main water sources used; and c) "contingent valuation" i.e. source choice decision in the presence of an alternative, specified by the level of service and a sub-set of prices.

Bidding games were evolved to address policy issues of specific interest-connection costs, tariffs and quality of the service.

For connectors, those who are already connected, two bidding games were played:

1. with increased monthly charges from the current level in stages for the same service and checking as to at what price, they would discontinue their connections.

2. with increasing monthly charges in stages against improved service over the current one, to determine the maximum price the respondents are willing to pay.

For non-connectors, those who have chosen not to connect, 3 bidding games were played:

1. assessing their response to a graduated set of connection costs without changes in tariff;

2. connection cost is reduced drastically, but the tariffs are increased significantly; and

3. the connection cost was fixed at a low price and monthly tariffs raised with an improvement in the quality of the service.

For probable connectors, those who are likely to connect when they have access to it, two games were played:

1. assessing the response to a range of connection costs and

2. assessing the response to a financing scheme which reduces the initial costs and raises the monthly charges.

The Contingent Valuation technique was also used - to ask connectors, the purposes for which the improved service would be used if made available, or what traditional sources they would use, if the piped water became prohibitve, and to ask non-connectors the reasons for not taking a connection and to probable connectors, the basic level of awareness about the piped water system.

Two other tools of investigation were used; a village schedule was designed to capture the relevant socio-economic and water related details and focused interviews were conducted with informal women's and men's groups separately.
FINDINGS

1. 3.5 per cent of households with yard taps located in water scarce area, 91 per cent in adequate water area and 43 per cent in areas with saline water intrusion resisted bidding beyond the current level of water charges. In the water scarce area, the majority of households responded positively even to a water charge of Rs 50 per month.

2. For an improved level of service (length of supply increased from 1 - 2 hours to 8 hours everyday and improved reliability), connectors even in the area with adequate water were willing to raise their bids. About 30 per cent of households were willing to double the existing charges and another one-third were willing to pay four to five times more than the current levels. In areas with saline water, majority was WTP for a significant increase in water charges. In the water scarce area, the response to higher bids for improved services improved even further. Nearly two-thirds were willing to pay 6 to 10 times more than the current rates.

3. Nearly 90 per cent are willing to pay for yard taps at the existing monthly tariffs and poor service levels, if the connection costs are reduced substantially. It would appear that the inability of the water system to provide yard taps is the main factor in explaining why households do not choose a private connection. In the adequate water zone, a majority of households would select yard connections at the same tariffs and service level, if there was a reduction in connection costs by 50 per cent.

4. Only a small proportion of all probable connectors were willing to connect at a cost of Rs 700. Surprisingly, 45 per cent of households in the poor quality water area and about 30 per cent in other areas were inclined to stay with their current source. It therefore seems that even at lowered connection costs and at the current tariff, the connection rate would only be in a range of 55 - 70 per cent.

5. It appears that the prospect of offsetting the effect of reduced connection costs by raising the monthly charge is not a very promising one as it could well lead to a substantial decline in connection rates. The evidence, however, does indicate the scope for a marginal increase in the current level of charges. A nominal connection cost and an average monthly charge of around Rs 10 is likely to result in about a fourth of the rural households hooking up to the improved service.

CONCLUSIONS

Rural households continue to use multiple sources of water. The improved system in its present form is only performing a supplementary role in meeting the rural water demand.

Income, tariffs, education and connection costs are important determinants of whether people would connect to the improved service. It is the initial connection cost, which seems to reduce demand for new house connections. However, the reliability of the service has a substantial positive effect on connection to an improved system and it offsets the negative effect of the tariff.

Well-taps are considered to be highly competitive with yard taps but public taps have a lower demand. However, public taps have undoubtedly helped in minimising the hardships faced by poor rural households in meeting their domestic water demand. Yard taps are regarded as a normal good and people tend to switch to them as incomes rise. While meeting of connection costs through loans or its incorporation into the tariff structure will enable a large number of households to hook up to the improved service through yard taps, access to potable water for the very poor will have to continue to be through public taps. Ensuring a longer duration of supply through these taps, better quality heavy duty taps, the use of liberalised consumption norms while planning for these systems and people's participation in operation and maintenance ought to be on the agenda.

People want house connections, for which they have been paying and are willing to pay for. Their willingness to pay is further enhanced with rise in incomes, educational levels and reliability of the service both in terms of quantity and quality. ingleton
Case Study VI

Willingness To Pay for Water in Kerala, India

OBJECTIVES

This study examines willingness to pay for connections to central water systems in several areas of northern Kerala State in India. It also attempts to explore socio-economic characteristics which determine household's WTP.

METHODOLOGY

The method adopted is to analyse the contingent valuation data collected in three areas of Kerala State - one, with abundant traditional sources of water, two, where traditional sources tend to dry up in summer and three, where there is abundant water but it has begun to experience salt water intrusion.

For sampling, households which currently own yard taps, households with access but have chosen not to purchase connections and households that do not yet have public water systems were included in the three sites.

Bidding Games are designed to find out how much people would be willing to pay for yard taps (both connection charge and monthly tariff) and how much they would be willing to pay for improved water service.

FINDINGS

1. Respondents in the bidding games were very sensitive to both the monthly tariff and the connection cost.

2. It is probably not the connections cost, but credit market conditions that reduce demand and ability to pay for new yard taps. The Water Authority has considerable scope to solve this problem lower credit for its customers.

3. Only current connectors are willing to pay substantially more for improved service. In particular, residents of scarce water areas were WTP the largest premium for a better service.

4. Owning a yard tap appears to reduce the impact of many socio-economic variables on the quantity of water used.

5. Simulations of results indicate that at a monthly tariff of about Rs 10 many more connections (even half of the poorest quintile) could be accommodated, the connection cost could be paid for as a component of tariff, and an increase in authority's revenues would result.

CONCLUSIONS

Large increases in welfare would result from reducing constraints on yard tap ownership implicit in the current system. The fact that current connectors are interested in a better service suggests that if more households connect, their concern after doing so will be for better service.

Case Study VII

Study on Willingness To Pay for Water and Sanitation Services*

BACKGROUND

Baroda Municipal Corporation (BMC) is presently engaged in water augmentation scheme. The original estimate of the scheme is Rs 66 crores. HUDCO has sanctioned a loan of Rs47 crores for this scheme. During this process of sanctioning the loan, HUDCO has insisted upon revision in water tariff. BMC has suggested some revisions in tariff rates for water. However, it is necessary to ascertain the effectiveness of these new rates in recovering the costs and as efficiency pricing. In this background, this study of demand and willingness to pay for water and sanitation has been sponsored by the Human Settlements Management Institute (HSMI), New Delhi, India.

OBJECTIVES

The main study objectives are to:

(a) evolve an approach for doing systematic willingness to pay studies for water and sanitation in urban centres.
(b) determine for Baroda metropolitan area
(c) the existing level of water supply and sanitation services and the related expenditure on water and sanitation by the different user groups

- the preferences and willingness to pay of households and industrial firms regarding the type of service provision and management of water supply and sanitation systems.

METHODOLOGY

The research team used both indirect (revealed preference) and direct (contingent valuation) methods to analyse how households make their choices about water and sanitation services. The indirect method used the revealed preferences of households through the actual choices and investments made by households in situations where no piped water is available and in others where it is not adequate. It will cover aspects related to nature of capital investments made and the operation and maintenance costs incurred by the households and/or communities.

Contingent Valuation method was used to estimate for Willingness to Pay based on the current levels and preferences identified, hypothetical choices and related price ranges were worked out for each major user category.

A survey of 550 households from different zones and types of housing was carried out. Detailed survey of 200 households among the sampled households was carried out for estimating WTP. For estimating demand from industrial sector, survey of 40 units was carried out.

FINDINGS

A. Domestic Sector

(a) Existing Situation: About 19 per cent of the households have individual house connection and another 7 per cent share it with others. As many as 29 per cent of households use house connection with pump, handpump, underground storage, etc. Bore/tubewell is used as a partial/full source by 19 per cent of the households. About 26 per cent use public sources for water supply. Only 18 per cent of the households are satisfied with existing municipal system. Every third house in the city spends on an average, one house per day for collection of water. Most of this time is spent by women and children. Opportunity cost of time is about Rs 2.5 crores per year.

As far as the procedure for obtaining new connections, it is very time consuming and cumbersome. Households generally utilise services of licenced plumbers to obtain the permission. It is estimated that unauthorised connections in the city are between 10 to 15 per cent.

A very large proportion of the households have access to sewered connections (63%). Shared toilet and septic tanks are used by 28 per cent of the households. Remaining 10 per cent use public toilets or

* Case study of Baroda prepared by Chetan Vaidya
open fields. About 73 per cent of the households are satisfied with the existing system.

(h) Expenditure: Annual municipal expenditure on water is very low (Rs 102 per households). About 49 per cent of the households have made capital expenditure on bore, handpump, filter and underground storage. Average capital expenditure among these households is Rs 2774. Per household non-municipal annual expenditure on water is 3 times more than municipal expenditure. Together, they account for only 1.36 per cent of average household income.

Annual municipal expenditure on sanitation is Rs 101 per household and corresponding figure for non-municipal expenditure is Rs 35 (among all households). Only 16 per cent of total households have made expenditure on non-municipal sanitation such as septic tank or soak pits.

(c) WTP for Water and Sanitation: Among households without house connection, 85 per cent households are WTP for improved public standposts. Among households with house connection, WTP for improved pressure and quality is 63 per cent and 11 per cent respectively. Average WTP for better pressure is Rs 25 per month.

Among all households, as many as 58.5 are WTP one time connection charge. These households are ready to pay Rs 726 per households. Little over 95 per cent are WTP water charges at the rate of Rs 24 per household. Annual WTP among all households is Rs 339 per household for water. It is 3 times the existing municipal expenditure but 60 per cent of the present non-municipal expenditure. WTP as percentage of household income is 0.85 per cent.

As many as 79 per cent of the households with house connection have expressed that they would continue to use the house connection even if monthly charge is increased from present Rs 8 to Rs 25 per month.

Only 28 per cent of the households are WTP connection charge for sanitation and the amount per household is Rs 597. As a percentage of household income it is only 0.36 per cent. Annual WTP is estimated to be Rs 144 among all households. Annual revenue for sanitation will be Rs 3 crores. WTP for water and sanitation taken together is only 1.21 per cent of household income, which is very low. Further, it decreases with rise in income.

B. Industrial Sector

Survey of large industries reveal that most industries cannot afford to rely solely on BMC production of water. Minimum cost rules are not the only factor in this decision. Benefits of having an own water supply system play an important role. Small and medium units need municipal water. However, they are not willing to pay more than present municipal charges. Industrial sector may not be able to cross-subsidise domestic users beyond a certain limit.

CONCLUSIONS AND RECOMMENDATIONS

Domestic water supply in Baroda is highly subsidised. With the implementation of the on-going scheme, supply of water in the city is likely to increase. Households have also expressed willingness to pay for water improvement, it is the appropriate time for BMC to accept principles of full cost recovery and achieve it gradually.

Specific recommendations are:

1. Increase local knowledge about cost of water and sanitation services.
2. Launch campaign with the theme of improved water supply at appropriate prices.
3. Raise minimum water charges from Rs 7.50 per month to Rs 25 per month. Connection charge for domestic water and sanitation to be increased from Rs 250 to Rs 750 and Rs 1000 respectively.
4. Integrate water and sanitation charges.
5. Shift responsibilities of distribution of municipal water to local groups.
6. Involve ward committee to be formed under the New Nagarpalika Bill.
7. Regularise unauthorised connections.
8. Simplify procedures for new connections.
9. Market water and sanitation to policy makers and communities.
10. Support community based infrastructure finance system.
11. Delink service taxes from Annual Rateable Value (ARV).
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