



**WATER AND SANITATION  
FOR HEALTH PROJECT**

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**GUIDELINES FOR CONDUCTING  
WILLINGNESS-TO-PAY STUDIES  
FOR IMPROVED WATER SERVICES  
IN DEVELOPING COUNTRIES**

**WASH FIELD REPORT NO. 306**

**OCTOBER 1988**

**Prepared for  
the Office of Health,  
Bureau for Science and Technology,  
U.S. Agency for International Development  
WASH Activity No. 353**

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## Chapter 1

### INTRODUCTION

The purpose of this manual is to provide practical advice for individuals who are interested in conducting a study on the willingness to pay (WTP) for water of households in a developing country.

#### 1.1 WTP Studies Defined

Willingness-to-pay studies are simply household surveys in which a member of a household is asked a series of structured questions which are designed to determine the maximum amount of money the household is willing to pay for a good or service. When WTP studies are conducted to assist with water-sector policy or planning, the specified good or service could be a house connection to a piped distribution system, access to a handpump or standpost, or provision of household sanitation facilities. WTP studies are also termed "contingent valuation" studies because the respondent is asked about what he or she would do in a hypothetical (or contingent) situation.

#### 1.2 Development of the WTP Methodology

The methodology for conducting WTP studies has been largely developed over the last 15 years by resource and environmental economists interested in such problems as estimating the benefits of environmental improvements (for example, changes in air and water quality).<sup>1</sup> Efforts to develop and improve the WTP methodology have focused not only on the most appropriate means of asking the WTP questions, but also on ways of determining whether people have answered the questions truthfully. There was initially little interest among economists in the WTP methodology because it was generally assumed that respondents would attempt to influence the results of a WTP survey by answering "strategically."

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<sup>1</sup>For excellent reviews of the current state of the art, see Ronald G. Cummings, David S. Brookshire, and William D. Schulze, (editors), Valuing Environmental Goods: An Assessment of the Contingent Valuation Method (Totowa, New Jersey: Rowman and Allanheld, 1986); and Robert Cameron Mitchell and Richard T. Carson, Using Surveys to Value Public Goods: The Contingent Valuation Method (Washington D.C.: Resources for the Future, 1986).

That is, instead of revealing his true valuation of the good or service, the respondent would give an answer designed to serve his own interests.<sup>2</sup>

The empirical evidence available to date from developed countries, however, suggests that such strategic bias is not as much of a problem as initially feared, and a consensus is gradually emerging that carefully conducted WTP studies can provide valuable information on households' preferences. There have also recently been successful attempts to apply the WTP methodology in developing countries.<sup>3</sup> The possibility of using WTP studies in developing countries is particularly significant because there is so little existing information on household demand for basic services, such as water supply, and there are few alternative approaches for estimating demand relationships due to the absence of high-quality household-level data.

### 1.3 The Uses of WTP Studies

Both policymakers and water resource planners working in developing countries have become increasingly interested in conducting WTP studies in order to learn more about households' preferences for improved water supplies and their willingness and ability to contribute toward the costs of operation and maintenance and construction. This interest stems in large part from a widespread acknowledgment among professionals in the water sector that communities' preferences regarding proposed water systems need to be incorporated in the planning and decision-making process and communities need to contribute money (and perhaps labor) to a water project so that they have a sense of ownership of the project and to ensure that the project will be both sustainable and replicable.

WTP studies in the water sector can provide information to assist policymakers and planners with four main types of decisions:

1. Site Selection. If a water agency or donor has a limited investment budget and must choose which villages and towns are to receive a new water system, WTP studies can assist with the

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<sup>2</sup> For example, if an individual were asked how much he would be willing to pay per month for the use of a public standpost, he might say that he wasn't willing to pay anything if he felt that the public standpost would be provided anyway and his answer might influence the amount he would be charged. Alternatively, he might give a very high amount if he felt his answer would influence whether the water agency would construct a water system in his community and if he felt that, once installed, the water agency would not be able to collect any fees.

<sup>3</sup> See Dale Whittington, John Briscoe, Xinming Mu, and William Barron, "Estimating the Willingness to Pay for Water Services in Developing Countries: A Case Study of the Use of Contingent Valuation Surveys in Southern Haiti," forthcoming in Economic Development and Cultural Change, 1988.

task of prioritizing investments. For example, villages in which the willingness to pay for improved water services is high are more likely to benefit most from a new water system and also most likely to be pay for recurrent costs of the system. Similarly, if a village has many high-quality, traditional water sources nearby, willingness to pay is likely to be low. In this case a new water system would not likely be used and would be a poor investment.

2. Choice of Service Level. Water resource planners in developing countries have commonly assumed that a community should be provided with the highest level of service possible, as long as the cost does not exceed 5 percent of household income. It has also been assumed that so long as the financial requirements of the improved water system do not exceed this 5 percent, households will abandon their existing water supply in favor of the improved system. Recent experience has shown, however, that this simple model of behavioral response to improved water supplies has often proved incorrect, with the result that poor investment decisions are made with respect to choice of technology. Sometimes too low a level of service is selected, and households are not willing to pay for the service even though the costs are less than 5 percent of income. On the other hand, households may be willing to pay more than 5 percent of their income for a house connection because they receive much better service than from a handpump or standpost. Information from WTP surveys may provide an improved basis for predicting whether people will use an improved source and for estimating the benefits of different service levels. In this way the surveys can assist in the selection of the most appropriate technology.
3. Tariff Design. Water utilities are under increasing pressure to be financially viable and to raise the prices they charge for water. However, few water utilities in developing countries have adequate information on which to base decisions regarding tariff design. If prices are set too low, revenues will not be sufficient to cover the costs of supplying water. If prices are set too high, households will not be able to afford to connect to a piped distribution system, and revenues will again be too low. WTP studies can provide information on the number of households which will choose to connect if different prices are charged. The relationships between the

price of water, the number of households connected, and utility revenues can thus be estimated.<sup>4</sup>

4. Project Design: Cost-Benefit Analysis. To the extent that households understand all the changes which will result from an improved water supply system, the WTP bids can serve as a measure of the economic and social benefits of the project.<sup>5</sup> For example, households' WTP bids may include their valuation of aesthetic, health, and other difficult-to-measure benefits. The summation of the WTP bids for all the households affected by the project is an estimate of the total benefits of the project and can be compared with the costs of the project in order to decide whether the investment is justified.

In addition to the economic information which can be obtained from WTP surveys, such surveys provide managers of water utilities and policymakers in the water sector with a new management tool. One of the most common themes in the current management literature is that managers--in both the public and private sectors--need to be in better touch with their customers. They should spend more time "wandering around" and talking informally with both their employees and their customers in order to understand their problems and needs better, and to get their input for fashioning solutions. WTP surveys are one means of facilitating this process. Such surveys provide a rich basis of information for further questioning and probing by managers. By themselves, WTP surveys are a highly structured, formal means of eliciting information on households' preferences for improved water services, but they can be extremely valuable as a way of convincing managers and policymakers of the necessity of communicating with people and facilitating a more open, participatory management style.

#### 1.4 The Aims of These Guidelines

This manual does not provide a summary or overview of the theoretical issues involved in the development and use of the contingent valuation method. The objective is rather to share some of the lessons which have been learned about carrying out WTP surveys in developing countries. To date the Water and Sanitation for Health (WASH) Project has been involved in case studies of the

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<sup>4</sup> See Dale Whittington, Donald Lauria, and Xinming Mu, Willingness to Pay for Water and Water Vending in Anambra State, Nigeria: Volume I - Onitsha (Draft), Report to the Anambra State Water Corporation, June, 1988.

<sup>5</sup> For a discussion of some of the difficulties involved in applying cost-benefit analysis to such investments in the water sector, see Duncan MacRae, Jr., and Dale Whittington, "Assessing Preferences in Cost-Benefit Analysis: Reflections on Rural Water Supply Evaluation in Haiti," Journal of Policy Analysis and Management, Vol.7, No. 2, 1987, pp. 246-263.

WTP methodology in three developing countries: Haiti, Nigeria, and Tanzania.<sup>6</sup> This manual is based on the WASH experiences in these three countries. It offers the kind of practical advice that the WASH research team wishes it had before it began its own fieldwork.

Chapter 2 of the manual deals with many of the issues involved in questionnaire design. This material is in many respects the heart of the manual and the material that many people will probably find most useful. Chapter 3 focuses on issues of survey implementation. Many aspects of the implementation of WTP studies are common to all socioeconomic surveys in developing countries, and this chapter simply highlights a few of the main points to remember. Chapter 4 discusses the analysis of the data collected in the survey in a very general way without going into the details of the econometric analysis. Chapter 5 outlines two types of studies which may be conducted in conjunction with WTP surveys: observations of water sources and surveys of water vending activities. Chapter 6 provides a general sense of the skills, resources, and time required to carry out a WTP study for improved water services in a developing country. Chapter 7 offers some concluding remarks on the appropriate use of information gathered from WTP surveys.

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<sup>6</sup> See Dale Whittington, Mark Mujwahuzi, Gerald McMahon, and Kyeongae Choe, Willingness to Pay for Water in Newala District, Tanzania: Strategies for Cost Recovery (draft), and Dale Whittington, John Briscoe, and Xinming Mu, Willingness to Pay for Water in Rural Areas: Methodological Approaches and an Application in Haiti (1987). Both are published by the Water and Sanitation for Health Project, Arlington, VA. See also Dale Whittington, Donald T. Lauria, and Xinming Mu, Willingness to Pay for Water Vending in Anambra State, Nigeria, Vol. I: Onitsha, Vol. II: Enugu (draft). (Report to the General Manager of the Anambra State Water Corporation, June 1988)

## Chapter 2

### QUESTIONNAIRE DESIGN

#### 2.1 Preliminary Issues

WTP questionnaires tend to be long and time consuming because in addition to a section which includes the WTP questions themselves, the questionnaire will usually also have sections on current water use practices and attitudes and socioeconomic characteristics of the households. These two sections are included so that the analyst can examine the factors which influence how much a household is willing to pay for water, and, indirectly, to assess the validity of the answers to the WTP questions.

There is no standardized questionnaire for a WTP study; each survey instrument should be developed in the field based on the conditions in the selected study area. The questionnaire used in a particular WTP study will be unique because the number and content of questions to be included will be constrained by three factors, all of which will vary in different situations: the policy issue(s) and concerns which motivated the study, the time which most respondents are willing to spend participating in the interview process, and the time available for fieldwork and data analysis.

First, there are always more issues of both research and policy interest than can practically be addressed in a single study. The analyst must carefully identify the policy issues which have the highest priority and focus the questions in the survey instrument on these issues. This process of deciding how to limit the scope of the WTP study to address the principal concerns of the client will largely determine the content of the questionnaire.

Second, there is a practical limit to how long most respondents in a given culture will answer an enumerator's questions.<sup>7</sup> This time limit may vary from household to household, and among household members, and at different times of the day. Before designing a questionnaire, the analyst must determine the maximum amount of time which a respondent can reasonably be expected to devote to the interview. This limit may be determined by asking experienced survey researchers familiar with the study area or by early experimentation and pretesting during the fieldwork. The limit may or may not finally constrain the length of the questionnaire because other factors may require an even shorter

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<sup>7</sup> In developing countries mail or telephone surveys are almost always impractical because, among other reasons: most people do not have working telephones, many people may be illiterate and unable to answer written questions, both mail and telephone services function poorly, households in squatter settlements may not have addresses and may be reluctant to formally acknowledge the location of their residence, and the cost of returning a mail questionnaire through the postal service may be high. We thus assume that the WTP questionnaire must be conducted orally by trained enumerators who interview respondents in person.

interview, but it would be counterproductive to design a questionnaire which required, for example, an hour and a half to complete, if only 50 percent of the respondents would consent to be interviewed for more than 45 minutes.

A third consideration is the time available for work in the field and for data analysis, both of which set limits on the number and content of questions to be asked in the WTP survey instrument. Given a limited amount of time for fieldwork, the analyst will typically face a tradeoff between completing a fewer number of longer interviews or a greater number of shorter interviews. It may be necessary to limit or simply exclude questions on some topics in order to obtain a large enough sample for reliable statistical analysis. Similarly, there is no point in collecting information which cannot be analyzed within the time and budget available for the completion of the study. In an extreme case, this may mean that the questionnaire will include only WTP questions and leave out questions about water use practices and socioeconomic characteristics. In such a case the analyst can say little about the likely validity of the WTP bids, or what will happen to the demand for water if changes occur in economic or social conditions in the community.

## 2.2 Alternative WTP Question Formats

In a society in which a substantial portion of the population may be illiterate, there are only two basic approaches to asking an individual his or her willingness to pay for an improved water service.<sup>8</sup>

### 2.2.1 Direct Questions

The first approach is a direct question such as the following: "What is the maximum you would be willing to pay per month to have a public standpost within 50 meters of your house?"

Based on the WASH Project's field experience with WTP surveys, this question format is not likely to work very well. There are two main difficulties. First, the meaning of the question itself can be difficult to translate. For example, in Haiti respondents were uncertain what was meant by "maximum." One person in particular asked whether the enumerator meant if someone put a gun to his head, what is the maximum he would pay? The enumerator tried to explain that the question meant how much he would freely be willing to pay, but this only added to the confusion, because the respondent then indicated that if he was free to decide, he would, of course, rather pay nothing.

The problem is that the concept of the maximum amount one is willing to pay depends on a clear understanding of the institutional arrangements in place and the assignment of property rights. In societies in which individuals are used to having property (and human) rights arbitrarily confiscated by the government

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<sup>8</sup> In developed countries respondents are sometimes presented with cards on which to check their responses to written material (this is termed the "payment card" method).

or other groups, the concept of the maximum one will pay is naturally easily associated with coercion.

The second, and related, problem with this direct question format is that individuals often respond to the question by asking how much they should pay or how much they would need to pay in order to have the improved water service. Many respondents quite reasonably did not want to commit themselves without knowing what the real cost was. Respondents seemed to struggle with the notion of a "fair" price. They did not want to pay more than was necessary, and they wanted to know what exactly was being asked of them.

### 2.2.2 Yes/No Questions with Clearly Specified Choices

An alternative WTP question format is a question such as the following, which requires a yes or no answer: "If a water committee established a monthly charge of \$x for each household to use standposts supplied by the new water system, would you choose to pay this amount and use the standposts, or would you continue to use the source you are using now?"

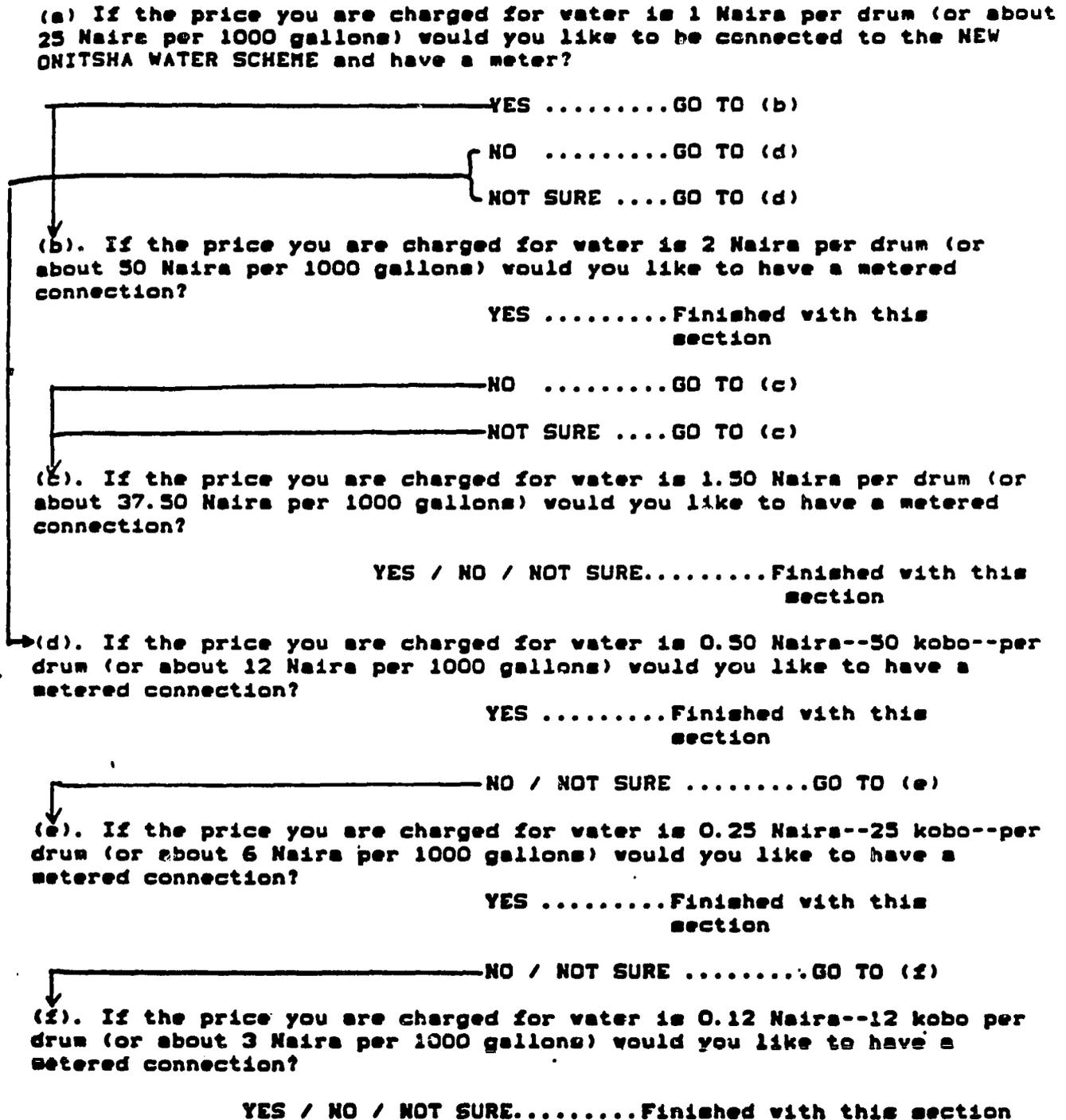
If the choice the respondent is asked to make is clearly specified, this format seems to work much better. In some situations the analyst might choose to ask each respondent only one such yes/no question, but this is a relatively inefficient use of the information potentially available from the respondent because, if asked further questions, he or she might be willing to reveal much more about the household's preferences. Typically the enumerator would ask two or three such yes/no questions, each time changing the price in the question. Such a sequence of questions is termed a "bidding game" because the respondent effectively bids for the improved service as if in an auction.<sup>9</sup> Figure 1 presents an example of a "bidding game" which was used in the WASH WTP study conducted in Nigeria.

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<sup>9</sup> The analyst might be forced to use only a single yes/no question if respondents simply will not answer additional questions in a bidding game, perhaps because the additional questions seemed too hypothetical. In general, if only a single yes/no question can be asked, the sample size must be increased to compensate for this loss of information.

Figure 1

Example of a "Bidding Game" Used in Onitsha, Nigeria



The result of the bidding game is strictly speaking not the maximum amount the household would be willing to pay, but rather an interval within which the household's "true" willingness to pay falls. Figure 2 illustrates schematically how the questions in a bidding game proceed and how the interval into which the WTP bid falls is determined. For example, the questions in Figure 2 result in the following categories:

Naira 0.00 - 0.11  
Naira 0.12 - 0.24  
Naira 0.25 - 0.49  
Naira 0.50 - 0.99  
Naira 1.00 - 1.49  
Naira 1.50 - 1.99  
≥ Naira 2.00

During the pretest the analyst should experiment with different values for the prices used in the questions so that the households' final WTP bids are relatively evenly distributed among the categories created. The objective in the design of the questionnaire is to spread the households' WTP bids out into different categories, and thus ensure that there is variation in the WTP bids among the households so that in the subsequent statistical analysis the analyst can examine the relationship between the WTP bids and the characteristics of the households.

### 2.3 Description of the Institutional Setting and Financing Mechanism

Before the enumerator asks the WTP question(s), the respondent must clearly understand both the water service which is being offered and the terms under which it will be provided. The respondent is read an opening statement, or preface to the WTP questions, which describes the institutional arrangement and the system for charging for water.<sup>10</sup> Because the amount a household is willing to pay may well depend upon such factors, it is extremely important for the enumerator to communicate exactly what is being proposed.<sup>11</sup>

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<sup>10</sup> The term "opening statement", used here to mean the beginning of the WTP section of the questionnaire, refers to the description of the "product" or water service for which the respondent is to be asked to bid. It is not the introductory statement of the interview itself in which the enumerator introduces him or herself, briefly explains the nature of the survey, and asks the respondent if he or she would be willing to be interviewed.

<sup>11</sup> It is also important to stress to all the enumerators that they are to read the opening statement precisely as it is written so that different enumerators are not giving respondents slightly different versions of the opening statement.

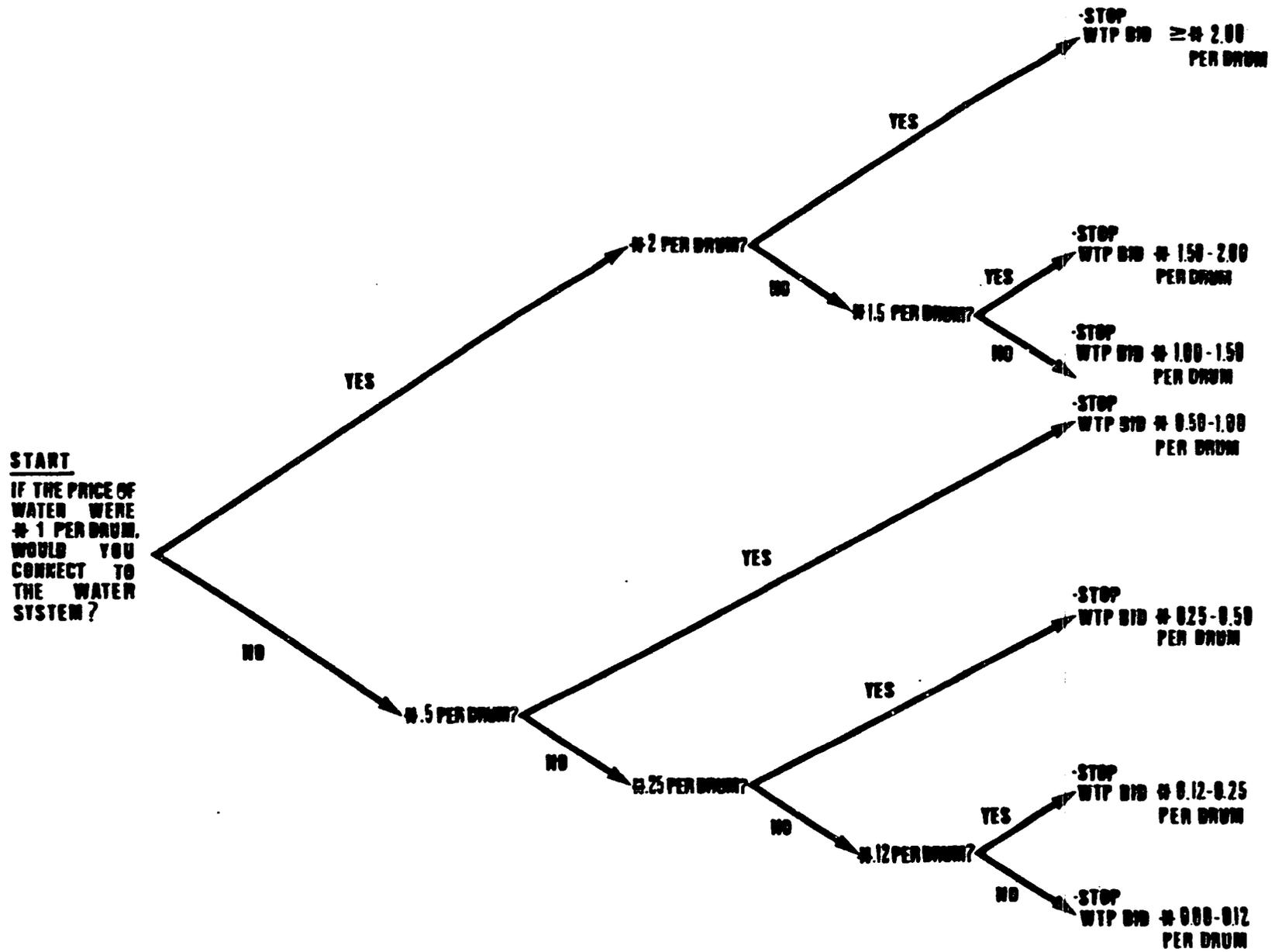


Figure 2

**FLOW CHART OF WILLINGNESS-TO-PAY BIDDING GAME**

In fact, this is often difficult to do in a reasonably short statement. As an example of what could go wrong, suppose a respondent is asked whether he would be willing to pay a flat rate of \$x per month for a house connection; the connection is not metered, and, if he pays the flat rate, he can then use as much water as he wants. In deciding upon how much he is willing to pay for such service, the respondent may imagine that he will sell water to his neighbors who choose not to connect to the piped system, and that he will use the water to irrigate a large garden. On the other hand, a second respondent, when deciding upon his WTP bid, may assume that such practices are not permitted. In this case the two respondents might bid very different amounts. What would at first appear to be major differences in the two individuals' valuations of the water service would really reflect their different interpretations of the terms of the contract which they were being offered.

As another example, consider the following opening statement which was used in the WASH study of willingness to pay in Haiti:

I am going to ask you some questions in order to know if you or someone from your household would be willing to pay money to ensure that the CARE Potable Water Project will be successful in Laurent. We would like you to answer these questions at ease. There are no wrong answers.

The water system is going to be managed by a committee of people from Laurent. CARE has decided to help Laurent by constructing a water system in this community. Your answers cannot change the fact that CARE has decided to build this water system. CARE never demands money from those people who collect water from public fountains. You will not have to pay money at the public fountains. We need you to tell the truth in order for CARE to construct the best water system for Laurent. Here are pictures of CARE public fountains in [names of other villages]. Households can collect any amount of water at any time.

After being read this opening statement and then asked the first WTP question in a bidding game, one respondent asked the enumerator who was going to be on the water committee. He explained that if the water committee was going to consist of the individuals who had been involved to date that he would not pay anything because they did not care about extending service to people in his neighborhood, and he did not trust them with the money. This was in fact a quite reasonable response (given his feeling about the members of the old water committee) because the opening statement had not specified in detail how the new water system was to be governed.

It is extremely difficult to foresee beforehand just how detailed the opening statement needs to be. Which government agency or donor is to be responsible for the construction and operation of the new water system may be extremely

important to households; on the other hand, it may be a matter of indifference.<sup>12</sup>

## 2.4 Adapting the WTP Questions to Specific Water Systems and Policy Issues

When asking for a household's WTP for an improved water service, the enumerator must be especially clear about three main characteristics of the improved service: the location, the reliability and hours of operation, and the price and method of payment. This section discusses these issues in terms of the precise phrasing of WTP questions designed to elicit households' preferences for specific kinds of water services.

### 2.4.1 Standposts or Handpumps

#### Location

When the improved water service is a handpump or standpost, there are two main choices in terms of specifying the location. The WTP question (or opening statement) can either describe the standpost or handpump as within a certain range of each household in the village or community (e.g., within 100 meters of each family) or as located in specific well-known points in the village (e.g., one near the clinic, one on the school yard, one next to the church, etc.). There are pros and cons associated with either choice. The latter approach is more precise but is generally only feasible in a relatively small village in which there are not too many locations. Everyone must know the locations given by the enumerator in the question so that there is no ambiguity about them. Specifying precisely where the handpumps or standposts will be located has the disadvantage of possibly generating controversy in the community about where an improved service should actually be located. A disadvantage of the first approach is that respondents may not have a clear sense of how far 100 meters is.

The following way of asking the WTP question combines aspects of both these two approaches:

Suppose the water line ran down the main street of town and five standposts were installed at equal distances from each other along the road. You would be free to obtain your water from any one of the standposts. If the price of using the standposts were \$x per month, would you choose to use the standposts or would you continue to use your traditional sources?

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<sup>12</sup> One way of exploring what an opening statement should include is to offer some examples of opening statements to members of a focus group and ask them to discuss whatever questions they may have or whatever comes to their mind (see Section 3.5).

In this case the respondent does not know precisely where the standposts will be located along the main road, but the possible locations are much more closely circumscribed.

### Reliability

In many developing countries people have experience with unreliable water supplies or know from friends or relatives in other locations that water systems and handpumps often break down for extended periods of time. A household's valuation of an improved water service will be a function of what the respondent assumes about the reliability of the service. Reliability may in fact be a characteristic that the analyst will want to determine. In other words, in order to determine how much more households are willing to pay for more reliable service, some households may be asked for their willingness to pay for one level of reliability (say, 5 hours per day), and another group of households would be asked for their willingness to pay for a different level of reliability (say, 24 hours per day). The analyst could then determine whether the WTP bids of the two groups were significantly different from each other.

In general the water utility would at a minimum want to know how much people would be willing to pay for the highest level of service feasible under realistic conditions. In many cases this may not be 24 hours per day, and to specify such an unrealistic level of reliability in the WTP question may make the question unnecessarily hypothetical. In addition to the level of reliability, it is also necessary to specify whether the handpumps or standposts will be open from sunrise to sundown or for some other hours of operation, and whether they will be open seven days a week.

### Method of Collecting Fees

There are several mechanisms which can be used regularly to collect revenues from households which use handpumps or standposts, and the questionnaire should specify clearly which form is being assumed.<sup>13</sup> One means of charging for water is simply to have an attendant at each standpost (or borehole) who collects money for each bucket sold. In this situation the WTP questions can take the

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<sup>13</sup> For a discussion of alternative means of revenue collection, see Christine van Wijk-Sijbesma, "What Price Water?: User Participation in Paying for Community-Based Water Supply," International Reference Centre for Community Water Supply and Sanitation, The Hague, Netherlands, March 1987. Some options for financing the initial costs of a water system may not involve regular charges. For example, community members may participate in a variety of funding-raising schemes. However, a questionnaire designed to explore whether households would be willing to participate in a specific scheme would have to be carefully tailored to the actual fund-raising activity and may not be easily generalizable.

following form: If the attendant charged \$x per 5-gallon bucket (or 20-liter container), would you purchase any water from the attendant?<sup>14</sup>

An alternative revenue collection mechanism is a simple household or head tax, in which each family which wants to use the standpost must pay a flat rate. In this case the questionnaire must detail how often the tax must be paid (i.e., monthly, annually, or whenever funds are required for maintenance), and whether it will be the same for every household. In some rural communities the notion of regular, repeated payments may not be well understood, and the enumerator may need to clarify this concept and explain why repeated payments are necessary.

If the appropriate institutional setting and financial mechanism for an improved water system are themselves policy issues, then the WTP questionnaire can be designed to determine households' preferences for different institutional and financing arrangements. For example, in the USAID-funded WTP study in Tanzania, two bidding games were included in the questionnaire.<sup>15</sup> The first asked the respondent whether he (or she) would purchase water from a new system of kiosks if water were sold at a specified price per bucket, and, if so, how many buckets the household would buy. The second asked the respondent whether he would be willing to pay a specified monthly fee to a water committee for unlimited access to public fountains in the village. By comparing the WTP bids obtained from these two bidding games, the analyst can learn much about the preferences of the respondents for the two cost-recovery arrangements.

#### 2.4.2 Piped Systems

##### Location and Reliability

The issue of location is obviously not as important for a house connection to a piped system as for a handpump or standpost. Still, it must be clear to the respondent whether a house connection means a tap in the yard or a tap actually inside the house. The question of the reliability of service from the piped system is important, but conceptually it is little different from the issue of reliability with respect to standposts discussed above.

##### Method of Collecting Fees

There are two main ways of charging for water from a piped system: metered taps and unmetered taps with flat (or graded) rates. The latter system of revenue collection can be incorporated into the WTP questions in a straightforward manner:

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<sup>14</sup> If the respondent answers "YES", the enumerator would then ask, "How much water do you think members of your household would purchase at the standpost every week?"

<sup>15</sup> See Tanzania WTP questionnaire included in Appendix A.

Suppose the price of a house connection were \$x per month. For this amount members of your household could use as much water as they wished. They would (would not) be allowed to sell water to their neighbors, and they would (would not) be allowed to use water for irrigating crops. Would you choose to connect to the new water system at this monthly price?

It is generally difficult, however, to structure a question to determine a household's willingness to pay for a metered tap because it is difficult to convey the meaning of a given commodity charge to a person who is not used to thinking in terms of the cost of water per unit volume. For example, if a respondent is asked whether he would connect to the piped system if the price of water were US\$ x per 1,000 gallons (or per cubic meter), he must estimate how much water he would use with the new service in order to calculate his monthly expenditure on water. The first problem is that he may have difficulty in thinking about how much water his household uses now in terms of thousands of gallons or cubic meters. The second problem is that he may have no idea (or may estimate incorrectly) the increase in the volume of water which would occur if a piped connection were installed inside his yard or house.<sup>16</sup>

There are, however, some situations in which it may be possible to ask meaningful WTP questions in terms of a commodity charge. For example, at the time of the WASH-assisted study of willingness to pay for water in Onitsha, Nigeria, most of the population purchased their water from an extensive system of water vendors. Some people purchased water by the drum and by larger volumes from tanker trucks; others purchased water by the bucket from private boreholes, from vendors carrying water door to door, or from water retailers selling from 500 or 1000-gallon tanks which were filled by tanker trucks. In this situation everyone in the city was intimately familiar with the prices of different volumes of water, and when the price used in the bidding game was put in terms of naira per drum, respondents had no trouble thinking seriously about the question and giving meaningful answers.

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<sup>16</sup> This is not meant to imply that some individuals will not think seriously about the possibility of the increased consumption which would likely result from a house connection. For example, during the course of one interview conducted during the WASH-assisted willingness-to-pay study in Onitsha, Nigeria, one man was asked whether he would be willing to pay a specified amount per drum for water from a metered connection. The price was about half the price he was currently paying vendors, but he indicated that he could not pay this much. After the interview was over, the individual was informally asked why he would not pay more since he was already paying vendors much more than the price specified in the bidding game. He answered that he would have trouble controlling the amount of water his children would use from a tap while he was at work, and he felt that if he paid any higher price for water from a metered connection than his WTP bid that his total expenditure on water would increase.

Similarly, in Guatemala people are entitled to half a "paja" per month, and everyone knows how much water this is and how much it currently costs.<sup>17</sup> A bidding game could thus be easily conducted if the price of water from a metered connection were specified in terms of quetzals per paja.

### Connection Fees

The most important issue for a household in its decision on whether or not to connect to a piped distribution system may, however, not be the monthly charge, but the costs of connection. This has important implications for the design of WTP questions for a house connection because, unlike the situation with handpumps or standposts, the analyst must either vary both the connection charge and the commodity charge (or monthly fee) or choose which one to vary in the bidding game and which one to fix at a constant level. Since it seems unlikely that a single respondent can provide meaningful answers to a lengthy bidding game which varies both the connection charge and the commodity charge, if the analyst wants to know how both the connection charge and the commodity charge affect a household's decision to connect to a piped system, it will generally be necessary to increase the sample size.

One option for a water utility to get households connected to a piped system is to finance the connection charge in the monthly rate so that a household has a low initial cost and higher monthly payments for a specified period of time.<sup>18</sup> In the extreme case the water utility could provide the connection free in order to ensure that the initial capital costs do not pose a barrier to connection for a household which has the cash flow to pay the monthly fee for a house connection. An important option to consider in the design of the WTP questions for a house connection is thus to specify a zero connection charge and then vary the monthly fee (or commodity charge). If households' willingness to pay a monthly fee is high, this is evidence that financing the connection charge may be feasible.

### Disposal of Wastewater

Another issue which may arise in the design of WTP questions for a house connection is the disposal of wastewater. This is much less of a problem with the smaller volumes of water which are used when people must carry water into the house. It may be necessary for the opening statement to address the question of drainage in some way so that households are not imagining different solutions to the wastewater disposal problem (and thus different expenditures) when they are deciding how much they can pay for a house connection.

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<sup>17</sup> One paja = 30 cubic meters.

<sup>18</sup> Several South American countries and the Philippines have programs which loan households the connection fee and then include charges for loan repayment in the household's monthly bill.

### 2.4.3 Operations and Maintenance

In some situations an improved water system may already have been installed, but the funds may not be available to operate and maintain it. In this case the objective of a willingness-to-pay study may be to determine whether the service population is willing and can afford to pay the operation and maintenance costs of the system. The WTP bidding game questions themselves would be essentially the same as for the situation in which the improved water system has not yet been installed, but the opening statement can be designed to make the questions much less hypothetical. For example, the following opening statement was used in the Tanzania WTP study:

As you know, this village is connected to the Kitangari Water Scheme, but the service has been unreliable. The construction costs of the Kitangari Water Scheme were paid by donors. In 1986 these donors then handed the water system over to the central government, and the central government now pays for the operation and maintenance of the water system. The main reason the system has been unreliable is that the central government has not had enough money to buy the diesel fuel necessary to run the pumps at all times. When the Ministry of Water engineer runs out of money, he cannot order diesel fuel from Mtwara, and the water stops coming. There is also a shortage of money for repairs and maintenance of the equipment.

Now I'm going to ask you some questions to learn whether your household would be willing to pay money in order to improve the reliability of the water supply scheme serving this village ....

The WTP questions that follow this opening statement are still designed to determine the maximum value the household would pay for water; the fact that the capital costs have already been incurred should not affect the respondent's answers. However, it is hoped that the focus on operation and maintenance costs in the opening statement makes the context for the interview more realistic to the respondent.

### 2.5 Current Water Use Practices and Attitudes

The WTP questionnaire should include a section on the household's water use practices and attitudes so that the analyst can examine the relationship between the household's WTP bids and its current water use situation. The section of the questionnaire on water use should be at the beginning of the interview in order to establish the credibility of the subject matter and to begin the respondent thinking about his or her current water use before asking about his valuation of an improved water service.

In order to understand the household's water-use decisions, it is just as important to know which water sources it does not use as to know which it does. The first step in designing this section of the questionnaire is thus to

determine all the options open to a household for obtaining its water. This may include a range of traditional and improved sources and the possibility of purchasing water from a variety of water vendors. The water vending options typically vary in terms of the volume of water purchased and whether the water is delivered to the household or is picked up at the source.<sup>19</sup> For a village in which there are only a handful of traditional sources, the questionnaire may actually refer to alternative sources by their specific local names; for a larger community or where there are many sources, the only option may be to refer to particular types of alternative sources, such as surface water, rainwater collection, water from neighbors, or water vendors.

For each water source (or class of source) the survey instrument should include questions on the following:

- whether the household obtains water from the source;
- if so, how much;
- what water from this source is used for (if anything);
- the price of water;
- the distance of the household from the source; and
- the respondent's perceptions of the quality of water from the source.

The questionnaire used in Onitsha, Nigeria, (presented in Appendix A) illustrates one easy, straightforward way of asking such questions. One page of the survey instrument is devoted to questions about each source.

It may not be possible to obtain reliable answers to questions about the distance of the household to alternative sources. If one of the purposes of the study is to understand how distance to alternative sources influences willingness to pay for an improved source (and the likelihood that households will use an improved source), then it may be necessary to use another approach to estimate the distance of the household to alternative sources. There are two main options. The first is to pace the distance from each household to each alternative source. The second option is to locate each house and each water source on a map and measure the distance from each house to each source.

The first option would generally require that two or three people be used per interview, one to conduct the interview and the rest to pace the distances. The

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<sup>19</sup> See Dale Whittington, Donald Lauria, Daniel Okun, and Xinming Mu, Water Vending and Development: Lessons from Two Countries, WASH Technical Report No. 45 (Arlington, VA: Water and Sanitation for Health Project, 1988.)

second option requires that a village map either already exists or can be drawn and that either enumerators or field supervisors be able to read a map and locate each household which is interviewed on it. Both approaches face the problem that a simple measure of distance may not adequately reflect the difficulty associated with carrying water from a given source to the household. In particular, elevation changes may greatly increase the difficulty of a particular route; individuals may be willing to walk much farther to avoid carrying water over a hill. If a topographic map is available, one way of dealing with this problem is to count the number of contour lines which must be crossed to collect water from each source.

## 2.6 Household Socioeconomic Characteristics

Surveys which focus on the socioeconomic characteristics of a population are routinely conducted in developing countries, and there is abundant literature on how to design questionnaires for this purpose.<sup>20</sup> There is little that is unique with regard to the application of this literature to the collection of socioeconomic data in WTP surveys. The principal types of information to be collected include the following:

- income or wealth,
- education,
- occupation,
- religion,
- tribe or ethnic group, if applicable, and
- household size.

Since the purpose of collecting this information in the WTP questionnaire is to relate the WTP bids statistically to the socioeconomic characteristics of the household, there is little to be gained by including open-ended, exploratory questions. The section of the WTP questionnaire on socioeconomic characteristics of the household should be designed to obtain essential information as simply and quickly as possible.

For example, many socioeconomic surveys require a roster of the names and ages of household members. This information may be quite time-consuming to record, and it is not needed in the analysis of the WTP bids. As another example, the education level of adult members of the household may be measured by the number of years of school completed. A simple question on whether the head of household can read a newspaper--(a) easily, (b) with difficulty, or (c) not at all--may

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<sup>20</sup> See, for example, Martin Bulmer and Donald P. Warwick (editors), Social Research in Developing Countries: Surveys and Censuses in the Third World (John Wiley & Sons Limited, 1983); and D.J. Casley and D.A. Lury, Data Collection in Developing Countries (Oxford: Clarendon Press, 1981).

subdivide the sample just as effectively and with less potential confusion and ambiguity about grade level and type of school.

It may be very difficult to obtain reliable answers to questions concerning income and wealth in developing countries.<sup>21</sup> Because of the suspicions such questions often raise, it is generally best to include them at the end of the interview, if at all.<sup>22</sup> One way of getting around the problem of asking for income information directly is to construct a "wealth index" for each household based on a series of questions about whether the household owns a list of consumer durables, such as a radio, fan, television, etc. A household wealth index can then be created by assigning an average value to each of the items on the list. More valuable items are thus weighted more heavily than items of lesser value.

What items are on the list will depend upon the level of development of the particular study area. Items should be selected in order to differentiate households from each other. There is no point in including an item if almost everyone in the sample has it (or does not have it), or if another item already in the list differentiates households in exactly the same way. Housing characteristics such as rent, and access to utilities such as electricity may also be good surrogates for household income or wealth.

Another approach which may be useful for collecting income data is for the enumerator to tell the respondent that it is not necessary for the purposes of the study to know the household's exact income, but that it is important to know generally the household's income level. The enumerator then asks in which of several categories the household income falls, i.e., less than US\$ 25 per month, \$25-50 per month, etc.<sup>23</sup>

One of the most difficult aspects of income questions is obtaining reliable measures of in-kind income in agricultural communities. If it proves necessary to construct a listing of each household's production of various crops, the portion of output sold, and the prices received, this will typically be quite

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<sup>21</sup> As noted in the introduction, the traditional rule of thumb in water resources planning in developing countries has been that households can spend 3-5 percent of their income for water from an improved source. The implicit assumption is that household income data are easy to obtain. In fact, it may well be easier to obtain information on willingness to pay for water directly than to get reliable information on household income to use to apply this rule of thumb.

<sup>22</sup> In the WASH WTP study in Haiti, enumerators simply refused to ask income or even expenditure questions because of the hostility such questions provoked.

<sup>23</sup> In the WASH WTP studies it has sometimes proved useful at this point in the interview for the enumerator to remind the respondent that at no time in the interview has she asked the respondent his name. The information is thus completely confidential.

time consuming and in most cases other portions of the questionnaire will need to be shortened or eliminated.

The willingness of some households to pay for water may be affected by their occupation or trade. For instance, the productivity of some small-scale, household manufacturing enterprises (e.g., tortilla production) may be greatly enhanced by piped water. Because individuals often have several jobs or trades, it is often necessary to inquire about the first, second, and third job of each adult member of the household in order to obtain reliable occupational data.

## 2.7 Testing for Biases

For a variety of reasons, respondents may not provide reliable, truthful answers to the WTP questions. The literature on contingent valuation studies discusses two main threats to the validity of WTP bids: strategic bias and hypothetical bias. Strategic bias may occur when the respondent believes he (or she) can influence a decision or plan by not answering the enumerator's questions honestly. Hypothetical bias may occur for either of two reasons: the respondent may not understand exactly the nature of the water services which the enumerator is asking him to value or the respondent may not bother to think seriously about the WTP questions or answer them accurately because he believes his answers will not actually influence the outcome of a decision or planning process.

### 2.7.1 Strategic Bias

How to deal with the issue of strategic bias requires careful thought and planning, particularly when the study is to be carried out in a poor community in a developing country and is to be managed or conducted by educated elites from outside the village or region. Just as an example of how quickly information about outsiders travels in such a community, a research team from the University of Karachi was conducting a WTP study for the World Bank, and went into a poor peri-urban area of Karachi to pretest an early version of their WTP questionnaire. A neighborhood was selected and a community leader was informed of the purpose of the research team's visit. The team went to the first house on the block to conduct the first interview, and within five minutes after starting the interview, a truck rolled by. The driver leaned out his window and shouted that the water situation in the neighborhood was terrible, and that the research team should arrange for the government to provide a water distribution line immediately. In such an environment there is clearly a risk that misinformation and rumors about a WTP study will affect the answers respondents give and possibly encourage them to attempt to influence the results of the study by giving strategic responses to the WTP questions.

### 2.7.2 Modifying the Questionnaire to Test for Biases

To the extent possible, the questionnaire should be designed to test for biases. If no evidence of such biases is found, then greater confidence can be placed on the survey results.<sup>24</sup> In practice there are two types of modifications to the WTP questionnaire which can be incorporated relatively easily to test the reliability of the responses. First, if respondents are uncertain about their own valuations of the improved water system, or want to please the enumerator, they may be influenced by the first price used in the WTP question because they may believe this is a "reasonable" answer. One way to test whether the initial price in the bidding game influences the respondent's final bid is to administer different versions of the question to different, randomly selected subsets of the sample. In one version the bidding game would start with a "high" price and the bidding would move down; in another version the bidding game would start with a "low" price and the bidding would move up. The analyst would then test to see whether the final bids of the two subsamples were statistically different.<sup>25</sup>

Second, different subsets of the population may be given different opening statements to the bidding game. One statement may seek to maximize the incentive for strategic bias; another would try to minimize it. Again, the analyst would test to see whether the final bids of the two subsamples were statistically different.

In addition to testing for strategic bias, the questionnaire can sometimes be designed to minimize its occurrence. This can be done by attempting to convince the respondent in the opening statement that it is not obvious how to behave strategically, and that his (or her) best strategy is to answer the WTP questions honestly. For example, in the opening statement to the bidding game used in the Tanzania WTP the respondent was told:

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<sup>24</sup> In addition to changes in the questionnaire itself, the analyst may attempt to test for biases through specific modifications in the research design. For example, in one WTP study conducted in Brazil, the author attempted to test for strategic bias by interviewing respondents in three villages. None of them had water systems but they differed in other respects: in one the water authority had not made a commitment to install a system; in one the water authority had agreed to install a system but had not yet established a tariff; and in the water authority had made a commitment to install one, and the water tariff had already been established. The authors hypothesized that if a strategic bias existed, the respondents in the three villages would bid differently (and indeed they did; see Xinming Mu, "Modeling Rural Water Demand Behavior: A Study of the Contingent Valuation Method," Ph.D. Dissertation, Department of City and Regional Planning, University of North Carolina at Chapel Hill, 1988).

<sup>25</sup> The bidding games in the Haiti household questionnaire in Appendix A illustrate one way in which this approach can be implemented. See Series C WTP Questions (Bidding Game No. 2) for example of low starting point, and Series D WTP Questions (Bidding Game No. 3) for example of high starting point.

It is important that you answer the questions as truthfully as you can so that we can know what you can afford to pay for water. If you and other people we interview say that you cannot pay anything, then perhaps it is not possible to improve the reliability of the water system by buying more diesel fuel (for the pumping station). If you say you can pay too much, then you might not be able to afford the water. So please answer the questions honestly.

In this particular study, it was far from obvious what an individual's best strategy would be if he wanted to answer strategically, and this opening statement attempted to reinforce this fact.

### 2.7.3 Hypothetical Bias

Beyond testing for starting-point bias, rigorous testing for hypothetical bias is very difficult. If the respondents' WTP bids were simply numbers "pulled out of the air," then they should not correlate with the socioeconomic characteristics of the household or water source characteristics. Thus, if a statistical analysis of the WTP bids shows that they are not related to such independent variables, this is strong evidence that hypothetical bias does exist. The converse, however, is not true. If the WTP bids are correlated with socioeconomic and water source characteristics, we cannot rule out the possibility of hypothetical bias, although the threat should be viewed as less serious.

One means of exploring this issue of how the respondents' interpreted and then responded to the WTP questions would be to conduct an anthropological investigation in the study village(s) after the WTP survey was carried out and to interview individuals about what they were thinking during the WTP interview. This would, however, likely require a highly skilled professional who understood the methodology used in the study, and would thus not be feasible in many field situations. Such an individual's interpretation of what went on in the village during the survey would still be speculative.

### 2.7.4 Logistical Considerations

Attempting to test for several different kinds of possible biases by administering different versions of the questionnaire to different subsamples leads to a much more complicated survey. For example, using two different starting points, two opening statements to test for strategic bias, and two descriptions of the alternative financing arrangements results in eight (2 x 2 x 2) versions of the questionnaire. Dealing with eight versions of the questionnaire may be difficult logistically in some field conditions and will require greater skill on the part of the enumerators and increased enumerator training. The sample size will also need to be increased to test for possible interactions between these response effects.

## Chapter 3

### SURVEY IMPLEMENTATION

#### 3.1 Selecting the Site

If the objective of the study is to examine the willingness to pay of a specific town or village, then site selection is not an issue. However, if the study covers an entire region or province and one objective is to be able to generalize from a few villages to the entire region, then it is necessary to select study villages or communities which are generally representative. Ideally this could be accomplished by selecting a random sample of villages, but it is often impractical logistically to work in a large enough number of villages to obtain the benefits of random selection. In a short study it will typically not be possible to work in more than a handful of sites, and the decision on which sites to select will necessarily be somewhat subjective.

When only a few villages in a region are to be studied, the analyst should try to select villages in which there is likely to be variation in the WTP bids of the households, the socioeconomic characteristics of the households, and the water source choices facing households. Such variations will enable the analyst to examine how household socioeconomic characteristics and water source characteristics affect WTP bids and thus to understand households' water demand behavior better. For example, if a village is selected in which almost all the households have the same education, then it will be impossible to investigate the relationship between education and willingness to pay.

In fact, if most households in most villages in a region have similar socioeconomic characteristics, there may be a conflict in terms of site selection between identifying villages which are representative, and finding villages in which there exist socioeconomic variations. Since the focus of a WTP study is on household behavior, unless there is a strong reason to believe that differences in the behavior of households in different villages cannot be explained by differences in socioeconomic or water sources characteristics, the analyst should generally opt for sites with variation in socioeconomic and water source characteristics even if they are not representative of most villages in a region. Of course, it would be best to include both types of villages if time and resources permit.

#### 3.2 Translating the Questionnaire

If the survey questionnaire is initially drafted in a language different from the one in which it will actually be administered, special attention must be paid to its translation. In all of the WTP studies in which WASH has participated, the pretest has uncovered unanticipated problems of translation--particularly in the translation of the bidding game and WTP questions. In the WASH-assisted WTP studies, the task of translation has generally been assigned to a team of people rather than to a single individual. A team effort at translation increases the likelihood that the pros and cons of

alternative choices of words or phrases will be considered. An alternative to a collaborative team approach is to have two individuals independently translate the questionnaire and then compare and discuss the differences.

However the translation effort is organized, an individual not associated with the original translation process should translate the final version back into the language in which it was initially drafted. In this way the analyst who wrote the questionnaire can be assured that it has been translated accurately.

### 3.3 Defining the Sample Frame

In most rural communities and peri-urban areas it will not be possible quickly to define a rigorous sample frame from which to draw a true random sample of households. The problem of identifying a well-specified sample frame is common to most survey work in developing countries and is not unique to WTP surveys. In two of the WASH WTP studies the problem of a poorly defined sample frame did not arise. In Tanzania the party organization reached down to the village level, and each group of approximately ten households had a "ten-cell leader" who was responsible for party matters at the grassroots level. Every village chairman had a complete list of all the ten-cell leaders in his village. The research team was thus able to pick a random sample of ten-cell leaders from the village chairman's list, and then interview all the households in the cells which were selected. In Haiti the study villages were small enough that the majority of the households in a village were interviewed. In this case if some care is taken to ensure that the process by which a few households are excluded is not systematically biased, the sample must be reasonably representative of the general population simply because it is such a large proportion of the total.

After a specific household is selected, the question arises as to who in the household should be interviewed. The answer depends on the objectives of the study and the politics of the household. If the objective of the research is to use the WTP bids to estimate the level of revenues which can be collected by a water utility or authority and the money in the household is completely controlled by the male head of household, then it is clearly necessary to interview the male head of household in order to obtain the required information. The fact that the women and children may carry the vast majority of the water, and that they would receive most of the benefits of an improved water source, is not relevant to the water utility in terms of estimating potential revenues.

On the other hand, if the objective is to estimate the social benefits of an improved water supply and the impact on economic development and children's health from the time women save as a result of no longer having to carry water so far, then the women in the household who make the water source choice decisions are the appropriate individuals to interview. If both men and women have some control over the household's finances, then both should be interviewed to see if there are differences in their willingness to pay for improved water sources. If such differences exist, there may be conflict within the household over expenditures for improved water supplies, the outcome of which may be difficult to predict.

### 3.4 Organizing and Training Enumerators

The usefulness of the WTP study is ultimately determined by the quality of the data collected. Unless the enumerators thoroughly understand the questionnaire and the objectives of the study and are motivated to collect high quality data, it is not likely that anything will be learned from the survey. Thus, the study director's single most important responsibility in carrying out a WTP study is, arguably, successfully to manage the team of enumerators.

#### 3.4.1 The Need for Training, Collaboration, and Supervision

The easiest way to ruin a WTP study is to treat the enumerators as if they are simply data collectors with no substantive role in the research. The study director must ensure that the enumerators develop a sense of ownership in the entire study, and particularly in the questionnaire. The enumerators must feel that their input into the design of the questionnaire is valued and that their suggestions are acted upon.

One of the quickest means of demonstrating to the enumerators that their views are important is to announce during the initial training session (in which enumerators are introduced to the questionnaire) that they should keep a written list of problems that arise during the pretest. After the pretest the study director should then hold a meeting to discuss the results and ask each enumerator individually to identify problems with the questionnaire and to suggest appropriate changes. The study director takes notes of all suggested changes and the names of the enumerators who made them. After the revised questionnaire is reproduced, another training session is held with the enumerators. In this session the study director goes over all the changes which have been made in the questionnaire as a result of the pretest. The study director points out each change which has been made and the name of the enumerator who suggested the change.

At the first training session, the field supervisor(s) should "role play" a complete interview in front of the team of enumerators, i.e., one should be the respondent and the other the interviewer. Another role-playing session should be held after the pretest with the revised questionnaire. The enumerators should then be paired off and asked to practice with each other as the study director and field supervisor(s) observe their performance.

There will typically be one or more members of the enumeration team who feel that all this training and discussion of the questionnaire is a waste of time and rather condescending toward the enumerators. Such individuals are certain that they know how to carry out the interviews. Such confidence on the part of some of the enumerators can be seductive to the study director, who may be tempted to cut short the training sessions. However, based on the WASH experiences, such enumerators are almost inevitably the ones who need the training the most. In all three of the WASH WTP studies, the worst interviews were carried out by enumerators who initially expressed the opinion that too much training was occurring and that the questionnaire was straightforward.

The enumerators must know that the study director cares about the quality of their work and that he or she is constantly reviewing it. One of the most effective ways of demonstrating this is for the study director or an assistant thoroughly to examine each questionnaire at night after the day's fieldwork, and then the following morning ask individual enumerators about any problems which were found. If a few enumerators are dropped from the team after a couple of days of poor performance, the point is quickly made that careful, high quality work is expected of all enumerators on the team.

The kinds of things that build camaraderie between the study director and the enumerators and a sense of common purpose are often simple and obvious, but are so important to the success of the study that they still need emphasizing. For example, the study director should learn the names of all the enumerators, and spend as much time with each individual as practical. Ideally this should include time in the evenings for informal interaction and discussions of problems and issues which arose during the day's work. To the extent practical, the study director should share any hardships of fieldwork with the field supervisors and enumeration team, including food and lodging. In some cases simple gestures like providing the enumeration team with T-shirts with a study logo, gifts of supplies to be used in the fieldwork such as clipboards, folders, and pens, and meals and soft drinks while in the field, will do wonders for team morale.

The study director should also work the same hours expected of the enumerators and should be in the villages while the survey work is being conducted, preferably moving from enumerator to enumerator, observing interviews and answering questions which may arise. The presence of the study director while an interview is being conducted may influence a respondent's answers, but the analyst can test statistically for the existence of such an effect.<sup>26</sup> The risk of such a bias must be weighed against the benefits of active supervision of the enumeration team. Actually observing the enumerators first hand is important because the study director must be confident that the enumerators took their task seriously, that all of the interviews actually took place, and that none of the data were made up by the enumerators.

In addition, the study director must be assured that there is no strategic bias introduced by the enumerators. This actually occurred in the WASH study of WTP in Haiti. An enumerator who thought he understood the objectives of the study believed that people needed to bid high in order that a water system could be justified for a particular village. During the course of the bidding game, he thus pressed and cajoled respondents to bid higher. This kind of behavior would have been very difficult to detect without first-hand observation by the study director.

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<sup>26</sup> Sometimes the presence of foreigners in a community may actually prove to be an advantage for the study. In the WASH-assisted WTP study in Onitsha, Nigeria, the enumerators actually preferred to have a foreigner with them when they conducted an interview because it was easier to convince the respondent that this was a serious research study and not a hoax.

### 3.4.2 How Many Enumerators Are Needed

An important decision which the study director must make is how many enumerators to hire. The ability of the study director and field supervisor(s) to maintain close supervision of the enumerators and to review the quality of the completed interviews will generally limit the size of the enumeration team to no more than 15 individuals. Logistical considerations such as the availability of vehicles and petrol may, however, further restrict the number of enumerators that can be effectively mobilized.

### 3.4.3 Who to Hire

When putting together a team of enumerators the question arises as to what kind of individuals make the best interviewers. Based on the WASH experiences with WTP studies, there does not seem to be a simple answer to this. In the Haiti study the project director went to great lengths to employ a team of experienced community organizers and health education workers who had worked in the area and knew the local customs and traditions. Many of these individuals did not prove to be reliable enumerators and were difficult to motivate. A few college students on vacation for the summer were also hired, and they worked out very well.

In Nigeria, on the other hand, everyone warned us against using the water authority's own team of enumerators, who were young secondary school graduates. These enumerators were supposed to be unreliable and poorly motivated. As a result the study director supplemented the enumeration team with a group of five graduate economics students from a local university. It turned out that with proper training the team of secondary school graduates employed by the water authority performed admirably; the economics graduate students, on the other hand, had to be dismissed for poor performance.

The WASH experience to date does indicate the importance of using enumerators with close ties to the communities in which the surveys are to be conducted. The enumerators may be local school teachers, secondary school graduates, or government employees, but, whatever their occupation, they should be respected within the community and have a good understanding of the local economy and social traditions. This requirement often rules out the use of college students from a national university.

Another issue with regard to the selection of enumerators is the appropriate mix of male and female enumerators. This depends in part, of course, on who in the household is to be interviewed. If women respondents are desired, then it is in general a good idea to use women enumerators. In some situations, such as in many Moslem cultures, women enumerators must be used to interview women in the household. On the other hand, in the WASH WTP studies women enumerators have had no trouble interviewing men, so that in general it seems desirable to use female enumerators.

### 3.5 Holding Focus Groups and Pretesting the Questionnaire

The importance of careful pretesting of the questionnaire cannot be overemphasized. In the WASH WTP studies each enumerator carried out almost a full day of interviews as part of the pretest. For a team of ten enumerators, this would entail conducting perhaps 50 to 75 interviews. A careful study of this many questionnaires will take at least a day, and the schedule should allow for this much time in order to take full advantage of the pretest. In every WASH WTP study, the findings from the pretest resulted in major changes in the household questionnaire. In some instances the changes may be so substantial that a second pretest will be necessary.

One technique increasingly used in contingent valuation studies to improve the questionnaire is to conduct a "focus group" before doing the pretest. A focus group is simply an open-ended, informal discussion among five to ten people similar to those who would be likely respondents. The leader of the focus group is typically the study director or a field supervisor. He or she directs the discussion in a very general way toward the topics covered in the questionnaire. The technique of using focus groups was first introduced in the private sector by researchers working for corporations interested in customers' reactions to new products and advertising messages. Such researchers found that people were often more likely to express their opinions in the context of a small group than in a one-on-one interview, and that the discussion among members of the focus group stimulated members to think and express themselves. Although initially used to assess people's responses to private consumption goods, the technique is equally applicable to individuals' opinions about public services.

The discussion among the focus group members can be invaluable in gauging the importance of a wide variety of issues, and thus providing a basis for revising the questionnaire before the pretest.

For example, the reliability of the improved water system might be a major concern of members of the focus groups, and thus the opening statement in the questionnaire should specifically address this issue. Similarly, the study director may want to know who generally controls the household's cash income and specifically whether or not women have enough control over the household's cash to ensure that their preferences for an improved water source affect households' payments for water. This issue could be raised for discussion in the focus group. Essentially the focus group provides an opportunity for some feedback on the topics raised in the questionnaire before the pretest and thus increases the usefulness of the pretest.

### 3.6 Carrying Out the Survey

In a small community or village, the permission of the village leadership to conduct the survey will be required. After permission is obtained, the village leaders will typically spread the message that the study team will be coming on a specific day and provide the community with some explanation of the purpose of the study. The exact message which the village leaders disseminate is difficult to control or monitor, but at least the study director and field supervisors should discuss in advance with the village leadership exactly what

to tell the community. For example, in one of the villages in the Tanzanian WTP study the village secretary was informed that he could tell people that they could discuss the issues raised in the questionnaires with their neighbors (which they probably would have done anyway), but that their responses were to be an answer for their household.

In a village or small community the survey should be carried out quickly, preferably in one day, so that the extent to which respondents will talk to neighbors and possibly bias later respondents is limited. In situations where false rumors are spread regarding the purpose of the study, a substantial portion of the respondents may be unwilling to be interviewed or may disappear from the village. The study director and field supervisor(s) must closely monitor the receptivity of the population to the enumerators and be prepared to call off the study in a particular village if the likelihood that the results will be biased becomes too great. Based on the WASH experience, the average enumerator will be able to complete seven to ten interviews per day. Thus, if there are ten enumerators, and each completes eight interviews per day, 80 interviews will be finished in one day.

## Chapter 4

### DATA ANALYSIS

#### 4.1 Tabulations of the WTP Bids

One of the simplest and most interesting analyses to do with the survey data is to prepare a simple frequency distribution of the households' WTP bids, such as presented in Figure 3. This information provides policymakers with estimates of how much different proportions of the sample population are willing to pay for a given type of service. Figure 4 presents this same information from a different perspective, showing how the percentage of households which would choose to use an improved water service such as a house connection or public tap changes as prices or connection fees are varied.

If information is available on the average per capita water consumption at different prices (for a given level of service), or, as a rough approximation, if per capita consumption is assumed to be constant, then the revenues associated with different prices can be calculated as follows:

$$\text{Revenues} = [\% \text{ of population using the service}] * [\text{total population}] * [\text{water consumption per capita}] * [\text{price of water}]$$

Figure 5 presents an estimate of this relationship between the prices charged and the water utility's revenues for Onitsha, Nigeria.

The objective of a water utility, however, is not simply to maximize revenues, but to provide as many people with potable water as possible. Using the information in Figures 4 and 5 the analyst can also depict the tradeoff between revenues and the percent of the population connected. This relationship is shown in Figure 6 for Onitsha, Nigeria.

The WTP bids can also be used directly to obtain a measure of the economic benefits of improved water service for the population to be served. The average WTP for those households which will use the water service at a given price can be calculated from the information in Figure 3. This average WTP per household can be multiplied by the number of households projected to use the service to derive an estimate of the aggregate benefits to the community.<sup>27</sup>

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<sup>27</sup> For a discussion and critique of methods used in the literature to aggregate WTP bids from a sample to a general population, see "Expanding Contingent Value Sample Estimates: Land Economics, Vol. 63, No. 4, November 1987. pp. 396-402.

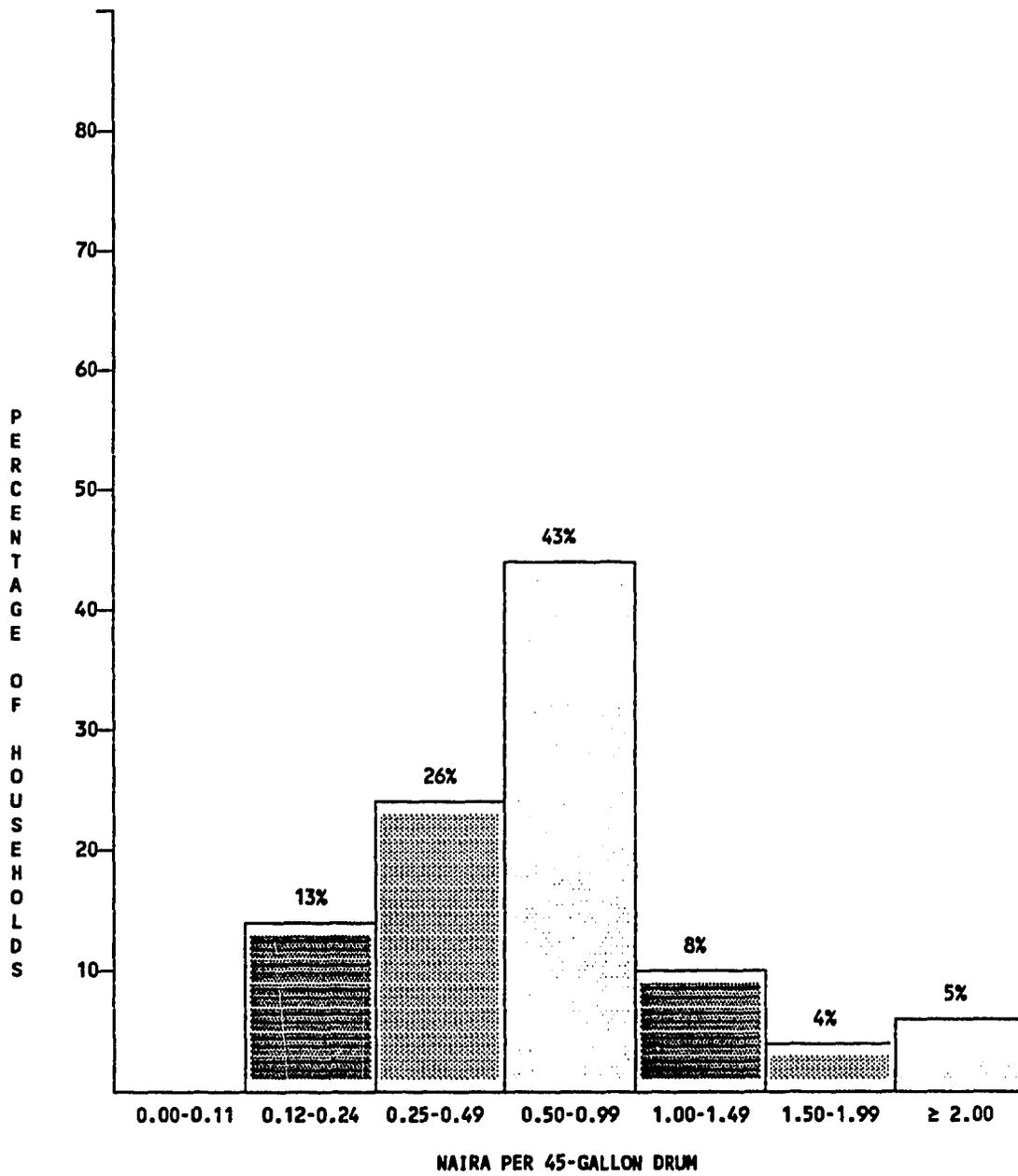


FIGURE 3: Frequency Distribution of Willingness-to-Pay Bids (Onitsha)

Figure 4

Percent of Households Willing to Pay for Household Connections,  
by Price of Water (Onitsha and Okpoko, Nigeria)

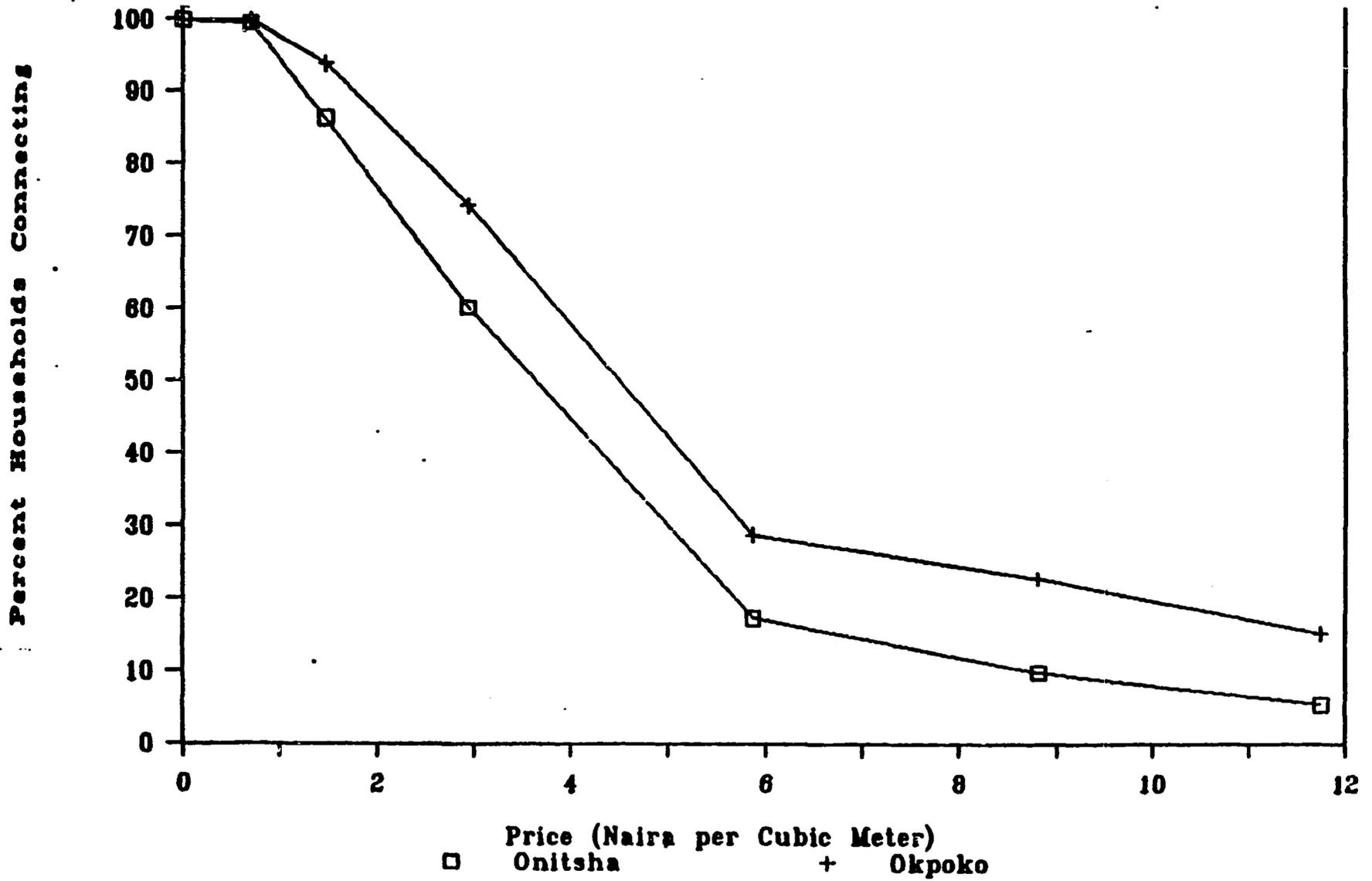


Figure 5

Annual Revenues from Water System,  
by Price of Water (Onitsha, Nigeria)

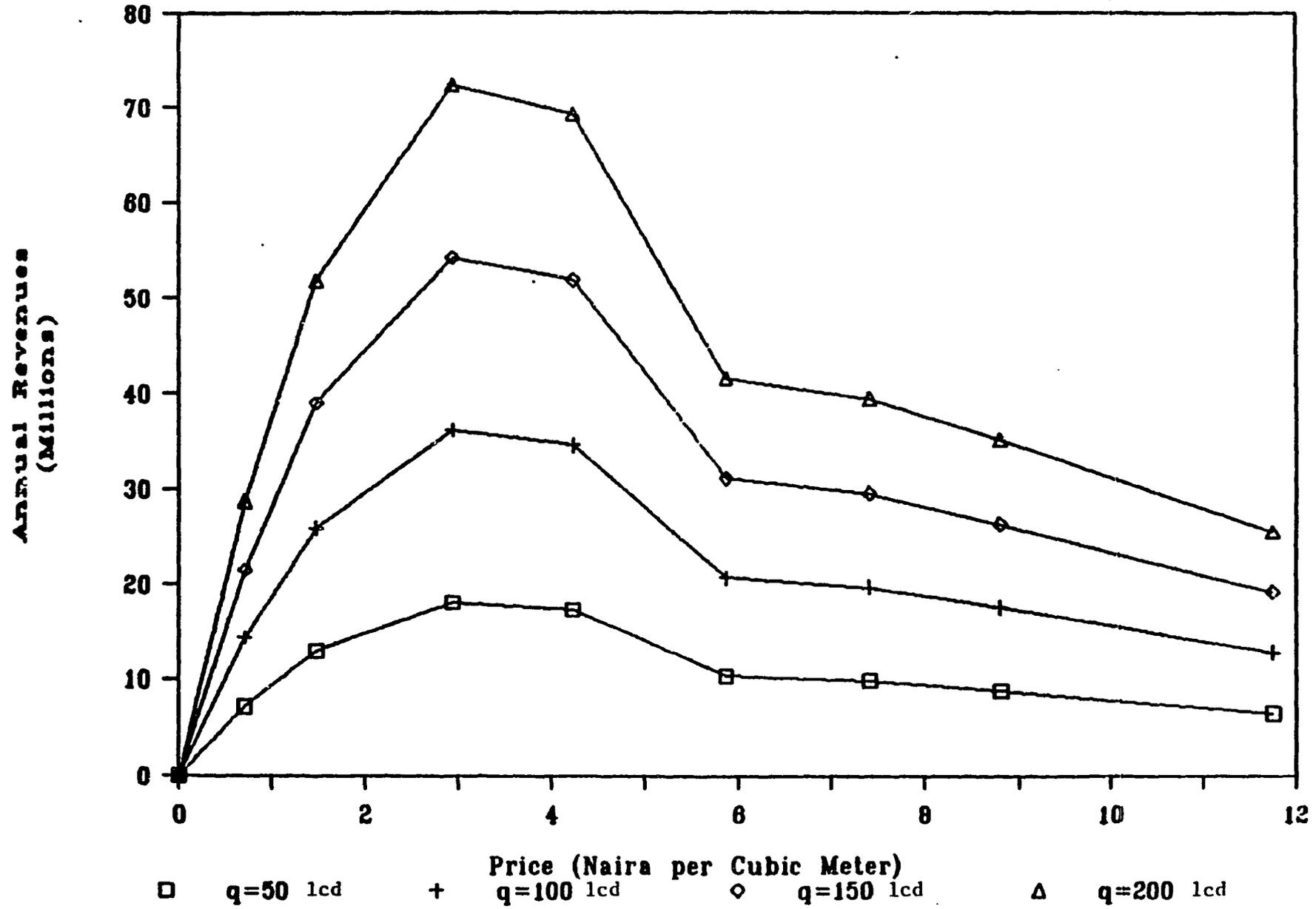
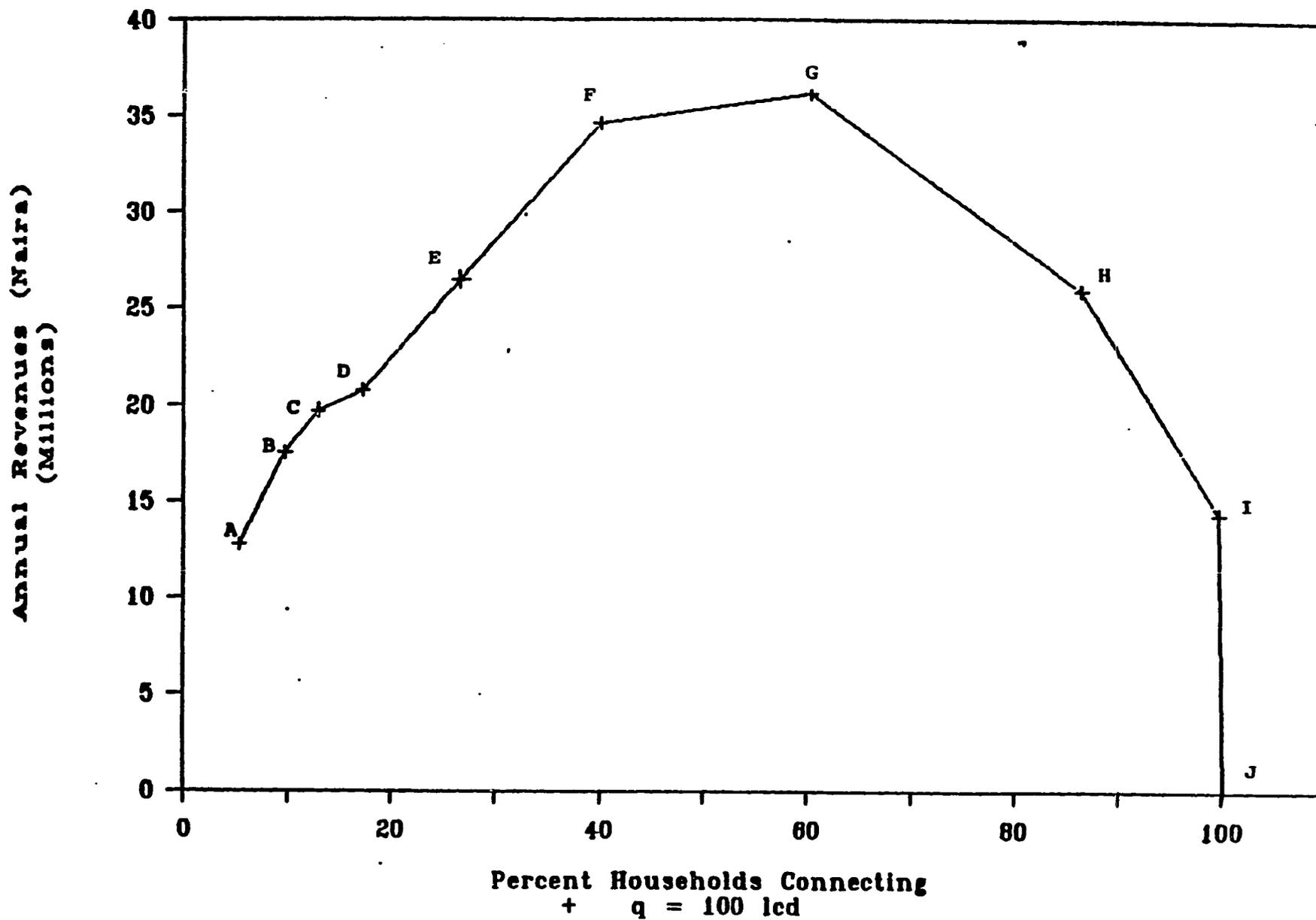


Figure 6  
Annual Revenues from Water System,  
by Percent of Households Connecting (Onitsha, Nigeria)



#### 4.2 Descriptive Statistics on Household Water Use and Socioeconomic Characteristics

The WTP questionnaires contain much of the information typically collected in a "knowledge, attitudes, and practices" (KAP) survey.<sup>28</sup> This background information on socioeconomic characteristics and water use practices of the households in the WTP study sites will be of general interest to a wide variety of groups, including local planning offices, health clinics, local and national government agencies, and donors. It is thus important to present this information in a form in which it is easily accessible to a wide audience. In the WASH WTP studies this has entailed the inclusion of detailed appendices with tables and figures of frequency distributions and simple descriptive statistics for all the socioeconomic and water use variables included in the questionnaire. Such appendices should also include cross-tabulations of selected water use and socioeconomic characteristics (e.g., per capita water use, by household income; housing type, by education level; etc.).

#### 4.3 Determinants of the WTP Bids

Although much useful information can be obtained directly from the frequency distribution of the WTP bids and descriptive statistics, a multivariate analysis of the determinants of the WTP bids can yield much additional insight into the data. There are two related, but distinct objectives of such a multivariate analysis.

The first is to see whether the WTP bids are systematically related to any of the variables suggested by economic theory. If they are, this should increase the analyst's confidence that the WTP bids indeed reflect households' preferences for improved water service, and are not simply random or meaningless numbers dreamed up by the respondent.

The second objective is to understand what specific factors (e.g., education, income, distance to traditional source) are most important in determining how much a household is willing to pay for access to an improved source. This information can have important policy implications. For example, if households more than a specified distance away from a new source such as handpumps or public taps are unwilling to pay for access, this may indicate the need for a greater number of public taps or a different spatial allocation pattern. Alternatively, if the multivariate analysis indicates that individuals with little education are not willing to pay for improved water service, this may suggest that a health education program is needed to increase the demand and improve the utilization of improved water sources. The estimated relationship between the WTP bids and water source characteristics and households' socioeconomic characteristics can also be used as a basis for predicting how much households in a different community (with different socioeconomic characteristics) would be willing to pay for improved water services and how the

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<sup>28</sup> See Bulmer and Warwick, op cit.

demand for improved services will change over time as such factors as income and education change.

A model to explain the WTP bids would generally include the following independent variables:<sup>29</sup>

#### Water Source Characteristics

- price of water from the traditional water source(s);<sup>30</sup>

#### Household Characteristics

- distance (or time) of the household to the traditional water source(s);
- household's perception of the quality of water from the traditional water source(s) and perhaps from the improved water source;
- household income (or wealth);
- education of household members;
- occupation of head of household;
- family size; and
- sex of respondent.

The appropriate statistical technique to use in the multivariate analysis will depend upon the form of the WTP data obtained in the bidding game. If the respondents are asked what is the most they are willing to pay in a direct, open-ended question, the dependent variable in the multivariate model (i.e., their WTP bids) will be continuous, and ordinary least squares regression can be used. However, if a bidding game is used to obtain the respondents' WTP bids, the observed dependent variable is not the maximum amount the household would be willing to pay, but rather an interval within which the "true" willingness to pay falls. Linear regression is not an appropriate technique for

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<sup>29</sup> See Whittington, Briscoe, Mu, and Barron op. cit., and Mu, Whittington, and Briscoe, op. cit., for a discussion of the theoretical justification of the model formulation.

<sup>30</sup> For water vendors delivering water directly to the household, the price of water could vary from household to household.

dealing with such an ordinal dependent variable; in this situation the correct approach is to use an ordered profit model.<sup>31</sup>

If this level of econometric sophistication is, however, not practical given the analytical skills on the study team and the time available, a simpler, more straightforward way of dealing with the data from a bidding game is possible. If the bidding game defines an interval within which the household's WTP falls, the analyst can simply take the mid-point of this interval as the value of the household's WTP bid, and treat this value as the dependent variable in a linear regression model. In other words, if the respondent indicates that he would be willing to pay \$US 1.00 per month for access to a public tap, but that he would not pay \$US 1.50, the mid-point of this interval is \$US 1.25, and this value would be assumed to be the respondent's WTP bid. Based on the WASH experience to date, this approach seems to yield results which are consistent with those obtained from an ordered profit model.

#### 4.4 Tests for Reliability

In addition to the independent variables of the multivariate model listed above, the analyst may also include variables which are designed to check for reliability and biases in the WTP bids. For example, if some of the respondents begin the bidding game with a low starting point and some begin with a high starting point, a dummy variable for starting point can be included as an independent variable. If it is statistically significant, this is evidence that starting point bias exists, and thus should reduce the analyst's confidence in the reliability of the WTP bids.

Similarly, if the questionnaire includes, for example, two bidding games for two different financing methods, some of the respondents may be given questionnaires in which the bidding game with one financing alternative is given first, and other respondents are given questionnaires in which the order of the bidding games is reversed. A dummy variable for questionnaire order can then be included in the model as a possible determinant of the WTP bids. Since there is no logical reason why respondents' preferences for the two financing alternatives should depend on the order in which the questions are asked, if the variable for question order is significant, this is again interpreted as evidence of unreliability of the WTP bids.

If the study team is unable for whatever reasons to use multivariate analysis to examine the determinants of the WTP bids, an alternative, although less satisfactory, approach to testing for biases is to calculate the means of the subsamples which received, for example, different starting points. The analyst can then test to see whether the difference in the means of the subsamples is statistically significant.

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<sup>31</sup> See Whittington, Briscoe, Mu, and Barron, op. cit.

## Chapter 5

### STUDIES DESIGNED TO SUPPLEMENT HOUSEHOLD SURVEYS

#### 5.1 Source Observations

In some WTP studies it may be advisable to cross-check some of the water quantity and water source choice data obtained in the household survey. It is often difficult to get reliable information on water use by asking people directly how much water household members use. A respondent may not be able to estimate volumes or may not know how many buckets other members of the household have collected. When per capita water use is very low, households are more likely to have an accurate picture of household water use than when water is more readily available, but even in this situation a male member of the household may not have a clear idea of how much water female members of the household are collecting.

One way of cross-checking the household survey data on water use is to post observers at the existing water sources, and have them record the amount of water collected by individuals who come to the source. There are several ways these data can be related back to the household interviews. As one example, in the Haiti WTP study, in which source observations were conducted, each respondent was given a card and ribbon with a number on it. The respondent was told to carry either the card or ribbon to the source when collecting water and show it to the source observer, who would then record the household number and the volume of water collected.

A source observation study is only practical when there are a limited number of sources used by households in the village. Ideally the source observations should be carried out for several days in order to determine daily fluctuations in both source choice and the quantity of water used. Also, because water collection typically begins very early in the morning and may not end until well after dark, one individual probably cannot observe a source for an entire day. Therefore, two observers are required for each source each day. A source observation study can thus prove to be time consuming and can require large numbers of staff. On the other hand, source observers need not be as highly trained as enumerators. All that is required is that they be able to read and write, and be able to estimate the volume of water containers (and possibly to tell time, if it is desired to determine queue times and the time of day when most water is collected). Typical entries in a source observer's "log book" might be the time the individual arrives at the water source, the individual's name or household number, the sex of the individual, the age (is it an adult or a child), the amount of water collected, and the departure time.

Although recording such information may appear to be straightforward and routine, it is important that the data collection procedure and log book entries be pretested as with any questionnaire. At a busy water source where many people are coming and going, an observer can quickly become overwhelmed if he or she is asked to record too much information. For example, in a WASH-sponsored study of water vending in Kenya, source observers were posted at every

source in a village and instructed to record the time of arrival and time of departure of everyone who obtained water from the source, both individuals and water vendors.<sup>32</sup> When the queues were long, as many as 30 people were waiting at a water source, and it became impossible for the source observer to remember when an individual who was departing actually arrived at the source because the individual could not be accurately identified from the entries in the log book. In this particular case the difficulty was solved by recording both the time of arrival and of departure for water vendors only; for individuals only the time of departure was recorded.

The training of source observers should focus primarily on estimating the volumes of different sized water containers. The trainees should actually be shown how much water from standardized containers it takes to fill odd-shaped containers of different sizes (i.e., gourdes, plastic containers, etc.). Trainees should be told that after the training session they will be given a test, and only those with the best scores will be hired. The test can be conducted at a single source, and each trainee should be required to fill in entries in a log book for one or two hours. Each trainee's work can then easily be compared with a log book completed by the study director or field supervisor and checked for accuracy.

## 5.2 Water Vending Surveys

One means of cross-checking the WTP information obtained from household surveys is to observe what people are already paying for water from vendors to see if their WTP bids are reasonable in the context of these market prices. Water vendors operate in almost all cities in developing countries and in many rural areas as well, and studies designed to determine the quantities of water they sell and the prices they charge can yield a wealth of information on the amount of money people are prepared to pay for water. In many cases the poorest households are already paying water vendors more than would be necessary to cover the full costs of a piped house connection.<sup>33</sup>

A study of water vending should typically be designed so that interviews are conducted with all of the participants in a water vending system, from the owners of the water source(s) through the final customers. The focus of the interviews with various vendors should be on their cost structure, the prices charged, and the quantities sold. From this information the analyst can develop a general picture of the vendors' profits and the extent to which they are able to control water prices.

Because water vending is an informal-sector activity, there is rarely any official information available on the extent or scale of vending operations.

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<sup>32</sup> See Dale Whittington, Donald Lauria, Daniel Okun, and Xinming Mu Water Vending and Development: Lessons from Two Countries, WASH Technical Report No. 45 (Arlington, VA: Water and Sanitation for Health Project, 1988).

<sup>33</sup> See Whittington, Lauria, Okun, and Mu, op. cit.

Obtaining a picture of the flows of money and water in a vending system is thus something like detective work. By interviewing participants on both sides of a market transaction--buyer and seller--the prices vendors charge can usually be determined with reasonable accuracy. (See Appendix B for sample water vending questionnaires.) One approach used in WASH water vending studies to verify information on prices and daily sales was to have an enumerator follow a water vendor over the course of an entire working day and actually observe each sale the vendor made and the price charged. In the Nigeria water vending study, it was necessary to pay the driver of a tanker truck to allow the enumerator to ride on the truck all day. In a study of water vending conducted in Kenya, vendors carried water in jerricans on handcarts, and the enumerators followed the vendors on foot, occasionally sharing the work of pushing the carts.<sup>34</sup>

It is more difficult to obtain information on the total quantity of water sold by vendors than on the prices charged. By interviewing water vendors and following vendors over the course of a day's work, the average sales per vendor can be estimated, but the total amount of water sold by vendors in the community is still unknown. There are three main ways the total amount of water provided by vendors can be estimated. The first is to develop an estimate of the total number of vendors and multiply by the average sales per vendor. In a large metropolitan area determining the total number of vendors can be very difficult. If there is an organized union of water vendors, it may be possible to obtain such information from the union. In a smaller community it may be possible to obtain a reasonably accurate answer simply by asking individual vendors how many vendors sell water in the village or town.

The second way of estimating the total amount of water provided by vendors is to place observers at all or a sample of the water sources where vendors purchase water and record the amount of water drawn by vendors over a period of several days. This approach is possible only where the water sources are known. In the WASH-assisted water vending study in Onitsha, Nigeria, for example, the tanker truck vendors filled their tanks from private boreholes located throughout the city, and a complete inventory of all these boreholes was not available.

A third approach is to develop the estimate from household interviews. If the household questionnaire includes questions about the quantity of water purchased from vendors, the analyst can generalize from the household sample to the entire urban population in order to develop an estimate of the total amount of water purchased by households from vendors. This approach is likely to be the least reliable of the three approaches for several reasons. First, the respondent's estimate of the quantity of water purchased from vendors may not be reliable. Second, the households interviewed may not have been selected from a rigorously defined sample frame and thus may not be representative of the general population. Third, the population of the village, town, or city may not be known.

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<sup>34</sup> Whittington, Lauria, Okun, and Mu, op. cit.

## Chapter 6

### TIME AND RESOURCE REQUIREMENTS FOR CARRYING OUT A WILLINGNESS-TO-PAY STUDY

#### 6.1 Skill Requirements of Project Team

A typical study team for a WTP study would consist of the following individuals.

- A study director--a natural resources, environmental, or agricultural economist with experience in survey research in developing countries (preferably with experience in contingent valuation studies).
- A research assistant--someone with computer skills and experience in database management and statistical analysis, possibly an economics or engineering graduate student.
- One or two field supervisors--preferably civil engineers with knowledge of the water situation in the study area.
- A team of enumerators.

If the study director is not a host country national, an individual from the host country with a comparable academic background should be hired as a counterpart to the study director. The counterpart would receive training in the contingent valuation methodology and assist with the training of the enumerators and the supervision of the fieldwork. The counterpart study director could also assist with drafting and translating the household questionnaire.

In an ideal setting the study team should include someone who could enter the data from the questionnaires into a microcomputer in the field the day after the questionnaire was completed. Entering the data into a microcomputer in the field accomplishes several things. First, the data management analyst can prepare preliminary analyses of the data for the study director while the fieldwork is still going on. If problems are identified with specific questions in the survey instrument, the questionnaire can be modified in subsequent study sites. Second, if problems are found with particular questionnaires, the study director can talk to the enumerators who completed these questionnaires and either resolve the problems or direct the enumerators to return to the households and correct the deficiencies. Third, the study director can present preliminary findings to government officials before leaving the country. Fourth, if all the data from the questionnaires can be entered into the microcomputer before leaving the country and the files can be cleaned of data entry errors, both the study director and the country counterpart can have copies of the data files before the study director departs. If this is not done, either the original questionnaires will have to be hand-carried or shipped out of the country (which for a large WTP study may entail transporting a couple

of hundred pounds of questionnaires), or the questionnaires must be left with the country counterpart, who would oversee the data entry. The second option could involve substantial delays in the preparation of the final report and may not be feasible if good microcomputer facilities are not available.

## 6.2 Project Schedule

The fieldwork for a WTP study will typically take four to six weeks, depending in large part on the amount of time required to arrange for institutional and logistical support in the study area. The schedule below provides a general idea of the main tasks which must be accomplished during a one-month period of fieldwork.

- Week 1: Selecting the site and drafting the questionnaire.
- Week 2: Training enumerators and pretesting the questionnaire.
- Week 3: Analyzing the pretest, revising the questionnaire, training enumerators in the revised questionnaire, producing the final survey instrument.
- Week 4: Administering the survey.

This schedule assumes that there is a team of ten enumerators, and that a sample size of 400-500 households is desired.<sup>35</sup> This schedule also assumes that microcomputer(s) are available for drafting and revising the questionnaire. The importance of having access to a word processor for drafting and revising the questionnaire should not be underestimated. The typical questionnaire will be on the order of 15 pages, and the research design can easily require that as many as eight different versions of the questionnaire be administered. Moreover, proper formatting of the questions, especially those in the bidding game, makes typing the questionnaire quite time consuming, and, without access to a word processor, it will be necessary to retype the questionnaire after the pretest. Also, the process of preparing the translation of the original questionnaire is greatly facilitated if multiple drafts can easily be prepared for review and comment by the translation team.

This schedule also assumes that the logistical support has already been arranged, and that national and local government officials have already been briefed about the study and have given permission for it to take place. In many cases these preliminary tasks will be among the most time consuming. If the study director is not a host country national, he or she should plan on making two trips to the country: one for preliminary work and the other for the survey itself.

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<sup>35</sup> On the question of the relationship between sample size and the statistical significance of the survey results, see Mitchell and Carson, op. cit., Appendix C.

The first trip would have the following objectives:

- to discuss the study with government officials and obtain permission to carry out the work;
- to identify an appropriate counterpart study director and negotiate his or her contract and availability;
- to make arrangements for logistical support, including automobiles, petrol, facilities for duplicating the questionnaires, and accommodations;
- to identify an appropriate group of enumerators for the study, make arrangements for their availability, and negotiate the terms of their payment;
- to tour the study area to observe the existing water situation, to identify study sites, and to obtain permission from the local community leaders to conduct the study.<sup>36</sup>

If these objectives could be accomplished on the first trip, the objectives of the second trip would be to draft and pretest the questionnaire, and then to conduct the survey.

If the preliminary trip is successful, it may be possible to cut the length of the second trip down to three weeks. It should be emphasized, however, that this schedule assumes that the logistics and fieldwork go smoothly and that there are no unanticipated difficulties. The total time required for fieldwork for a WTP study cannot realistically be reduced to less than four weeks, but it could easily take longer. In this sense the schedule above is optimistic.

After the fieldwork is completed, two to three months should generally be allocated for data analysis and report preparation. The level of effort and time required depends upon the number of questionnaires to be analyzed and the extent and sophistication of the econometric work to be undertaken.

### 6.3 Resource Requirements

The actual costs of conducting a WTP study depend on several country and site-specific factors, but the following budget illustrates the general order of magnitude of the resource requirements for a modest study:

<u>1. Personnel</u>	<u>Time Required</u>
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<sup>36</sup> If village maps are not available for the sites selected and they are needed in order to calculate the distances from the households to traditional water sources, then arrangements should be made during this first trip to have them drawn.

Study director	50 days
Country counterpart	40 days
Data analyst	50 days
Two field supervisors	20 days each
Ten enumerators	20 days each

2. Travel

a. Two international airline tickets

b. Per diem

Study director	35 days
Country counterpart	30 days
Data analyst	20 days
Field supervisors	20 days each
Ten enumerators	15 days each

c. Automobile/truck/van rental

Two vehicles	50 rental-days total
Gasoline	500 gallons

3. Materials and Supplies

a. Paper for questionnaires: 10,000 sheets

b. Copying and/or duplicating

4. Publication Costs

5. Costs of Debriefing and Presentation of Report

## Chapter 7

### USE OF THE INFORMATION FROM WTP STUDIES

The question of how government authorities and donors can make the best use of information collected through WTP studies requires careful consideration. Although WTP surveys can provide water utilities, national and local governments, and donor organizations with valuable information on households' preferences regarding an improved water supply, such studies are not a substitute for active community participation in decision-making. WTP surveys are a means for various governmental bodies to learn more about households' demand for water services and their likely response to various projects and policy proposals. Such knowledge is necessary if water ministries and other planning authorities are to avoid many of the common mistakes of previous programs in the water sector, but it is not sufficient to ensure their success. Ideally the information obtained from WTP surveys should provide a basis for a more informed dialogue between governmental authorities and local communities.

Figure 7 illustrates one possible flow of information from a WTP study. In this case the WTP study provides decision-makers with information that they use to make decisions regarding site selection, service level, and tariff design. In effect, the WTP survey may have been used to circumvent local democratic processes. Households in the community have provided information on their preferences, and in this limited sense their interests are represented. They are, however, not active participants in the decision-making process.

Figure 8 presents an alternative flow of information. In this case the governmental authority processes the information obtained from the WTP survey, and these results are then presented to the community and become the basis for joint planning decisions. The local community and the government authority thus both learn from the results of the WTP study. The community is involved at both the individual household level in terms of providing information and then at the community level in terms of making a decision on the nature of the collective commitment to the improved water system.

The political and institutional realities involved in water sector planning are, of course, rarely as simple as either of these two models would imply. For one thing, local government and other structures of community organization may not be representative of the local population. Women and the poor are often not adequately represented on local government or district councils. In such cases just talking with local elites may result in serious misjudgments regarding what the majority of people actually want in terms of improved water services. In such a situation WTP surveys can provide government bodies with an important means of gathering information directly from some segments of the population without having it filtered through local elites. While useful, this does not increase the political power of the households interviewed.

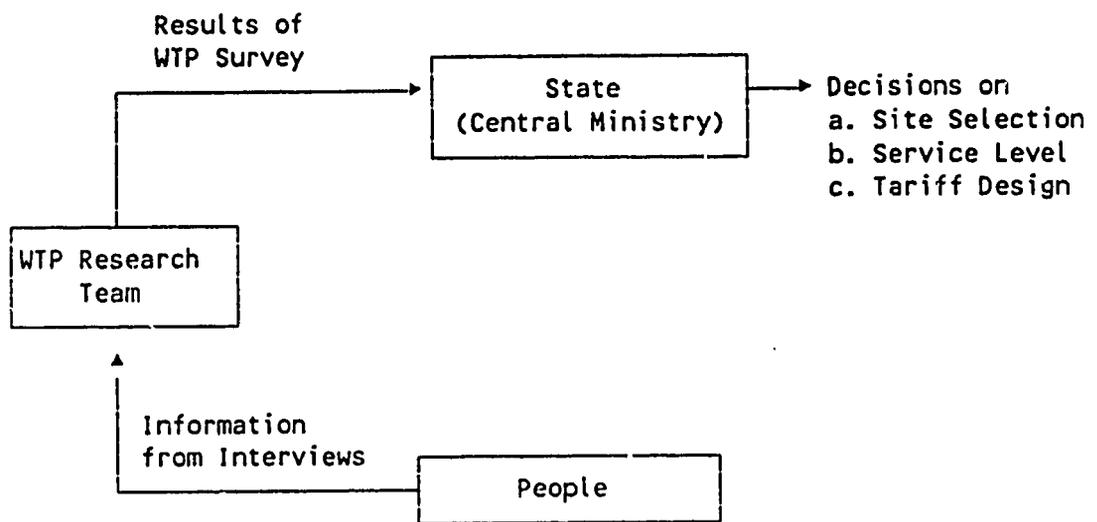
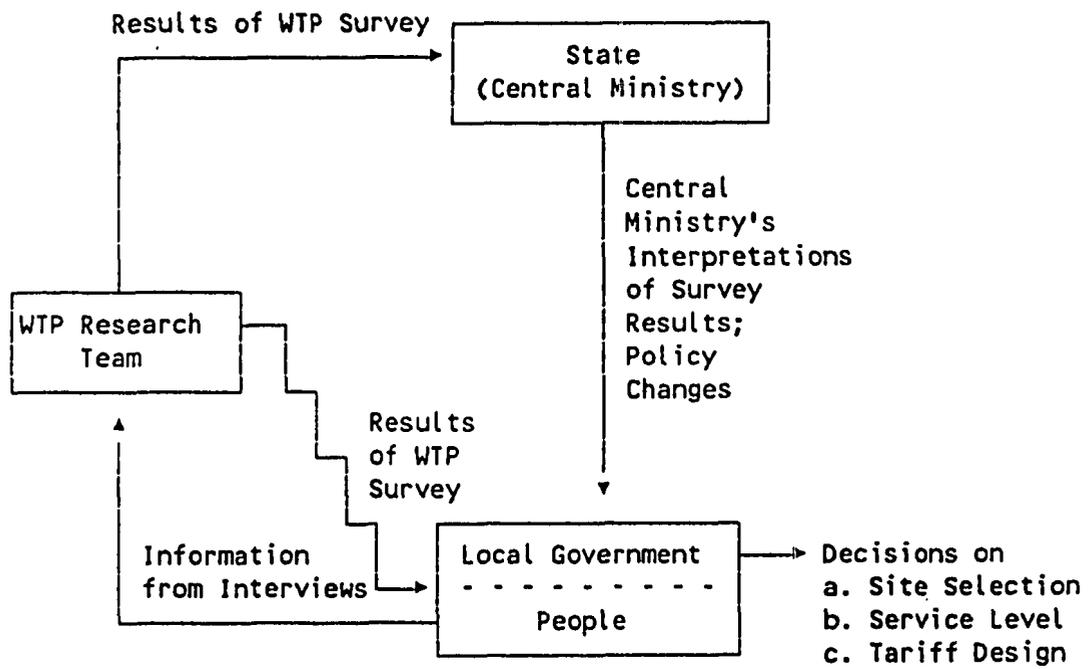


Figure 7: Use of Information from Willingness-to-Pay Studies for Centralized Decision-Making



**Figure 8: Use of Information from Willingness-to-Pay Studies to Support Community-Level Decision-Making**

**Appendix A**

**EXAMPLES OF HOUSEHOLD WILLINGNESS-TO-PAY QUESTIONNAIRES**

1. Haiti
2. Nigeria
3. Tanzania

**Household Questionnaire**

Haiti

**INTRODUCTORY STATEMENT I**

**(FOR THOSE VILLAGES WHERE WATER SYSTEMS ARE ALREADY COMPLETED)**

We are working with CARE on a water study. CARE has helped people in \_\_\_\_\_ to build a potable water system. We will be asking questions to determine if people in \_\_\_\_\_ like this new water system and what is the best system to build for other communities.

Your responses are assisting us only on questions concerning potable water systems. These responses will aid us to better understand how to supply potable water to other communities. And, these responses are not going to change anything in regard to the water system already in \_\_\_\_\_.

If you do not want to respond to these questions you are free to stop at anytime.

**INTRODUCTORY STATEMENT II**

**(FOR THOSE VILLAGES WHERE WATER SYSTEMS HAVE NOT BEEN STARTED)**

We are working with CARE on a water study. CARE wants to help people in \_\_\_\_\_ supply water to their community. We would like to ask you some questions to be able to know what needs to be done in \_\_\_\_\_ to supply potable water.

Your responses are assisting us only on questions concerning potable water systems. And, these responses will also aid us to better understand how to supply potable water to other communities.

If you do not want to respond to these questions you are free to stop at anytime.

Questionnaire Series #: \_\_\_\_\_

Time Interview Starts: \_\_\_\_\_ Ends: \_\_\_\_\_

Household #: \_\_\_\_\_ Date of Interview: \_\_\_\_\_

Name of Locality: \_\_\_\_\_

Name of Enumerator: \_\_\_\_\_

**HOUSEHOLD QUESTIONNAIRE**

**1ST PART**

1. Name of Person Being Interviewed: \_\_\_\_\_

Age: \_\_\_\_\_ MAN / WOMAN

Are other people helping the respondent answer questions?

YES / NO

2. Name of Head of Household: \_\_\_\_\_

Is this a female-headed household? YES / NO

3. How many people live in this house? \_\_\_\_\_

How many adults (over age 18)? \_\_\_\_\_

How many young people (ages 13-18)? \_\_\_\_\_

How many children (ages 5-12)? \_\_\_\_\_

How many children under five? \_\_\_\_\_

4. What is the occupation of the head of your household?

Does he/she or other members have other occupations?

<u>FIRST</u> <u>OCCUPATION</u>	<u>OTHER OCCUPATIONS</u>		
	1	2	3
Farmer _____			
Mason/Carpenter _____			
Sailor/Fisherman _____			
Craftsman _____			
Factory Worker _____			
Small Business (Madam Sara) _____			
Large Business _____			
Voudou Priest, Medicine Man, Midwife _____			
Professional _____			
Other ( ) _____			

5. Where is your household getting water this week?

- a) \_\_\_\_\_
- b) \_\_\_\_\_
- c) \_\_\_\_\_
- d) \_\_\_\_\_

Where does your household get water for:

	1st Place	2nd Place	3rd Place	4th Place
- Drinking	_____	_____	_____	_____
- Cooking	_____	_____	_____	_____
- Adult Bathing	_____	_____	_____	_____
- Children Bathing	_____	_____	_____	_____
- Clothes Washing	_____	_____	_____	_____
- Utensil Washing	_____	_____	_____	_____
- Animal Bathing	_____	_____	_____	_____
- Animal Drinking	_____	_____	_____	_____

6. Does your household get water at these same sources during the rainy season? YES / NO

If no, where does your household get water during the rainy season?

- a) \_\_\_\_\_
- b) \_\_\_\_\_
- c) \_\_\_\_\_
- d) \_\_\_\_\_
- e) \_\_\_\_\_

Where does your household get water during the rainy season for:

	1st Place	2nd Place	3rd Place	4th Place
- Drinking	_____	_____	_____	_____
- Cooking	_____	_____	_____	_____
- Adult Bathing	_____	_____	_____	_____
- Children Bathing	_____	_____	_____	_____
- Clothes Washing	_____	_____	_____	_____
- Utensil Washing	_____	_____	_____	_____
- Animal Bathing	_____	_____	_____	_____
- Animal Drinking	_____	_____	_____	_____

7. Can you show me what containers your household uses for collecting water?

How much water does each container hold?	For each container, how many times is it filled daily?
a) _____	_____
b) _____	_____
c) _____	_____
d) _____	_____
e) _____	_____

8. Does your household collect rainwater? YES / NO

Does your household have a tank to collect rainwater? YES / NO

9. Does your household use water which comes from Cayes or another town?  
YES / NO

If yes,

a) What town is this? \_\_\_\_\_

b) Does your household pay for this water? YES / NO  
How much does your household pay per gallon? \_\_\_\_\_

c) On average, how many gallons does your household get  
from \_\_\_\_\_ each trip? \_\_\_\_\_

d) Does your household pay for having this water transported? YES / NO

How much does your household pay to have this water  
transported? \_\_\_\_\_

e) How many times does your household get water from \_\_\_\_\_  
weekly? \_\_\_\_\_

f) Does someone else transport this water for you or does  
a member of your household transport this water?  
\_\_\_\_\_

10. In Port-au-Prince, people often sell water by the bucket.  
Suppose someone in \_\_\_\_\_ starts selling tap water  
that is of good quality. If a large bucket (7 gallon)  
cost \*\* , would your household buy it? YES / NO

How many of these buckets would your household buy daily?  
\_\_\_\_\_

\*\* Different prices are given here, the following was used in Haiti:  
0.10 or 0.20 or 0.30 or 0.40 or 0.50 gourdes.

**2ND PART** (Complete the following questions for each source)

1. Source name: \_\_\_\_\_
2. Does your household use this water at the source? YES / NO
3. If you have to choose three words: Good / Fair / Bad which would you choose to describe the following for this source?

GOOD FAIR BAD

- |                              |       |
|------------------------------|-------|
| a) Color                     | _____ |
| b) Odor                      | _____ |
| c) Taste                     | _____ |
| d) Dirt                      | _____ |
| e) No Microbes in the water  | _____ |
| f) Reliability               | _____ |
| g) No quarrels at the source | _____ |

NOT FAR FAR VERY FAR

- h) Distance \_\_\_\_\_

4. (Complete the following for this source if water is carried back to the house.)

How many people in your household carry water each day? \_\_\_\_\_

How many adults? \_\_\_\_\_

How many children? \_\_\_\_\_

How many times each day does each person go to this source to get water?

How much water does each person carry in one trip?

- 1) \_\_\_\_\_
- 2) \_\_\_\_\_
- 3) \_\_\_\_\_
- 4) \_\_\_\_\_
- 5) \_\_\_\_\_
- 6) \_\_\_\_\_

**3RD PART WILLINGNESS TO PAY FOR WATER**

**Introduction [Opening Statement A]**

(The enumerator should read sentence after sentence.)

I am going to ask you some questions in order to know if you or someone from your household would be willing to pay money to ensure that the CARE Potable Water Project will be successful in Laurent/Sin Jean du Sud.

We would like you to answer these questions at ease. There are no wrong answers.

The water system is going to be managed by a committee of people from Laurent/Sin Jean. This committee will be chosen by the people of Laurent/Sin Jean.

CARE has decided to help Laurent/Sin Jean by constructing a water system in this community. Your answers cannot change the fact that CARE has decided to build this water system.

CARE never demands money from those people who collect water from public fountains. You will not have to pay money at the public fountains.

We need you to tell the truth in order for CARE to construct the best water system that Laurent/Sin Jean needs.

Did you understand everything that I was saying?  
(If not, the enumerator should repeat the above sentences again.)

**3RD PART WILLINGNESS TO PAY FOR WATER**

**Introduction [Opening Statement B]**

(The enumerator should read sentence after sentence.)

I am going to ask you some questions in order to know if you or someone from your household would be willing to pay money so that the CARE Potable Water Project will be successful in Laurent/Sin Jean du Sud.

The water system is going to be managed by a committee of people from Laurent/Sin Jean. This committee will be chosen by the people of Laurent/Sin Jean.

The committee will decide the amount each household will have to pay to operate and maintain the water system.

Did you understand everything that I was saying?  
(If not, the enumerator should repeat the above sentences again.)

Series A WTP Questions

(Open-ended Questions)

- A.1 Here are pictures of CARE public fountains in Rosier and Port-à-Piment (show pictures). Households collect any amount of water and at anytime.

What is the largest amount of money your household would be willing to pay each month without difficulty to have a public fountain in your neighborhood?

Amount of Money: \_\_\_\_\_  
I don't know: \_\_\_\_\_

- A.2 CARE thinks if people want to have a private connection, it is a privilege and the household has to pay for it. (The enumerator should explain what this means: a private connection meaning a pipe installed in the house with a tap.)

CARE will already have set up public fountains so that, everyone will have at their disposal good drinking water. Suppose that the amount of money for installing a private connection will cost 125 gourdes plus money for the materials. The water from the private connection can be used only in your house. You won't be able to sell water or use it to water gardens. If you do not pay each month, your private connection will be disconnected.

How much would your household be willing to pay each month to have a private connection?

Amount of Money: \_\_\_\_\_  
I don't know: \_\_\_\_\_

If your household could pay more, how much do you think your household would be willing to pay each month to have a private connection?

Amount of Money: \_\_\_\_\_  
I don't know: \_\_\_\_\_

Series B WTP Questions

(Bidding Game No. 1)

B.1 Here are pictures of CARE public fountains set up in Rosier and Port-à-Piment (show pictures).

(a) Do you think your household would be willing to pay (2 or 5 or 7) gourdes each month to use a public fountain located in your neighborhood?

Yes \_\_\_\_\_ Go to (b)  
No \_\_\_\_\_ Go to (c)  
I don't know \_\_\_\_\_ Go to (f)

(b) We do not know how much the water committee will decide for each household to pay for using the public fountain each month. If the decision is for each household to give 10 gourdes each month, would your household be willing to pay this?

Yes \_\_\_\_\_ Go to (f)  
No \_\_\_\_\_ Go to (d)  
I don't know \_\_\_\_\_ Go to (f)

(c) We do not know how much the water committee will decide for each household to pay for using the public fountain each month. If the decision is for each household to give 0.50 gourdes each month, would your household be willing to pay this?

Yes \_\_\_\_\_ Go to (e)  
No \_\_\_\_\_ Go to (f)  
I don't know \_\_\_\_\_ Go to (f)

(d) Would your household be willing to pay (5 or 7 or 8) gourdes each month to use a public fountain located in your neighborhood?

Yes \_\_\_\_\_ Go to (f)  
No \_\_\_\_\_ Go to (f)  
I don't know \_\_\_\_\_ Go to (f)

(e) Would your household be willing to pay (1 or 2 or 5) gourdes each month to use a public fountain located in your neighborhood?

Yes \_\_\_\_\_ Go to (f)  
No \_\_\_\_\_ Go to (f)  
I don't know \_\_\_\_\_ Go to (f)

(f) Think for a moment, what is the largest amount of money your household would be willing to pay each month to use a public fountain? If it would cost your household more than this amount, your household could not afford to pay and would not be able to use the public fountain.

Amount of Money: \_\_\_\_\_ Go to the next page  
I don't know: \_\_\_\_\_ Go to the next page

B.2 CARE thinks that if your household wants to have a private connection it is a privilege and your household has to pay for it (explain if needed). It is going to be the responsibility of the water committee to fix the amount people will pay each month. This has nothing to do with this survey. Suppose your household pays 125 gourdes for the installation plus the money for the materials and CARE has already set up public fountains so that, everyone will have at their disposal good drinking water.

(a) Would your household be willing to pay (5 or 10 or 15) gourdes each month to have a private connection?

Yes \_\_\_\_\_ Go to (b)  
No \_\_\_\_\_ Go to (c)  
I don't know \_\_\_\_\_ Go to (f)

(b) We are not able to know beforehand how much money the water committee is going to demand for a private connection each month. If the committee asks 20 gourdes each month, would your household be willing to pay to have a private connection?

Yes \_\_\_\_\_ Go to (f)  
No \_\_\_\_\_ Go to (d)  
I don't know \_\_\_\_\_ Go to (f)

(c) We are not able to know beforehand how much money the water committee is going to demand for a private connection each month. If the committee asks 2.50 gourdes each month, would your household be willing to pay to have a private connection?

Yes \_\_\_\_\_ Go to (e)  
No \_\_\_\_\_ Go to (f)  
I don't know \_\_\_\_\_ Go to (f)

(d) Would your household be willing to pay (10 or 15 or 17) gourdes each month to have a private connection?

Yes \_\_\_\_\_ Go to (f)  
No \_\_\_\_\_ Go to (f)  
I don't know \_\_\_\_\_ Go to (f)

(e) Would your household be willing to pay (3 or 5 or 10) gourdes each month to have a private connection?

Yes \_\_\_\_\_ Go to (f)  
No \_\_\_\_\_ Go to (f)  
I don't know \_\_\_\_\_ Go to (f)

(f) Now, take a moment to reflect. What is the largest amount of money you think your household would be willing to pay each month to have a private connection?

Amount of Money: \_\_\_\_\_ Go to (g)  
I don't know: \_\_\_\_\_ Go to (g)

(g) Do you think that your household can pay the installation charge and the amount for the materials?

Yes \_\_\_\_\_ Go to the next page  
No \_\_\_\_\_ Go to the next page  
I don't know \_\_\_\_\_ Go to the next page

Series C WTP Questions

(Bidding Game No. 2)

C.1

- (a) Do you think your household would be willing to pay 0.50 gourdes each month to use a public fountain in your neighborhood?

Yes \_\_\_\_\_ Go to (b)  
No \_\_\_\_\_ Go to (f)  
I don't know \_\_\_\_\_ Go to (f)

- (b) Do you think your household would be willing to pay 2 gourdes each month to use a public fountain in your neighborhood?

Yes \_\_\_\_\_ Go to (c)  
No \_\_\_\_\_ Go to (f)  
I don't know \_\_\_\_\_ Go to (f)

- (c) Do you think your household would be willing to pay 5 gourdes each month to use a public fountain in your neighborhood?

Yes \_\_\_\_\_ Go to (d)  
No \_\_\_\_\_ Go to (f)  
I don't know \_\_\_\_\_ Go to (f)

- (d) Do you think your household would be willing to pay 7 gourdes each month to use a public fountain in your neighborhood?

Yes \_\_\_\_\_ Go to (e)  
No \_\_\_\_\_ Go to (f)  
I don't know \_\_\_\_\_ Go to (f)

- (e) Do you think your household would be willing to pay 10 gourdes each month to use a public fountain in your neighborhood?

Yes \_\_\_\_\_ Go to (f)  
No \_\_\_\_\_ Go to (f)  
I don't know \_\_\_\_\_ Go to (f)

- (f) Take a moment, what is the greatest amount of money your household would be willing to pay to use a public fountain. If it would cost your household more than this amount, your household could not afford to pay and would not be able to use the public fountain.

Amount of Money: \_\_\_\_\_ Go to the next page  
I don't know: \_\_\_\_\_ Go to the next page

C.2 CARE thinks that if your household wants to have a private connection it is a privilege and your household has to pay for it (explain if needed). It is going to be the responsibility of the water committee to fix the amount people will pay each month. This has nothing to do with this survey. Suppose your household pays 125 gourdes for the installation plus the money for the materials and that everyone will have at their disposal good drinking water at public fountains.

(a) Would your household be willing to pay 2.50 gourdes each month to have a private connection?

Yes _____	Go to (b)
No _____	Go to (f)
I don't know _____	Go to (f)

(b) Would your household be willing to pay 5 gourdes each month to have a private connection?

Yes _____	Go to (c)
No _____	Go to (f)
I don't know _____	Go to (f)

(c) Would your household be willing to pay 10 gourdes each month to have a private connection?

Yes _____	Go to (d)
No _____	Go to (f)
I don't know _____	Go to (f)

(d) Would your household be willing to pay 15 gourdes each month to have a private connection?

Yes _____	Go to (e)
No _____	Go to (f)
I don't know _____	Go to (f)

(e) Would your household be willing to pay 20 gourdes each month to have a private connection?

Yes _____	Go to (f)
No _____	Go to (f)
I don't know _____	Go to (f)

(f) Take a moment to reflect. What is the largest amount of money you think your household would be willing to pay to have a private connection?

Amount of Money: _____	Go to (g)
I don't know: _____	Go to (g)

(g) Do you think that your household can pay the installation charge and the amount for the materials?

Yes	_____	Go to the next page
No	_____	Go to the next page
I don't know	_____	Go to the next page

Series D WTP Questions

(Bidding Game No. 3)

D.1

- (a) Do you think your household would be willing to pay 10 gourdes each month to use a public fountain in your neighborhood?

Yes \_\_\_\_\_ Go to (f)  
No \_\_\_\_\_ Go to (b)  
I don't know \_\_\_\_\_ Go to (f)

- (b) Do you think your household would be willing to pay 7 gourdes each month to use a public fountain in your neighborhood?

Yes \_\_\_\_\_ Go to (f)  
No \_\_\_\_\_ Go to (c)  
I don't know \_\_\_\_\_ Go to (f)

- (c) Do you think your household would be willing to pay 5 gourdes each month to use a public fountain in your neighborhood?

Yes \_\_\_\_\_ Go to (f)  
No \_\_\_\_\_ Go to (d)  
I don't know \_\_\_\_\_ Go to (f)

- (d) Do you think your household would be willing to pay 2 gourdes each month to use a public fountain in your neighborhood?

Yes \_\_\_\_\_ Go to (f)  
No \_\_\_\_\_ Go to (e)  
I don't know \_\_\_\_\_ Go to (f)

- (e) Do you think your household would be willing to pay 0.50 gourdes each month to use a public fountain in your neighborhood?

Yes \_\_\_\_\_ Go to (f)  
No \_\_\_\_\_ Go to (f)  
I don't know \_\_\_\_\_ Go to (f)

- (f) Take a moment, what is the greatest amount of money your household would be willing to pay to use a public fountain. If it would cost your household more than this amount, your household could not afford to pay and would not be able to use the public fountain.

Amount of Money: \_\_\_\_\_ Go to the next page  
I don't know: \_\_\_\_\_ Go to the next page

D.2 CARE thinks that if your household wants to have a private connection it is a privilege and your household has to pay for it (explain if needed). It is going to be the responsibility of the water committee to fix the amount people will pay each month. This has nothing to do with this survey. Suppose your household pays 125 gourdes for the installation plus the money for the materials and that everyone will have at their disposal good drinking water at public fountains.

(a) Would your household be willing to pay 20 gourdes each month to have a private connection?

Yes \_\_\_\_\_ Go to (f)  
No \_\_\_\_\_ Go to (b)  
I don't know \_\_\_\_\_ Go to (f)

(b) Would your household be willing to pay 15 gourdes each month to have a private connection?

Yes \_\_\_\_\_ Go to (f)  
No \_\_\_\_\_ Go to (c)  
I don't know \_\_\_\_\_ Go to (f)

(c) Would your household be willing to pay 10 gourdes each month to have a private connection?

Yes \_\_\_\_\_ Go to (f)  
No \_\_\_\_\_ Go to (d)  
I don't know \_\_\_\_\_ Go to (f)

(d) Would your household be willing to pay 5 gourdes each month to have a private connection?

Yes \_\_\_\_\_ Go to (f)  
No \_\_\_\_\_ Go to (e)  
I don't know \_\_\_\_\_ Go to (f)

(e) Would your household be willing to pay 2.50 gourdes each month to have a private connection?

Yes \_\_\_\_\_ Go to (f)  
No \_\_\_\_\_ Go to (f)  
I don't know \_\_\_\_\_ Go to (f)

(f) Take a moment to reflect. What is the largest amount of money you think your household would be willing to pay to have a private connection?

Amount of Money: \_\_\_\_\_ Go to (g)  
I don't know: \_\_\_\_\_ Go to (g)

(g) Do you think that your household can pay the installation charge and the amount for the materials?

Yes	_____	Go to the next page
No	_____	Go to the next page
I don't know	_____	Go to the next page

4TH PART            CONCERNING HEALTH

1. How many times did you or another member of your household go to the Medical Center last month? \_\_\_\_\_

(Questions 2-3 are concerning infants only.)

2. Are there infants in the household who had diarrhea last week?

YES / NO

How many infants had diarrhea last week? \_\_\_\_\_

3. Are there infants in the household that had skin infections last week?

YES / NO

5TH PART LEVEL OF EDUCATION & MEASURE OF HOUSEHOLD ASSETS

1. Do teenagers and children in your household go to school?

YES / NO

What grades are they in?

Did you go to school?	YES / NO
<u>What grade have you completed?</u>	
Did your husband/wife go to school?	YES / NO
<u>What grade has he/she completed?</u>	
Did other adults in the household go to school?	YES / NO
<u>What grades have they completed?</u>	

LEVEL OF EDUCATION	TEENAGERS & CHILDREN	ADULTS
	# # # # # # # #	# # # # # #

---

Uneducated	_____
Kindergarten	
Infant Class (1)	
Preparatory (2-3)	_____
Elementary (4-5)	_____
Middle Class (6-7)	
6th, 5th (8-9)	_____
4th, 3rd, 2nd (10-12)	_____
Rheto	_____
Philosophy	_____
University	_____

2. Do you own your house or do you rent your house?

Own \_\_\_\_\_ Rent \_\_\_\_\_

3. How many rooms does your house have? \_\_\_\_\_

4. Do you have people in a foreign country who send you money?

YES / NO

**OBSERVATIONS TO BE MADE BY THE ENUMERATOR**

5. How is the house covered (i.e., what is the roof made of)? (Put an (x) next to the correct answer)
- a) Concrete
  - b) Sheet metal
  - c) Straw
6. How are the walls of the house constructed?
- a) Block/Stone
  - b) Mason
  - c) Lattice/Straw
7. How is the floor made?
- a) Mosaic/Brick
  - b) Cement
  - c) Dirt
8. Is the house (doors and windows) painted? YES / NO
9. Does the house have a front porch? YES / NO
10. Does the household have a latrine? YES / NO
11. Does the household have a radio? YES / NO
12. Does the household have a Coleman Lantern? YES / NO
13. Does the household have a glass lamp? YES / NO

6TH PART FOR THE ENUMERATOR TO COMPLETE

We would like you to respond to these questions about the survey.

1. Was the person who responded to the questions irritated? YES / NO
2. Did he/she give you a warm welcome? YES / NO
3. Do you think he/she was a little nervous? YES / NO
4. Do you think he/she made efforts to tell the truth? YES / NO
5. Was it difficult for him/her to respond to the questions on willingness to pay? YES / NO
6. How do you evaluate the responses given?  
(Choose one)  
Excellent / good / fair / mediocre / bad

Do you have any comments you would like to make about this survey?

DON'T FORGET TO RECORD WHAT TIME THE INTERVIEW ENDED!

Household Questionnaire - Nigeria

Name of Enumerator:

World Bank Research Unit  
Washington D.C.  
Onitsha Water Study

Date:

Area of Onitsha:

1. Is the person being interviewed male or female?      M / F
2. Is this person the head of the household?              YES / NO
3. Is this interview being conducted at a  
residence or business?    Residence / Business
4. How many adults live in this household?  
(include servants)    No. of adults \_\_\_\_\_
5. How many children live in this household?  
    No. of children: \_\_\_\_\_

\* \* \* \*

ENUMERATOR: JUST OBSERVE.

6. Is this dwelling a .... single family house?              \_\_\_\_\_  
    duplex?    \_\_\_\_\_  
    flat in multistory bldg?                      \_\_\_\_\_  
    flat in single story bldg?                      \_\_\_\_\_  
    tenement renting single rooms?              \_\_\_\_\_  
    batcher house?    \_\_\_\_\_  
    other    \_\_\_\_\_

7. How would you rate the quality of this housing unit?  
    GOOD / FAIR / POOR  
    Not applicable (business)

*[Faint, illegible text at the bottom of the page]*

Water Sources-- Source No. 1: TANKER TRUCKS

8. Are tanker trucks selling water in this neighborhood? YES / NO

↓  
Go to next  
water source

9. What prices do they charge? Don't Know \_\_\_\_\_

	<u>Rainy Season</u>	<u>Dry Season</u>
Per Drum	_____	_____
500 gallons	_____	_____
1000 gallons	_____	_____

10. How would you judge the quality of the water from tanker trucks?

GOOD / FAIR / POOR

Don't Know \_\_\_\_\_

11. Do you ever buy water from a tanker truck? YES / NO

↓  
Go to next  
water source

12. What size storage tank(s) do you have?

\_\_\_\_\_ drums  
\_\_\_\_\_ 500 gallon  
\_\_\_\_\_ 1000 gallon

13. On average, how much water does this household buy from tanker trucks per week? (Record water consumption)

Rainy Season \_\_\_\_\_

Dry Season \_\_\_\_\_

14. What is the water you buy from tanker trucks used for?

	<u>Rainy Season</u>	<u>Dry Season</u>
Drinking/Cooking	_____	_____
Bathing/Washing/ Cleaning, etc.	_____	_____

Source No. 2: Neighbors / Small Water Retailers

15. Are there people in this neighborhood that sell water by the bucket from storage tanks or private taps (or do you sell water)?

YES / NO

↓  
Go to next  
water source

16. What prices do they charge? Don't Know -----

Rainy Season                      Dry Season

Small Bucket  
(about 2 g)

-----

Large Bucket  
(about 4 g)

-----

17. How far away is the nearest neighbor who sells water?

Number of houses -----

Roundtrip collection time -----

18. How would you judge the quality of the water from small water retailers / neighbors?

GOOD / FAIR / POOR                      Don't Know -----

19. Do you ever buy water from your neighbors or small retailers?

YES / NO

↓  
Go to next  
water source

20. How much water does this household buy, on average, from small retailers or neighbors per week (in buckets or gallons)?

Rainy Season -----

Dry Season -----

21. What is the water you buy from neighbors used for?

Rainy Season                      Dry Season

Drinking/Cooking

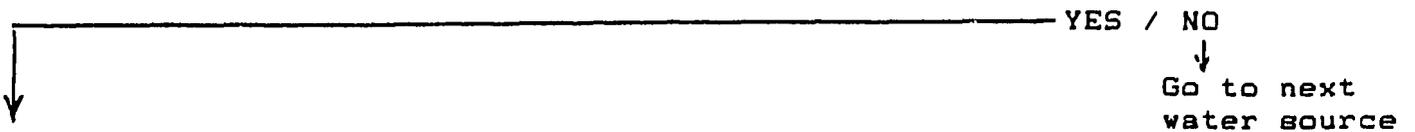
-----

Bathing/Washing/  
Cleaning, etc.

-----

Source No. 3: Distributing Vendors

22. Are there vendors on bicycles, on foot, or pushing carts that sell water in this neighborhood?



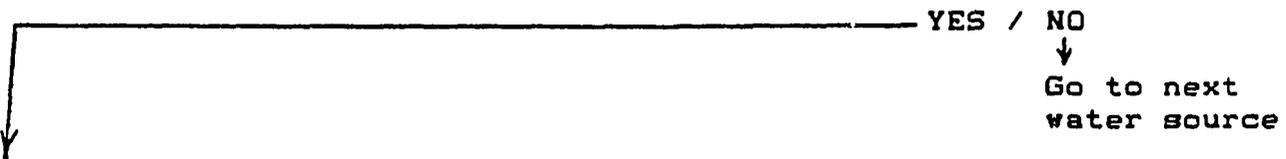
23. What prices do they charge? Don't Know -----

	Rainy Season	Dry Season
Small Bucket (about 2 g)	-----	-----
Large Bucket (about 4 g)	-----	-----

24. How would you judge the quality of the water from small water retailers / neighbors?

GOOD / FAIR / POOR      Don't Know -----

25. Do you ever buy water from these distributing vendors?



26. How much water does this household buy, on average, from distributing vendors per week (in buckets or gallons)?

Rainy Season -----  
Dry Season -----

27. What is the water you buy from distributing vendors used for?

	Rainy Season	Dry Season
Drinking/Cooking	-----	-----
Bathing/Washing/ Cleaning, etc.	-----	-----

Source No. 4: Shallow Wells

28. Are there shallow wells in this neighborhood where people can obtain water for household use?

YES / NO

↓  
Go to next  
water source

29. What prices do they charge?

Don't Know -----

Free/No Charge -----

Rainy Season

Dry Season

Small Bucket  
(about 2 g)

-----

-----

Large Bucket  
(about 4 g)

-----

-----

30. How far away is the nearest shallow well where you can obtain water?

Number of houses -----

Roundtrip collection time -----

31. How would you judge the quality of the water from this shallow well?

GOOD / FAIR / POOR      Don't Know -----

32. Do you ever obtain water from shallow wells?

YES / NO

↓  
Go to next  
water source

33. How much water does this household obtain (or buy), on average, from shallow wells per week (in buckets or gallons)?

Rainy Season -----

Dry Season -----

34. What is the water you obtain (or buy) from shallow wells used for?

Rainy Season

Dry Season

Drinking/Cooking

-----

-----

Bathing/Washing/  
Cleaning, etc.

-----

-----

Source No. 5: Rainwater Collection

35. Do people in this neighborhood collect rainwater for household use?

YES / NO

↓  
Go to next  
water source

36. How would you judge the quality of the rainwater people collect?

GOOD / FAIR / POOR      Don't Know      -----

37. Do you ever collect rainwater?

YES / NO

↓  
Go to next  
water source

38. How much rainwater does this household collect per week, on average, during the rainy season? (in buckets or gallons) *OR DRUMS*

Rainy Season -----

39. What is the rainwater you collect used for?

Rainy Season

Drinking/Cooking -----

Bathing/Washing/  
Cleaning, etc. -----

Source No. 6: Surface water (river, streams, ditch, pond)

40. Are there surface water sources in this area where people can obtain water for household use?

YES / NO

↓  
Go to next  
water source

41. List the surface water sources available:

- a. -----
- b. -----
- c. -----

42. Which one would you say most people use or is the most popular?

-----

43. How far away is the most popular surface water source where people can obtain water?

Number of houses -----  
(or miles or meters) -----  
Roundtrip collection time -----

44. How would you judge the quality of the water from this source?

GOOD / FAIR / POOR      Don't Know -----

45. Do you ever obtain surface water from one of these sources for your household use?

YES / NO

Go to next  
water source

46. Which ones do you collect water from?

- (a) -----
- (b) -----
- (c) -----

47. How much water does this household collect, on average, from surface water sources per week (in buckets or gallons)?

Rainy Season -----

Dry Season -----

48. What is the water you collect from surface sources used for?

	Rainy Season	Dry Season
Drinking/Cooking	-----	-----
Bathing/Washing/ Cleaning, etc.	-----	-----

Source No. 7: Private Connections

49. Does this household have a private connection with the old Onitsha water system?

YES/ NO  
↓  
Go to  
Question 50



If YES, does it work (ie., does it provide water)?

YES/ NO  
Go to  
Question 50

If YES, how would you describe the reliability of the water from your connection?

GOOD / FAIR / POOR

How would you judge the quality of the water from your private connection?

GOOD / FAIR / POOR

How much of your household's water would you say you obtain from your private connection?

Almost all -----

About half -----

Very little -----

50. Has this household paid for a connection to the New Onitsha water Scheme?

YES / NO

Willingness to Pay for Private Water Connection

Enumerator: This section of the questionnaire is only for those households without a reliable connection. Please read the following statement and questions to the person being interviewed. Do NOT change them into your own words.

\* \* \* \* \*

When the NEW ONITSHA WATER SCHEME is commissioned and when distribution pipes reach your area, those households with private connections will have safe, reliable water - with good pressure - 24 hours per day, all year around.

The World Bank thinks every family wants its own water connection so that it can have as much water as it needs when it needs it. To be fair, each family should pay only for the amount it uses. Just as people buy water from vendors only pay for the amount they buy, if you use a lot of water, you should pay more than if you use only a little. It would be up to the household to decide how much to use.

To achieve this, each family would have to have a meter installed on its connection, just like a meter is installed to measure how much electricity people use. Every month the meter would be read to determine how much water the household has used and how much the household would have to pay.

Of course, in some cases it will not be possible to provide a household an individual meter, at least for a long time, but assume that you could have a water meter. The decision on whether or not to connect to the NEW ONITSHA WATER SCHEME and have a metered connection would be the household's or the landlord's. People would still be free to buy water from water vendors if they wished.

71.

(a) If the price you are charged for water is 1 Naira per drum (or about 25 Naira per 1000 gallons) would you like to be connected to the NEW ONITSHA WATER SCHEME and have a meter?

YES .....GO TO (b)

NO .....GO TO (d)

NOT SURE ....GO TO (d)

(b). If the price you are charged for water is 2 Naira per drum (or about 50 Naira per 1000 gallons) would you like to have a metered connection?

YES .....Finished with this section

NO .....GO TO (c)

NOT SURE ....GO TO (c)

(c). If the price you are charged for water is 1.50 Naira per drum (or about 37.50 Naira per 1000 gallons) would you like to have a metered connection?

YES / NO / NOT SURE.....Finished with this section

(d). If the price you are charged for water is 0.50 Naira--50 kobo--per drum (or about 12 Naira per 1000 gallons) would you like to have a metered connection?

YES .....Finished with this section

NO / NOT SURE .....GO TO (e)

(e). If the price you are charged for water is 0.25 Naira--25 kobo--per drum (or about 6 Naira per 1000 gallons) would you like to have a metered connection?

YES .....Finished with this section

NO / NOT SURE .....GO TO (f)

(f). If the price you are charged for water is 0.12 Naira--12 kobo per drum (or about 3 Naira per 1000 gallons) would you like to have a metered connection?

YES / NO / NOT SURE.....Finished with this section

Household Characteristics and Assets

52. Does your family own or rent this (its) house or flat? OWN / RENT

IF RENT, how much do you pay per month for rent?

Less than 25 Naira \_\_\_\_\_  
25 - 50 Naira \_\_\_\_\_  
50 - 100 Naira \_\_\_\_\_  
100 - 200 Naira \_\_\_\_\_  
200 - 300 Naira \_\_\_\_\_  
300 - 500 Naira \_\_\_\_\_  
Over 500 Naira \_\_\_\_\_

53. How much is your monthly electric bill?

Less than 5 Naira \_\_\_\_\_  
5 - 10 Naira \_\_\_\_\_  
10 - 20 Naira \_\_\_\_\_  
20 - 30 Naira \_\_\_\_\_  
30 - 50 Naira \_\_\_\_\_  
Over 50 Naira \_\_\_\_\_

Does not have electricity \_\_\_\_\_

54. How many rooms does your house (flat) have?

(do not include storage, kitchen, or bathroom) No. of Rooms \_\_\_\_\_

55. Does your house (flat) have an indoor toilet? YES / NO

56. Which of the following does your household own?

Refrigerator _____	Car _____
Color TV _____	Black & White TV _____
Motorcycle _____	Radio _____
Fan _____	A/C _____

Wage Earners and Household Income

57. How many years of education does the head of household have?

Primary -----  
 Secondary -----  
 More than Secondary -----  
 No. of Years -----

58. How many persons in this household are wage earners? -----

59. For each wage earner, indicate his or her occupation:  
 (give head of household first; indicate sex)

Wage Earner	Sex M/F	Laborer	Skilled Laborer	Office Worker	Big Busi.	Small Trader	Professional	Other

60. What is the household's total cash income per month from all sources?

Naira per Month	Wage Earner No. 1	Wage Earner No. 2	Wage Earner No. 3	Wage Earner No. 4
Less than 200 N				
200 - 400 Naira				
400 - 600 Naira				
600 - 800 Naira				
800 -1200 Naira				
1200-1500 Naira				
1500-2000 Naira				
Over 2000 Naira				

61. Enumerator: How would you rate the overall quality of this interview?

GOOD / FAIR / POOR

UNICEF/MAJI Water Study, Newala District, Tanzania

Household Questionnaire

Name of Enumerator:

Time Start:

Date:

Time Finish:

Village:

Name of the 10-cell leader:

[ENUMERATOR: READ THE FOLLOWING INTRODUCTORY STATEMENT ]

My name is \_\_\_\_\_ and I am working with UNICEF and MAJI on a study of the water situation in Newala district. This village has been selected as one of the villages for our study. We have received permission from the District Executive Director, the District Commissioner, and your Village Secretary to conduct this study. You have been selected as one of the people we would like to interview. The interview will just take a few minutes. Your responses will help provide the village with better water service. Your answers will be completely confidential, and if at any time during the interview you want to stop answering questions, you are free to do so.

Would you be willing to be interviewed? YES / NO

[NOTE: ONLY THE MOST SENIOR MALE OR FEMALE IN THE HOUSEHOLD SHOULD BE INTERVIEWED ]

\* \* \*

1. Name of respondent: \_\_\_\_\_
2. Is the person being interviewed male or female? MALE / FEMALE
3. Is the person being interviewed the head of the household? YES / NO
4. Is this a female-headed household? YES / NO
5. Are you a 10-cell leader? YES / NO
6. How many adults live in this household? No. of adults \_\_\_\_\_  
(ADULTS: 18 YEARS AND OLDER)
7. How many children live in this household? No. of children \_\_\_\_\_

[ Enumerator: Now I would like to ask you some questions about the water situation in this village. ]

8. Is the water system working today (i.e., is there water in the pipes)?

YES / NO

IF YES, GO TO QUESTION NO. 10

9. How many days has the system been without water?

No. of days \_\_\_\_\_

Rainwater Collection

10. Do you have a rainwater collection tank?

YES / NO

IF NO, GO TO QUESTION NO. 15

11. Does it work (i.e. does it hold water)

YES / NO

IF NO, GO TO QUESTION NO. 16

12. If your neighbor runs out of water, do you sometimes provide your neighbor water from your tank?

YES / NO

IF NO, GO TO QUESTION 16

13. Do you charge something for the water?

YES / NO

IF NO, GO TO QUESTION 16

14. How much do you charge per bucket?

Price per bucket \_\_\_\_\_

15. [IF RESPONDENT DOES NOT HAVE A RAINWATER COLLECTION TANK, ASK ...]

How much do your neighbors with a tank usually charge for a bucket of water ?

Price per bucket \_\_\_\_\_

16. How would you judge the quality of water from rainwater collection tanks?

GOOD / POOR

Don't Know \_\_\_\_\_

\_\_\_\_\_ pump, or \_\_\_\_\_ taps  
in another village)

17. Which source of water (other than rainwater tanks) do you use most often when the system does not have water?

Name of source \_\_\_\_\_

Type of source:  
(Check one most often used)

spring \_\_\_\_\_

open pond \_\_\_\_\_

traditional well \_\_\_\_\_

handpump \_\_\_\_\_

other \_\_\_\_\_

18. How far away is this traditional source (one way)?

No. of miles \_\_\_\_\_

or No. of kilometers \_\_\_\_\_

19. How long does it usually take to walk there (one way)?

No. of hours \_\_\_\_\_

20. How long do you usually have to wait in the queue there?

No. of hours \_\_\_\_\_

Never a queue \_\_\_\_\_

21. How would you judge the quality of the water at this source?

GOOD / POOR

Don't Know \_\_\_\_\_

22. Do water vendors ever sell water in this village?

YES / NO

IF NO, GO TO QUESTION 25

23. (IF YES, ASK ...) How much do they usually charge per bucket?

Rainy Season (Price per bucket) -----

Dry Season (Price per bucket)  
(at this time of year) -----

Don't Know -----

24. How would you judge the quality of water sold by water vendors?

GOOD / POOR

Don't Know -----

Water Consumption

25. When the water system is working, how many buckets do members of your household carry home in a day from the domestic tap?

Rainy Season -----

Dry Season -----

26. When the system is not working, how many buckets do members of your household use?

Rainy Season -----

Dry Season -----

Part II : WILLINGNESS TO PAY FOR WATER QUESTIONS

[ ENUMERATOR: READ THE STATEMENT BELOW EXACTLY AS IT IS GIVEN; DO NOT PARAPHRASE. ]

Opening Statement A:

As you know, this village is connected to the Kitangari Water Scheme, but the service has been unreliable. The construction costs of the Kitangari Water Scheme were paid by donors. In 1986 these donors then handed the water system over to the central government and the central government now pays for the operation and maintenance of the water system. The main reason that the water supply has been unreliable is that the central government has not had enough money to buy the diesel fuel necessary to run the pumps at all times. When the MAJI engineer runs out of money, he cannot order diesel fuel from Mtwara, and the water stops coming. There is also a shortage of money for repairs and maintenance of the equipment.

Now I'm going to ask you some questions to learn whether your household would be willing to pay money in order to improve the reliability of the water supply scheme serving this village. It is important that you answer the questions as truthfully as you can so that we can really know what you can afford to pay for water. If you and other people we interview say you cannot pay anything, then perhaps it is not possible to improve the reliability of the water system by buying more diesel. If you say you can pay too much, then you might not be able to afford the water. So please answer the questions honestly.

[ ENUMERATOR: READ THE STATEMENT BELOW EXACTLY AS IT IS GIVEN; DO NOT PARAPHRASE. ]

Opening Statement B:

As you know, this village is connected to the Kitangari Water Scheme, but the service has been unreliable. The construction costs of the Kitangari Water Scheme were paid by donors. In 1986 these donors then handed the water system over to the central government and the central government now pays for the operation and maintenance of the water system. The main reason that the water supply has been unreliable is that the central government has not had enough money to buy the diesel fuel necessary to run the pumps at all times. When the MAJI engineer runs out of money, he cannot order diesel fuel from Mtwara, and the water stops coming. There is also a shortage of money for repairs and maintenance of the equipment.

I'm going to come back tomorrow to ask you some questions to learn whether your household would be willing to pay money in order to improve the reliability of the water supply scheme serving this village. I want you to think carefully about how much you can afford to pay for water. You can discuss it with other members of your household or even your neighbors, but tomorrow I want you to answer my questions just for your household. I don't want everyone in the village to get together and agree upon one answer. Do you understand?

It is important that you answer the questions tomorrow as truthfully as you can so that we can really know what you can afford to pay for water. If you and other people we interview say you cannot pay anything, then perhaps it is not possible to improve the reliability of the water system by buying more diesel. If you say you can pay a very high price, then you might not be able to afford the water. So please answer the questions honestly.

Financing Alternative No. 1: Pay By the Bucket

[Bidding Game with low starting point]

Financing Alternative No. 1: Pay By the Bucket

[Bidding Game with low starting point]

When the old Makonde water scheme was in operation in this village, people had to pay for their water by the bucket. People got water from domestic taps and paid the tap attendant the money which was used to purchase diesel and to pay for repair and maintenance of the water system.

Suppose government started a new system for collecting money and charged people by the bucket so that money could be available to buy enough diesel fuel for the pumping station all the time and let's suppose that there was an attendant at every domestic tap in the village who would collect that money and assume that water would be available continuously with strong pressure from early in the morning until night.

(a) Now, if the price of water per bucket were 0.50 shillings, would you buy water from the domestic tap?

YES / NO  
NOT SURE

[ IF NO, GO TO (d) ]

[IF YES, ASK ...] How many buckets would you buy from the domestic tap per day ...

No. of buckets -----

(b) Now, if the price of water per bucket were 1 shilling, would you buy water from the domestic tap?

YES / NO  
NOT SURE -----

[ IF NO, GO TO (d) ]

[IF YES, ASK ...] How many buckets would you buy from the domestic tap per day ...

No. of buckets -----

(c) Now, if the price of water per bucket were 3 shillings, would you buy water from the domestic tap?

YES / NO  
NOT SURE -----

[ IF NO, GO TO (d) ]

[IF YES, ASK ...] How many buckets would you buy from the domestic tap per day ...

No. of buckets -----

... the water you need from the domestic tap, what is the most you could pay per bucket?

Maximum price per bucket \_\_\_\_\_ shillings

[ IF THE RESPONDENT MENTIONS ANY PRICE, GO TO (e) ]

[ IF THE PRICE IS ZERO, ASK .... ]

What are the reasons you would not want to pay for water by the bucket even if the price were very low?

(Check appropriate response)

Cannot afford to pay anything \_\_\_\_\_

Satisfied with traditional source \_\_\_\_\_

It's the Government's responsibility to provide free water \_\_\_\_\_

Other (please specify) \_\_\_\_\_

[ IF THE PRICE GIVEN IN (d) IS ZERO, SKIP (e), (f), (g) and (h) ]

(e) If the price of water was \_\_\_\_\_ (use price of water in (d) above), how many buckets do you think your household would buy per day on average?

No. of buckets per day \_\_\_\_\_

[ENUMERATOR: TELL RESPONDENT THAT YOU ARE GOING TO CALCULATE HOW MUCH THAT WOULD COST PER MONTH]

(f) If the price of water was \_\_\_\_\_ (use price of water in (d) above), and your household bought \_\_\_\_\_ buckets per day, it would cost you \_\_\_\_\_ per day for water, or \_\_\_\_\_ shillings per month (multiply by 30).

In order to be able to pay for water, which expenses would you reduce?

Food	_____
Clothing	_____
Beer/Cigarettes	_____
Transportation	_____
School fees	_____
Other (Specify)	_____

the

you

[INDICATE EXPENSES MENTIONED IN (e)] so as to be able to pay  
----- [ QUOTE AMOUNT IN (f) ] per month?

YES ----- GO TO NEXT PAGE

NO ----- Go to (h)

NOT SURE ----- Go to (h)

(h) If you got all the water you needed from the domestic tap, what is  
the most you could pay per month?

Maximum amount per month ----- shillings

[Bidding Game with high starting point]

When the old Makonde water scheme was in operation in this village, people had to pay for their water by the bucket. People got water from domestic taps and paid the tap attendant the money which was used to purchase diesel and to pay for repair and maintenance of the water system.

Suppose government started a new system for collecting money and charged people by the bucket so that money could be available to buy enough diesel fuel for the pumping station all the time and let's suppose that there was an attendant at every domestic tap in the village who would collect that money and assume that water would be available continuously with strong pressure from early in the morning until night.

(a) Now, if the price of water per bucket were 3 shillings, would you buy water from the domestic tap?

YES / NO

NOT SURE

[ IF NO, GO TO (b) ]

[IF YES, ASK ...] How many buckets would you buy from the domestic tap per day ...

No. of buckets -----

(b) Now, if the price of water per bucket were 1 shilling, would you buy water from the domestic tap?

YES / NO

NOT SURE -----

[ IF NO, GO TO (c) ]

[IF YES, ASK ...] How many buckets would you buy from the domestic tap per day ...

No. of buckets -----

(c) Now, if the price of water per bucket were 0.50 shillings, would you buy water from the domestic tap?

YES / NO

NOT SURE -----

[ IF NO, GO TO (d) ]

[IF YES, ASK ...] How many buckets would you buy from the domestic tap per day ...

No. of buckets -----

(d) If you got all the water you needed from the \_\_\_\_\_ tap, the most you could pay per bucket?

Maximum price per bucket \_\_\_\_\_ shillings

[ IF THE RESPONDENT MENTIONS ANY PRICE, GO TO (e) ]

[ IF THE PRICE IS ZERO, ASK .... ]

What are the reasons you would not want to pay for water by the bucket even if the price were very low?

(Check appropriate response)

Cannot afford to pay anything \_\_\_\_\_

Satisfied with traditional source \_\_\_\_\_

It's the Government's responsibility to provide free water \_\_\_\_\_

Other (please specify) \_\_\_\_\_

[ IF THE PRICE GIVEN IN (d) IS ZERO, SKIP (e), (f), (g) and (h) ]

(e) If the price of water was \_\_\_\_\_ (use price of water in (d) above), how many buckets do you think your household would buy per day on average?

No. of buckets per day \_\_\_\_\_

[ENUMERATOR: TELL RESPONDENT THAT YOU ARE GOING TO CALCULATE HOW MUCH THAT WOULD COST PER MONTH]

(f) If the price of water was \_\_\_\_\_ (use price of water in (d) above), and your household bought \_\_\_\_\_ buckets per day, it would cost you \_\_\_\_\_ per day for water, or \_\_\_\_\_ shillings per month (multiply by 30).

In order to be able to pay for water, which expenses would you reduce?

Food \_\_\_\_\_  
Clothing \_\_\_\_\_  
Beer/Cigarettes \_\_\_\_\_  
Transportation \_\_\_\_\_  
School fees \_\_\_\_\_  
Other (Specify) \_\_\_\_\_

(g) Do you really think you can reduce the expenses \_\_\_\_\_  
[INDICATE EXPENSES MENTIONED IN (e)] so as to be able to pay  
\_\_\_\_\_ [ QUOTE AMOUNT IN (f) ] per month?

YES \_\_\_\_\_ GO TO NEXT PAGE

NO \_\_\_\_\_ Go to (h)

NOT SURE \_\_\_\_\_ Go to (h)

(h) If you got all the water you needed from the domestic tap, what is  
the most you could pay per month?

Maximum amount per month \_\_\_\_\_ shillings

[BIDDING GAME WITH LOW STARTING POINT]

Payment of a flat monthly rate to the village treasurer is one way of strengthening the water service to the village. The village treasurer would deposit the money into a special account which the water engineer would use to purchase diesel for providing reliable water supply services. This account would be safe, and the money would not be misused. For example, to withdraw money from this account would require the District Commissioner, the District Executive Director, and the District Water Engineer to authorize the withdrawal by signing the withdrawal certificate. They would ensure that the money withdrawn is used for water supply services. This step will help in strengthening the water supply service so that each household will be able to draw as much water as it wants.

There are 178 villages in the Kitangari Water Scheme, serving about 200,000 people. Each village would be told its fair share of the costs of the diesel fuel; the village would have to raise this amount from the households there.

(a) Suppose that the Resident Engineer and the District Council calculated that in order to provide reliable service with the existing domestic taps, that each household in all the villages served by the scheme would need to pay 25 shillings per month. Those households that didn't pay would not be allowed to use the domestic taps. Would you choose to pay 25 shillings per month, or would you choose to fetch water from your traditional sources?

YES - pay the flat fee of 25 TSh /mo ..... Go to (b)  
No - choose to fetch water  
    from traditional source ..... Go to (d)  
Not sure ..... Go to (d)

(b) Suppose instead of 25 shillings per month that the flat fee for each household was 50 shillings per month. Would you choose to pay 50 shillings per month, or would you choose to fetch water from your traditional sources?

YES - pay the flat fee of 50 TSh /mo ..... Go to (c)  
No - choose to fetch water  
    from traditional source ..... Go to (d)  
Not sure ..... Go to (d)

(c) If the flat fee for each household was 100 shillings per month, would you choose to pay this fee, or would you choose to fetch water from your traditional sources?

YES - pay the flat fee of 100 TSh /mo ..... Go to (d)  
No - choose to fetch water  
    from traditional source ..... Go to (d)  
Not sure ..... Go to (d)

Maximum monthly fee \_\_\_\_\_ shillings

[ IF THE RESPONDENT MENTIONS ANY AMOUNT, GO TO (e) ]

[ IF THE AMOUNT IS ZERO, ASK .... ]

What are the reasons you would not want to pay for reliable water even if the amount per month were very low?

(Check appropriate response)

Cannot afford to pay anything \_\_\_\_\_  
Satisfied with traditional source \_\_\_\_\_  
It's the Government's responsibility  
to provide free water \_\_\_\_\_  
Other (please specify) \_\_\_\_\_

[ IF THE AMOUNT GIVEN IN (d) IS ZERO, SKIP (e), (f), and (g) ]

(e) In order to be able to pay for water, which expenses would you reduce?

Food \_\_\_\_\_  
Clothing \_\_\_\_\_  
Beer/Cigarettes \_\_\_\_\_  
Transportation \_\_\_\_\_  
School fees \_\_\_\_\_  
Other (Specify) \_\_\_\_\_

[CHECK THE AMOUNT IN (d) AND THEN ASK ... ]

(f) Do you really think you can reduce the expenses \_\_\_\_\_  
[INDICATE EXPENSES MENTIONED IN (e)] so as to be able to pay  
\_\_\_\_\_ [ QUOTE AMOUNT IN (d) ] per month?

YES \_\_\_\_\_ GO TO NEXT PAGE

NO \_\_\_\_\_ Go to (g)

NOT SURE \_\_\_\_\_ Go to (g)

(g) What is the maximum amount you think your household is able to pay per month without problems?

Maximum amount per month \_\_\_\_\_ shillings

Financing Alternative No. 2: Flat Rate for Each Household

[BIDDING GAME WITH HIGH STARTING POINT]

Payment of a flat monthly rate to the village treasurer is one way of strengthening the water service to the village. The village treasurer would deposit the money into a special account which the water engineer would use to purchase diesel for providing reliable water supply services. This account would be safe, and the money would not be misused. For example, to withdraw money from this account would require the District Commissioner, the District Executive Director, and the District Water Engineer to authorize the withdrawal by signing the withdrawal certificate. They would ensure that the money withdrawn is used for water supply services. This step will help in strengthening the water supply service so that each household will be able to draw as much water as it wants.

There are 178 villages in the Kitangari Water Scheme, serving about 200,000 people. Each village would be told its fair share of the costs of the diesel fuel; the village would have to raise this amount from the households there.

(a) Suppose that the Resident Engineer and the District Council calculated that in order to provide reliable service with the existing domestic taps, that each household in all the villages served by the scheme would need to pay 100 shillings per month. Those households that didn't pay would not be allowed to use the domestic taps. Would you choose to pay 100 shillings per month, or would you choose to fetch water from your traditional sources?

YES - pay the flat fee of 100 TSh /mo	.....	Go to (d)
No - choose to fetch water from traditional source	.....	Go to (b)
Not sure	.....	Go to (b)

(b) Suppose instead of 100 shillings per month that the flat fee for each household was 50 shillings per month. Would you choose to pay 50 shillings per month, or would you choose to fetch water from your traditional sources?

YES - pay the flat fee of 50 TSh /mo	.....	Go to (d)
No - choose to fetch water from traditional source	.....	Go to (c)
Not sure	.....	Go to (c)

(c) If the flat fee for each household was 25 shillings per month, would you choose to pay this fee, or would you choose to fetch water from your traditional sources?

YES - pay the flat fee of 25 TSh /mo	.....	Go to (d)
No - choose to fetch water from traditional source	.....	Go to (d)
Not sure	.....	Go to (d)

(d) What is the most your household could afford to pay per month?

Maximum monthly fee \_\_\_\_\_ shillings

[ IF THE RESPONDENT MENTIONS ANY AMOUNT, GO TO (e) ]

[ IF THE AMOUNT IS ZERO, ASK .... ]

What are the reasons you would not want to pay for reliable water even if the amount per month were very low?

(Check appropriate response)

- Cannot afford to pay anything \_\_\_\_\_
- Satisfied with traditional source \_\_\_\_\_
- It's the Government's responsibility to provide free water \_\_\_\_\_
- Other (please specify) \_\_\_\_\_

[ IF THE AMOUNT GIVEN IN (d) IS ZERO, SKIP (e), (f), and (g) ]

(e) In order to be able to pay for water, which expenses would you reduce?

- Food \_\_\_\_\_
- Clothing \_\_\_\_\_
- Beer/Cigarettes \_\_\_\_\_
- Transportation \_\_\_\_\_
- School fees \_\_\_\_\_
- Other (Specify) \_\_\_\_\_

[CHECK THE AMOUNT IN (d) AND THEN ASK ... ]

(f) Do you really think you can reduce the expenses \_\_\_\_\_ [INDICATE EXPENSES MENTIONED IN (e)] so as to be able to pay \_\_\_\_\_ [ QUOTE AMOUNT IN (d) ] per month?.

- YES \_\_\_\_\_ GO TO NEXT PAGE
- NO \_\_\_\_\_ Go to (g)
- NOT SURE \_\_\_\_\_ Go to (g)

(g) What is the maximum amount you think your household is able to pay per month without problems?

Maximum amount per month \_\_\_\_\_ shillings

Education Level

29. Can you read a newspaper? YES / NO

[IF YES, ASK ...]

Can you read it ... Easily -----

With Some Difficulty -----

30. Have you ever been to school? YES / NO

[ IF NO, GO TO QUESTION 32 ]

31. What level have you completed? (Check appropriate level)

Standard 1-4 -----

Standard 5-7 -----

Secondary form 1-4 -----

Secondary form 5-6 -----

University -----

Other (specify) -----

32. Have you attended adult education classes? YES / NO

33. Are you married? YES / NO

[ IF NO, GO TO QUESTION 38 ]

34. Can your husband/wife read a newspaper? YES / NO

[IF YES, ASK ...]

Can he/she read it ... Easily -----

With Some Difficulty -----

35. Has your husband/wife ever been to school? YES / NO

IF NO, GO TO QUESTION 37

Standard 1-4 -----  
 Standard 5-7 -----  
 Secondary form 1-4 -----  
 Secondary form 5-6 -----  
 University -----  
 Other (specify) -----

37. Has he /she attended adult education classes? YES / NO

Household Assets

[ STARTING QUESTION 38-39, FOR THOSE ITEMS BELONGING TO THE HOUSEHOLD, INDICATE BY CHECKING THE APPROPRIATE SPACE]

38. Does this household own any of the following items? (CHECK IF YES)

Hurricane lamp -----

Bicycle -----

Radio -----

39. How many goats does this household own? No. of goats -----

Occupation

40 . Is the head of household a farmer? YES / NO

41. What is the roof of the house made of?

Grass thatch / Corrugated Iron

42. What type of floor does the house have?

Mud \_\_\_\_\_  
Cement \_\_\_\_\_  
No Floor \_\_\_\_\_

43. What are the walls constructed of?

Mud with sticks/no plaster \_\_\_\_\_  
Mud with sticks/mud plaster \_\_\_\_\_  
Mud with sticks/cement plaster \_\_\_\_\_  
Mud bricks/no plaster \_\_\_\_\_  
Mud bricks/mud plaster \_\_\_\_\_  
Mud bricks/cement plaster \_\_\_\_\_  
Mud bricks/cement plaster/  
whitewashed \_\_\_\_\_

44. How many windows does the house have?

No. of windows \_\_\_\_\_

45. Does the door of the house have a lock? YES / NO

46. Does the house have a wooden door? YES / NO

47. Some people are of the opinion that villages should be responsible for meeting the costs of operation and maintenance of their water system. Do you agree or disagree with that opinion?

AGREE -----

DISAGREE -----

UNDECIDED -----

48. Some people believe that it is the responsibility of the government alone to provide water free to every citizen of this country. Do you agree or disagree or disagree with this stand?

AGREE -----

DISAGREE -----

UNDECIDED -----

49. Due to the current government efforts of providing water to villages, some people expect that in 10 years time, every resident of Tanzania will have access to reliable sources of water, and this will be to every village of this country. Do you agree or disagree with this line of thought?

AGREE -----

DISAGREE -----

UNDECIDED -----

For the Enumerator Only

50. Was the person who responded to the questions irritated or nervous?

YES / NO

51. Do you think he/she made an effort to tell the truth? YES / NO

52. How would you rate the overall quality of this interview?

GOOD / FAIR / POOR

DO YOU HAVE ANY COMMENTS YOU WOULD LIKE TO MAKE ABOUT THE RESPONDENT'S ANSWERS TO THIS QUESTIONNAIRE? IF SO, PLEASE RECORD THEM BELOW.

Arrangements

[ENUMERATOR: READ CAREFULLY]

Now, I would like you to express your views regarding the arrangements which you think would be suitable in collecting funds for running and maintaining the water system. I will explain three alternatives which could be used. In all three alternatives the village will be involved in collecting funds and in starting the accounts, which will be managed by the village itself.

For the first alternative, every month the District Council will collect the money which will have been contributed by the village in that period. The District Executive Director, together with the District Water Engineer, will be involved in the purchase of diesel and spare parts.

The second alternative will involve the formation of a new Kitangari Water Board. All the villages will have a representative to that Board. The Board will carry out its activities as was the case with the old Makonde Water Supply System 30 years ago. The new Board would collect a water levy from all the villages participating in the water scheme every month, and the Board would be involved directly in the purchase of diesel and spare parts for the water system.

The third alternative would involve the central government in collecting the water payments every month. The District Water Engineer would in this case be involved in collecting the funds and in purchasing diesel and spare parts.

53. Now, do you believe that if the village government collects the water levy, it will submit the funds so collected to the organs responsible for the operation of the system without the money collected being lost?

YES / NO

54. Are you in favor of the District Council being involved in receiving the payments for water from the villages and in purchasing diesel and spare parts for the water system?

YES / NO

55. Would you have faith in a new Kitangari Water Board which would be responsible for operating the water system and in collecting a water levy such as was done thirty years ago?

YES / NO

56. Would you be satisfied with a system whereby the office of the resident water engineer on behalf of the central government would be involved in collecting payments for water and in strengthening water supply services?

YES / NO

57. Which alternative would you prefer most?

Option 1    -----  
Option 2    -----  
Option 3    -----

**Appendix B**

**EXAMPLES OF WATER VENDING QUESTIONNAIRES  
(ONITSHA, NIGERIA)**

1. Questionnaire for Managers/Attendants of Boreholes
2. Water Vendor Questionnaire (Tanker Trucks)
3. Questionnaire for Small Retailer
4. Questionnaire for Distributing Vendor
5. Log Sheet for Enumerators Riding in Tanker Truck

QUESTIONNAIRE FOR MANAGERS/ATTENDANTS OF BOREHOLES

Name of Enumerator:

Date: Borehole ID NO. \_\_\_\_\_

Onitsha

1. In what part of Onitsha is this borehole located?

Fege	Niger Approach Layout
G.R.A.	Omaguba I
American Quarters	Awanda Layout
Inland Town	Woliwo
Industrial Layout	Otu
Omagba II	Odoakpu
Okpoko	Other _____

2. How many boreholes do you have here which serve tanker trucks?

3. What are your hours of operation? (i.e., when are you open for business)

From: \_\_\_\_\_ a.m. To: \_\_\_\_\_ p.m.

4. Which days of the week are you open for operation?

\_\_\_\_\_

5. How deep is this borehole(s)? \_\_\_\_\_ meters/feet

6. When was this borehole constructed (installed)? Year: \_\_\_\_\_

7. How much did it cost to construct this borehole, including the pump and equipment? \_\_\_\_\_ N

8. Do you know how much it would cost today? \_\_\_\_\_ N

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9. Does this borehole have sufficient quantities of water throughout the year? YES / NO

10. What price do you charge tanker trucks for water...

	in the rainy season?	in the dry season?
for 1000 gallons	_____ N	_____ N
for 1500 gallons	_____ N	_____ N
for 2000 gallons	_____ N	_____ N

11. What price do you charge individuals per 5 gallon bucket...

in the rainy season? \_\_\_\_\_ N  
in the dry season? \_\_\_\_\_ N  
not applicable

12. On average, how many tanker trucks do you fill per day...

in the rainy season? \_\_\_\_\_  
in the dry season? \_\_\_\_\_

13. On average, what are your daily sales (revenue)...

	to tanker trucks	to individuals
in the rainy season?	_____ N	_____ N
in the dry season?	_____ N	_____ N

14. On average, how much does the electricity cost per month to run this borehole? \_\_\_\_\_ N

15. On average, how much is spent each month on the repair and maintenance of this borehole(s) and pumping equipment? \_\_\_\_\_ N

16. Is this a privately-owned borehole or is it owned by the Anambra Water Supply Corporation? PRIVATE / AWSC

If private, what is the owner's (or company's) name?

\_\_\_\_\_

17. What is the monthly wage of the borehole manager (attendant).

\_\_\_\_\_ N

WATER VENDOR QUESTIONNAIRE (Tanker Trucks)

Name of Enumerator:

Date:

Onitsha

Truck

1. Make and Year:
2. How much water can this truck carry? \_\_\_\_\_  
(i.e., How much water does the tank hold?)
3. Is this truck used only for hauling water? YES / NO  
If NO, what other purposes is this truck used for?
4. How many kilometers are on the truck's odometer? \_\_\_\_\_
5. If this truck were sold on the market today for a fair price, how much do you think it would be worth? \_\_\_\_\_

Water

6. Where do you usually get the water that you sell?  
(Circle appropriate answer)

In the rainy season:

Private borehole

Public borehole

City water system

River or stream

Other

In the dry season:

Private borehole

Public borehole

City water system

River or stream

Other

7. In what area of Onitsha do you usually buy water?

Fege	Niger Approach Layout	Otu
G.R.A	Omaguba I	Omagba II
American Q.	Awada Layout	Odoakpu
Inland Town	Woliwo	Okpoko
Industrial Layout		

8. In what area of Onitsha do you usually sell water?

Fege	Niger Approach Layout	Otu
G.R.A.	Omaguba I	Omagba II
American Q.	Awada Layout	Odoakpu
Inland Town	Woliwo	Okpoko
Industrial Layout		

9. How much does it cost to fill your tank...

at a public borehole? \_\_\_\_\_ N (rainy season)

at a private borehole? \_\_\_\_\_ N (rainy season)

at a public borehole in the dry season? \_\_\_\_\_ N

at a private borehole in the dry season? \_\_\_\_\_ N

10. How many tank loads of water does this truck sell on average per day...

in the rainy season? \_\_\_\_\_

in the dry season? \_\_\_\_\_

11. How many days per week does this truck sell water...

in the rainy season? \_\_\_\_\_

in the dry season? \_\_\_\_\_

Repairs

12. How much does it cost per month on average for repairs and maintenance for this truck (excluding tires)? \_\_\_\_\_ N

Tires

13. How many tires are on this truck? \_\_\_\_\_

14. Do you use new, used, or recap tires on this truck? New / Used / Recap

15. How much does a new tire for this truck cost? \_\_\_\_\_ N

" " " " used " " " " ? \_\_\_\_\_ N

" " " " recap " " " " ? \_\_\_\_\_ N

16. How many months does a set of tires last, on average? \_\_\_\_\_

Salaries

17. Are you the owner of this truck? YES / NO

If NO, who is the owner? \_\_\_\_\_

Does the owner ever work on the truck selling water? YES / NO

18. How many people usually work on the truck...

in the rainy season? One / Two

in the dry season? One / Two

19. What is the total salary paid per day to all the workers on this truck?

in the rainy season? \_\_\_\_\_ N

in the dry season? \_\_\_\_\_ N

20. How many hours per day do you work selling water...

in the rainy season? \_\_\_\_\_

in the dry season? \_\_\_\_\_

21. How many months in a year do you work selling water? \_\_\_\_\_

Which months do you not sell water (if any)? \_\_\_\_\_

Distance

22. What is the total distance (i.e., number of kilometers) this truck travels each day on average selling water...

in the rainy season? \_\_\_\_\_ kilometers

in the dry season? \_\_\_\_\_ kilometers

Customers

23. What prices do you charge your customers for water?

per drum \_\_\_\_\_

per 500 gallons \_\_\_\_\_

per 1000 gallons \_\_\_\_\_

24. Do other water vendors charge the same prices as you?

YES / NO / DON'T KNOW

25. What is the total value of the water you sell per day on average? (i.e., your average daily sales or revenues)

in the rainy season? \_\_\_\_\_ N

in the dry season? \_\_\_\_\_ N

26. How many regular customers do you have? \_\_\_\_\_

27. How much water does your average household customer buy per week?  
\_\_\_\_\_ gallons

For Enumerator Only (Do Not Ask Vendor; Just Observe)

28. What is the condition of this truck? Excellent / Good / Fair / Poor

29. Length of truck? \_\_\_\_\_ meters  
Width of truck? \_\_\_\_\_ meters

30. How much water does the tank of this truck hold? \_\_\_\_\_ gallons

31. What is the condition of the tires? Excellent / Good / Fair / Poor

QUESTIONNAIRE FOR SMALL RETAILER

(Sells from Storage Tank)

Name of Enumerator:

Date:

Area of Onitsha:

QUESTIONNAIRE FOR SMALL RETAILER

(Sells from Storage Tank)

1. What times of day do you sell water? \_\_\_\_\_ a.m. \_\_\_\_\_ p.m.
2. What days of the week do you sell water? \_\_\_\_\_
3. Where do you obtain the water you sell from your storage tank?

In the rainy season

Tanker truck

Shallow well

City water system

Other \_\_\_\_\_

In the dry season

Tanker truck

Shallow well

City water system

Other \_\_\_\_\_

4. What price do you charge for water...

in the rainy season? \_\_\_\_\_ N

in the dry season? \_\_\_\_\_ N

5. On average, how many customers purchase water from you each day...

in the rainy season? \_\_\_\_\_

in the dry season? \_\_\_\_\_

6. How much water does an average customer buy from you when she comes to purchase water? \_\_\_\_\_ gallons

7. On average, how much water do you sell per week...

during the rainy season? \_\_\_\_\_ gallons

during the dry season? \_\_\_\_\_ gallons

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8. On average, how much of this water is sold to vendors who resell the water to households...

during the rainy season? \_\_\_\_\_ gallons

during the dry season? \_\_\_\_\_ gallons

9. On average, how much water do you purchase from tanker trucks per week...

during the rainy season? \_\_\_\_\_ gallons

during the dry season? \_\_\_\_\_ gallons

10. How much of the water that you buy from tanker trucks do you think your household consumes for its personal uses? (each week)

during the rainy season? \_\_\_\_\_ gallons

during the dry season? \_\_\_\_\_ gallons

11. How many gallons does your storage tank hold?

12. If you had to buy a new storage tank today this size, how much do you think it would cost? \_\_\_\_\_ N

13. How much does a tanker truck usually charge to fill your storage tank...

in the rainy season? \_\_\_\_\_ N

in the dry season? \_\_\_\_\_ N

QUESTIONNAIRE FROM DISTRIBUTING VENDOR

(Man with 2 buckets on a stick or with bicycle carrying jerricans)

Name of Emunerator:

Date:

Onitsha - Region of Interview:

QUESTIONNAIRE FOR DISTRIBUTING VENDOR

(Man with 2 buckets on a stick or with bicycle carrying jerricans)

1. Where do you usually get the water that you sell?

In the rainy season

Private (commercial) borehole

Public borehole

Shallow well

City water system

Small water retailer

(with storage tank)

River or stream

Other

In the dry season

Private (commercial) borehole

Public borehole

Shallow well

City water system

Small water retailer

(with storage tank)

River or stream

Other

2. In what area of Onitsha do you usually sell water?

Fege

G.R.A.

American Quarters

Inland Town

Industrial Layout

Omagba II

Okpoko

Niger Approach Layout

Omagba I

Awanda Layout

Woliwo

Otu

Odoakpu

Other \_\_\_\_\_

3. How many days a week do you usually sell water...

in the rainy season? \_\_\_\_\_

in the dry season? \_\_\_\_\_

4. How many months a year do you work selling water? \_\_\_\_\_

5. How long have you been selling water? \_\_\_\_\_ years

6. Do you have another job? YES / NO

If YES, explain:

7. How many gallons do you usually carry when you have a full load?  
\_\_\_\_\_ gallons

8. (Fill in the table below by asking the water vendor about an average business day)

In the rainy season

average number of loads per day? \_\_\_\_\_

no. of jerricans (buckets) per load? \_\_\_\_\_

no. of hours worked per day? \_\_\_\_\_

In the dry season

average number of loads per day? \_\_\_\_\_

no. of jerricans (buckets) per load? \_\_\_\_\_

no. of hours worked per day? \_\_\_\_\_

9. On average, how much do you charge per 4-gallon bucket (jerrican)...

in the rainy season? \_\_\_\_\_

in the dry season? \_\_\_\_\_

10. What is the total value of the water you sell per day (i.e., your total daily revenues or sales) on average...

in the rainy season? \_\_\_\_\_ N

in the dry season? \_\_\_\_\_ N

11. Do you have any regular customers? YES / NO

If YES, how many? \_\_\_\_\_

On average, how many 4-gallon jerricans does a regular household customer purchase per week...

in the rainy season? \_\_\_\_\_

in the dry season? \_\_\_\_\_

12. How much do you have to pay to fill a 4-gallon jerrican...

in the rainy season? \_\_\_\_\_

in the dry season? \_\_\_\_\_

13. Do other water vendors charge the same price as you?

YES / NO / DO NOT KNOW

14. What is your age? \_\_\_\_\_ years

15. What was your occupation before you became a water vendor?

\_\_\_\_\_

